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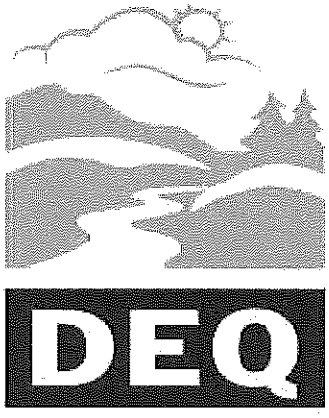
OREGON
ENVIRONMENTAL QUALITY
COMMISSION MEETING
MATERIALS 01/09/1998



State of Oregon
Department of Environmental Quality

Revised A G E N D A

ENVIRONMENTAL QUALITY COMMISSION MEETING

January 9, 1998
DEQ Conference Room 3A
811 S. W. Sixth Avenue
Portland, Oregon

Notes: Because of the uncertain length of time needed for each agenda item, the Commission may deal with any item at any time in the meeting. If a specific time is indicated for an agenda item, an effort will be made to consider that item as close to that time as possible. However, scheduled times may be modified if agreeable with participants. Anyone wishing to listen to the discussion on any item should arrive at the beginning of the meeting to avoid missing the item of interest.

Public Forum: The Commission will break the meeting at approximately **11:30 a.m.** for the Public Forum if there are people signed up to speak. The Public Forum is an opportunity for citizens to speak to the Commission on environmental issues and concerns not a part of the agenda for this meeting. The public comment period has already closed for the Rule Adoption items and, in accordance with ORS 183.335(13), no comments can be presented to the Commission on those agenda items. Individual presentations will be limited to 5 minutes. The Commission may discontinue this forum after a reasonable time if an exceptionally large number of speakers wish to appear.

Work Session and Meeting will begin at 9:00 a.m.

WORK SESSION: Pollution Control Facility and Plastics Recycling Tax Credit Rules

A. **Approval of Minutes**

B. **Action Item**: Reconsideration of the Petition by JELD-WEN, INC for Declaratory Ruling Concerning Availability of Sewer as Defined in OAR 340-71-160(5)9f)

C. **Action Item**: Umatilla Chemical Depot Permit Modification

D. **Informational Item**: Report from Fish and Wildlife Regarding Total Dissolved Gas

E. **Action Item:** Petition for Rulemaking to Designation 10 Waterbodies as "Outstanding Resource Waters" under OAR 340-41-026

F. **Approval of Tax Credits**

G. **Commissioners' Report**

H. **Director's Report**

Hearings have already been held on the Rule Adoption items and the public comment period has closed. In accordance with ORS 183.335(13), no comments can be presented by any party to either the Commission or the Department on these items at any time during this meeting.

The Commission will have lunch at 12:00 noon. . No Commission business will be discussed.

The Commission has set aside February 19-20, 1998, for their next meeting. It will be held at DEQ headquarters in Portland, Oregon.

Copies of staff reports for individual agenda items are available by contacting the Director's Office of the Department of Environmental Quality, 811 S. W. Sixth Avenue, Portland, Oregon 97204, telephone 229-5301, or toll-free 1-800-452-4011. Please specify the agenda item letter when requesting.

If special physical, language or other accommodations are needed for this meeting, please advise the Director's Office, (503)229-5301 (voice)/(503)229-6993 (TTY) as soon as possible but at least 48 hours in advance of the meeting.

January 5, 1998

Pollution Control Facility Tax Credit Rules
Chapter 340 Division 16
EQC Work Session
January 9, 1998

Accounting Review

	Current Rule	Proposed Rule
No independent CPA review required.	<= $20,000	<= $50,000
Applicant required to submit independent CPA review with the application. Applicant pays their CPA firm for this review.	Between $20,000 and $250,000	Between $50,000 and $500,000
Department selects and pays for the independent accounting review.	=> $250,000	=> $500,000
Applicant may be asked to reimburse the Department for a second accounting review to be performed by a firm selected by the Department.	=> $250,000	Eliminated
Waiver from independent CPA review available.	No	Yes

Fee Schedules

	Current/Actual	Proposed Rule	No Limits
Minimum	$50	$50	$11*
Maximum	$5,050	$15,000	$328,000*
Refund	100% of processing fee	50% of fee paid	50% of fee paid
Preliminary Fee	1995 legislation	½ of 1% of estimated facility cost.	½ of 1% of estimated facility cost.
Final Filing Fee	$50	Eliminated	Eliminated
Final Processing Fee	½ of 1% of facility cost	1% of facility cost minus any preliminary fee paid.	1% of facility cost
Fee Surplus (Deficit)	($395,461)	$55,359*	$1,400,804*

* As applied to applications received during study period 6/30/93 to 7/1/96.

Impacts of ROI and Integral Facility Rules—Examples

Assumptions: 1) Eligible cost of each facility is $1,000,000 2) Each has a 10 year useful life 3) Each business operates at profit margins near the national average.

Example Facility	Integral ?	Annual Facility Income	Percent Allocable	Tax Credit	Present Facility Value	Notes
Examples Addressing ROI						
Stack Scrubber	No	-0-	100%	$500,000	$391,782	Industrial control is required by law, but it returns no income
Pre-treatment system	No	$50,000	100%	$500,000	$783,548	Some required facilities return income to the owner
		$100,000	100%	$500,000	$1,175,322	This is the point at which the facility returns its full cost
		$110,000	62%	$310,000	$916,006	
		$127,625	0%	-0-	1,000,000	A normally profitable investment based on national average
Examples Addressing The Integral Facility Rule						
Solid Waste Landfill Liner	Yes	$50,000	0%	-0-	$391,774	ROI Calculation considers only the profitability of the overall business
Recycling collection bins applicant is a recycler	Yes	$100,000	0%	-0-	$783,548	
Recycling collection bins applicant is a garbage hauler	No	$100,000	100%	$500,000	$1,175,322	Since the primary line of business is not recycling, the ROI calculation treats the facility separately

Approved_____
Approved with Corrections____

Minutes are not final until approved by the EQC

Environmental Quality Commission
Minutes of the Two Hundred and Sixth-Fifth Meeting

December 30, 1997
Regular Meeting

The Environmental Quality Commission regular meeting was convened at 12:15 p.m. on Tuesday, December 30, 1997, at the Department of Environmental Headquarters, 811 SW Sixth, Portland, Oregon. The following members were present by phone:

Henry Lorenzen, Chair
Carol Whipple, Vice-Chair
Linda McMahan, Member
Melinda Eden, Member
Tony Van Vliet, Member

Also present were Larry Knudsen, Assistant Attorney General, Oregon Department of Justice; Langdon Marsh, Director, Department of Environmental Quality; and other staff.

Note: Staff reports presented at this meeting, which contain the Department's recommendations, are on file in the Office of the Director, 811 SW Sixth Avenue, Portland, Oregon 97204. Written material submitted at this meeting is made a part of the record and is on file at the above address. These written materials are incorporated in the minutes of the meeting by reference.

A. Approval of Tax Credits

The Commission approved staffs request to remove tax credit application number 4764 from consideration at this time.

4764 Willamette Industries, Inc.	New broom sweeper & Dewalt dump bin.	$22,292	100%

A motion was made by Vice-Chair Whipple to approve the following tax credits. The motion was seconded by Commissioner McMahan and approved by five "yes" votes.

Pollution Prevention Pilot Program

App. #	Applicant	Description of Facility	Certified Cost	Percent Allocable	Certificate Value
	Perc				
4654	Jonie Anderson/dba Rogue Cleaners	New drycleaning machine using Exxon 2000 solvent.	$42,596	NA	$ 42,596
	1	**Perc**	**$42,596**		**$42,596**

Pollution Control Facilities Tax Credit

App. #	Applicant	Description of Facility	Certified Cost	Percent Allocable	Certificate Value
	Air				
4731	LTM, Inc.	One pulse jet baghouse with a built-in horizontal cyclone collector manufactured by Astec Industries.	*$287,597*	100%	$ 143,799
4849	Roseburg Forest Products Co.	Western Pneumatics #200 Primary Filter Baghouse as an addition to the existing cyclone systems at Ply #1.	$38,380	100%	$ 19,190
4852	Roseburg Forest Products Co.	Two Carter-Day RJ144 bag houses.	$57,155	100%	$ 28,578
	3	**Air**	**$383,132**		**$191,566**
	Noise				
4812	Northwest Pipeline, Corp.	An indirect heater with a low noise burner, acoustical blankets installed over the 4-inch above ground pipes to lower noise.	$8,173	100%	$ 4,087
4815	Integrated Device Technology (IDT)	A concrete tilt up building enclosure.	$110,000	100%	$ 55,000
	2	**Noise**	**$118,173**		**$59,087**

App. #	Applicant	Description of Facility	Certified Cost	Percent Allocable	Certificate Value
	Field Burning				
4870	Cersovski Farms	One, x 22' x 100' x 180', steel, straw storage building.	$142,041	100%	$ 71,021
4877	George G. Langdon	One 75' X 100' X 18' steel, straw storage building with concrete floor.	$153,060	100%	$ 76,530
4889	Carl Neuschwander	A 24' x 124' x 180' pole constructed Straw Storage Shed.	$119,079	100%	$ 59,540
	3	**Field Burning**	**$414,180**		**$207,090**
	Water				
4716	Intel Corporation	Wastewater reuse/recycling system: 1 containment structure, one 300-gal reinforced fiberglass subfab collection tank, one 5,000 gal. reinforced fiberglass waste storage tank, waste transfer & sump pumps, electrical controls & plumbing.	*$340,610*	100%	$ 170,305
4742	Danny Dave Farm	A CAFO waste facility including sump pump, pit agitator, inverter, separator, PTO and traveler.	$47,248	100%	$ 23,624
4859	Alberta Body & Paint	One, Standard American Petroleum Institute, 650 gallon water/oil separator tank.	$5,593	100%	$ 2,797
	3	**Water**	**$393,451**		**$196,726**
	USTs				
4820	Cain Petroleum, Inc.	One doublewall flexible plastic piping, overfill alarm, sumps and Stage II recovery equipment.	$44,653	100%	$ 22,327
4851	Westmart Foodstores, Inc.	Epoxy lining in three underground storage tanks, doublewall flexible plastic piping, spill containment basins, automatic tank gauge system, overfill alarm, line leak detectors, automatic shutoff valves and Stage II vapor recovery piping.	$67,158	99%	$ 33,243
4855	Krista Cody LTD. dba/Astoria Mini Mart	Line leak detectors, automatic tank gauge system and an overfill alarm.	$15,922	100%	$ 7,961
4866	Cain Petroleum, Inc.	One 2 compartment STi-P3 tank and one doublewall fiberglass clad steel tank, doublewall flexible plastic piping, spill containment basins, automatic tank gauge system, overfill alarm, sumps, oil/water separators and Stage II recovery equip.	$185,123	91%	$ 84,231

App. #	Applicant	Description of Facility	Certified Cost	Percent Allocable	Certificate Value
4866	Cain Petroleum, Inc.	One 2 compartment STi-P3 tank and one doublewall fiberglass clad steel tank, doublewall flexible plastic piping, spill containment basins, automatic tank gauge system, overfill alarm, sumps, oil/water separators and Stage II recovery equip.	$185,123	91%	$ 84,231
4868	Truax Harris Energy Co., LLC	One oil/water separator.	$22,823	100%	$ 11,412
4869	Truax Harris Energy Co., LLC	Stage II vapor recovery equipment.	$140,251	93%	$ 65,217
4874	Barry J. Desbiens	Turbine leak detectors and Stage I & II vapor recovery equipment.	$21,840	100%	$ 10,920
4875	Barry J. Desbiens	Automatic tank gauge system and Stage I and II vapor recovery equipment.	$22,331	100%	$ 11,166
4876	Loon Lake Lodge Resort	2 doublewall aboveground storage tanks, doublewall flexible plastic piping, spill containment basins, line leak detectectors, sumps and automatic shutoff valves.	$23,347	100%	$ 11,674
4888	Grass Valley Station	One singlewall fiberglass tank & piping system & one double wall fiberglass-clad steel tank and flexible plastic piping, spill containment basins, automatic tank gauge system, overfill alarm, line leak detectors, auto shutoff valve & sumps.	$66,087	94%	$ 31,061
	11	**USTs**	**$794,658**		**$373,441**
	22	**Pollution Control**	**$1,689,417**		**$820,822**
	23	**All Tax Credits**	**$1,732,013**		**$863,418**

A motion was made by Commission Eden to deny the following tax credits. It was seconded by Commissioner Van Vliet and carried with four "yes" votes. Chair Lorenzen was not present for this portion of the meeting.

App. #	Applicant	Description of Facility	Claimed Cost	Claimed Percent	Certificate Value
4528	Willamette Industries, Inc.	Clark PNUE Air Bagfilter	$97,507	100%	
4858	Alberta Body & Paint	Robinair series 1234A recovery, recycling and recharging unit for R-12 & R-134a.	$3,500	100%	
4861	Portland General Electric Company	Replacement of PCB filled substation capacitors with non-PCB filled capacitors.	$19,856	100%	
	3		**$120,863**		**$ -**

After discussion, Commissioner Van Vliet made a motion to approve tax credit number 4814. Commissioner McMahan seconded the motion and it was carried with five "yes" votes.

4814	Integrated Device Technology (IDT)	Exhaust scrubbers consist of 4 Harrington HPCA914-5LB 60,000 CFM Horizontal cross-flow packed wet scrubbers with 4 Harrington HPCA-5425 fans, 100 HP motors and 6 gusher PCL-4x6-10SE 7071M-b recirculating pumps.	*$419,217*	100%	$ 209,609

There was a discussion concerning how "salable commodities" are used. The discussion was not specific to tax credit application number 4814. The Department explained this is one of the five considerations used to determine the percentage of the facility cost allocable to pollution control. It is only used in determining the average annual cash flow as part of the return on investment calculation. Applicants generally show estimated income from salable commodities as more than offset by the estimated expenditures.

The applicant can take the tax credit over a longer period than the depreciation period. There are changes with the new rule package and the certificate under development that will more clearly define the useful life of the facility. Depreciation is the value of the tax credit or any potential penalties that could have been assessed if the applicant chose not to comply with regulations are not considered in determining the return on investment in a facility.

Larry Knudsen will provide information regarding the advisability of the Department considering penalty avoidance in the ROI consideration. Though the Department of Revenue is administratively responsible for the tax credit once it has been certified, Larry will research DEQ's ability to restrict the period the certificate holder can take the tax credit to the depreciation period.

The Commission postponed the certification of tax credit number 4890 and 4891 until January 9, 1998.

The Commission asked staff to provide vehicle identification numbers for the tractors and serial numbers for the implements presented in tax credit application number 4890 and 4891. Additionally they asked for a description of the relationship between the two applications and applicants; a verification of that the plow and flailer were both needed on the entire 1000 acres to be removed from field burning.

4890	Dean McKay Farms, Inc.	New Farm equipment, 8870 John Deere Tractor, John Deere 995 HC 8 Bottom Plow, 4430 Ford Tractor, Two 515 Holland Baler, 14' rear Flail & 15' rear Flail.	$249,836	96%	$ 119,921
4891	Mark McKay Farms, Inc.	New Farm Equipment, 8400 John Deere Tractor, John Deere Chisel Plow, 4430 Ford Tractor, Allen Rakes, 585 Holland Baler, 1095 Holland Stacker.	$248,496	100%	$ 124,248

There being no further business the meeting was adjourned at 12:50 p.m.

Approved_____
Approved with Corrections__X_

Minutes are not final until approved by the EQC

Environmental Quality Commission
Minutes of the Two Hundred and Sixth-Fourth Meeting

November 21, 1997
Regular Meeting

The Environmental Quality Commission regular meeting was convened at 9:00 a.m. on Friday, November 21, 1997, at the Department of Environmental Headquarters, 811 SW Sixth, Portland, Oregon. The following members were present:

Henry Lorenzen, Chair
Carol Whipple, Vice-Chair
Linda McMahan, Member
Melinda Eden, Member
Tony Van Vliet, Member

Also present were Larry Knudsen, Assistant Attorney General, Oregon Department of Justice; Langdon Marsh, Director, Department of Environmental Quality; and other staff.

Note: Staff reports presented at this meeting, which contain the Department's recommendations, are on file in the Office of the Director, 811 SW Sixth Avenue, Portland, Oregon 97204. Written material submitted at this meeting is made a part of the record and is on file at the above address. These written materials are incorporated in the minutes of the meeting by reference.

A. Approval of Minutes

The minutes of the August 22, 1997 regular meeting were reviewed. Commissioner Van Vliet moved that the minutes be approved as written. Vice Chair Whipple seconded the motion. The motion was carried by five "yes" votes.

B. Approval of Tax Credits

Willamette Industries requested that their tax credits presented for denial and rejection be removed from Agenda Item B until a future Environmental Quality Commission. Tax credit applications number 4528, 4764, 4570 were removed from the Agenda.

It was moved by Vice-Chair Whipple to approve forty tax credit applications for certification as presented for approval in Agenda item B reserving tax credit number 4847 for discussion as requested by the applicant. The motion was seconded by Commissioner McMahan and carried with five "yes" votes.

Discussion Tax Credit Number 4847: Marshall's Oil and Insulating Co. included a forklift that was for other purposes other than for the exclusive use with the facility claimed in tax credit application number 4847. The inclusion of the forklift would have made the entire facility ineligible for a tax credit since a sole purpose facility must be used "exclusively" for pollution control. The applicant was unable to attend the EQC meeting and asked Bill Bree to bring the discussion before the Commission. The applicant asked the Commission to reconsider the Department's recommendation and include the portion of the forklift used in the operation of the claimed facility.

After a discussion citing definitions of "sole purpose" in Oregon Revised Statute 468.155(1)(a) and Oregon Administrative Rule 340-016-0010 (9), it was moved by Vice-Chair Whipple that the Commission approved tax credit application number 4847 without the forklift since the definition of sole purpose means the "exclusive purpose." The motion was seconded by Commissioner Eden and carried with five "yes" votes.

The forty-one tax credits approved as presented to the Environmental Quality Commission for tax credit certification are as follows.

Applications for Pollution Prevention Pilot Program: Air Quality

TC No.	Applicant	Description of Facility	Certified Cost
4813	Irwin-Hodson Metal Manufacting Co.	Continuous Aqueous Parts Cleaning System to clean oil off production parts.	$54,955

Applications for Reclaimed Plastic Tax Credit

TC No.	Applicant	Description of Facility	Certified Cost	% Allocable
4608	Ideal Door Components, Inc.	Two twenty cavity injection molds made of P-20 tool steel	$100,000	100%
4637	NPI Inc., Northwest Polymers	One portable dock ramp for loading and unloading recyclable plastic.	$8,500	100%
4674	Marshall's Oil and Insulation Co.	Hyster Forklift Model #35XM, Serial #D001H0231BS. A JA Freeman Baler Model #DDA, Serial #67207.	$22,473	38%
4709	WWDD	Cumberland Model c-1000 Granulator and an ASNHT 3/8in. Hoe XX1000 Screen.	$73,585	100%
4787	R Plastics, Inc.	Plastic granulator to grind flat sheet into pellets for reuse.	$5,016	100%
4808	Denton Plastics, Inc.	Conveyor belt used to move recyclable plastic to grinder	$8,640	100%

Applications for Pollution Control Facilities Tax Credit

TC No.	Applicant	Description of Facility	Certified Cost	% Allocable
4557	Weyerhaeuser Company	120' diameter above ground concrete primary clarifier, sumps, pumps and associate plumbing and electrical control systems	*$1,262,800*	100%
4715	Jackson Oil, Inc.	Tank leak detection system	$89,295	98%
4729	Roseburg Forest Products Co.	Installation of an electrostatic precipitator	*$4,984,881*	100%
4732	LTM, Inc.	Installation of Four 30" Diameter Astec Mufflers	$12,080	100%
4769	Corvallis Disposal Co.	Kann Hi-Jacker 76" Side Dump Recycling Truck	$78,783	100%
4771	Albany-Lebanon Sanitation, Inc.	1995 Trailmobile 48X102 Dry Vans used to haul baled recyclable commodities from plant to market source. Serial Numbers 1PTO1JAH3S9019633 and 1PTO1JAH3S9019634	$34,900	100%
4782	United Disposal Service, Inc	New McIntyre Hydraulic Alligator Metal Cleaning Shear, Model 320, Serial #1726-96.	$9,300	100%
4786	United Disposal Service, Inc	Two Self Dumping Hoppers, Ser.#140064 & #140065; Three Self Dumping Hoppers, Ser.#139860, #13961, & #13962.	$4,175	100%
4790	Corvallis Disposal Co.	576 101-Gallon Toter Carts Model # 60501, Serial #'s YW008782-YW009357.	$37,152	100%
4791	Corvallis Disposal Co.	Ten 2-yard Containers (Model #M73T, Serial #135077-135086); 20 4-yard Containers (Model #M75T, Serial #13587-135096 & 139495-139504); 10 6-yard Containers (Model #M76T, Serial #135097-135106).	$30,814	100%
4793	United Disposal Service, Inc.	Three 48.9-Yard Drop Boxes, Model #M2296SC, Serial Numbers #9264, #9265, & #9268	$15,181	100%
4803	United Disposal Service, Inc.	Three Hundred & Sixty 64 Gal. Schaefer Compostainers with Wheels, Serial # Y64-001531 thur Y64-001890.	$22,939	100%
4804	Powell Blvd. Chevron, Inc.	Installation of Stage II Vapor Recovery System.	$118,721	85%
4807	4 B Farms, Inc.	Pole Building structure, 106' W x 133'6" L x 30' H. For straw removal and storage.	$153,830	100%
4810	Albany-Lebanon Sanitation, Inc.	576 101-Gallon Toter Carts, Model #61001, Serial #YW008629 - YW009204.	$37,342	100%
4817	United Disposal Service, Inc.	1,000 Red 14-gallon Recycling Bins & 500 White 14-gallon Recycling Bins.	$6,900	100%
4818	United Disposal Service, Inc.	Three, Ten Yard Drop Boxes to be used to pick-up concrete at Construction Sites.	$3,500	100%
4819	Corvallis Disposal Co.	One, Marathon TC-3 HD/HF Stationary Cardboard Compactor System, Serial #39854-W	$12,483	100%
4822	Alan Bowdish, Inc.	New Tanks, Piping and Pollution Control Equipment.	$143,521	87%

4824	Patrick Industries, Inc.	Western Pneumatics Model 630 Bag House System, with 70,000 CFM air intake system.	$277,030	100%
4827	Devin Oil Co., Inc.	Upgrade of Tanks, Piping and Pollution Control Equipment.	$163,723	94%
4831	Albany-Lebanon Sanitation, Inc.	Six-30 yd Recycling Drop Boxes, Serial #8232-8237; Two-35 yd Cardboard Recycling Boxes, Serial #8229-8230; and One 25.7 Glass Recycling Box, Serial #8231.	$49,831	100%
4832	Corvallis Disposal Co.	Five 30-yard (20' x 65") SC Style Drop Boxes with domed lids (model #2065SC, Serial #8224-8228, used to store & transport recyclable newspaper & magazines.	$18,478	100%
4833	Corvallis Disposal Co.	650 white recycling bags, 220 single-bag stands & 100 double-bag stands for collection of High- Grade paper from Businesses.	$6,524	100%
4835	Enserv, LLC	This is a new Business location. There were no tanks or piping at this location previously. Two Fiberglass Tanks, (1) 10,000 gal. & (1) 15,000 gal. double wall Permatank.	$124,257	92%
4837	United Disposal Service, Inc.	One New 1996 Volvo Truck, Model WXR64 Serial #4V5ECFMD7TR722918 & One Heil Formula 7000-27 Refuse Packer, Serial #7101560.	$156,607	100%
4838	Western Stations Co.	New Tanks, Piping & Pollution Control Equipment.	$174,171	92%
4839	Home Fuel Oil Co.	Tank Lining & Pollution Control Equipment.	$60,920	99%
4842	Golden Valley Farms	Freeman 370T Baler, engine serial #8417152 & Metallic Building 120' x 200' x 24'.	$190,000	100%
4843	Albany-Lebanon Sanitation, Inc.	3013 RC-12 recycling bins which is are used for collection of recycling at the curb.	$12,775	100%
4844	Winnoco, Inc.	Upgrade of Pollution Control Equipment with Incon Model #TS1000/4P.	$8,891	100%
4846	Albany-Lebanon Sanitation, Inc.	165 95-Gal. Schaefer Carts (Serial #12027-12191) & 2 9810-Y Infinity set, 6-S Park Litter Waste Enclosures & 2 Surface Mnts. for Recycling Upgrade.	$8,580	100%
4847	Marshall's Oil and Insulation Co.	2 Canopies covering the equipment. A Balemaster Model #6030H, Serial # B69-7-9380235. A Hyster Forklift Model #35XM, Serial #D001H0231BS. A JA Freeman Baler Model #DDA, Serial #67207.	$15,728	100%
4850	Peter Walker & Son	1997 Ford F250 HD Pickup Truck, VIN #3FTHF25H4VMA47774, with refuse runabout Model LG10 Hyd. Dumpbody, Serial #LG1009971049	$21,042	100%

It was moved by Commissioner Van Vliet that the following three tax credit applications were denied. The motion was seconded by Commissioner Eden and was carried by five "yes" votes.

App. No.	Applicant	Description of Facility	Claimed Facility Cost	Claimed % Allocable	Program
4734	Woodburn Fertilizer, Inc.	Bag House for Dust Collection	$97,960	100%	Air
4776	Cabinet Creations, Inc.	Binks filter-type spray booth, Model 30-670, 26' x 14', with 20-filter intake and tower exhaust.	$9,665	100%	Air
4821	United Disposal Service, Inc.	1 1990 6-cyl. GMC Truck, Model C70D42, Serial # 1GDJ7H1LJ602292. 1 Simon-Effer Model 5000 AZ/2S Articulating Crane w/outriggers Serial # 6024502. 1 Flat Bed Truck w/stake pockets, head board, paint, lights, wiring belt winches and Tool Box	$38,040	100%	Solid Waste

It was moved by Vice-Chair Whipple that the following six certificate transfers be approved. Commissioner McMahan seconded the motion and it carried with five "yes" votes.

Certificate No.	Issued On	Transfer From	Transfer To
2143	4/17/90	Arthur H. Clough P.O. Box 98 Arlington, OR 97812	Devin Oil Co., Inc. PO Box "G" Arlington, OR 97812
2791	12/30/91	Glen A. Showalter 33979 Highway 228 Halsey, OR 97348	J & J Farming LLC, 33979 Hwy. 228 Halsey, OR 97348 EIN 93-0996032
3261	12/10/93	Regency Car Wash Inc. 1001 S. Riverside Medford, OR 97501	Gerald Sauter, Regency Car Wash Inc. 1001 S. Riverside Medford, OR 97501 a 50% shareholder
3261	12/10/93	Regency Car Wash Inc. 1001 S. Riverside Medford, OR 97501	Michele Sauter Regency Car Wash Inc. 001 S. Riverside Medford, OR 97501 a 50% shareholder
3266	12/10/93	Jimmy L. Arendell 18045 SE Portland Ave Milwaukie, OR 97267	Arendell Properties, LLC 4140 SE Harrison Milwaukie, OR 97222 EIN 91-1757504
3531	11/17/95	Chevron USA, Inc. 6001 Bollinger Canyon Rd. Bldg. L San Ramon, CA 94583	Powell Blvd Chevron, Inc. Attn: Gene Pulver 30 W. Powell Blvd Gresham, OR 97030

The Commission acknowledged the Department's request to include rejections in Agenda Item B . Generally, there will be no action required of the Commission regarding Department rejections since the Department has the authority to reject tax credit applications when an applicant does not provide information required to complete the application review (OAR 340-16-020(1)(h)) and when an applicant does not submit a timely application (OAR 340-16-020(1)(I)). The following rejections were reported in Agenda item B:

App. No.	Applicant	Description of Facility	Claimed Facility Cost	Claimed % Allocable	Program
4505	Chevron USA, Inc.	Untimely Response: 2-12000 gal. tanks, 1-15000 tank, doublewall fiberglass piping, Spill Containment and Overflow Protection, Stage II Vapor Recovery	$256,229	100%	USTs
4506	Chevron USA, Inc.	Untimely Response: 3-15000 gal. tanks, 1-1000 gal. tank, doublewall fiberglass piping, Spill Containment and Overflow Protection, Stage II Vapor Recovery	$345,364	100%	USTs
4811	Albany-Lebanon Sanitation Co.	Untimely Submittal: 360 95-Gallon Toter Carts, Model #USD-C95, Serial #11337-11696.	$18,720	100%	Solid Waste

The Commission and staff agreed to December 30, 1997, at 12:15 pm for the end-of-year conference call to approve credit applications.

C. Umatilla Chemical Depot Permit Modification

The Commission accepted public comment regarding the Umatilla Chemical Depot Permit Modification from the following citizens.

- Judge Louis Carlson, Chairman of the Morrow County Commission, testified to the impact the Umatilla incineration facility will have on local community infrastructure needs, and requested that the EQC deny the permit modification until such time that the U.S. Army is willing to negotiate the payment of impact fees.

- Mr. J.R. Wilkinson of the Confederated Tribes of the Umatilla Indian Reservation expressed his support for Morrow County's position. Mr. Wilkinson expressed his dissatisfaction at the time allowed for public review of material related to the permit modification, and also his dissatisfaction with the amount of liability insurance being carried by Raytheon.

- Mr. Mark Brown of the Oregon Clearinghouse for Pollution Reduction pointed out that an attachment to one of the documents that was provided for public comment was illegible. Mr. Brown also expressed his concern about Raytheon's compliance history at the Johnston Atoll incineration facility, the indemnification being granted by the U.S. Government, and whether the EQC had taken into consideration recent developments in the challenge of the contract award at the Arkansas incineration facility.

- Ms. Karyn Jones of the Hermiston-based organization GASP also expressed support for the position taken by Morrow County, and Mr. Wilkinson's contention there had not been adequate time for public review of documents. Ms. Jones also expressed her concern about the indemnification being granted to Raytheon from the U.S. government, and pointed out to the EQC that ex-Governor Goldschmidt had also been concerned over the indemnification issue.

The Commission discussed the contractor's indemnification granted by the U.S. Government and the potential application of the Federal Tort Claims Act in the event of an chemical incident at the Umatilla Depot. Mr. Larry Edelman of the Attorney General's office explained that under certain circumstances ("discretionary function") there were limitations in recovering damages under the Tort Claims Act. Mr. Edelman explained that the presence of the contractor indemnification actually would make it easier to provide coverage, and he recommended the Commission add Raytheon Demilitarization Company to the Umatilla permit.

Mr. Raj Malhotra of the U.S. Army and Mr. Sam Kasley of Raytheon Demilitarization Company answered some of the Commission's questions concerning contract award fees and the illegible document provided by the Army. Mr. Malhotra agreed to provide the Commission and the Department a legible copy of the document as quickly as possible. Department staff discussed the permit modification process completed to date, and summarized the issues for the Commission.

The Commission decided to postpone their decision on this item until their January, 1998, meeting and instructed the Department to hold a limited comment period (November 26 to December 10) for public review of the legible copy of the document that Mr. Malhotra agreed to provide. The Commission also instructed the Department to prepare a proposed findings order for Commission review and discussion at the January meeting.

Public Comment:

Hedy Rijken of Waldport, Oregon addressed the Commission. She was speaking on behalf of the H2O&S, owners of the sanitary treatment facility in the Otter Rock area on the central Oregon coast. The Carmel Foulweather Sanitary District was formed in the mid-1970's in response to a survey which showed that 63% of the septic systems in the Otter Rock/Beverly Beach area were marginal or failing. There was an immediate need for sewer service to property owners at that time. Further studies in 1984 recommended the district's best option would be to hook up to the existing sanitary treatment facility currently serving the Inn at Otter Crest. The board took no action. H2O&S purchased the treatment facility approximately three years ago and has developed plans to offer voluntary hook-up to area residents. The sanitary board has refused to allow area residents to hook up to the plant under this plan. H2O&S are asking the Environmental Quality Commission to order the Carmel Foulweather Sanitary District to negotiate an agreement with H2O&S to provide the service they were created to provide 25 years ago. The Commission asked that the Department look into this issue and report back to the Commission at the January, 1998, EQC meeting.

D. City of Dallas—Request for Waste Load Increase, Waiver of Temperature Standard and Waiver of Minimum Dilution Standard

Barbara Burton presented this agenda item. A brief summary of each request follows:

The mass load increase will be offset by the virtual elimination of raw sewage overflows and by the reduction in the amount of ammonia discharged. In addition, the method of calculating the mass load limit has changed since the existing treatment facility was built. For exactly the same treatment plant, the assigned mass load limits are now significantly higher but the actual mass loads discharged will not change.

Oregon Administrative Rules (OAR) 340-41-026(3) allows for exceptions to the general policy that treatment facilities should increase treatment efficiency so growth and development will not result in increases in mass loads. Specific findings were made and other criteria were considered.

The minimum design criteria (OAR 340-41-455(1)(f)) that applies to wastewater treatment facilities in the Willamette basin includes the minimum dilution requirement. The proposed discharge was evaluated, and the Department concluded the proposed discharge could be safely allowed without violating water quality standards. The very high level of treatment will compensate for the lack of dilution.

Oregon Administrative Rules 340-41-026(3)(a)(H) allows the Commission to grant an exception to the temperature standard if a discharge causes more than 1 degree increase in stream temperature. It must be demonstrated that the City is implementing all reasonable management practices; the discharge will not significantly affect the beneficial uses; and the environmental cost of cooling the discharge outweighs the impact of the discharge in order to qualify for an exception to the temperature standard.

The Department believes the proposed discharge meets these three criteria. In the event that conditions in Rickreall Creek improve so the City's discharge becomes a significant adverse factor, then the Department will work with the City to explore ways to reduce or eliminate the adverse impact.

Vice Chair Whipple moved the request for waste load increase, the waiver of temperature standard and the Waiver of minimum dilution standard be approved. Commissioner Van Vliet sectioned the motion and it was carried with five "yes" votes.

E. Report from Fish and Wildlife Regarding Total Dissolved Gas

Margareat Filardo (Fish Passage Center) and Mark Schneider (National Marine Fisheries Service) presented information to the EQC regarding the 1997 spill program. Margareat presented information showing river flows and corresponding levels of TDG. The water year was characterized by very high flows and very high levels of TDG due to uncontrolled spill. Increased incidence of dissloved gas trauma were observed during high levels of TDG. A more thorough review of the 1997 TDG data will be presented at the January meeting.

F. Commissioners' Reports

It was announced that Henry Lorenzen has been appointed to the Fish and Wildlife Commission.

G. Director's Report

Proposals were presented to the Legislative Emergency Board in November. DEQ requests for VIP funding and staffing as well as money for rural gas station tank conversion grants did not get fully approved. Legislators approved $6.9 million limitation to operate VIP through the biennium, but rejected our request for 83 permanent state positions to implement the enhanced vehicle inspection program. They asked that DEQ report back next year evaluating program operation with a mix of public employees and temporary, contract workers.

The Emergency Board did not approve more money for financial assistance grants to small rural gas stations for tank upgrades. They did ask DEQ to come back to a subsequent meeting after the expected grant applicants are better defined.

The first formal step of developing the 1998 303(d) list is now being completed. A public call for data went out several weeks ago. DEQ will analyze that information and release a draft 1998 list for 60 days of public review beginning in January. An updated list is due to EPA in April, 1998,.

It is possible the list could grow beyond the current list of 869 waterbodies. DEQ will make adjustments to remove waters that were listed incorrectly in 1996 or where better data justifies removal. Water quality staff will review existing watershed management plans on federal lands to determine what it would take for the plans to qualify as nonpoint source TMDLs.

A package of rules will be before the EQC in February to enable DEQ's role in the 401 Certification process for grazing permits on Forest Service lands. This court-ordered program was implemented this past spring under temporary rules. DEQ is now near the end of an extended rule development process that involved a diverse advisory committee.

The following agency people were recognized at the October Quarterly Managers Meeting and received plaques for their excellent work.

Ted Vandehey – for outstanding service in support of Exchange mail systems, computer network systems and regional upgrades. The statewide network has undergone lots of changes over the last year, and Ted has been instrumental in making the system work.
Steve Masuo – for his outstanding work supporting DEQ network systems, the Sequent system that holds many agency databases, and for his support of access and use of the DAS mainframe for data and printing capability.

Jeff Christensen, Brooks Koenig, Bruce Hope, Keven Paarrett and Eric Blischke – these people received individual awards but were recognized as a team for their outstanding contributions toward development of our state environmental cleanup rules.
Debra Sturdevant – for her outstanding achievement in developing and implementing water quality 401 Certifications for livestock grazing in Oregon. This work was quite a departure from previous 401 processes and required both organizational and diplomatic skills.
Bart Collinsworth – for innovation and implementation of Waste Reduction Assistance action forms and successful outcome measurement techniques for the Western Region Hazardous Waste Program.
Andree Pollock and Jennifer Sutter -- for their outstanding work in the role as the agency's underground storage tank and voluntary cleanup liaisons to the Westside Light Rail project from 1992 through 1997. They were commended for being a responsive, productive and flexible partners in this massive construction project.
Peggy Halferty – for her excellent work in bringing the State Revolving Fund lending pace up from 57 percent of funds lent in FY 95 to 97.4 percent in 1997. Her skills led to an average 20 percent improvement per year over the three year period.
Judy Hatton – for remarkable endurance and ability to deal with extreme workloads, profound ambiguity, unprecedented requests and relentless change.

The regular meeting was adjourned at 2:00 p.m.

Work Session: Pollution Control Facility and Plastics Recycling Tax Credit Rules

Helen Lottridge, Maggie Vandehey and Mitch West presented the worksession documents.

Advisory Committee Process

Helen Lottridge presented a brief summary or the tax credit advisory committee process — explaining that Lang Marsh asked the advisory committee to provide pre-consultation to the Department. The Director specifically asked the advisory committee to identify processing *in*efficiencies and to incorporate 1995 legislation that included new rulemaking for the Pollution Prevention pilot program.

Advisory committee members were recipients or potential recipients of tax relief which placed the burden of representing Oregon taxpayer on the committee and staff. Once the process was complete, the advisory committee believed they had achieved a compromise agreement with the Department. There was extensive staff turnover during the advisory committee process including the program movement to Management Services Division (MSD). This move to MSD coincided with the ending of the formal advisory committee. Upon MSD's review of the rulemaking package, the Department decided the rules needed to take a different direction from the advisory committee recommendation. Maggie Vandehey, Mitch West and Paul Langner met with the advisory committee in the spring of 1997 to explain the Department's direction. Advisory committee members expressed disappointment with the Department's proposal. There was an additional meeting in mid November.

Fees

Maggie Vandehey explained that according to OAR 468.165 (5) the Commission may adopt a schedule of reasonable fees based on the estimated cost of filing, investigating, granting and rejecting tax credit applications.

The purpose in addressing the fee structure is to reduce the program's operating deficit. The main difference between the Department's proposal and the advisory committee recommendation is the consideration of the general fund that was used to make up for insufficient fee revenue. In order to determine the cost of the tax credit program, the Department looked at program revenue and expenditures and compared them to revenues that would have been received based on the Department's proposal and the advisory committee recommendation as shown in the table below.

Study Period 7/1/93 to 6/30/96	*Actual*	*Department Proposal*	*Advisory Committee Recommendation*
Fee Revenue	$464,601		
General Fund	$153,985		
Gross Revenue	$618,586	$735,092	$657,456
Refunds	-$87,119	-$43,560*	-$43,560*
Net Revenues	$531,467	$691,532	$613,896
Total Expenditures	$772,893	$772,893	$772,893
Surplus or (Deficit)	($241,426)	($81,360)	($158,997)

* Represents 50% of actual refunded amount— the Department did not tie refunds to specific applications for this study.

Staff are in the midst of making process changes that would provide program savings and therefore, help eliminate the program deficit. The Commission expressed concerned that streamlining the program would mean the application review would be compromised and that 2.3 FTE was insufficient to support a program of this magnitude.

The advisory committee recommendation and the Department's proposal differed on the fee for preliminary certification of a facility. The statute does not provide a guarantee that a facility which receives a preliminary certification will receive a final certification once the facility is built and therefore, the advisory committee recommendation was for a non-refundable $250. Staff justified one-half of one percent fee for preliminary certification because preliminary certification is an option, not a requirement, available to the applicant when the eligibility of the facility or the activity is in question. Approval or denial of the preliminary certification would be based on an engineering plan review for which the Department would incur the engineering review cost. The fee would apply toward the final certification fee and 50% of the fee would be refundable should it be denied

Independent Accountant's Review

The goal in addressing the rules and the practice regarding the independent accountant's review is to eliminate two accounting reviews required for applicants with facilities that cost $250,000 or more. Even though the Department contracts for the accountant's review, there are added costs of overseeing these reviews.

Under the current rule, applicants with facilities costing over $20,000 are required to have an independent certified public accountant review of facility cost information before submitting their application — even if the facility cost is documented by a single invoice. When a facility cost exceeds or equals $250,000, the Department selects one of four accounting firms currently under contract to perform the second accounting review as requested by the Commission.

The Department may only recoup the cost when the "evaluation or analysis is unusually extensive" (OAR 340-016-0045(6)) or when the facility is integral to the applicant's business (OAR 340-016-0030(5)(d)(E)).

The advisory committee and staff proposed that all accounting firms are subject to the same professional standards; and therefore, the second review performed by a firm under contract with the Department does not add significant value. The Department explained the engineering review of the application generally identifies most ineligible costs and costs that do not substantially contribute to pollution control. The proposal would provide for specific guidelines for and standards for the review. However, the Commissioners were dubious about an accounting firm's ability to perform a truly independent review – adding that in theory we can provide standards for accounting review but in reality clients base part of their selection of an accounting firm on their willingness to stretch the standards in their favor.

The current rule requires the review be performed by a certified public accountant for facilities with a claimed facility cost over $20,000. The proposal would raise the threshold amount to $50,000.

The proposed rule would provide a waiver of the independent certified public accountant's review for applications if the cost of their facility can be thoroughly documented by invoices or canceled checks submitted with the application; it is not part of a larger construction project; and it consists of a single pollution control component or process.

The Commission expressed the need for an independent auditor's review especially where there is a tie between the applicant and the vendor or where the applicant performs part of the work. They explored the alternative of the Department publishing a list of firms from which the applicant could select one to review their facility cost information before submitting their application to the Department. Larry Knudsen explained the legal issues associated with how the lists are maintained and how the firms are paid.

Direction: Do not eliminate the Department's ability to require an accounting review by a firm under contract with the Department. Use the waiver as the tool to bypass the review. Explore some "middle ground" regarding the external accounting review. There was no problem with raising the ceiling for review from $20,000 to $50,000. Provide some means of recouping the cost of the accounting review.

Integral Facility

The Department explained the concept of the facility that is integral to an applicant's business and its relationship to the determining the percentage of the facility cost allocable to pollution control. The Department' explained their goal is to develop a rule that may be defensibly implemented while addressing the Commission's concerns regarding applicants that receive a substantial tax credit even though the operation of the facility allows them to produce an income that will adequately compensate them for building the facility.

In 1993 the EQC adopted rules which when placed into practice eliminated facilities owned by an applicant whose business is pollution control through the return on investment calculation. The Commission asked if this rule was the result of legislation. Larry Knudsen explained that the integral facility concept is not in statute but the Commission adopted the rule in their response to landfill owners who claimed liners as a pollution control facility. Examples in rule include commercial solid waste and hazardous waste landfills; solid and hazardous waste recycling businesses; and environmental service providers. Under this rule, the percentage of the facility cost allocable to pollution control became so low that it was not financially beneficial for these facilities to apply for a tax credit.

The advisory committee recommended eliminating all rules that would limit the tax credit based on the facility being integral to the applicant's business. The Department proposal would include the concept of a facility which is integral to the applicant's business as a tool to identify the business unit the applicant should consider in the cash flow analysis. (The cash flow analysis is part of the Return On Investment (ROI) calculations used to determine the percentage of the facility cost allocable to pollution control.)

The Commission asked for clarification on the impact of the proposal and the advisory committee process. Staff explained there were not a sufficient number of applications reviewed according to this section of the rule to make projections regarding the impact of the proposal discussed here. Also, it is not possible to know how many applicants did not submit an application because they met the definition of a facility integral to the applicant's business and the method of determining the percentage allocable to pollution control eliminated the potential for a tax credit. Staff feels the results of their proposal would be to provide some tax credit to businesses excluded by the 1993 rule. With the Department's integral facility proposal coupled with the proposal for correcting the ROI calculation, these facilities would be certified at a much lower level than without the proposed ROI. The Commission asked if the advisory committee was aware that removal of the integral facility references would increase the number of facilities eligible for tax credits. Staff said the advisory committee knew their recommendation would allow inclusion of the businesses excluded by the1993 rule. The Commission recognized that they would clearly like to see the program narrowed whereas, the advisory committee would like to see it broadened.

The Department asked for the Commission's guidance on providing tax credits to applicant's whose business is recycling. (Recycling businesses were excluded by the 1993 rule adoption.) These businesses feel strongly that the rule discourages and sends mixed message to recycling or material recovery businesses. They were additionally, discouraged because the rule was developed without an advisory committee process that has been customary for the Department's rule-making process. The Commission adopted the rule with cautionary advice from the Department of Justice.

Staff expressed exasperation over the fact that legislative intent is not easy to determine. The Commission acknowledged difficulty. The tax credit program was created as a cushion for the additional expenses that a business may incur in order to comply with these laws. It was later the program was broadened to help businesses enter into activities that support the environmental goals of the state. The legislative intent is at the crux of the integral facility discussion. Larry Knudsen shared that the problem with the tax credit legislation has been that it has virtually been amended every two years since 1971 and that makes it difficult to find a thread of intent flowing through to the legislation. The program was steered in one direction or another, often in reaction to a position that the Commission had taken.

The Commission asked how the integral facility definition relates to principal purpose and sole purpose. Staff explained the principal purpose or the sole purpose is the first test to determine if a facility may be eligible for a tax credit. The integral facility is one way for the Department and the Commission to determine the percentage of the facility cost allocated to pollution control.

Since the integral facility concept is reliant on the ROI considerations, the Commission and Staff decided to discuss ROI.

ROI

The Department explained the role of Return on Investment (ROI) in determining the percentage of the facility cost allocable to pollution control, explaining the financial and economic principles behind the current method, the proposal and the advisory committee recommendation.

The tax credit program is unlike most programs where the Commission is given a broad grant of rulemaking authority and policy direction that doesn't exist in the tax credit program. The only area where there is broad authority is in the return on investment and the cost allocation. The rule cannot include or exclude any facility outside the percentage allocable determination for any other reasons. The percentage of the facility cost allocable to pollution control is determined by the percentage of time the facility is used for pollution control (<-$50,000) or by the criteria in ORS 468.190(1):

(a) If applicable, the extent to which the facility is used to recover and convert waste products into a salable or usable commodity.

(b) The estimated annual percent return on the investment in the facility.
(c) If applicable, the alternative methods, equipment and costs for achieving the same pollution control objective.
(d) Any related savings or increase in costs that occur or may occur as a result of the installation of the facility.
(e) Any other factors which are relevant in establishing the portion of the actual cost of the facility properly allocable to the prevention, control or reduction of air, water or noise pollution or solid or hazardous waste or to recycling or appropriately disposing of used oil.

The proposal would significantly reduce the percentage allocable to pollution control from the current rule. Unlike the current rule and the advisory committee recommendation, a facility must have no positive annual cash flow projected over its useful life before the Commission would certify it at 100% allocable to pollution control. Under the current rule, the Commission would certify the facility at 100% if it produces just $1.00 less than the average annual cash flow over the useful life of the facility.

The advisory committee proposal would certify a facility at 100% allocable to pollution control if the average annual cash flow equals the cost of the facility over its useful life.

Staff and the Commission agreed the topics of the integral facility and the ROI calculations needed more extensive discussions, postponing the continuation until January 9, 1998, Commission meeting.

Direction: Provide several examples of an integral facility and show the impact of the methods for determining the percentage of the facility cost allocable to pollution control. Provide several examples of the ROI calculations.

1/8/97

SCHWABE WILLIAMSON & WYATT P.C.
ATTORNEYS AT LAW

PACWEST CENTER, SUITES 1600-1800
1211 SOUTHWEST FIFTH AVENUE ▪ PORTLAND, OREGON 97204-3795
TELEPHONE: 503 222-9981 ▪ FAX: 503 796-2900 ▪ TELEX: 650-686-1360

COREY J. PARKS
Admitted in Oregon and Idaho
Direct Line: (503) 796-2462
E-Mail Address: cjp@schwabe.com

January 8, 1998

Ms. Susan Greco
Environmental Quality Commission
811 S.W. Sixth Avenue
Portland, OR 97204

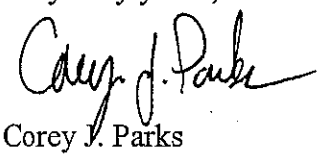
Re: Agenda Item B, EQC Meeting of January 9, 1998

Dear Ms. Greco:

Enclosed with this letter is a brief summary of Jay Waldron's presentation on behalf of JELD-WEN to be given at tomorrow's EQC meeting. This summary may provide you and the EQC members with an easy to reference framework for Mr. Waldron's presentation. I hope that it proves helpful. I would appreciate it if you would distribute it today. Thank you.

If you have any questions, please do not hesitate to contact me at (503) 796-2462.

Very truly yours,



Corey J. Parks

CJP:cjp
Enclosure

SCHWABE, WILLIAMSON & WYATT, P.C.

MEMORANDUM

TO: Environmental Quality Commission

FROM: Petitioner JELD-WEN, Inc.

SUBJECT: Agenda Item B, Petition by JELD-WEN, Inc. for a Declaratory Ruling Concerning Availability of Sewer as Defined in OAR 340-71-160(5)(f); EQC Meeting of January 9, 1998

Presiding Officer Lawrence Smith has issued a Proposed Order in this case which concluded that (1) the requirement and precondition of annexation by the City of Klamath Falls does not prevent a sewage system from being "legally available" to JELD-WEN under the applicable regulation and (2) because Klamath Falls was willing to provide a sewage service to JELD-WEN, sewer service was "legally available" to JELD-WEN and its request for a permit to continue to operate an alternative on-site sewer system was therefore properly denied. The Commission must now issue a final declaratory ruling. That ruling should reject the Proposed Order and hold instead that Klamath Falls' sewerage system is not "legally available" to JELD-WEN and, therefore, that the DEQ must issue a Division 71 permit to JELD-WEN for its otherwise acceptable on-site sewer system.

1. The City Of Klamath Falls Is Not "Willing" To Provide Sewer Service Due To The Precondition Of City Annexation.

Under OAR 340-71-160(5)(f)(B), a sewerage system is "legally available" only if the sewerage system owner is "willing or obligated" to provide sewer service. JELD-WEN presented legal authority to the Presiding Officer which clearly established that an owner cannot be "willing" to provide sewer service unless the owner is also "able" to do so. Otherwise, the definition of "legally available" under the foregoing regulation would be meaningless. In this case, the owner (Klamath Falls) is not able, and therefore not willing, to provide sewer service to JELD-WEN because of the precondition of city annexation.

Nor is Klamath Falls "obligated" to provide sewer service to JELD-WEN under OAR 340-71-160(5)(f)(B). The City's code requires that the extension of any of its services "be made conditional upon the applicant's consent to annexation." Nothing in the applicable Comprehensive Plan is inconsistent with this requirement of annexation. Therefore, the City cannot be "obligated" to provide sewer service to JELD-WEN in the absence of JELD-WEN's consent to annexation.

2. The Proposed Order Unlawfully Compels JELD-WEN To Consent To Annexation.

ORS Chapter 222 establishes five separate procedures for annexation by a city -- each of which requires the consent of both land owners and the electorate. In order for a sewer system to be "legally available" under the Proposed Order, JELD-WEN must be compelled to waive those statutory rights. JELD-WEN presented legal authority to the Presiding Officer which clearly

established that such rights are "privileges" under the Privileges and Immunities Clause of the Oregon Constitution. Forcing JELD-WEN to consent to annexation also violates JELD-WEN's Fourteenth Amendment right to equal protection under the Ninth Circuit's holding in Hussey v. City of Portland, and JELD-WEN's Fifth Amendment right to just compensation for a government taking of its property under the U.S. Supreme Court's holding in Dolan v. City of Tigard.

3. The Presiding Officer's Reasoning In The Proposed Order Is Wrong.

The Presiding Officer held in the Proposed Order that forcing annexation on JELD-WEN is not unconstitutional under Hussey v. City of Portland because JELD-WEN's voting rights as a land owner, rather than as an elector, are involved in this case. The Presiding Officer misread the opinion in Hussey to reach this conclusion. The Ninth Circuit made a different distinction in Hussey: that court distinguished cases in which land owners were asserting rights to sewer service, as opposed to rights to withhold consent to annexation, and held that rights to sewer service are not subject to the "strict scrutiny" test under the Fourteenth Amendment. In contrast, JELD-WEN's right to withhold consent to annexation is protected by that same strict standard of Equal Protection under the Fourteenth Amendment, just like the voter's rights to withhold consent to annexation were in Hussey.

The Presiding Officer also concluded that protecting JELD-WEN's right to consent to annexation would mean that "businesses such as petitioner's * * * would never be required to consent to an areawide system [under ORS 454.655(4)]." That conclusion was also erroneous. The DEQ has the power to ensure acceptable sewage disposal, whether or not city annexation is involved. If JELD-WEN's on-site sewerage system were defective or unacceptable, the DEQ has the authority to shut its plant down without having to resort to annexation.

JELD-WEN is entitled to a Division 71 permit because its on-site sewerage system is proper and acceptable. The DEQ cannot violate JELD-WEN's constitutional right to consent to the annexation and taking of its property in order to reach a different result. DEQ's mission is to protect the environment, not to engage in land use planning. The Division 71 permit, by DEQ staff's own statements, will protect the environment.

State of Oregon

Department of Environmental Quality Memorandum

Date: December 15, 1997

To: Environmental Quality Commission

From: Langdon Marsh, Director

Subject: Agenda Item B, Petition by JELD-WEN, Inc. for Declaratory Ruling Concerning Availability of Sewer as Defined in OAR 340-71-160(5)(f), EQC Meeting: January 9, 1998

Statement of Purpose

On June 26, 1997 JELD-WEN Inc. submitted a petition for declaratory ruling to the Environmental Quality Commission (EQC) for an interpretation of OAR 340-71-160(5)(f). The presiding officer issued a Proposed Declaratory Ruling on December 11, 1997. The EQC must issue a final declaratory ruling within 60 days after the close of the record. Notwithstanding that requirement, the EQC can decide not to issue a ruling at any time. OAR 137-02-020.

Background

Petitioner, JELD-WEN Inc. owns and operates a manufacturing facility in Klamath County, Oregon. The facility abuts the city boundary of Klamath Falls, Oregon and is contained in the Urban Growth Boundary of the City. The City is willing to provide sewage services to Jeld-WEN if the land is annexed to the City.

In early 1997, JELD-WEN discovered that its on-site sewage disposal system was failing and contacted the Department to request the permit necessary to perform repairs to their system. The Department denied JELD-WEN's request for the permit based on OAR 340-71-755(5) which states that the Department shall deny a permit if a sewage system "is both legally and physically available." The rule defines a system to be "legally available" if the system is not under a connection permit moratorium and the sewerage system owner is willing or obligated to provide sewer service. The Department determined that the City's annexation requirement does not make the City "unwilling" to provide the service.

On June 27, 1997, JELD-WEN submitted a Petition for Declaratory Ruling, requesting the EQC to interpret OAR 340-71-160(5)(f). JELD-WEN contends that the requirement of annexation makes the City's system "legally unavailable." The EQC accepted the petition and designated Lawrence Smith as the presiding officer.

The petitioner and the Department submitted briefs to the presiding officer and a hearing was held on November 24, 1997. On December 11, 1997, the presiding officer issued his Proposed Declaratory Ruling. The presiding officer held that the only thing preventing the availability of sewer service to the petitioner is their refusal to be annexed thus the city is willing in this context. The petitioner argued that the City is not willing to provide sewer services if it imposes a condition on the providing of the services. Since there is no direct statutory or other

interpretation of "willing" in this context, the petitioner relied on a 1st Circuit Court case regarding the meaning of " willingness" in an employment context. The presiding officer held this definition of "willing" is not controlling or persuasive. The context is too different.

The petitioner relied upon Hussey v. City of Portland, 64 F. 3d 1260 (9th Cir. 1995) to argue that the annexation requirement is unconstitutional by forcing petitioner to equivalently "vote" in a certain way. The presiding officer held that Hussey is not controlling in this matter since the petitioner did not allege an interference of voting rights as an elector, as was the case in Hussey. Instead the petitioner alleged interference in its right to give consent as a landowner. The court in the case, specifically differentiated between elector's and landowner's rights. Finally, he held there is no "right to consent on annexation."

The presiding officer concluded that a pre-condition of annexation does not make a sewage system legally unavailable. Since the City of Klamath Falls is willing to provide sewage service to the petitioner, the request for an on-site disposal system permit was properly denied.

Authority of the Commission with Respect to the Issue

Under ORS 183.390, agencies must apply the Attorney General's Uniform Rules without further adoption or amendment. Declaratory rulings are covered by OAR 137-002-0010 through 137-002-0060. Under OAR 137-002-0050, the presiding officer issues a proposed order and within 60 days of the close of the record, the EQC must issue the final declaratory ruling. OAR 137-002-0050(2) gives the parties (JELD-WEN) and agency staff the right to oral argument but there is no other opportunity for the parties or staff to submit objections to the presiding officer's proposed ruling.

Attachments

Proposed Declaratory Ruling, dated 12/11/97
Exhibits A through G

Exhibit A - Letter from Neal A. Hueske, Petition for Declaratory Ruling and Attachments thereto, dated 6/27/97
Exhibit B - Letter to Jay Waldron and interested parties, dated 8/ 26/97
Exhibit C - Memorandum to Environmental Quality Commission, dated 9/24/97
Exhibit D - Letter from Neal A. Hueske, Brief and Attachments thereto, dated 11/19/97
Exhibit E - Department's Brief, dated 11/19/97
Exhibit F - Schedule for Declaratory Ruling
Exhibit G - Notice of Declaratory Ruling Hearing, dated 11/5/97

Reference Documents (available upon request)

OAR 137-002-0010 through 137-002-0060

Report Prepared By: Susan M. Greco
Phone: (503) 229-5213

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION
OF THE STATE OF OREGON

IN RE:	)	
	)	PROPOSED
Jeld-Wen, Inc., an Oregon Corporation,	)	DECLARATORY RULING
Petitioner.	)	
	)	

BACKGROUND

On June 27, 1997, petitioner Jeld-Wen, Inc. petitioned the Environmental Quality Commission (Commission) for an interpretation of OAR 340-71-160(5)(f) (Exhibit A). On August 26, 1997, the Commission agreed to issue a declaratory ruling in response to petitioner's request. The Commission notified interested parties of an opportunity for intervention (Exhibit B). No other party has requested intervention, so the only party is petitioner.

A hearing was held on November 24, 1997, in Portland, Oregon, before a Presiding Officer appointed by the Commission, Lawrence S. Smith. Petitioner was represented by Jay Waldron, attorney with Schwabe, Williamson & Wyatt. The Department of Environmental Quality (DEQ) was represented by Michael Huston and Celeste Doyle, assistant attorneys general.

FINDINGS OF FACT

[The following facts are from the Statement of Facts in petitioner Jeld-Wen's petition, upon which the Commission relied when it agreed to issue a declaratory ruling.]

1. Petitioner Jeld-Wen, Inc., owns and operates a door and cutstock manufacturing facility in Klamath County, Oregon. The facility abuts the city boundary of Klamath Falls, Oregon, and is within the urban growth boundary of Klamath Falls. Klamath Falls is obligated to provide sewer services within its city boundary and will provide such services to petitioner if petitioner's land is annexed to Klamath Falls. Klamath County has no sewerage system available for petitioner.

2. In 1978, DEQ granted petitioner Jeld-Wen a permit to upgrade its on-site septic tank/drainfield system to treat and dispose of domestic wastes generated at its manufacturing facility. As a condition for the permit, petitioner Jeld-Wen was required to leave an undeveloped area next to the drainfield for use as a future drainfield. This on-site sewage system was included in petitioner Jeld-Wen's NPDES permit. The system has operated without a detectable problem since 1978. DEQ has no record of regulatory violations of the system.

3. On May 2, 1997, petitioner Jeld-Wen discovered that the drainfield for its on-site sewage system at the facility was potentially failing. Petitioner Jeld-Wen notified DEQ and requested permits to repair the existing drainfield or to install a new drainfield in the area put aside for a future drainfield. DEQ conducted a site evaluation of the system on May 6 and 13, 1997, and petitioner Jeld-Wen submitted an application and fee of $1,200.

4. On May 22, 1997, DEQ informed petitioner Jeld-Wen that the area surveyed was satisfactory for a new system if it included a recirculating gravel filter and if the soil was allowed to dry before installation (See, Exhibit B to Exhibit A). Nevertheless, DEQ denied petitioner's request for a permit because DEQ concluded the sewerage system of the City of Klamath Falls was legally available to petitioner because it could request annexation to Klamath Falls. Petitioner Jeld-Wen does not want to be annexed to Klamath Falls because petitioner estimates it would have to pay an additional $250,000 to $300,000 per year in property taxes to the Klamath Falls, in addition to connection and monthly user fees. The form of the Annexation Agreement is in Appendix A to Exhibit E, pages 44 and 45.

LAW IN ISSUE

ORS 454.655(4) states in part:

No permit shall be issued if a community or area-wide sewerage is available which will satisfactorily accommodate the proposed sewage discharge.

OAR 340-71-755(5) (formerly OAR 340-71-160(5)) states:

Upon receipt of a completed application the Agent shall deny the permit if:

* * * *

(f) A sewerage system which can serve the proposed sewage flow is both legally and physically available as described below:

* * * *

(B) Legal Availability. A sewerage system shall be deemed legally available if the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide a sewer service.

CONCLUSION TO FACTS

An area-wide sewerage system owner, Klamath Falls, is willing to provide sewer service to petitioner Jeld-Wen, Inc., so petitioner's request for a permit for an on-site disposal system is denied.

CONCLUSIVE LEGAL EFFECT

The Commission concludes that a pre-condition of annexation does not prevent a sewerage system from being legally available to an applicant.

REASONING

Petitioner and DEQ agree that, under the above rule, DEQ shall deny a permit to an applicant if a area-wide sewerage system is both legally and physically available and that an area-wide sewerage system is legally available if the system is not subject to a DEQ connection permit moratorium and

the sewerage system owner is willing or obligated to provide sewer service. Petitioner and DEQ further agree that there is no connection moratorium at this time. DEQ concedes that Klamath Falls is not obligated to provide sewer service, so the only issue is whether Klamath Falls is willing to provide sewer service.

Petitioner Jeld-Wen did not allege that Klamath Falls would contest or deny annexation if requested by petitioner or would refuse to provide sewer service if petitioner requested. Petitioner argues that Klamath Falls' precondition of annexation before providing sewer service that Klamath Falls is not willing to provide sewer service. Strictly speaking, sewer service by Klamath Falls is not legally available at this very moment because petitioner's facility must first be annexed. As stated above, petitioner will not encounter any objection from Klamath Falls to its request for annexation or sewer service, so a plain reading of the law says an area-wide sewer service is in effect legally available to petitioner because the city is willing to provide the service and the only thing preventing availability of such service is petitioner's refusal to be annexed.

A plain reading of ORS 454.655(4) also seems to require connection to area-wide system whenever such a system is available. DEQ defined availability in its rule. Because the plain meaning of the statute seems unambiguous, legislative history need not be consulted. It is also noted as a general principle that if annexation as a condition precedent meant a system was not legally available, then few if any applicants would connect to area-wide systems because it seems that annexation is often a pre-condition to connection. It would mean that businesses such as petitioner's, who completely control whether to be annexed, would never be required to connect to an area-wide system. ORS 454.655(4) does not seem to allow for such an exception or allow some applicants to control connection to an area-wide system by refusing to annex.

Petitioner's reliance on *Hernando Flecha v. Quiros*, 567 F.2d 1154 (1st Cir. 1977) is not controlling or persuasive because it defines "willing" in a completely different area of law. That case decided whether Puerto Rican employees were willing to work in the United States, where the legal protections were less than in Puerto Rico. The court held that the Puerto Rican workers were not in effect willing to work in the United States because they were bound by the stricter Puerto Rican law. Therefore, the Puerto Rican workers did not count as available workers when determining a certificate for allowing foreign workers to work in the United States. This case dealt with the definition of "willing" in determining a certificate for allowing foreign workers to work in the United States. The definition of "willing" in certifying a need for foreign workers under federal law is too different a context or question from the definition of "willing" under DEQ law. The holding in *Hernando, supra*, is not controlling or persuasive.

Petitioner Jeld-Wen states at length in its brief that under the various processes of annexation, petitioner must give its approval as a landowner before annexation can happen and that DEQ's denial of an on-site system in effect requires it to "vote" for annexation against its wishes. Petitioner alleges that requiring annexation as a precedent to obtaining a permit is a violation of its Constitutional rights, specifically the personal right to equal protection under the Fourteenth Amendment, as defined in *Hussey v. City of Portland*, 64 F.3d 1260 (9th Cir. 1995). The court in *Hussey, supra*, discussed at great length how Portland's ordinance interfered with *electors'* voting rights. The petitioner did not allege such an interference of voting rights as an elector, but only in

its rights to give consent as a landowner. The court in *Hussey, supra*, specifically differentiated between the voting rights of electors and the consent of landowners when distinguishing its conclusion from *Blackwell v. City of St. Charles*, 726 F.Supp. 256 (E.D.Mo.1989), *aff'd per curiam*, 917 F.2d 1150 (8th Cir.1990). In *Blackwell, supra*, the landowners claimed unconstitutional interference in its voting rights when it was required to give consent to annexation as landowners. The court applied only a rational basis test because voting rights were not involved. The court in *Hussey, supra,* made that distinction also, emphasizing voting rights were at issue, not consent from landowners. Because only consent as a landowner has been impacted, rather than voting rights, a rational test is applied. DEQ meets such a test for the interference with a property owner's rights to give consent is more than balanced by the public's interest in regulating discharged waste under ORS 468B.015(3). DEQ's requirement that petitioner Jeld-Wen connect to the area-wide system before a permit will be issued does not violate petitioner's 14th Amendment rights defined in *Hussey, supra.*

Petitioner Jeld-Wen finally argues by analogy from land use law, as held in *Dolan v. City of Tigard*, 512 U.S. 374 (1994), that DEQ is requiring petitioner to give up its constitutionally protected "right to consent (i.e. vote) on annexation". As stated above, petitioner has not established that its right to consent as a landowner is as protected as the right of an elector to vote. Petitioner asserted no other violation of constitutional rights. DEQ is not taking petitioner Jeld-Wen's property, so there is no question of a taking here. Also, unlike in *Dolan, supra*, the benefit of the sewer service has a direct relation to the property. *Dolan, supra* is not enlightening.

In its letter of May 22, 1997, denying the permit for a drainfield replacement (See Exhibit B to Exhibit A), DEQ concluded the potential financial burden of connection was not a relevant consideration under the rule. In its letter, DEQ asserted that the Commission has ruled in the past that annexation is not an unreasonable requirement for connection to a sewerage system. DEQ has not provided cites to such rulings by the Commission. This interpretation seems to imply a reasonableness requirement in the rule in deciding whether a sewerage system was legally available. Without prior Commission rulings and no guide from the rules regarding reasonableness, or even a reference to reasonableness in the rule, a conclusion based on reasonableness is a policy question that is deferred to the Commission. It is noted that the above facts were provided by petitioner. DEQ did not provide evidence regarding how much better public health and safety is protected with an area-wide system rather than an on-site sewer system that petitioner proposes. Such a factor would necessarily be considered in determining whether application of the rule was reasonable. The Commission has the authority to set a precedent in this case and make a policy decision.

Dated this 11th day of December, 1997.

Lawrence S. Smith
Presiding Officer
ENVIRONMENTAL QUALITY COMMISSION

APPEAL RIGHTS

If you wish to appeal the Commission's declaratory ruling, you have 60 days to file a petition for review with the Oregon Court of Appeals from the date of service of the declaratory ruling by the Environmental Quality Commission. See, ORS 183.480 et seq.

Certificate of Mailing

I certify that I mailed the attached PROPOSED DECLARATORY RULING to each of the following persons on 12/12/97, 1997:

Jay T. Waldron
Schwabe Williamson & Wyatt
PacWest Center, Suite 1600
1211 S.W. 5th Avenue
Portland OR 97204-3795
(Via Certified Mail #P335742346)

Rod Wendt
JELD-WEN Inc.
3250 Lakeport Blvd.
Klamath Falls, OR 97601
(Via Certified Mail #335742347)

Susan M. Greco
Department of Environmental Quality

SCHWABE WILLIAMSON & WYATT P.C.
ATTORNEYS AT LAW

PACWEST CENTER, SUITES 1600-1800
1211 SOUTHWEST FIFTH AVENUE ▪ PORTLAND, OREGON 97204-3795
TELEPHONE: 503 222-9981 ▪ FAX: 503 796-2900 ▪ TELEX: 650-686-1360

NEAL A. HUESKE
Direct Line: (503) 222-9981
E-Mail Address: nah@schwabe.com

June 26, 1997

VIA HAND DELIVERY
Environmental Quality Commission
811 SW Sixth Avenue
Portland, Oregon 97204

Attention: Ms. Susan Greco

Re: Petition for Declaratory Ruling
Our File No. 101984-105068

Dear Commission Members:

This law firm represents JELD-WEN, Inc. Enclosed please find a Petition for Declaratory Ruling on behalf of JELD-WEN. It is our hope that the EQC can review this matter and assign it to the agenda for their August meeting.

If you have any questions, please give me a call.

Very truly yours,

Neal A. Hueske

Neal A. Hueske

NAH:mfc
cc: Mr. Stanley K. Meyers (JELD-WEN)
Mr. Richard Nichols (DEQ - Eastern Region)
Mr. Larry Knudsen (Oregon Department of Justice)

Exhibit A - 20 pages

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

FOR THE STATE OF OREGON

In re JELD-WEN, Inc.,	)	
	)	
Petitioner.	)	No. _____
	)	
	)	PETITION FOR A DECLARATORY RULING
	)	

JELD-WEN, Inc., through its attorneys Schwabe, Williamson & Wyatt petitions the Environmental Quality Commission for a declaratory ruling pursuant to OAR Chapter 137, Division 2. In support of its petition, JELD-WEN relies on the following statement of issues, statement of facts, legal argument and other information required under OAR 137-02-010.

APPLICABLE RULE

The issue in this case is an interpretation of OAR 340-71-160(5)(f). DEQ claims this regulation requires JELD-WEN to abandon its existing method of sewage disposal [an on-site sewage disposal system (a drainfield)]. DEQ also claims that the regulation requires connection to the City of Klamath Falls' sanitary sewer system, even though the City of Klamath Falls requires annexation of the JELD-WEN property by the City before it will allow a connection. JELD-WEN's property is located in Klamath

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

County. The City stated that it must annex JELD-WEN's property before JELD-WEN can connect to the City sewer system. Despite these physical and legal impediments, DEQ has determined that the City of Klamath Falls' sewer is "physically available" and "legally available" as those terms are defined in the regulation.

In part, the applicable regulations state that no person shall cause or allow construction, alteration, or repair of an on-site sewerage disposal system, without first applying for and obtaining a permit. OAR 340-71-160(1). Under the regulations, DEQ "shall" deny the permit if "a sewerage system which can serve the proposed sewage flow is both legally and physically available." OAR 340-71-160(5)(f). A sewerage system shall be deemed legally available if the system is not subject to a DEQ connection permit moratorium, and "the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(13). A copy of the applicable rule is attached to this Petition as Exhibit A.

STATEMENT OF ISSUES

Whether DEQ can consider a sewerage system to be "legally available" under its regulations if the owner of the sewer system requires the landowner to become annexed in order to be connected?

Whether DEQ is justified in denying JELD-WEN's application for repair of an existing and previously permitted septic tank drainfield system?

STATEMENT OF FACTS

Since approximately 1950, JELD-WEN Inc. has operated and maintained a septic tank/drainfield system at its door and cutstock manufacturing facilities located in Klamath County. The system is used primarily to treat and dispose of domestic wastes generated at the facility.

In 1978, JELD-WEN retained an engineering firm to design upgrades to and repair the existing system. DEQ approved the 1978 design and granted JELD-WEN a

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

permit to install the upgrades. As a condition of the 1978 plan approval letter from DEQ, JELD-WEN was required to leave undeveloped areas contiguous to the drainfield for use as future drainfield. The JELD-WEN system has been included in the facility's NPDES permit in the past. The system has operated successfully since 1978 (and before) without any environmental or public health problems. There have been no regulatory violations at the system.

The JELD-WEN facility is located (and was in 1978) within the unincorporated jurisdiction of Klamath County, outside of the Klamath Falls city limits, but within the urban growth boundary. The Klamath Falls city boundary abuts the JELD-WEN property line, separated by Lakeport Boulevard. There was no available County sewer system in 1978, nor is there today. The City of Klamath Falls, on the other hand, does maintain a City sewer system. However, the City is unwilling to allow a connection to its sewer without annexation of the property to be hooked up.

On May 2, 1997, JELD-WEN discovered that its drainfield system was potentially failing. Jeld-Wen immediately notified Walt West and Dick Nichols of the Eastern Region Water Quality Management program of DEQ's Eastern Region office in Bend, as well as Bob Bagget of the onsite sewer program in Pendleton. Pursuant to OAR 340-71-160, JELD-WEN requested appropriate permits in order to repair the existing drainfield. DEQ informed JELD-WEN that it was necessary first to conduct a Site Evaluation of the system. On May 6 and 13, 1997, DEQ staff traveled to Klamath Falls and conducted the evaluation, after which JELD-WEN completed an application and submitted a $1,200 application fee.

On May 22, 1997, DEQ informed JELD-WEN through a memorandum that the area surveyed was satisfactory for a new system if it included a recirculating gravel filter, and if the soil was allowed to dry before installation. See May 22, 1997 DEQ Memorandum, attached as Exhibit B. However, the memorandum went on to state that

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

DEQ staff would deny JELD-WEN's permit application because it considered the City of Klamath Falls sewer system to be "legally available" even though the City would require annexation.

JELD-WEN disagrees that the City's sewer system is "legally available." The City lacks the authority to annex JELD-WEN without JELD-WEN's consent and JELD-WEN has no intention of voluntarily consenting to annexation since JELD-WEN already receives all necessary public services from other sources and annexation would cost JELD-WEN significant sums of money.[1] JELD-WEN has received some or all of its water supply from the City system for at least the last 25 years.

JELD-WEN disagreed with DEQ's position in a June 2, 1997 letter to Richard Nichols, attached as Exhibit C. DEQ responded by letter on June 3, 1997, and stated that it agrees that the area proposed by JELD-WEN is acceptable for the replacement drainfield. Despite the acceptability of the replacement drainfield, DEQ said it was unable to issue the permit because it feels the City of Klamath Falls sewer system is physically and legally available. As a result, DEQ is precluded from issuing a permit to construct a replacement drainfield. June 3, 1997 Letter from DEQ to Stanley K. Meyers, attached as Exhibit D. The letter also suggested that JELD-WEN petition the EQC for a declaratory ruling on this issue. JELD-WEN is working on a temporary solution with DEQ while the EQC reviews this petition.

LEGAL ANALYSIS

JELD-WEN's property is close to the Klamath Falls sewer system which makes the City system arguably "physically available" to JELD-WEN, as defined in OAR 340-71-160(5)(f)(A). However, the physical availability of a sewerage system is just one

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[1]Through conversations with City personnel, Jeld Wen anticipates that annexation would result in a property tax assessment equal to approximately $250,000 to $300,000, plus substantial connection fees and monthly user fees.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

prong of a two-prong test. DEQ must also establish that the City's sewerage system is "legally available" before it can deny JELD-WEN's permit.

As previously mentioned, a sewerage system is legally available if "the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(B). The system is not under a Department connection permit moratorium. However, at issue is whether the City of Klamath Falls (i.e., the sewerage system owner) is "willing or obligated" to provide sewer service to JELD-WEN. Since there is no caselaw interpreting the meaning of "willing or obligated" as these words are used in OAR 340-71-160(5)(f)(B), an analysis of this language is limited to an examination of other statutory and regulatory authority and consideration of the plain meaning of the language.

Pursuant to ORS 454.215(1), "(a)ny municipality may own, acquire, construct, equip, operate and maintain, either within or without its statutory or corporate limits, in whole or in part, disposal systems with all appurtenances necessary, useful or convenient for the collection, treatment and disposal of sewage." The Oregon legislature made it clear in ORS 454.215(2) that the authority it granted to municipalities over disposal systems in ORS 454.215(1) is "in addition to, and not in derogation of any power existing in the municipality under any constitutional, statutory or charter provisions now or hereafter existing." In other words, Oregon Revised Statutes enables municipalities to provide disposal systems, but it does not mandate that they provide such services. Moreover, municipalities have the rights, powers and privileges to determine in which manner they shall provide such services.

Under its City charter, Klamath Falls is "obligated" to provide a sewer system to all who are within city limits. Since JELD-WEN is not within city limits, Klamath Falls is not obligated to provide sewer services to JELD-WEN. Accordingly, the only way Klamath Falls sewer system is "legally available" to JELD-WEN, is if Klamath

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

Falls is "willing" to provide such services. In JELD-WEN's case, Klamath Falls is willing to provide sewer services to JELD-WEN if, and only if, JELD-WEN is annexed to the city. In other words, Klamath Falls' "willingness" to provide sewer services is contingent upon JELD-WEN's annexation to the City. Unless the condition of being annexed to the city is satisfied, Klamath Falls is not willing to deliver sewer services to JELD-WEN. JELD-WEN strenuously opposes annexation.

The power of a municipality to annex territory is entirely a legislative function, granted to the municipality through express authority by the state legislature, and subject only to constitutional restrictions. McQuillan, Municipal Corporations § 7.10 (3rd ed. 1996). In other words, municipalities have no inherent power to annex territory, unless that right is granted by the state legislature. McQuillan at § 7.13. The methods of annexation must specifically be authorized by legislation. McQuillan at § 7.14. Thus, DEQ has no authority to mandate annexation unless that power is expressly granted by the legislature, which it has not done.

ORS Chapter 222 describes seven types of proceedings to annex non-boundary commission territory to a city. These proceedings may be initiated by the city, on its own motion, or by a petition of the landowners in the territory to be annexed. ORS 222.111(2). Since JELD-WEN does not intend to petition for annexation, any annexation proceedings initiated would be done at the city's initiative. Of the seven types of proceedings to annex non-boundary commission territory, five require consent. The five consent annexations are as follows:

1. The general annexation method requires the city council to submit an annexation proposal to the electors of the territory proposed for annexation and to the electors of the annexing city. If a majority of both groups vote in favor of annexation, the territory may be annexed. ORS 222.111(5).

2. Another annexation method involves holding an election in the territory to be annexed and, instead of holding a vote of the electorate, having a public hearing on the annexation. ORS 222.120(2).

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

3. The third method of annexation requires the written consents of 100% of the property owners and more than 50% of the electors residing in the territory to be annexed. Such consent dispenses with the need to take a vote of the property owners and electors in the territory. Again, as in the second method, the citizens are given the opportunity to approve or disapprove of the annexation via a public hearing. ORS 222.125.

4. The *triple majority method of annexation*, which the court of appeals has determined is unconstitutional, requires the written consents of more than half of the landowners in the territory, who also own more than half of the land in the territory, which represents more than half of the assessed value of all real property in the territory proposed to be annexed. The city council must either hold a public hearing for the city on the annexation or put it to a vote of the city's electorate. ORS 222.170(1).

5. The *double majority annexation* is initiated by filing with the city council written consents to annex from a majority of the electors in a territory and from the owners of more than half of the land in the territory. The city council must either hold a public hearing for the city or have a city election on the annexation. ORS 222.170(2).

Despite the subtle and intricate differences between these annexation methods, a common thread runs throughout all of them. Under each method, the three parties at issue (the landowners in the territory, the electorate in the territory and the electorate in the city) have a voice in the process. Whether by voting, written consent or public hearing, Oregon's legislature mandated that the three groups with a vested interest be heard. Moreover, a landowner's ability to give or withhold consent for annexation of his own land is considered a "privilege" under the privileges and immunities clause of Oregon's constitution. Mid-County Future v. Port. Metro. Area LGBC, 82 Or App 193, 728 P2d 63 (1986). "The landowners can neither bring about an annexation that the electorate might oppose . . . nor unilaterally prevent an annexation that the electorate might favor." Mid-County Future v. Port. Metro. Area LGBC, 106 Or App 647, 653, 809 P2d 1354 rev. denied, 312 Or 80 (1991).

There are only two very limited circumstances in which a city may annex a territory without the landowner's consent. First, the city may annex territory which is surrounded by the corporate boundaries of the city ("island annexation"). Although this

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

type of annexation may be done without the consent of the land owners in the territory or the residents in the territory to be annexed, such type of annexation is subject to referendum. ORS 222.750. The only other circumstance where a city may annex a territory without consent is if conditions within a territory have caused a danger to the public health as determined by the Division of Health and such conditions may be alleviated by the services provided by the annexing city. ORS 222.855. ORS 222.840 through 222.910 sets forth a detailed and comprehensive process for allowing health hazard annexations and provides such authority only to the Division of Health. The Oregon legislature has not granted DEQ the authority similar to that granted to the Division of Health to require annexation on a finding of a health hazard. Other than these two specific and limited situations, a city must obtain consent before annexing a territory.

The fact that these two situations are so specific, and would leave little doubt as to whether a particular territory may be annexed under these particular provisions, only demonstrates, at great length, the caution the Oregon legislature took in limiting those situations where a city could act unilaterally. Since the JELD-WEN facility is not an island surrounded by the corporate boundaries of Klamath Falls, and because the Division of Health has not determined a health hazard pursuant to ORS 222.840 through 910, the JELD-WEN property may be annexed to the City of Klamath Falls only with the consent of JELD-WEN. As previously stated, JELD-WEN has no intention of consenting voluntarily.

In the event DEQ does not grant JELD-WEN a permit to repair the existing drainfield, and such inability to repair results in violations of water quality regulations, JELD-WEN may be forced to "consent" to annexation in order to have a disposal system in compliance with the law. Forcing a party's consent to annexation has been regarded as the equivalent of forcing a party to vote a certain way. Pursuant to Hussey v. City of Portland, 64 F.3d 1260 (9th Cir. 1995), such coercion is unconstitutional.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

In Hussey, the Environmental Quality Commission ordered the City of Portland to provide sewer services to residents of an unincorporated area of East Multnomah County (known as "Mid-County"). The EQC also required the residents to hook up to the sewer system once available. Although the EQC forbade the City from requiring annexation as a condition of hooking up to the sewers, the City passed an ordinance which provided a subsidy in the form of reduced sewer connection charges in exchange for landowners signing an irrevocable consent to annexation. 64 F3d at 1262. Those landowners who failed to consent to annexation would not receive reduced sewer connection charges. Id.

A group of landowners sued for declaratory and injunctive relief, arguing that imposing financial distress only on electors who opposed annexation was a violation of their personal right to equal protection under the Fourteenth Amendment. The landowners argued, and the court of appeals agreed, that obtaining the consent of electors is the constitutional equivalent of voting. Even though there is no federal or state constitutional right to vote on annexation of territory by a City, once that right is granted through a statute, the right to vote becomes constitutionally protected. 64 F.3d at 1263. Coercing the landowners to consent to annexation (by imposing financial distress on them if they did not consent) was unconstitutional because it abrogated the landowners' right to vote and therefore failed to survive strict scrutiny.

Here, the situation is similar. DEQ's position requires JELD-WEN to give up its constitutionally protected right to consent (i.e., vote) on annexation by Klamath Falls. Rather than the subsidy provided to the landowners in Hussey v. City of Portland, however, the economic coercion in this case is DEQ's denial of JELD-WEN's repair of its drainfield. Without a satisfactorily-repaired drainfield, JELD-WEN runs the risk of violating several water quality regulations. By denying issuance of the permit, DEQ forces

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

JELD-WEN to consent to annexation to the City. Such coercion distorts the political process and is unconstitutional under Hussey v. City of Portland.

CONCLUSION AND RELIEF REQUESTED

Klamath Falls is willing to provide sewer services only to those parties annexed to the City. JELD-WEN is not presently annexed to the City. It is not willing to voluntarily consent to annexation and it cannot be forced to consent to annexation. Thus, Klamath Falls is not willing to provide sewer services to JELD-WEN.

The sole reason for DEQ's denial of JELD-WEN's permit is because DEQ believed the sewerage system of Klamath Falls was both legally and physically available. Although Klamath Falls system may be physically available, it is not legally available because Klamath Falls is not willing or obligated to provide such services. For these reasons, DEQ is required to issue the Division 71 permit to JELD-WEN.

Respectfully submitted,

SCHWABE, WILLIAMSON & WYATT

By: _____

Jay T. Waldron, OSB #74331
Neal A. Hueske, OSB #91319
Of Attorneys for Plaintiff

NAME AND ADDRESS OF PETITIONER:

JELD-WEN, INC.
3250 Lakeport Blvd.
Klamath Falls, OR 97601
Attention: Rod Wendt

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

that the property owner will receive a permit to construct a system on that property provided procedures and conditions for permit issuance found in OAR 340-71-160 are met.

(4) Approval or Denial:

(a) In order to obtain a favorable site evaluation report the following conditions shall be met:

(A) All criteria for approval of a specific type or types of system, as outlined in OAR 340, Division 71 shall be met;

(B) Each lot or parcel must have sufficient usable area available to accommodate an initial and replacement system. The usable area may be located within the lot or parcel, or within the bounds of another lot or parcel if secured pursuant to OAR 340-71-130(11). Sites may be approved where the initial and replacement systems would be of different types, e.g., a standard subsurface system as the initial system and an alternative system as the replacement system. The site evaluation report shall indicate the type of the initial and type of replacement system for which the site is approved.

EXCEPTION: A replacement area is not required in areas under control of a legal entity such as a city, county, or sanitary district, provided the legal entity gives a written commitment that sewerage service will be provided within five years.

(b) A site evaluation shall be denied where the conditions identified in subsection (4)(a) of this rule are not met;

(c) Technical rule changes shall not invalidate a favorable site evaluation, but may require use of a different kind of system.

(5) Site Evaluation Report Review. A site evaluation report issued by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the site evaluation report issue date, and be accompanied by the review fee. The review shall be conducted and a report prepared by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82; DEQ 8-1983, f. & ef. 5-25-83; DEQ 9-1984, f. & ef. 5-29-84; DEQ 15-1986, f. & ef. 8-6-86

Existing System Evaluation Report

340-71-155 (1) Any person, upon application, may request an evaluation report on an existing on-site sewage disposal system. The application shall be on a form provided by the agent and approved by the Department.

(2) The application is complete only when the form, on its face, is completed in full, signed by the owner or the owner's legally authorized representative, and is accompanied by all necessary exhibits including the fee. A fee shall not be charged for an evaluation report on any proposed repair, alteration or extension of an existing system.

(3) The agent shall:

(a) Examine the records, if available, on the existing system; and

(b) Conduct a field evaluation of the existing system; and

(c) Issue a report of findings to the applicant.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 8-1983, f. & ef. 5-25-83

Permit Application Procedures — General Requirements

340-71-160 (1) No person shall cause or allow construction, alteration, or repair of a system, or any part thereof, without first applying for and obtaining a permit.

EXCEPTION: Emergency repairs as set forth in OAR 340-71-215.

(2) Applications for permits shall be made on forms provided by the Agent and approved by the Department.

(3) An application is complete only when the form, on its face, is completed in full, is signed by the owner or the owner's legally authorized representative, and is accompanied by all required exhibits and fee. Except as otherwise allowed in OAR 340-71-400(6), the exhibits shall include:

(a) Favorable site evaluation report;

(b) Favorable land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission acknowledged comprehensive plan or complies with the statewide planning goals;

(c) Plans and specifications for the on-site system proposed for installation within the area identified in the favorable site evaluation report. The Agent shall determine and request the minimum level of detail necessary to insure proper system construction;

(d) Any other information the Agent finds is necessary to complete the permit application.

(4) The application form shall be received by the Agent only when the form is complete, as detailed in section (3) of this rule.

(5) Upon receipt of a completed application the Agent shall deny the permit if:

(a) The application contains false information;

(b) The application was wrongfully received by the Agent;

(c) The proposed system would not comply with these rules;

(d) The proposed system, if constructed, would violate a Commission moratorium as described in OAR 340-71-460;

(e) The proposed system location is encumbered as described in OAR 340-71-130(8);

(f) A sewerage system which can serve the proposed sewage flow is both legally and physically available, as described below:

(A) Physical Availability. A sewerage system shall be deemed physically available if its nearest connection point from the property to be served is:

(i) For a single family dwelling, or other establishment with a maximum projected daily sewage flow of not more than 450 gallons, within 300 feet;

(ii) For a proposed subdivision or group of two to five single family dwellings, or equivalent projected daily sewage flow, not further than 200 feet multiplied by the number of dwellings or dwelling equivalents;

(iii) For proposed subdivisions or other developments with more than five single family dwellings, or equivalents, the Agent shall make a case-by-case determination of sewerage availability.

EXCEPTION: A sewerage system shall not be considered available if topographic or man-made features make connection physically impractical.

(B) Legal Availability. A sewerage system shall be deemed legally available if the system is not

under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

(6) A permit shall be issued only to a person licensed under ORS 454.695, or to the owner or easement holder of the land on which the system is to be installed.

(7) No person shall construct, alter or repair a system, or any part thereof, unless that person is licensed under ORS 454.695, or is the permittee.

(8) The Agent shall either issue or deny the permit within 20 days after receipt of the completed application.

EXCEPTION: If weather conditions or distance and unavailability of transportation prevent the Agent from acting to either issue or deny the permit within 20 days, the applicant shall be notified in writing. The notification shall state the reason for delay. The Agent shall either issue or deny the permit within 60 days after the mailing date of such notification.

(9) A permit issued pursuant to these rules shall be effective for one year from the date of issuance for construction of the system. The construction-installation permit is not transferable. Once a system is installed pursuant to the permit, and a Certificate of Satisfactory Completion has been issued for the installation, conditions imposed as requirements for permit issuance shall continue in force as long as the system is in use.

(10) Renewal of a permit may be granted to the original permittee if an application for permit renewal is filed prior to the original permit expiration date. Application for permit renewal shall conform to the requirements of sections (2) and (4) of this rule. The permit shall be issued or denied consistent with sections (5), (6), (8), and (9) of this rule.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 19-1981, f. 7-23-81, ef. 7-27-81; DEQ 8-1983, f. & ef. 5-25-83; DEQ 15-1986, f. & ef. 8-6-86

Permit Denial Review

340-71-165(1) A permit denied by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the permit denial notice from the Agent, and be accompanied by the denial review fee. The denial review shall be conducted and a report prepared by the Department.

(2) Permit denials for systems proposed to serve a commercial facility, intended to be used in a commercial activity, trade, occupation or profession, may be appealed through the contested case hearing procedure set forth in ORS Chapter 183 and OAR Chapter 340, Division 11.

(3) If the Agent intends to deny a permit for a parcel of ten acres or larger in size, the Agent shall:

(a) Provide the applicant with a Notice of Intent to Deny;

(b) Specify reasons for the intended denial; and

(c) Offer a contested case hearing in accordance with ORS Chapter 183 and OAR Chapter 340, Division 11.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82

Pre-Cover Inspections

340-71-170 (1) When construction, alteration or repair of a system for which a permit has been issued is complete, except for backfill (cover), or as required by permit, the system installer shall notify the Agent. The Agent shall inspect the installation to determine if it complies with the rules of the Commission, unless the inspection is waived by the Agent in accordance with section (2) of this rule or in accordance with the provisions of OAR 340-71-400(6).

(2) The Agent may, at his own election, waive the pre-cover inspection provided:

(a) The installation is a standard subsurface system installed by a sewage disposal service licensed pursuant to ORS 454.695; and

(b) The inspecting jurisdiction and the Department have developed an impartial method of identifying those installers who have a history of proper installations without excessive numbers of corrections; and

(c) Inspections waived are for installations made by installers identified as having a good history of proper installation; and

(d) A list of installers whose inspections may be waived is available to the public and the Department; and

(e) A representative number of each installer's systems has been inspected, regardless of installation history; and

(f) After system completion the installer certifies in writing that the system complies with the rules of the Commission, and provides the Agent with a detailed as-built plan (drawn to scale) of the installation.

(3) Pre-cover inspection details shall be recorded on a form approved by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 15-1986, f. & ef. 8-6-86

Certificate of Satisfactory Completion

340-71-175 (1) The Agent shall issue a Certificate of Satisfactory Completion, if, upon inspection of installation, the system complies with the rules of the Commission and the conditions of the permit.

(2) If inspected installation does not comply with the rules of the Commission and the conditions of the permit, the permittee shall be notified in writing or a Correction Notice shall be posted on the site. System deficiencies shall be explained and satisfactory completion required. Follow-up inspections may be waived by the Agent. After satisfactory completion a Certificate shall be issued.

(3) If the inspection is not made within seven days after notification of completion, or the inspection is waived, a Certificate of Satisfactory Completion shall be deemed to have been issued by operation of law. In such cases, a modified Certificate shall be issued to the owner.

(4) A system, once installed, shall be backfilled (covered) only when:

(a) The permittee is notified by the Agent that inspection has been waived; or

(b) The inspection has been conducted by the Agent and a Certificate of Satisfactory Completion has been issued; or

under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

(6) A permit shall be issued only to a person licensed under ORS 454.695, or to the owner or easement holder of the land on which the system is to be installed.

(7) No person shall construct, alter or repair a system, or any part thereof, unless that person is licensed under ORS 454.695, or is the permittee.

(8) The Agent shall either issue or deny the permit within 20 days after receipt of the completed application.

EXCEPTION: If weather conditions or distance and unavailability of transportation prevent the Agent from acting to either issue or deny the permit within 20 days, the applicant shall be notified in writing. The notification shall state the reason for delay. The Agent shall either issue or deny the permit within 60 days after the mailing date of such notification.

(9) A permit issued pursuant to these rules shall be effective for one year from the date of issuance for construction of the system. The construction-installation permit is not transferable. Once a system is installed pursuant to the permit, and a Certificate of Satisfactory Completion has been issued for the installation, conditions imposed as requirements for permit issuance shall continue in force as long as the system is in use.

(10) Renewal of a permit may be granted to the original permittee if an application for permit renewal is filed prior to the original permit expiration date. Application for permit renewal shall conform to the requirements of sections (2) and (4) of this rule. The permit shall be issued or denied consistent with sections (5), (6), (8), and (9) of this rule.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 19-1981, f. 7-23-81, ef. 7-27-81; DEQ 8-1983, f. & ef. 5-25-83; DEQ 15-1986, f. & ef. 8-6-86

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(3) If the Agent intends to deny a permit for a parcel of ten acres or larger in size, the Agent shall:

(a) Provide the applicant with a Notice of Intent to Deny;

(b) Specify reasons for the intended denial; and

(c) Offer a contested case hearing in accordance with ORS Chapter 183 and OAR Chapter 340, Division 11.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82

Pre-Cover Inspections

340-71-170 (1) When construction, alteration or repair of a system for which a permit has been issued is complete, except for backfill (cover), or as required by permit, the system installer shall notify the Agent. The Agent shall inspect the installation to determine if it complies with the rules of the Commission, unless the inspection is waived by the Agent in accordance with section (2) of this rule or in accordance with the provisions of OAR 340-71-400(6).

(2) The Agent may, at his own election, waive the pre-cover inspection provided:

(a) The installation is a standard subsurface system installed by a sewage disposal service licensed pursuant to ORS 454.695; and

(b) The inspecting jurisdiction and the Department have developed an impartial method of identifying those installers who have a history of proper installations without excessive numbers of corrections; and

(c) Inspections waived are for installations made by installers identified as having a good history of proper installation; and

(d) A list of installers whose inspections may be waived is available to the public and the Department; and

(e) A representative number of each installer's systems has been inspected, regardless of installation history; and

(f) After system completion the installer certifies in writing that the system complies with the rules of the Commission, and provides the Agent with a detailed as-built plan (drawn to scale) of the installation.

(3) Pre-cover inspection details shall be recorded on a form approved by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 15-1986, f. & ef. 8-6-86

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(2) If inspected installation does not comply with the rules of the Commission and the conditions of the permit, the permittee shall be notified in writing or a Correction Notice shall be posted on the site. System deficiencies shall be explained and satisfactory completion required. Follow-up inspections may be waived by the Agent. After satisfactory completion a Certificate shall be issued.

(3) If the inspection is not made within seven days after notification of completion, or the inspection is waived, a Certificate of Satisfactory Completion shall be deemed to have been issued by operation of law. In such cases, a modified Certificate shall be issued to the owner.

(4) A system, once installed, shall be backfilled (covered) only when:

(a) The permittee is notified by the Agent that inspection has been waived; or

(b) The inspection has been conducted by the Agent and a Certificate of Satisfactory Completion has been issued; or

State of Oregon

Department of Environmental Quality — Memorandum

Date: May 22, 1997

To: File - JELD-WEN, inc.
BEN FAB Division, IW-File
Klamath County

From: Walt West, IW - WQ

Through: Dick Nichols, Eastern Region WQ Manager

Subject: Drainfield Replacement

On May 2, 1997, JELD-WEN, inc., (JWI) notified our Department that sewage was surfacing from their existing drainfield. I met with Karen Olsen at the facility on May 6, 1997, and observed where the effluent was surfacing. The facilitty's septic tank was being pumped on a regular basis to reduce flow into the drainfield system and to prevent sewage from reaching a nearby drainage ditch and to protect human health. On May 13, 1997, Lawrence Brown of the Department's On-Site program conducted a site evaluation for possible repair. The site is located in Klamath Falls at; T38, R9, S19; Tax Lot 400 lots 4 & 5. The evaluation report findings are summarized below.

The soil in the area proposed to install a replacement drainfield was found to be a silty clay. Permanent Groundwater is predicted to rise to within 48 and 53 inches from the ground surface in both areas evaluated.

The rules for standard drainfield systems require that a permanent water table shall be four feet or more from the bottom of the absorption facility. With trench depths of 18 inches, minimum, the water table could be no closer than 66 inches from the ground surface. [OAR 340-71-220 (1) (b)].

The rules for capping fill systems require that a permanent ground water shall be 4 feet below the bottom of the absorption facility, however, capping fills are limited to soils no finer than silty clay loam. A silty clay is finer than a silty clay loam, therefore, capping fill is not an option. Even with 4 feet of separation and 12 inch trench depths, minimum, the permanent water table shall be no closer than 60 inches from the ground surface. OAR 340-71-265 (1)(c) and (f). Again, at this site the permanent water table is predicted to rise to within 48 and 53 inches from the ground surface.

EXHIBIT B
PAGE 1 OF 3

With these two options eliminated, by rule, a pretreatment device would be required. We believe that with the flows of this facility a recirculating gravel filter would be the only appropriate treatment device. Since the effluent quality is similar to that of sand filter effluent 50 linear feet of disposal trench would be required per 150 gallons per day of flow. Technical specifications for a recirculating gravel filter are attached for your information.

The site conditions are not conducive for installing a system at this time. The sidewalls were smeared in test holes 1 through 8 and in the opinion of this Agent damage would occur to the system operation if installed at this time. Test Holes 9 and 10 were drier but area is limited due to the site's limitations. Should a drainfield system be allowed in conjunction with a recirculating gravel filter, installation would need to be delayed until soil dries sufficiently to prevent smearing of the sidewalls of the drainfield trench during construction.

Observations in the test holes dug between drainlines of the original drainfield indicated blackening and moisture extending to at least 30 inches from the drainline. The drainlines were spongy and very soft. Also, the distribution boxes which were uncovered were completely full indicating that the drainlines were saturated. The person who dug the test holes in the original drainfield drove overtop of the existing drainlines and sank about 6 to 10 inches. Damage to the perforated pipe in these areas is expected.

With respect to system repair, OAR 340-71-160 (5)(f) states that upon receipt of a completed application the Agent shall deny the permit if : A sewerage system which can serve the proposed sewage flows is both legally and physically available. Physical Availability is defined by its nearest connection point from the property to be served expressed in feet. For developments with more than 5 single family equivalents projected daily sewage flow, the Agent shall make a case-by-case determination of sewerage availability. A single family dwelling would be required to connect if the sewer is within 300 feet. At this site, the sewer is less than 50 feet running down Lakeport Blvd.

A sewerage system shall be deemed legally available if the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

At this time with the available information, it would seem to us that our rules will dictate that a repair permit not be issued and that you must connect to the City of Klamath Falls sewerage facility. We know that you have done some initial investigation of this option and found that City policy requires annexation which, in turn, involves a significant increase in your property taxes. Nevertheless, the rules governing this type of situation do not consider the potential financial burden of connection as a basis to allow a repair when sewer is deemed available. Further, we believe that the Environmental Quality Commission (EQC) has ruled in the past that annexation is not

an unreasonable requirement for connection to sewer. Our staff is researching past EQC meeting minutes to find the record of such a ruling. If and when we find it, we will provide you a copy.

Enclosures (2)

EXHIBIT B
PAGE 3 OF 3

June 2, 1997

Mr. Richard Nichols
Eastern Region WQ Manager
Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, Oregon 97701

JELD-WEN's Klamath Falls On-Site Drainfield

Dear Mr. Nichols:

This letter will confirm receipt of the Department of Environmental Quality's ("DEQ") Memorandum dated May 22, 1997 addressed to Ben-Fab, and will also serve to address the analysis upon which the DEQ bases its preliminary conclusion that JELD-WEN, inc. ("JWI") "must connect to the City of Klamath Falls sewerage facility." First of all, let me thank you for your courtesy and candor in providing us with the DEQ's preliminary opinions, as we will incur significant civil engineering charges before we even begin the permit process. However, Bill Fagan, myself, and others here at JWI have carefully reviewed the Memorandum and while we agree that the soils would support a properly engineered on-site drainfield, we respectfully (and strenuously) disagree with your annexation conclusion. As the DEQ's preliminary conclusion may be a dispositive issue to moving forward and properly correcting the current problems, and in as much as we currently have the good fortune of not operating under an emergency situation, I was hoping you would be available to meet with me at your convenience, tomorrow, June 3, in your office to discuss this further.

EXHIBIT C
PAGE 1 OF 2

Essentially, I would like to discuss with you the language from the regulation cited in the Memorandum instructing the DEQ agent to deny a repair permit if "A sewerage system which can serve the proposed sewage flows is both legally and physically available." (Emphasis added). As you know, the JWI property and facilities serviced by the existing standard on-site drainfield for the past 20 years are located within and under the jurisdiction of Klamath County—not the City of Klamath Falls. The County sewerage system is located on the other side of the community. Accordingly, the County sewerage system is not "physically available". Furthermore, the City of Klamath Falls has indicated that it is not willing to allow a connection since we are not part of the City. As a result, the City's sewerage system is not "legally available" to JWI at the present time. We do not believe that OAR 340-71-160(5)(f), cited above, should impede our permit process.

I also note in the DEQ Memorandum a reference to possible prior Environmental Quality Commission rulings forcing a landowner to annex with a City to meet the "legal and physical availability" requisites. I am not aware of any such rulings but would appreciate you forwarding same so they can be reviewed by our legal department.

Again, I remain very hopeful that we can quickly resolve this issue and move forward with preventing an emergency situation. Please call me with your availability for tomorrow or if you have any questions. If I am not available when you call, please feel free to call Bill Fagan also. I look forward to meeting you.

Sincerely,

Stan Meyers

Stanley K. Meyers, P.E.
Vice President, Engineering

EXHIBIT C
PAGE 2 OF 2

Oregon

June 3, 1997

DEPARTMENT OF ENVIRONMENTAL QUALITY

EASTERN REGION
Bend Office

RECEIVED
JUN 13 1997
Schwabe, Williamson & Wyatt

Mr. Stanley K. Meyers, P.E.
Vice President, Engineering
JELD-WEN
PO Box 1329
Klamath Falls, OR 97601-0268

Mr. Meyers:

This letter will summarize our telephone conference today. Included in the call were you, Messrs. Charlie Taylor and Bill Fagan of JELD-WEN and Walt West and myself representing DEQ.

The issue discussed relates to the failing on-site sewage disposal system that serves your Klamath Falls wood products complex. The Department has concluded that the City of Klamath Falls sewer is physically and legally available and, as a result, we cannot provide you approval to construct a replacement drainfield. You, on the other hand, disagree that it is available because the City will not allow you to connect unless you annex into the City.

The Department does agree that you have an acceptable area to put a replacement drainfield although because groundwater levels are somewhat shallow, a recirculating gravel filter must be used to pretreat the sewage prior to discharge into the drainfield.

As we concluded in our meeting, the Department believes you should file a petition for declaratory ruling with the Environmental Quality Commission if you wish to pursue construction of a replacement drainfield. I have enclosed the Oregon's Model Rules of Procedure Applicable to Proceedings for Agency Declaratory Rulings for your information. The petition should be filed with the Environmental Quality Commission in care of the Director of DEQ, Langdon Marsh. His address is: 811 SW 6th Avenue, Portland, OR 97204. I have also enclosed a copy of the October 27, 1978 EQC meeting minutes and a supporting document which addresses an issue relative to on-site sewage disposal systems which may have some relevancy to this matter.

If you have questions or comments, please call me or Walt West in this office at (541) 388-6146.

Sincerely,

Richard J. Nichols, Manager
Bend Water Quality Section
Eastern Region

RJN/ns
Enclosures
cc: Susan Greco/Paul Burnet - DEQ - HQ
Larry Knudsen - DOJ - Portland
Stephanie Hallock/file - Bend

EXHIBIT D
PAGE 1 OF 1

2146 NE 4th Street
Suite 104
Bend, OR 97701
(541) 388-6146

Oregon

DEPARTMENT OF
ENVIRONMENTAL
QUALITY

August 26, 1997

Jay T. Waldron
Schwabe, Williamson & Wyatt
PacWest Center, Suite 1600
1211 S.W. 5th Avenue
Portland OR 97204-3795

RE: Petition for Declaratory Ruling regarding OAR 340-71-160(5)(f)

Dear Mr. Waldron:

This letter is to confirm that the Environmental Quality Commission has decided to issue a declaratory ruling interpreting OAR 340-71-160(5)(f), as requested by Jeld-Wen Inc. Since the petition did not list any persons or entities that would be interested in the requested ruling, the Department has determined the following persons to be interested parties:

(1) Janet Gillaspie
Association of Clean Water Agencies
25 N.E. 11th Avenue #200
Portland OR 97232

(2) Gordon Fultz
Association of Oregon Counties
P.O. Box 12729
Salem OR 97309-0729

(3) Joni T. Low
League of Oregon Cities
1201 Court Street N.E.
P.O. Box 928
Salem OR 97308

(4) Kent Colahan
South Suburban Sanitary District
2201 Laverne
Klamath Falls OR 97603

Exhibit B-
30 pages

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
TDD (503) 229-6993

(5) James Keller
City of Klamath Falls
500 Klamath Avenue
Klamath Falls OR 97601

(6) Jeff Webber
DLCD
1175 Court Street N.E.
Salem OR 97310

(7) Harry Richmond
1000 Friends of Oregon
300 Willamette Building
534 S.W. 3rd Avenue
Portland OR 97204

Any of the parties above may petition for intervention in this matter. Petitions will be accepted by the Environmental Quality Commission until September 12, 1997. Petitions should be served on: Environmental Quality Commission, c/o Susan Greco, 811 S.W. 6th Avenue, Portland, Oregon, 97204. Copies should also be served on each of the parties listed above. A petition for intervention must be in writing and contain the items referenced in OAR 137-02-025, a copy of which is attached.

The Environmental Quality Commission will be ruling on any petitions for intervention at its October 3rd, 1997 meeting which will take place in La Grande, Oregon. The Commission will also be determining other procedural issues at that meeting. Once the exact location and time of the meeting is determined, I will let each of you know.

If you should have any questions or need further assistance in the matter, please feel free to call me at (503) 229-5213.

Sincerely,

Susan M. Greco
Rules Coordinator

Enclosures (Petition from Jeld-Wen, Inc.; OAR Chapter 340, Division 11; OAR Chapter 137, Division 02)

cc: Dick Nichols, ER
Walt West, ER
Larry Knudsen, DOJ
Michael Huston, DOJ

RULES OF GENERAL APPLICABILITY AND ORGANIZATION

DIVISION 11

RULES OF PRACTICE AND PROCEDURE

[ED. NOTE: Administrative Orders DEQ 69(Temp) and DEQ 72 repealed previous OAR 340-11-005 through 340-11-170(SA 10).]

Definitions

340-11-005 The words and phrases used in this Division have the same meaning given them in ORS 183.310. Additional terms are defined as follows unless context requires otherwise:

(1) "Adoption" means the carrying of a motion by the Commission with regard to the subject matter or issues of an intended agency action.

(2) "Agency Notice" means publication in OAR and mailing to those on the list as required by ORS 183.335(6).

(3) "Commission" means the Environmental Quality Commission.

(4) "Department" means the Department of Environmental Quality.

(5) "Director" means the Director of the Department or the Director's authorized delegates.

(6) "Filing" means receipt in the office of the Director. Such filing is adequate where filing is required of any document with regard to any matter before the Commission, Department or Director, except a claim of personal liability.

(7) "Model Rules" or "Uniform Rules" means the Attorney General's Uniform and Model Rules of Procedure, OAR 137-01-005 through 137-04-010 as amended and in effect on April 29, 1988.

(8) "Presiding Officer" or "Hearing Officer" means the Commission, its Chairman, the Director, or any individual designated by the Commission or the Director to preside in any contested case, public, or other hearing. Any employee of the Department who actually presides in any such hearing is presumptively designated by the Commission or Director, such presumptive designation to be overcome only by a written statement to the contrary bearing the signature of the Commission Chairman or the Director.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; DEQ 25-1979, f. & ef. 7-5-79; DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Public Notice and Informational Hearings

340-11-007 (1) If the Department proposes to issue or renew with increased discharges, a permit under OAR 340-20-130, 340-20-155, 340-45-033, 340-61-020, or 340-106-001, a public notice containing information regarding the proposed permit will be prepared by the Department and will be forwarded to the applicant or other interested person at the discretion of the Department for comment. Each public notice shall, at a minimum, for that permit, contain:

(a) All Notices:

(A) Name of applicant;

(B) Type and duration of permit;

(C) Type of facility and kind of product if appropriate;

(D) Description of substances stored, disposed of or discharged under the conditions of the permit;

(E) An indication of the location of plans, specifications, or other documents used in preparing the permit;

(F) Any special conditions imposed in the permit.

(b) New Permits Only:

(A) A list of other Department permits requiring public notice under this rule, which are expected to be required;

(B) Basis of the need for a permit.

(c) Renewal Permits with Increased Discharges Only:

(A) Basis of the need for permit modification;

(B) Date of previous permit;

(C) Formal Compliance and enforcement history (excluding items under appeal) under most recent permit.

(2) The notice will also contain a description of public participation opportunities. These contents will be in addition to any specific permit notice requirements of individual programs.

(3) Whenever there is required or permitted a hearing which is neither a contested case hearing nor a rule making hearing as defined in ORS Chapter 183, the Presiding Officer shall follow any applicable procedural law, including case law and rules, and take appropriate procedural steps to accomplish the purpose of the hearing. Interested persons may, on their own motion or that of the Presiding Officer, submit written briefs or oral argument to assist the Presiding Officer in resolution of the procedural matters set forth herein.

(4) Prior to the submission of testimony by members of the general public, the Presiding Officer shall present and offer for the record a summary of the questions the resolution of which, in the Director's preliminary opinion, will determine the matter at issue. The Presiding Officer shall also present so many of the facts relevant to the resolution of these questions as are available and which can practicably be presented in that forum.

(5) Following the public information hearing, or within a reasonable time after receipt of the report of the Presiding Officer, the Director or Commission shall take action upon the matter. Prior to or at the time of such action, the Commission or Director shall address separately each substantial distinct issue raised in the hearings record. This shall be in writing if taken by the Director or shall be noted in the minutes if taken by the Commission in a public forum.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88); DEQ 34-1990, f. 8-20-90, cert. ef. 9-1-90

Hearings on Variances

340-11-008 [DEQ 78, f. 9-6-74, ef. 9-25-76; Repealed by DEQ 122, f. & ef. 9-13-76]

Rulemaking

Notice of Rulemaking

340-11-010 (1) Notice of intention to adopt, amend, or repeal any rule(s) shall be in compliance with applicable state and federal laws and rules, including ORS Chapter 183 and sections (2) and (3) of this rule.

(2) In addition to the news media on the list established pursuant to ORS 183.335(6), a copy of the notice shall be furnished to such news media as the Director may deem appropriate.

(3) In addition to meeting the requirements of ORS 183.335(1), the notice shall contain the following:

(a) Where practicable and appropriate, a copy of the rule proposed to be adopted;

(b) Where the proposed rule is not set forth verbatim in the notice, a statement of the time, place, and manner in which a copy of the proposed rule may be obtained and a description of the subject and issues involved in sufficient detail to inform a person that his interest may be affected;

(c) Whether the Presiding Officer will be a hearing officer or a member of the Commission;

(d) The manner in which persons not planning to attend the hearing may offer for the record written testimony on the proposed rule.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 122, f. & ef. 9-13-76

[ED. NOTE: The text of Temporary Rules is not printed in the Oregon Administrative Rules Compilation. Copies may be obtained from the adopting agency or the Secretary of State.]

Request for a Public Hearing

340-11-015 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Postponing Intended Action

340-11-020 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Rulemaking Process

340-11-024 The rulemaking process shall be governed by the Attorney General's Model Rules, OAR 137-01-005 through 137-01-060. As used in those rules, the terms, "agency", "governing body", and "decision maker" generally should be interpreted to mean "Commission". The term "agency" may also be interpreted to be the "Department" where context requires.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Conduct of Rulemaking Hearing

340-11-025 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Presiding Officer's Report

340-11-030 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Action of the Commission

340-11-035 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Answers, Motions, Amendments and Withdrawals of Petitions

340-11-040 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Petition to Promulgate, Amend or Repeal Rule: Contents of Petition, Filing of Petition

340-11-045 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Petition to Promulgate, Amend, or Repeal Rule: Contents of Petition, Filing of Petition

340-11-046 The filing of petitions for rulemaking and action thereon by the Commission shall be in accordance with the Attorney General's Uniform Rule of Procedure set forth in OAR 137-01-070. As used in that rule, the term "agency" generally refers to the Commission but may refer to the Department if context requires.

Stat. Auth.: ORS Ch. 184 & 468
Hist.: DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Petition to Promulgate, Amend, or Repeal Rule: Contents of Petition, Filing of Petition

340-11-047 [DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Notice of Hearing

340-11-050 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Temporary Rules

340-11-052 The Commission may adopt temporary rules and file the same, along with supportive findings, pursuant to ORS 183.335(5) and 183.355(2) and the Attorney General's Model Rule OAR 137-01-080.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 122, f. & ef. 9-13-76; DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Periodic Rule Review

340-11-053 Periodic review of agency rules shall be accomplished once every three years in

accordance with ORS 183.545 and the Attorney General's Model Rule OAR 137-01-085.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Subpoenas
340-11-055 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Intervention
340-11-060 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Declaratory Ruling: Institution of Proceedings, Consideration of Petition and Disposition of Petition
340-11-061 The declaratory ruling process shall be governed by the Attorney General's Uniform Rules of Procedure, OAR 137-02-010 through 137-02-060. As used in those rules, the terms "agency", "governing body", and "decision maker" generally should be interpreted to mean "Commission". The term "agency" may also be interpreted to be the "Department" where context requires.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Declaratory Rulings: Institution of Proceedings, Consideration of Petition and Disposition of Petition
340-11-062 [DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Conduct of the Hearing
340-11-065 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-24-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Disqualification
340-11-070 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-24-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Powers of Chairmen or Hearings Officer
340-11-075 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-24-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Who May Appear at Hearings
340-11-080 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-24-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Standard of Conduct at Hearings
340-11-085 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-24-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Hearings Reporter
340-11-090 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-24-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Contested Cases

Transcript of Testimony
340-11-095 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Service of Written Notice
340-11-097 (1) Whenever a statute or rule requires that the Commission or Department serve a written notice or final order upon a party other than for purposes of ORS 183.335 or for the purposes of notice to members of the public in general, the notice or final order shall be personally delivered or sent by registered or certified mail.

(2) The Commission or Department perfects service of a written notice when the notice is posted, addressed to, or personally delivered to:

(a) The party; or

(b) Any person designated by law as competent to receive service of a summons or notice for the party; or

(c) Following appearance of Counsel for the party, the party's counsel.

(3) A party holding a license or permit issued by the Department or Commission or an applicant therefore, shall be conclusively presumed able to be served at the address given in his application, as it may be amended from time to time, until the expiration date of the license or permit.

(4) Service of written notice may be proven by a certificate executed by the person effecting service.

(5) In all cases not specifically covered by this section, a rule, or a statute, a writing to a person, if mailed to said person at his last known address, is rebuttably presumed to have reached said person in a timely fashion, notwithstanding lack of certified or registered mailing.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76

Contested Case Proceedings Generally
340-11-098 Except as specifically provided in OAR 340-11-132, contested cases shall be governed by the Attorney General's Model Rules of Procedure, OAR 137-03-001 through 137-03-093. In general, a contested case proceeding is initiated when a decision of the Director or Department is appealed to the Commission. Therefore, as used in the Model Rules, the terms "agency", "governing body", and "decision maker" generally should be interpreted to mean "Commission". The term "agency" may also be interpreted to be Department where context requires.

Stat. Auth.: ORS Ch. 183 & 468

Hist.: DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Written Notice of Opportunity for a Hearing

340-11-100 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Non-Attorney Representation

340-11-102 Pursuant to the provisions of Section 3 of Chapter 833, Oregon Laws 1987, and the Attorney General's Model Rule OAR 137-03-008, a person may be represented by an attorney or by an authorized representative in a contested case proceeding before the Commission or Department.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Agency Representation by Enforcement Section

340-11-103 (1) The Enforcement Section staff is authorized to appear on behalf of the Department in contested case hearings involving civil penalties and/or Department Orders.

(2) The Enforcement Section staff shall not present legal argument on behalf of the Department in contested case hearings.

(3) "Legal argument" as used in this rule includes argument on:

(a) The jurisdiction of the Department to hear the contested case;

(b) The constitutionality of a statute or rule or the application of a constitutional requirement to the Department; and

(c) The application of court precedent to the facts of the particular contested case proceeding.

(4) "Legal argument" as used in this rule does not include presentation of evidence, examination or cross-examination of witnesses, factual argument or argument on:

(a) The application of the facts to the statutes or rules directly applicable to the issues in the contested case;

(b) Comparisons of prior actions of the Department in handling similar situations;

(c) The literal meaning of the statute or rules directly applicable to the issues in the contested case; or

(d) The admissibility of evidence or the correctness of procedures being followed.

(5) When the Enforcement Section staff is representing the Department in a contested case hearing, the hearings officer shall advise the Department representative of the manner in which objections may be made and matters preserved for appeal. Such advice is of a procedural nature and does not change applicable law on waiver or the duty to make timely objections. Where such objections involve legal argument, the hearings officer shall provide a reasonable opportunity for the Department representative to consult legal counsel and shall permit legal counsel to file written legal argument within a reasonable time after conclusion of the hearing but before final disposition.

Stat. Auth.: ORS 183.450(7)
Hist.: DEQ 16-1991, f. & cert. ef. 9-30-91

Generally

340-11-105 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 78, f. 9-6-74, ef. 9-25-74]

Answer Required: Consequences of Failure to Answer

340-11-107 (1) Unless waived in the notice of opportunity for a hearing, and except as otherwise provided by statute or rule, a party who has been served written notice of opportunity for a hearing shall have 21 days from the date of mailing or personal delivery of the notice in which to file with the Director a written answer and application for hearing.

(2) In the answer, the party shall admit or deny all factual matters and shall affirmatively allege any and all affirmative claims or defenses the party may have and the reasoning in support thereof. Except for good cause shown:

(a) Factual matters not controverted shall be presumed admitted;

(b) Failure to raise a claim or defense shall be presumed to be waiver of such claim or defense;

(c) New matters alleged in the answer shall be presumed to be denied unless admitted in subsequent pleading or stipulation by the Department or Commission; and

(d) Subject to ORS 183.415(10) evidence shall not be taken on any issue not raised in the notice and the answer unless such issue is specifically raised by a subsequent petitioner for party status and is determined to be within the scope of the proceeding by the presiding officer.

(3) In the absence of a timely answer, the Director on behalf of the Commission or Department may issue a default order and judgment, based upon a prima facie case made on the record, for the relief sought in the notice.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Oath or Affirmation

340-11-110 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 78, f. 9-6-74, ef. 9-25-74]

Right to Full and True Disclosure of the Facts

340-11-115 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Subpoenas

340-11-116 Subpoenas.

(1) Upon a showing of good cause and general relevance any party to a contested case shall be issued subpoenas to compel the attendance of witnesses and the production of books, records and documents.

(2) Subpoenas may be issued by:

(a) A hearing officer; or

(b) A member of the Commission; or

(c) An attorney of record of the party requesting the subpoena.

(3) Each subpoena authorized by this section shall be served personally upon the witness by the party or any person over 18 years of age.

(4) Witnesses who are subpoenaed, other than parties or officers or employees of the Department or Commission, shall receive the same fees and mileage as in civil actions in the circuit court.

(5) The party requesting the subpoena shall be responsible for serving the subpoena and tendering the fees and mileage to the witness.

(6) A person present in a hearing room before a hearing officer during the conduct of a contested case hearing may be required, by order of the hearing officer, to testify in the same manner as if he were in attendance before the hearing officer upon a subpoena.

(7) Upon a showing of good cause a hearing officer or the Chairman of the Commission may modify or withdraw a subpoena.

(8) Nothing in this section shall preclude informal arrangements for the production of witnesses or documents, or both.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 122, f. & ef. 9-13-76; DEQ 25-1979, f. & ef. 7-5-79; DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Conduct of Hearing

340-11-120 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

The Record

340-11-121 [DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Evidentiary Rules

340-11-125 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74 , ef. 6-25-74; DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Objections

340-11-130 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 78, f. 9-6-74, ef. 9-25-74]

Alternative Procedure for Entry of a Final Order in Contested Cases Resulting from Appeal of Civil Penalty Assessments

340-11-132 In accordance with the procedures and limitations which follows, the Commission's designated Hearing Officer is authorized to enter a final order in contested cases resulting from imposition of civil penalty assessments:

(1) Hearing Officer's Final Order: In a contested case if a majority of the members of the Commission have not heard the case or considered the record, the Hearing Officer shall prepare a written Hearing Officer's Final Order including findings of fact and conclusions of law. The original of the Hearing Officer's Final Order shall be filed with the Commission and copies shall be served upon the parties in accordance with OAR 340-11-097 (regarding service of written notice).

(2) Commencement of Appeal to the Commission:

(a) The Hearing Officer's Final Order shall be the final order of the Commission unless within 30 days from the date of mailing, or if not mailed then from the date of personal service, any of the parties, a member of the Commission, or the Department files with the Commission and serves upon each party and the Department a Notice of Appeal. A proof of service thereof shall also be filed, but failure to file a proof of service shall not be a ground for dismissal of the Notice of Appeal;

(b) The timely filing and service of a Notice of Appeal is a jurisdictional requirement for the commencement of an appeal to the Commission and cannot be waived; a Notice of Appeal which is filed or served late shall not be considered and shall not affect the validity of the Hearing Officer's Final Order which shall remain in full force and effect;

(c) The timely filing and service of a sufficient Notice of Appeal to the Commission shall automatically stay the effect of the Hearing Officer's Final Order.

(3) Contents of Notice of Appeal. A Notice of Appeal shall be in writing and need only state the party's or a Commissioner's intent that the Commission review the Hearing Officer's Final Order.

(4) Procedures on Appeal:

(a) Appellant's Exceptions and Brief — Within 30 days from the date of service or filing of his Notice of Appeal, whichever is later, the Appellant shall file with the Commission and serve upon each other party written exceptions, brief and proof of service. Such exceptions shall specify those findings and conclusions objected to and reasoning, and shall include proposed alternative findings of fact, conclusions of law, and order with specific references to those portions to the record upon which the party relies. Matters not raised before the Hearing Officer shall not be considered except when necessary to prevent manifest injustice. In any case where opposing parties timely serve and file Notices of Appeal, the first to file shall be considered to be the appellant and the opposing party the cross appellant;

(b) Appellee's Brief — Each party so served with exceptions and brief shall then have 30 days from the date of service or filing, whichever is later, in which to file with the Commission and serve upon each other party an answering brief and proof of service;

(c) Reply Brief — Except as provided in subsection (d) of this section, each party served with an answering brief shall have 20 days from the date of service or filing, whichever is later, in which to file with the Commission and serve upon each other party a reply brief and proof of service;

(d) Cross Appeals — Should any party entitled to file an answering brief so elect, he may also cross appeal to the Commission the Hearing Officer's Final Order by filing with the Commission and serving upon each other party in addition to an answering brief a Notice of Cross Appeal, exceptions (described in subsection (a) of this section), a brief on cross appeal and proof of service, all within the same time allowed for an answering

brief. The appellant-cross appellee shall then have 30 days in which to serve and file his reply brief, cross answering brief and proof of service. There shall be no cross reply brief without leave of the Chairman or the Hearing Officer;

(e) Briefing on Commission Invoked Review — Where one or more members of the Commission commence an appeal to the Commission pursuant to subsection (2)(a) of this rule, and where no party to the case has timely served and filed a Notice of Appeal, the Chairman shall promptly notify the parties of the issue that the Commission desires the parties to brief and the schedule for filing and serving briefs. The parties shall limit their briefs to those issues. Where one or more members of the Commission have commenced an appeal to the Commission and a party has also timely commenced such a proceeding, briefing shall follow the schedule set forth in subsections (a), (b), (c), (d), and (f) of this section;

(f) Extensions — The Chairman or a Hearing Officer, upon request, may extend any of the time limits contained in this section. Each extension shall be made in writing and be served upon each party. Any request for an extension may be granted or denied in whole or in part;

(g) Failure to Prosecute — The Commission may dismiss any appeal or cross appeal if the appellant or cross appellant fails to timely file and serve any exceptions or brief required by these rules;

(h) Oral Argument — Following the expiration of the time allowed the parties to present exceptions and briefs, the Chairman may at his discretion schedule the appeal for oral argument before the Commission;

(i) Scope of Review — In an appeal to the Commission of a Hearing Officer's Final Order, the Commission may substitute its judgment for that of the Hearing Officer in making any particular finding of fact, conclusion of law, or order. As to any finding of fact made by the Hearing Officer the Commission may make an identical finding without any further consideration of the record;

(j) Additional Evidence — In an appeal to the Commission of a Hearing Officer's Final Order the Commission may take additional evidence. Requests to present additional evidence shall be submitted by motion and shall be supported by a statement specifying the reason for the failure to present it at the hearing before the Hearing Officer. If the Commission grants the motion, or so decides of its own motion, it may hear the additional evidence itself or remand to a Hearing Officer upon such conditions as it deems just.

(5) In exercising the authority to enter a final order pursuant to this rule, the Hearing Officer:

(a) Shall not reduce the amount of civil penalty imposed by the Director unless:

(A) The department fails to establish some or any of the facts regarding the violation; or

(B) New information is introduced at the hearing regarding mitigating and aggravating circumstances not initially considered by the Director. Under no circumstances shall the Hearing Officer reduce or mitigate a civil penalty based on new information submitted at the hearing below the minimum established in the schedule of civil penalties contained in Commission rules.

(b) May elect to prepare proposed findings of fact and a proposed order and refer the matter to the Commission for entry of a final order pursuant to the general procedure for contested cases prescribed under OAR 340-11-098.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 78, f. 9-6-74, ef. 9-25-74; DEQ 115, f. & ef. 7-6-76; DEQ 25-1979, f. & ef. 7-5-79; DEQ 7-1988, f. & cert. ef. 5-6-88 (and corrected 9-30-88)

Presiding Officer's Proposed Order in Hearing Before the Department

340-11-133 [DEQ 78, f. 9-6-74, ef. 9-25-74; Repealed by DEQ 122, f. & ef. 9-13-76]

Presiding Officer's Proposed Order in Hearing Before the Department

340-11-134 [DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Final Orders in Contested Cases Notification

340-11-135 [DEQ 69(Temp), f. & ef. 3-22-74; DEQ 72, f. 6-5-74, ef. 6-25-74; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Powers of the Director

340-11-136 (1) Except as provided by OAR 340-12-075, the Director, on behalf of the Commission, may execute any written order which has been consented to in writing by the parties adversely affected thereby.

(2) The Director, on behalf of the Commission, may prepare and execute written orders implementing any action taken by the Commission on any matter.

(3) The Director, on behalf of the Commission, may prepare and execute orders upon default where:

(a) The adversely affected parties have been properly notified of the time and manner in which to request a hearing and have failed to file a proper, timely request for a hearing; or

(b) Having requested a hearing, the adversely affected party has failed to appear at the hearing or at any duly scheduled prehearing conference.

(4) Default orders based upon failure to appear shall issue only upon the making of a prima facie case on the record.

Stat. Auth.: ORS Ch. 183 & 468
Hist.: DEQ 122, f. & ef. 9-13-76

Miscellaneous Provisions

340-11-140 [DEQ 122, f. & ef. 9-13-76; Repealed by DEQ 7-1988, f. & cert. ef. 5-6-88]

Procedures for Conduct of Contested Case on Order of Environmental Quality Commission

340-11-141 [DEQ 13-1987(Temp), f. & ef. 6-19-87]

Rules/Applicability

340-11-142 (1) The Environmental Quality Commission hereby adopts the Attorney General's Model Rules numbered OAR 137-03-001 through 137-03-093 and OAR 137-04-010 (Model Rules) for

application to any contested case conducted by or for the Commission on denial pursuant to OAR 340-48-035 of 401 certification of the proposed Salt Caves Hydroelectric Project.

(2) The Model Rules shall only apply to the contested case (or cases) described in section (1) of this rule. The Commission's rules for conduct of contested cases, OAR 340-11-097 through 340-11-140, shall continue to apply in all other cases. These rules shall become effective upon filing of the adopted rule with the Secretary of State.

Stat. Auth.: ORS Ch. 183
Hist.: DEQ 19-1987, f. & ef. 10-15-87

340-11-200 [Renumbered to 340-16-045]

DIVISION 2

MODEL RULES OF PROCEDURE APPLICABLE TO PROCEEDINGS FOR AGENCY DECLARATORY RULINGS

Institution of Proceedings for Declaratory Rulings

137-02-000 [1AG 14, f. & ef. 10-22-75; Repealed by JD 2-1986, f. & ef. 1-27-86]

[ED. NOTE: OAR 137-02-010 to 137-02-060 were adopted by the Attorney General as required by ORS 183.410. Agencies must apply these rules without further adoption or amendment.]

Petition for Declaratory Ruling

137-02-010 The petition to initiate proceedings for declaratory rulings shall contain:

(1) The rule or statute that may apply to the person, property, or state of facts;

(2) A detailed statement of the relevant facts; including sufficient facts to show petitioner's interest;

(3) All propositions of law or contentions asserted by petitioner;

(4) The questions presented;

(5) The specific relief requested; and

(6) The name and address of petitioner and of any other person known by petitioner to be interested in the requested declaratory ruling.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Service of Declaratory Ruling Petition

137-02-020 (1) The petition shall be deemed filed when received by the agency.

(2) Within 60 days after the petition is filed the agency shall notify the petitioner in writing whether it will issue a ruling. If the agency decides to issue a ruling, it shall serve all persons named in the petition by mailing:

(a) A copy of the petition together with a copy of the agency's rules of practice; and

(b) Notice of any proceeding including the hearing at which the petition will be considered. (See OAR 137-02-030 for contents of notice.)

(3) Notwithstanding section (2) of this rule, the agency may decide at any time that it will not issue a declaratory ruling in any specific instance. The agency shall notify the petitioner in writing when the agency decides not to issue a declaratory ruling.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; 1AG 17, f. & ef. 11-25-77; 1AG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Intervention in Declaratory Rulings

137-02-025 (1) Any person or entity may petition the agency for permission to participate in the

proceeding as a party.
(2) The petition for intervention shall be in writing and shall contain:
(a) The rule or statute that may apply to the person, property, or state of facts;
(b) A statement of facts sufficient to show the intervenor's interest;
(c) A statement that the intervenor accepts the petitioner's statement of facts for purposes of the declaratory ruling;
(d) All propositions of law or contentions asserted by the intervenor;
(e) A statement that the intervenor accepts the petitioner's statement of the questions presented or a statement of the questions presented by the intervenor;
(f) A statement of the specific relief requested.
(3) The agency may, in its discretion, invite any person or entity to file a petition for intervention.
(4) The agency, in its discretion, may grant or deny any petition for intervention. If a petition for intervention is granted, the status of the intervenor(s) shall be the same as that of an original petitioner, i.e. the declaratory ruling, if any, issued by the agency shall be binding between the intervenor and the agency on the facts stated in the petition, subject to review as provided in ORS 183.410
(5) The decision to grant or deny a petition for intervention shall be in writing and shall be served on all parties.

Stat. Auth.: ORS Ch. 183.410
Stats. Implemented: ORS 183.410
Hist.: JD 5-1989, f. 10-5-89, cert. ef. 10-15-89; JD 6-1995, f. 8-25-95, cert. ef. 9-9-95

Notice of Declaratory Ruling Hearing

137-02-030 The notice of hearing for a declaratory ruling shall:
(1) Be accompanied by a copy of the petition requesting the declaratory ruling and by a copy of any petition for intervention if copies of these petitions have not previously been served on the party;
(2) Set forth the time and place of the proceeding; and
(3) Identify the presiding officer.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: IAG 14, f. & ef. 10-22-75; IAG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Declaratory Ruling Procedure

137-02-040 (1) The proceeding shall be conducted by and shall be under the control of the presiding officer. The presiding officer may be the chief administrative officer of the agency, a member of its governing body or any other person designated by the agency.
(2) No testimony or other evidence shall be accepted at the hearing. The petition will be decided on the facts stated in the petition, except that the presiding officer may agree to accept, for consideration by the agency, a statement of alternative facts if such a statement has been stipulated to in writing by all parties to the proceeding, including any intervening parties.
(3) The parties and agency staff shall have the right to present oral argument. The presiding officer may impose reasonable time limits on the time allowed for oral argument. The parties and agency staff may file briefs in support of their respective positions. The presiding officer shall fix the time and order of filing briefs and may direct that the briefs be submitted prior to oral argument. The presiding officer may permit the filing of memoranda following the hearing.
(4) The proceeding may be conducted in person or by telephone.
(5) As used in this rule, "telephone" means any two-way electronic communication device.

Stat. Auth.: ORS 183.410
Stats. Implemented: ORS ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; 1AG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89; JD 6-1993, f. 11-1-93, cert. ef. 11-4-93; JD 6-1995, f. 8-25-95, cert. ef. 9-9-95

Presiding Officer's Proposed Declaratory Ruling

137-02-050 (1) Except when the presiding officer is the decision maker, the presiding officer shall prepare a proposed declaratory ruling in accordance with OAR 137-02-060 for consideration by the decision maker.

(2) When a proposed declaratory ruling is considered by the decision maker, the parties and agency staff shall have the right to present oral argument to the decision maker.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Issuance of Declaratory Ruling

137-02-060 (1) The agency shall issue its declaratory ruling within 60 days of the close of the record.

(2) The ruling shall be in writing and shall include:

(a) The facts upon which the ruling is based;

(b) The statute or rule in issue;

(c) The agency's conclusion as to the applicability of the statute or rule to those facts;

(d) The agency's conclusion as to the legal effect or result of applying the statute or rule to those facts;

(e) The reasons relied upon by the agency to support its conclusions;

(f) A statement that under ORS 183.480 the parties may obtain judicial review by filing a petition with the Court of Appeals within 60 days from the date the declaratory ruling is served.

(3) The ruling shall be served by mailing a copy to the parties.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; 1AG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Effect of Agency Ruling

137-02-070 [1AG 14, f. & ef. 11-22-75;
Repealed by JD 2-1986,
f. & ef. 1-27-86]

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

FOR THE STATE OF OREGON

In re JELD-WEN, Inc., Petitioner.	)	No. _____
	)	PETITION FOR A DECLARATORY RULING

JELD-WEN, Inc., through its attorneys Schwabe, Williamson & Wyatt petitions the Environmental Quality Commission for a declaratory ruling pursuant to OAR Chapter 137, Division 2. In support of its petition, JELD-WEN relies on the following statement of issues, statement of facts, legal argument and other information required under OAR 137-02-010.

APPLICABLE RULE

The issue in this case is an interpretation of OAR 340-71-160(5)(f). DEQ claims this regulation requires JELD-WEN to abandon its existing method of sewage disposal [an on-site sewage disposal system (a drainfield)]. DEQ also claims that the regulation requires connection to the City of Klamath Falls' sanitary sewer system, even though the City of Klamath Falls requires annexation of the JELD-WEN property by the City before it will allow a connection. JELD-WEN's property is located in Klamath

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

County. The City stated that it must annex JELD-WEN's property before JELD-WEN can connect to the City sewer system. Despite these physical and legal impediments, DEQ has determined that the City of Klamath Falls' sewer is "physically available" and "legally available" as those terms are defined in the regulation.

In part, the applicable regulations state that no person shall cause or allow construction, alteration, or repair of an on-site sewerage disposal system, without first applying for and obtaining a permit. OAR 340-71-160(1). Under the regulations, DEQ "shall" deny the permit if "a sewerage system which can serve the proposed sewage flow is both legally and physically available." OAR 340-71-160(5)(f). A sewerage system shall be deemed legally available if the system is not subject to a DEQ connection permit moratorium, and "the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(13). A copy of the applicable rule is attached to this Petition as Exhibit A.

STATEMENT OF ISSUES

Whether DEQ can consider a sewerage system to be "legally available" under its regulations if the owner of the sewer system requires the landowner to become annexed in order to be connected?

Whether DEQ is justified in denying JELD-WEN's application for repair of an existing and previously permitted septic tank drainfield system?

STATEMENT OF FACTS

Since approximately 1950, JELD-WEN Inc. has operated and maintained a septic tank/drainfield system at its door and cutstock manufacturing facilities located in Klamath County. The system is used primarily to treat and dispose of domestic wastes generated at the facility.

In 1978, JELD-WEN retained an engineering firm to design upgrades to and repair the existing system. DEQ approved the 1978 design and granted JELD-WEN a

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

permit to install the upgrades. As a condition of the 1978 plan approval letter from DEQ, JELD-WEN was required to leave undeveloped areas contiguous to the drainfield for use as future drainfield. The JELD-WEN system has been included in the facility's NPDES permit in the past. The system has operated successfully since 1978 (and before) without any environmental or public health problems. There have been no regulatory violations at the system.

The JELD-WEN facility is located (and was in 1978) within the unincorporated jurisdiction of Klamath County, outside of the Klamath Falls city limits, but within the urban growth boundary. The Klamath Falls city boundary abuts the JELD-WEN property line, separated by Lakeport Boulevard. There was no available County sewer system in 1978, nor is there today. The City of Klamath Falls, on the other hand, does maintain a City sewer system. However, the City is unwilling to allow a connection to its sewer without annexation of the property to be hooked up.

On May 2, 1997, JELD-WEN discovered that its drainfield system was potentially failing. Jeld-Wen immediately notified Walt West and Dick Nichols of the Eastern Region Water Quality Management program of DEQ's Eastern Region office in Bend, as well as Bob Bagget of the onsite sewer program in Pendleton. Pursuant to OAR 340-71-160, JELD-WEN requested appropriate permits in order to repair the existing drainfield. DEQ informed JELD-WEN that it was necessary first to conduct a Site Evaluation of the system. On May 6 and 13, 1997, DEQ staff traveled to Klamath Falls and conducted the evaluation, after which JELD-WEN completed an application and submitted a $1,200 application fee.

On May 22, 1997, DEQ informed JELD-WEN through a memorandum that the area surveyed was satisfactory for a new system if it included a recirculating gravel filter, and if the soil was allowed to dry before installation. See May 22, 1997 DEQ Memorandum, attached as Exhibit B. However, the memorandum went on to state that

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

DEQ staff would deny JELD-WEN's permit application because it considered the City of Klamath Falls sewer system to be "legally available" even though the City would require annexation.

JELD-WEN disagrees that the City's sewer system is "legally available." The City lacks the authority to annex JELD-WEN without JELD-WEN's consent and JELD-WEN has no intention of voluntarily consenting to annexation since JELD-WEN already receives all necessary public services from other sources and annexation would cost JELD-WEN significant sums of money.[1] JELD-WEN has received some or all of its water supply from the City system for at least the last 25 years.

JELD-WEN disagreed with DEQ's position in a June 2, 1997 letter to Richard Nichols, attached as Exhibit C. DEQ responded by letter on June 3, 1997, and stated that it agrees that the area proposed by JELD-WEN is acceptable for the replacement drainfield. Despite the acceptability of the replacement drainfield, DEQ said it was unable to issue the permit because it feels the City of Klamath Falls sewer system is physically and legally available. As a result, DEQ is precluded from issuing a permit to construct a replacement drainfield. June 3, 1997 Letter from DEQ to Stanley K. Meyers, attached as Exhibit D. The letter also suggested that JELD-WEN petition the EQC for a declaratory ruling on this issue. JELD-WEN is working on a temporary solution with DEQ while the EQC reviews this petition.

LEGAL ANALYSIS

JELD-WEN's property is close to the Klamath Falls sewer system which makes the City system arguably "physically available" to JELD-WEN, as defined in OAR 340-71-160(5)(f)(A). However, the physical availability of a sewerage system is just one

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[1]Through conversations with City personnel, Jeld Wen anticipates that annexation would result in a property tax assessment equal to approximately $250,000 to $300,000, plus substantial connection fees and monthly user fees.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

prong of a two-prong test. DEQ must also establish that the City's sewerage system is "legally available" before it can deny JELD-WEN's permit.

As previously mentioned, a sewerage system is legally available if "the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(B). The system is not under a Department connection permit moratorium. However, at issue is whether the City of Klamath Falls (i.e., the sewerage system owner) is "willing or obligated" to provide sewer service to JELD-WEN. Since there is no caselaw interpreting the meaning of "willing or obligated" as these words are used in OAR 340-71-160(5)(f)(B), an analysis of this language is limited to an examination of other statutory and regulatory authority and consideration of the plain meaning of the language.

Pursuant to ORS 454.215(1), "(a)ny municipality may own, acquire, construct, equip, operate and maintain, either within or without its statutory or corporate limits, in whole or in part, disposal systems with all appurtenances necessary, useful or convenient for the collection, treatment and disposal of sewage." The Oregon legislature made it clear in ORS 454.215(2) that the authority it granted to municipalities over disposal systems in ORS 454.215(1) is "in addition to, and not in derogation of any power existing in the municipality under any constitutional, statutory or charter provisions now or hereafter existing." In other words, Oregon Revised Statutes enables municipalities to provide disposal systems, but it does not mandate that they provide such services. Moreover, municipalities have the rights, powers and privileges to determine in which manner they shall provide such services.

Under its City charter, Klamath Falls is "obligated" to provide a sewer system to all who are within city limits. Since JELD-WEN is not within city limits, Klamath Falls is not obligated to provide sewer services to JELD-WEN. Accordingly, the only way Klamath Falls sewer system is "legally available" to JELD-WEN, is if Klamath

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

Falls is "willing" to provide such services. In JELD-WEN's case, Klamath Falls is willing to provide sewer services to JELD-WEN if, and only if, JELD-WEN is annexed to the city. In other words, Klamath Falls' "willingness" to provide sewer services is contingent upon JELD-WEN's annexation to the City. Unless the condition of being annexed to the city is satisfied, Klamath Falls is not willing to deliver sewer services to JELD-WEN. JELD-WEN strenuously opposes annexation.

The power of a municipality to annex territory is entirely a legislative function, granted to the municipality through express authority by the state legislature, and subject only to constitutional restrictions. McQuillan, Municipal Corporations § 7.10 (3rd ed. 1996). In other words, municipalities have no inherent power to annex territory, unless that right is granted by the state legislature. McQuillan at § 7.13. The methods of annexation must specifically be authorized by legislation. McQuillan at § 7.14. Thus, DEQ has no authority to mandate annexation unless that power is expressly granted by the legislature, which it has not done.

ORS Chapter 222 describes seven types of proceedings to annex non-boundary commission territory to a city. These proceedings may be initiated by the city, on its own motion, or by a petition of the landowners in the territory to be annexed. ORS 222.111(2). Since JELD-WEN does not intend to petition for annexation, any annexation proceedings initiated would be done at the city's initiative. Of the seven types of proceedings to annex non-boundary commission territory, five require consent. The five consent annexations are as follows:

1. The general annexation method requires the city council to submit an annexation proposal to the electors of the territory proposed for annexation and to the electors of the annexing city. If a majority of both groups vote in favor of annexation, the territory may be annexed. ORS 222.111(5).

2. Another annexation method involves holding an election in the territory to be annexed and, instead of holding a vote of the electorate, having a public hearing on the annexation. ORS 222.120(2).

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1500, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

3. The third method of annexation requires the written consents of 100% of the property owners and more than 50% of the electors residing in the territory to be annexed. Such consent dispenses with the need to take a vote of the property owners and electors in the territory. Again, as in the second method, the citizens are given the opportunity to approve or disapprove of the annexation via a public hearing. ORS 222.125.

4. The *triple majority method of annexation*, which the court of appeals has determined is unconstitutional, requires the written consents of more than half of the landowners in the territory, who also own more than half of the land in the territory, which represents more than half of the assessed value of all real property in the territory proposed to be annexed. The city council must either hold a public hearing for the city on the annexation or put it to a vote of the city's electorate. ORS 222.170(1).

5. The *double majority annexation* is initiated by filing with the city council written consents to annex from a majority of the electors in a territory and from the owners of more than half of the land in the territory. The city council must either hold a public hearing for the city or have a city election on the annexation. ORS 222.170(2).

Despite the subtle and intricate differences between these annexation methods, a common thread runs throughout all of them. Under each method, the three parties at issue (the landowners in the territory, the electorate in the territory and the electorate in the city) have a voice in the process. Whether by voting, written consent or public hearing, Oregon's legislature mandated that the three groups with a vested interest be heard. Moreover, a landowner's ability to give or withhold consent for annexation of his own land is considered a "privilege" under the privileges and immunities clause of Oregon's constitution. Mid-County Future v. Port. Metro. Area LGBC, 82 Or App 193, 728 P2d 63 (1986). "The landowners can neither bring about an annexation that the electorate might oppose . . . nor unilaterally prevent an annexation that the electorate might favor." Mid-County Future v. Port. Metro. Area LGBC, 106 Or App 647, 653, 809 P2d 1354 rev. denied, 312 Or 80 (1991).

There are only two very limited circumstances in which a city may annex a territory without the landowner's consent. First, the city may annex territory which is surrounded by the corporate boundaries of the city ("island annexation"). Although this

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795

type of annexation may be done without the consent of the land owners in the territory or the residents in the territory to be annexed, such type of annexation is subject to referendum. ORS 222.750. The only other circumstance where a city may annex a territory without consent is if conditions within a territory have caused a danger to the public health as determined by the Division of Health and such conditions may be alleviated by the services provided by the annexing city. ORS 222.855. ORS 222.840 through 222.910 sets forth a detailed and comprehensive process for allowing health hazard annexations and provides such authority only to the Division of Health. The Oregon legislature has not granted DEQ the authority similar to that granted to the Division of Health to require annexation on a finding of a health hazard. Other than these two specific and limited situations, a city must obtain consent before annexing a territory.

The fact that these two situations are so specific, and would leave little doubt as to whether a particular territory may be annexed under these particular provisions, only demonstrates, at great length, the caution the Oregon legislature took in limiting those situations where a city could act unilaterally. Since the JELD-WEN facility is not an island surrounded by the corporate boundaries of Klamath Falls, and because the Division of Health has not determined a health hazard pursuant to ORS 222.840 through 910, the JELD-WEN property may be annexed to the City of Klamath Falls only with the consent of JELD-WEN. As previously stated, JELD-WEN has no intention of consenting voluntarily.

In the event DEQ does not grant JELD-WEN a permit to repair the existing drainfield, and such inability to repair results in violations of water quality regulations, JELD-WEN may be forced to "consent" to annexation in order to have a disposal system in compliance with the law. Forcing a party's consent to annexation has been regarded as the equivalent of forcing a party to vote a certain way. Pursuant to Hussey v. City of Portland, 64 F.3d 1260 (9th Cir. 1995), such coercion is unconstitutional.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

In Hussey, the Environmental Quality Commission ordered the City of Portland to provide sewer services to residents of an unincorporated area of East Multnomah County (known as "Mid-County"). The EQC also required the residents to hook up to the sewer system once available. Although the EQC forbade the City from requiring annexation as a condition of hooking up to the sewers, the City passed an ordinance which provided a subsidy in the form of reduced sewer connection charges in exchange for landowners signing an irrevocable consent to annexation. 64 F3d at 1262. Those landowners who failed to consent to annexation would not receive reduced sewer connection charges. Id.

A group of landowners sued for declaratory and injunctive relief, arguing that imposing financial distress only on electors who opposed annexation was a violation of their personal right to equal protection under the Fourteenth Amendment. The landowners argued, and the court of appeals agreed, that obtaining the consent of electors is the constitutional equivalent of voting. Even though there is no federal or state constitutional right to vote on annexation of territory by a City, once that right is granted through a statute, the right to vote becomes constitutionally protected. 64 F.3d at 1263. Coercing the landowners to consent to annexation (by imposing financial distress on them if they did not consent) was unconstitutional because it abrogated the landowners' right to vote and therefore failed to survive strict scrutiny.

Here, the situation is similar. DEQ's position requires JELD-WEN to give up its constitutionally protected right to consent (i.e., vote) on annexation by Klamath Falls. Rather than the subsidy provided to the landowners in Hussey v. City of Portland, however, the economic coercion in this case is DEQ's denial of JELD-WEN's repair of its drainfield. Without a satisfactorily-repaired drainfield, JELD-WEN runs the risk of violating several water quality regulations. By denying issuance of the permit, DEQ forces

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

JELD-WEN to consent to annexation to the City. Such coercion distorts the political process and is unconstitutional under Hussey v. City of Portland.

CONCLUSION AND RELIEF REQUESTED

Klamath Falls is willing to provide sewer services only to those parties annexed to the City. JELD-WEN is not presently annexed to the City. It is not willing to voluntarily consent to annexation and it cannot be forced to consent to annexation. Thus, Klamath Falls is not willing to provide sewer services to JELD-WEN.

The sole reason for DEQ's denial of JELD-WEN's permit is because DEQ believed the sewerage system of Klamath Falls was both legally and physically available. Although Klamath Falls system may be physically available, it is not legally available because Klamath Falls is not willing or obligated to provide such services. For these reasons, DEQ is required to issue the Division 71 permit to JELD-WEN.

Respectfully submitted,

SCHWABE, WILLIAMSON & WYATT

By: _____

Jay T. Waldron, OSB #74331
Neal A. Hueske, OSB #91319
Of Attorneys for Plaintiff

NAME AND ADDRESS OF PETITIONER:

JELD-WEN, INC.
3250 Lakeport Blvd.
Klamath Falls, OR 97601
Attention: Rod Wendt

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

that the property owner will receive a permit to construct a system on that property provided procedures and conditions for permit issuance found in OAR 340-71-160 are met.

(4) Approval or Denial:

(a) In order to obtain a favorable site evaluation report the following conditions shall be met:

(A) All criteria for approval of a specific type or types of system, as outlined in OAR 340, Division 71 shall be met;

(B) Each lot or parcel must have sufficient usable area available to accommodate an initial and replacement system. The usable area may be located within the lot or parcel, or within the bounds of another lot or parcel if secured pursuant to OAR 340-71-130(11). Sites may be approved where the initial and replacement systems would be of different types, e.g., a standard subsurface system as the initial system and an alternative system as the replacement system. The site evaluation report shall indicate the type of the initial and type of replacement system for which the site is approved.

EXCEPTION: A replacement area is not required in areas under control of a legal entity such as a city, county, or sanitary district, provided the legal entity gives a written commitment that sewerage service will be provided within five years.

(b) A site evaluation shall be denied where the conditions identified in subsection (4)(a) of this rule are not met;

(c) Technical rule changes shall not invalidate a favorable site evaluation, but may require use of a different kind of system.

(5) Site Evaluation Report Review. A site evaluation report issued by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the site evaluation report issue date, and be accompanied by the review fee. The review shall be conducted and a report prepared by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82; DEQ 8-1983, f. & ef. 5-25-83; DEQ 9-1984, f. & ef. 5-29-84; DEQ 15-1986, f. & ef. 8-6-86

Existing System Evaluation Report

340-71-155 (1) Any person, upon application, may request an evaluation report on an existing on-site sewage disposal system. The application shall be on a form provided by the agent and approved by the Department.

(2) The application is complete only when the form, on its face, is completed in full, signed by the owner or the owner's legally authorized representative, and is accompanied by all necessary exhibits including the fee. A fee shall not be charged for an evaluation report on any proposed repair, alteration or extension of an existing system.

(3) The agent shall:

(a) Examine the records, if available, on the existing system; and

(b) Conduct a field evaluation of the existing system; and

(c) Issue a report of findings to the applicant.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 8-1983, f. & ef. 5-25-83

Permit Application Procedures — General Requirements

340-71-160 (1) No person shall cause or allow construction, alteration, or repair of a system, or any part thereof, without first applying for and obtaining a permit.

EXCEPTION: Emergency repairs as set forth in OAR 340-71-215.

(2) Applications for permits shall be made on forms provided by the Agent and approved by the Department.

(3) An application is complete only when the form, on its face, is completed in full, is signed by the owner or the owner's legally authorized representative, and is accompanied by all required exhibits and fee. Except as otherwise allowed in OAR 340-71-400(6), the exhibits shall include:

(a) Favorable site evaluation report;

(b) Favorable land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission acknowledged comprehensive plan or complies with the statewide planning goals;

(c) Plans and specifications for the on-site system proposed for installation within the area identified in the favorable site evaluation report. The Agent shall determine and request the minimum level of detail necessary to insure proper system construction;

(d) Any other information the Agent finds is necessary to complete the permit application.

(4) The application form shall be received by the Agent only when the form is complete, as detailed in section (3) of this rule.

(5) Upon receipt of a completed application the Agent shall deny the permit if:

(a) The application contains false information;

(b) The application was wrongfully received by the Agent;

(c) The proposed system would not comply with these rules;

(d) The proposed system, if constructed, would violate a Commission moratorium as described in OAR 340-71-460;

(e) The proposed system location is encumbered as described in OAR 340-71-130(8);

(f) A sewerage system which can serve the proposed sewage flow is both legally and physically available, as described below:

(A) Physical Availability. A sewerage system shall be deemed physically available if its nearest connection point from the property to be served is:

(i) For a single family dwelling, or other establishment with a maximum projected daily sewage flow of not more than 450 gallons, within 300 feet;

(ii) For a proposed subdivision or group of two to five single family dwellings, or equivalent projected daily sewage flow, not further than 200 feet multiplied by the number of dwellings or dwelling equivalents;

(iii) For proposed subdivisions or other developments with more than five single family dwellings, or equivalents, the Agent shall make a case-by-case determination of sewerage availability.

EXCEPTION: A sewerage system shall not be considered available if topographic or man-made features make connection physically impractical.

(B) Legal Availability. A sewerage system shall be deemed legally available if the system is not

under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

(6) A permit shall be issued only to a person licensed under ORS 454.695, or to the owner or easement holder of the land on which the system is to be installed.

(7) No person shall construct, alter or repair a system, or any part thereof, unless that person is licensed under ORS 454.695, or is the permittee.

(8) The Agent shall either issue or deny the permit within 20 days after receipt of the completed application.

EXCEPTION: If weather conditions or distance and unavailability of transportation prevent the Agent from acting to either issue or deny the permit within 20 days, the applicant shall be notified in writing. The notification shall state the reason for delay. The Agent shall either issue or deny the permit within 60 days after the mailing date of such notification.

(9) A permit issued pursuant to these rules shall be effective for one year from the date of issuance for construction of the system. The construction-installation permit is not transferable. Once a system is installed pursuant to the permit, and a Certificate of Satisfactory Completion has been issued for the installation, conditions imposed as requirements for permit issuance shall continue in force as long as the system is in use.

(10) Renewal of a permit may be granted to the original permittee if an application for permit renewal is filed prior to the original permit expiration date. Application for permit renewal shall conform to the requirements of sections (2) and (4) of this rule. The permit shall be issued or denied consistent with sections (5), (6), (8), and (9) of this rule.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 19-1981, f. 7-23-81, ef. 7-27-81; DEQ 8-1983, f. & ef. 5-25-83; DEQ 15-1986, f. & ef. 8-6-86

Permit Denial Review

340-71-165(1) A permit denied by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the permit denial notice from the Agent, and be accompanied by the denial review fee. The denial review shall be conducted and a report prepared by the Department.

(2) Permit denials for systems proposed to serve a commercial facility, intended to be used in a commercial activity, trade, occupation or profession, may be appealed through the contested case hearing procedure set forth in ORS Chapter 183 and OAR Chapter 340, Division 11.

(3) If the Agent intends to deny a permit for a parcel of ten acres or larger in size, the Agent shall:

(a) Provide the applicant with a Notice of Intent to Deny;

(b) Specify reasons for the intended denial; and

(c) Offer a contested case hearing in accordance with ORS Chapter 183 and OAR Chapter 340, Division 11.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82

Pre-Cover Inspections

340-71-170 (1) When construction, alteration or repair of a system for which a permit has been issued is complete, except for backfill (cover), or as required by permit, the system installer shall notify the Agent. The Agent shall inspect the installation to determine if it complies with the rules of the Commission, unless the inspection is waived by the Agent in accordance with section (2) of this rule or in accordance with the provisions of OAR 340-71-400(6).

(2) The Agent may, at his own election, waive the pre-cover inspection provided:

(a) The installation is a standard subsurface system installed by a sewage disposal service licensed pursuant to ORS 454.695; and

(b) The inspecting jurisdiction and the Department have developed an impartial method of identifying those installers who have a history of proper installations without excessive numbers of corrections; and

(c) Inspections waived are for installations made by installers identified as having a good history of proper installation; and

(d) A list of installers whose inspections may be waived is available to the public and the Department; and

(e) A representative number of each installer's systems has been inspected, regardless of installation history; and

(f) After system completion the installer certifies in writing that the system complies with the rules of the Commission, and provides the Agent with a detailed as-built plan (drawn to scale) of the installation.

(3) Pre-cover inspection details shall be recorded on a form approved by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 15-1986, f. & ef. 8-6-86

Certificate of Satisfactory Completion

340-71-175 (1) The Agent shall issue a Certificate of Satisfactory Completion, if, upon inspection of installation, the system complies with the rules of the Commission and the conditions of the permit.

(2) If inspected installation does not comply with the rules of the Commission and the conditions of the permit, the permittee shall be notified in writing or a Correction Notice shall be posted on the site. System deficiencies shall be explained and satisfactory completion required. Follow-up inspections may be waived by the Agent. After satisfactory completion a Certificate shall be issued.

(3) If the inspection is not made within seven days after notification of completion, or the inspection is waived, a Certificate of Satisfactory Completion shall be deemed to have been issued by operation of law. In such cases, a modified Certificate shall be issued to the owner.

(4) A system, once installed, shall be backfilled (covered) only when:

(a) The permittee is notified by the Agent that inspection has been waived; or

(b) The inspection has been conducted by the Agent and a Certificate of Satisfactory Completion has been issued; or

State of Oregon
Department of Environmental Quality Memorandum

Date: May 22, 1997

To: File - JELD-WEN, inc.
BEN FAB Division, IW-File
Klamath County

From: Walt West, IW - WQ

Through: Dick Nichols, Eastern Region WQ Manager

Subject: Drainfield Replacement

On May 2, 1997, JELD-WEN, inc., (JWI) notified our Department that sewage was surfacing from their existing drainfield. I met with Karen Olsen at the facility on May 6, 1997, and observed where the effluent was surfacing. The facilitty's septic tank was being pumped on a regular basis to reduce flow into the drainfield system and to prevent sewage from reaching a nearby drainage ditch and to protect human health. On May 13, 1997, Lawrence Brown of the Department's On-Site program conducted a site evaluation for possible repair. The site is located in Klamath Falls at; T38, R9, S19; Tax Lot 400 lots 4 & 5. The evaluation report findings are summarized below.

The soil in the area proposed to install a replacement drainfield was found to be a silty clay. Permanent Groundwater is predicted to rise to within 48 and 53 inches from the ground surface in both areas evaluated.

The rules for standard drainfield systems require that a permanent water table shall be four feet or more from the bottom of the absorption facility. With trench depths of 18 inches, minimum, the water table could be no closer than 66 inches from the ground surface. [OAR 340-71-220 (1) (b)].

The rules for capping fill systems require that a permanent ground water shall be 4 feet below the bottom of the absorption facility, however, capping fills are limited to soils no finer than silty clay loam. A silty clay is finer than a silty clay loam, therefore, capping fill is not an option. Even with 4 feet of separation and 12 inch trench depths, minimum, the permanent water table shall be no closer than 60 inches from the ground surface. OAR 340-71-265 (1)(c) and (f). Again, at this site the permanent water table is predicted to rise to within 48 and 53 inches from the ground surface.

EXHIBIT B
PAGE 1 OF 3

With these two options eliminated, by rule, a pretreatment device would be required. We believe that with the flows of this facility a recirculating gravel filter would be the only appropriate treatment device. Since the effluent quality is similar to that of sand filter effluent 50 linear feet of disposal trench would be required per 150 gallons per day of flow. Technical specifications for a recirculating gravel filter are attached for your information.

The site conditions are not conducive for installing a system at this time. The sidewalls were smeared in test holes 1 through 8 and in the opinion of this Agent damage would occur to the system operation if installed at this time. Test Holes 9 and 10 were drier but area is limited due to the site's limitations. Should a drainfield system be allowed in conjunction with a recirculating gravel filter, installation would need to be delayed until soil dries sufficiently to prevent smearing of the sidewalls of the drainfield trench during construction.

Observations in the test holes dug between drainlines of the original drainfield indicated blackening and moisture extending to at least 30 inches from the drainline. The drainlines were spongy and very soft. Also, the distribution boxes which were uncovered were completely full indicating that the drainlines were saturated. The person who dug the test holes in the original drainfield drove overtop of the existing drainlines and sank about 6 to 10 inches. Damage to the perforated pipe in these areas is expected.

With respect to system repair, OAR 340-71-160 (5)(f) states that upon receipt of a completed application the Agent shall deny the permit if : A sewerage system which can serve the proposed sewage flows is both legally and physically available. Physical Availability is defined by its nearest connection point from the property to be served expressed in feet. For developments with more than 5 single family equivalents projected daily sewage flow, the Agent shall make a case-by-case determination of sewerage availability. A single family dwelling would be required to connect if the sewer is within 300 feet. At this site, the sewer is less than 50 feet running down Lakeport Blvd.

A sewerage system shall be deemed legally available if the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

At this time with the available information, it would seem to us that our rules will dictate that a repair permit not be issued and that you must connect to the City of Klamath Falls sewerage facility. We know that you have done some initial investigation of this option and found that City policy requires annexation which, in turn, involves a significant increase in your property taxes. Nevertheless, the rules governing this type of situation do not consider the potential financial burden of connection as a basis to allow a repair when sewer is deemed available. Further, we believe that the Environmental Quality Commission (EQC) has ruled in the past that annexation is not

an unreasonable requirement for connection to sewer. Our staff is researching past EQC meeting minutes to find the record of such a ruling. If and when we find it, we will provide you a copy.

Enclosures (2)

EXHIBIT B
PAGE 3 OF 3

June 2, 1997

Mr. Richard Nichols
Eastern Region WQ Manager
Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, Oregon 97701

JELD-WEN's Klamath Falls On-Site Drainfield

Dear Mr. Nichols:

This letter will confirm receipt of the Department of Environmental Quality's ("DEQ") Memorandum dated May 22, 1997 addressed to Ben-Fab, and will also serve to address the analysis upon which the DEQ bases its preliminary conclusion that JELD-WEN, inc. ("JWI") "must connect to the City of Klamath Falls sewerage facility." First of all, let me thank you for your courtesy and candor in providing us with the DEQ's preliminary opinions, as we will incur significant civil engineering charges before we even begin the permit process. However, Bill Fagan, myself, and others here at JWI have carefully reviewed the Memorandum and while we agree that the soils would support a properly engineered on-site drainfield, we respectfully (and strenuously) disagree with your annexation conclusion. As the DEQ's preliminary conclusion may be a dispositive issue to moving forward and properly correcting the current problems, and in as much as we currently have the good fortune of not operating under an emergency situation, I was hoping you would be available to meet with me at your convenience, tomorrow, June 3, in your office to discuss this further.

EXHIBIT C
PAGE 1 OF 2

Essentially, I would like to discuss with you the language from the regulation cited in the Memorandum instructing the DEQ agent to deny a repair permit if "A sewerage system which can serve the proposed sewage flows is both legally and physically available." (Emphasis added). As you know, the JWI property and facilities serviced by the existing standard on-site drainfield for the past 20 years are located within and under the jurisdiction of Klamath County—not the City of Klamath Falls. The County sewerage system is located on the other side of the community. Accordingly, the County sewerage system is not "physically available". Furthermore, the City of Klamath Falls has indicated that it is not willing to allow a connection since we are not part of the City. As a result, the City's sewerage system is not "legally available" to JWI at the present time. We do not believe that OAR 340-71-160(5)(f), cited above, should impede our permit process.

I also note in the DEQ Memorandum a reference to possible prior Environmental Quality Commission rulings forcing a landowner to annex with a City to meet the "legal and physical availability" requisites. I am not aware of any such rulings but would appreciate you forwarding same so they can be reviewed by our legal department.

Again, I remain very hopeful that we can quickly resolve this issue and move forward with preventing an emergency situation. Please call me with your availability for tomorrow or if you have any questions. If I am not available when you call, please feel free to call Bill Fagan also. I look forward to meeting you.

Sincerely,

Stan Meyers

Stanley K. Meyers, P.E.
Vice President, Engineering

EXHIBIT C
PAGE 2 OF 2

Oregon

June 3, 1997

DEPARTMENT OF ENVIRONMENTAL QUALITY

EASTERN REGION
Bend Office

RECEIVED
JUN 13 1997
Schwabe, Williamson & Wyatt

Mr. Stanley K. Meyers, P.E.
Vice President, Engineering
JELD-WEN
PO Box 1329
Klamath Falls, OR 97601-0268

Mr. Meyers:

This letter will summarize our telephone conference today. Included in the call were you, Messrs. Charlie Taylor and Bill Fagan of JELD-WEN and Walt West and myself representing DEQ.

The issue discussed relates to the failing on-site sewage disposal system that serves your Klamath Falls wood products complex. The Department has concluded that the City of Klamath Falls sewer is physically and legally available and, as a result, we cannot provide you approval to construct a replacement drainfield. You, on the other hand, disagree that it is available because the City will not allow you to connect unless you annex into the City.

The Department does agree that you have an acceptable area to put a replacement drainfield although because groundwater levels are somewhat shallow, a recirculating gravel filter must be used to pretreat the sewage prior to discharge into the drainfield.

As we concluded in our meeting, the Department believes you should file a petition for declaratory ruling with the Environmental Quality Commission if you wish to pursue construction of a replacement drainfield. I have enclosed the Oregon's Model Rules of Procedure Applicable to Proceedings for Agency Declaratory Rulings for your information. The petition should be filed with the Environmental Quality Commission in care of the Director of DEQ, Langdon Marsh. His address is: 811 SW 6th Avenue, Portland, OR 97204. I have also enclosed a copy of the October 27, 1978 EQC meeting minutes and a supporting document which addresses an issue relative to on-site sewage disposal systems which may have some relevancy to this matter.

If you have questions or comments, please call me or Walt West in this office at (541) 388-6146.

Sincerely,

Richard J. Nichols, Manager
Bend Water Quality Section
Eastern Region

RJN/ns
Enclosures
cc: Susan Greco/Paul Burnet - DEQ - HQ
Larry Knudsen - DOJ - Portland
Stephanie Hallock/file - Bend

EXHIBIT D
PAGE 1 OF 1

2146 NE 4th Street
Suite 104
Bend, OR 97701
(541) 388-6146
DEQ/CR-401-141

State of Oregon
Department of Environmental Quality Memorandum

Date: September 24, 1997

To: Environmental Quality Commission

From: Langdon Marsh, Director

Subject: Agenda Item D, Petition by JELD-WEN, Inc. for Declaratory Ruling Concerning Availability of Sewer as Defined in OAR 340-71-160(5)(f), EQC Meeting: October 3, 1997

At the Commission's August 22, 1997 meeting, the Commission decided to accept a petition for declaratory ruling interpreting OAR 340-71-160(5)(f), as requested by JELD-WEN, Inc. At that time, the Commission allowed interested parties until September 12, 1997 to petition for intervention in the matter. The Commission agreed to rule on any petitions for intervention at this meeting. Notice was sent to potentially affected and interested parties on August 26, 1997 and no petitions for intervention were received for interested or affected parties.

Also at the August meeting, the Commission determined that they wished a Presiding Officer to conduct the hearing on the matter and to present the Commission with a proposed order. The Department has contracted with Lawrence Smith, an Administrative Law Judge with the Employment Department to conduct the hearing. The Commission will, most likely, be making a final ruling at the Commission meeting scheduled for January 8th and 9th, 1998.

Attachments

Letter to Jay Waldron, dated August 26, 1997

Report Prepared By: Susan Greco
Phone: (503) 229-5213

Exhibit C-
24 pages

Oregon

DEPARTMENT OF
ENVIRONMENTAL
QUALITY

August 26, 1997

Jay T. Waldron
Schwabe, Williamson & Wyatt
PacWest Center, Suite 1600
1211 S.W. 5th Avenue
Portland OR 97204-3795

RE: Petition for Declaratory Ruling regarding OAR 340-71-160(5)(f)

Dear Mr. Waldron:

This letter is to confirm that the Environmental Quality Commission has decided to issue a declaratory ruling interpreting OAR 340-71-160(5)(f), as requested by Jeld-Wen Inc. Since the petition did not list any persons or entities that would be interested in the requested ruling, the Department has determined the following persons to be interested parties:

(1) Janet Gillaspie
Association of Clean Water Agencies
25 N.E. 11th Avenue #200
Portland OR 97232

(2) Gordon Fultz
Association of Oregon Counties
P.O. Box 12729
Salem OR 97309-0729

(3) Joni T. Low
League of Oregon Cities
1201 Court Street N.E.
P.O. Box 928
Salem OR 97308

(4) Kent Colahan
South Suburban Sanitary District
2201 Laverne
Klamath Falls OR 97603

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
TDD (503) 229-6993

DEQ-1

(5) James Keller
City of Klamath Falls
500 Klamath Avenue
Klamath Falls OR 97601

(6) Jeff Webber
DLCD
1175 Court Street N.E.
Salem OR 97310

(7) Harry Richmond
1000 Friends of Oregon
300 Willamette Building
534 S.W. 3rd Avenue
Portland OR 97204

Any of the parties above may petition for intervention in this matter. Petitions will be accepted by the Environmental Quality Commission until September 12, 1997. Petitions should be served on: Environmental Quality Commission, c/o Susan Greco, 811 S.W. 6th Avenue, Portland, Oregon, 97204. Copies should also be served on each of the parties listed above. A petition for intervention must be in writing and contain the items referenced in OAR 137-02-025, a copy of which is attached.

The Environmental Quality Commission will be ruling on any petitions for intervention at its October 3rd, 1997 meeting which will take place in La Grande, Oregon. The Commission will also be determining other procedural issues at that meeting. Once the exact location and time of the meeting is determined, I will let each of you know.

If you should have any questions or need further assistance in the matter, please feel free to call me at (503) 229-5213.

Sincerely,

Susan M. Greco
Rules Coordinator

Enclosures (Petition from Jeld-Wen, Inc.; OAR Chapter 340, Division 11; OAR Chapter 137, Division 02)

cc: Dick Nichols, ER
Walt West, ER
Larry Knudsen, DOJ
Michael Huston, DOJ

DIVISION 2

MODEL RULES OF PROCEDURE APPLICABLE TO PROCEEDINGS FOR AGENCY DECLARATORY RULINGS

Institution of Proceedings for Declaratory Rulings
137-02-000 [1AG 14, f. & ef. 10-22-75;
Repealed by JD 2-1986,
f. & ef. 1-27-86]

[ED. NOTE: OAR 137-02-010 to 137-02-060 were adopted by the Attorney General as required by ORS 183.410. Agencies must apply these rules without further adoption or amendment.]

Petition for Declaratory Ruling
137-02-010 The petition to initiate proceedings for declaratory rulings shall contain:
(1) The rule or statute that may apply to the person, property, or state of facts;
(2) A detailed statement of the relevant facts; including sufficient facts to show petitioner's interest;
(3) All propositions of law or contentions asserted by petitioner;
(4) The questions presented;
(5) The specific relief requested; and
(6) The name and address of petitioner and of any other person known by petitioner to be interested in the requested declaratory ruling.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Service of Declaratory Ruling Petition
137-02-020 (1) The petition shall be deemed filed when received by the agency.
(2) Within 60 days after the petition is filed the agency shall notify the petitioner in writing whether it will issue a ruling. If the agency decides to issue a ruling, it shall serve all persons named in the petition by mailing:
(a) A copy of the petition together with a copy of the agency's rules of practice; and
(b) Notice of any proceeding including the hearing at which the petition will be considered. (See OAR 137-02-030 for contents of notice.)
(3) Notwithstanding section (2) of this rule, the agency may decide at any time that it will not issue a declaratory ruling in any specific instance. The agency shall notify the petitioner in writing when the agency decides not to issue a declaratory ruling.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; 1AG 17, f. & ef. 11-25-77; 1AG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Intervention in Declaratory Rulings
137-02-025 (1) Any person or entity may petition the agency for permission to participate in the

proceeding as a party.
(2) The petition for intervention shall be in writing and shall contain:
(a) The rule or statute that may apply to the person, property, or state of facts;
(b) A statement of facts sufficient to show the intervenor's interest;
(c) A statement that the intervenor accepts the petitioner's statement of facts for purposes of the declaratory ruling;
(d) All propositions of law or contentions asserted by the intervenor;
(e) A statement that the intervenor accepts the petitioner's statement of the questions presented or a statement of the questions presented by the intervenor;
(f) A statement of the specific relief requested.
(3) The agency may, in its discretion, invite any person or entity to file a petition for intervention.
(4) The agency, in its discretion, may grant or deny any petition for intervention. If a petition for intervention is granted, the status of the intervenor(s) shall be the same as that of an original petitioner, i.e. the declaratory ruling, if any, issued by the agency shall be binding between the intervenor and the agency on the facts stated in the petition, subject to review as provided in ORS 183.410
(5) The decision to grant or deny a petition for intervention shall be in writing and shall be served on all parties.

Stat. Auth.: ORS Ch. 183.410
Stats. Implemented: ORS 183.410
Hist.: JD 5-1989, f. 10-5-89, cert. ef. 10-15-89; JD 6-1995, f. 8-25-95, cert. ef. 9-9-95

Notice of Declaratory Ruling Hearing

137-02-030 The notice of hearing for a declaratory ruling shall:
(1) Be accompanied by a copy of the petition requesting the declaratory ruling and by a copy of any petition for intervention if copies of these petitions have not previously been served on the party;
(2) Set forth the time and place of the proceeding; and
(3) Identify the presiding officer.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: IAG 14, f. & ef. 10-22-75; IAG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Declaratory Ruling Procedure

137-02-040 (1) The proceeding shall be conducted by and shall be under the control of the presiding officer. The presiding officer may be the chief administrative officer of the agency, a member of its governing body or any other person designated by the agency.
(2) No testimony or other evidence shall be accepted at the hearing. The petition will be decided on the facts stated in the petition, except that the presiding officer may agree to accept, for consideration by the agency, a statement of alternative facts if such a statement has been stipulated to in writing by all parties to the proceeding, including any intervening parties.
(3) The parties and agency staff shall have the right to present oral argument. The presiding officer may impose reasonable time limits on the time allowed for oral argument. The parties and agency staff may file briefs in support of their respective positions. The presiding officer shall fix the time and order of filing briefs and may direct that the briefs be submitted prior to oral argument. The presiding officer may permit the filing of memoranda following the hearing.
(4) The proceeding may be conducted in person or by telephone.
(5) As used in this rule, "telephone" means any two-way electronic communication device.

Stat. Auth.: ORS 183.410
Stats. Implemented: ORS ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; 1AG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89; JD 6-1993, f. 11-1-93, cert. ef. 11-4-93; JD 6-1995, f. 8-25-95, cert. ef. 9-9-95

Presiding Officer's Proposed Declaratory Ruling

137-02-050 (1) Except when the presiding officer is the decision maker, the presiding officer shall prepare a proposed declaratory ruling in accordance with OAR 137-02-060 for consideration by the decision maker.

(2) When a proposed declaratory ruling is considered by the decision maker, the parties and agency staff shall have the right to present oral argument to the decision maker.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Issuance of Declaratory Ruling

137-02-060 (1) The agency shall issue its declaratory ruling within 60 days of the close of the record.

(2) The ruling shall be in writing and shall include:

(a) The facts upon which the ruling is based;

(b) The statute or rule in issue;

(c) The agency's conclusion as to the applicability of the statute or rule to those facts;

(d) The agency's conclusion as to the legal effect or result of applying the statute or rule to those facts;

(e) The reasons relied upon by the agency to support its conclusions;

(f) A statement that under ORS 183.480 the parties may obtain judicial review by filing a petition with the Court of Appeals within 60 days from the date the declaratory ruling is served.

(3) The ruling shall be served by mailing a copy to the parties.

Stat. Auth.: ORS Ch. 183
Stats. Implemented: ORS 183.410
Hist.: 1AG 14, f. & ef. 10-22-75; 1AG 1-1981, f. & ef. 11-17-81; JD 2-1986, f. & ef. 1-27-86; JD 5-1989, f. 10-6-89, cert. ef. 10-15-89

Effect of Agency Ruling

137-02-070 [1AG 14, f. & ef. 11-22-75;
Repealed by JD 2-1986,
f. & ef. 1-27-86]

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

FOR THE STATE OF OREGON

In re JELD-WEN, Inc., Petitioner.	)	No. _____
	)	PETITION FOR A DECLARATORY RULING

JELD-WEN, Inc., through its attorneys Schwabe, Williamson & Wyatt petitions the Environmental Quality Commission for a declaratory ruling pursuant to OAR Chapter 137, Division 2. In support of its petition, JELD-WEN relies on the following statement of issues, statement of facts, legal argument and other information required under OAR 137-02-010.

APPLICABLE RULE

The issue in this case is an interpretation of OAR 340-71-160(5)(f). DEQ claims this regulation requires JELD-WEN to abandon its existing method of sewage disposal [an on-site sewage disposal system (a drainfield)]. DEQ also claims that the regulation requires connection to the City of Klamath Falls' sanitary sewer system, even though the City of Klamath Falls requires annexation of the JELD-WEN property by the City before it will allow a connection. JELD-WEN's property is located in Klamath

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795

County. The City stated that it must annex JELD-WEN's property before JELD-WEN can connect to the City sewer system. Despite these physical and legal impediments, DEQ has determined that the City of Klamath Falls' sewer is "physically available" and "legally available" as those terms are defined in the regulation.

In part, the applicable regulations state that no person shall cause or allow construction, alteration, or repair of an on-site sewerage disposal system, without first applying for and obtaining a permit. OAR 340-71-160(1). Under the regulations, DEQ "shall" deny the permit if "a sewerage system which can serve the proposed sewage flow is both legally and physically available." OAR 340-71-160(5)(f). A sewerage system shall be deemed legally available if the system is not subject to a DEQ connection permit moratorium, and "the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(13). A copy of the applicable rule is attached to this Petition as Exhibit A.

STATEMENT OF ISSUES

Whether DEQ can consider a sewerage system to be "legally available" under its regulations if the owner of the sewer system requires the landowner to become annexed in order to be connected?

Whether DEQ is justified in denying JELD-WEN's application for repair of an existing and previously permitted septic tank drainfield system?

STATEMENT OF FACTS

Since approximately 1950, JELD-WEN Inc. has operated and maintained a septic tank/drainfield system at its door and cutstock manufacturing facilities located in Klamath County. The system is used primarily to treat and dispose of domestic wastes generated at the facility.

In 1978, JELD-WEN retained an engineering firm to design upgrades to and repair the existing system. DEQ approved the 1978 design and granted JELD-WEN a

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

permit to install the upgrades. As a condition of the 1978 plan approval letter from DEQ, JELD-WEN was required to leave undeveloped areas contiguous to the drainfield for use as future drainfield. The JELD-WEN system has been included in the facility's NPDES permit in the past. The system has operated successfully since 1978 (and before) without any environmental or public health problems. There have been no regulatory violations at the system.

The JELD-WEN facility is located (and was in 1978) within the unincorporated jurisdiction of Klamath County, outside of the Klamath Falls city limits, but within the urban growth boundary. The Klamath Falls city boundary abuts the JELD-WEN property line, separated by Lakeport Boulevard. There was no available County sewer system in 1978, nor is there today. The City of Klamath Falls, on the other hand, does maintain a City sewer system. However, the City is unwilling to allow a connection to its sewer without annexation of the property to be hooked up.

On May 2, 1997, JELD-WEN discovered that its drainfield system was potentially failing. Jeld-Wen immediately notified Walt West and Dick Nichols of the Eastern Region Water Quality Management program of DEQ's Eastern Region office in Bend, as well as Bob Bagget of the onsite sewer program in Pendleton. Pursuant to OAR 340-71-160, JELD-WEN requested appropriate permits in order to repair the existing drainfield. DEQ informed JELD-WEN that it was necessary first to conduct a Site Evaluation of the system. On May 6 and 13, 1997, DEQ staff traveled to Klamath Falls and conducted the evaluation, after which JELD-WEN completed an application and submitted a $1,200 application fee.

On May 22, 1997, DEQ informed JELD-WEN through a memorandum that the area surveyed was satisfactory for a new system if it included a recirculating gravel filter, and if the soil was allowed to dry before installation. See May 22, 1997 DEQ Memorandum, attached as Exhibit B. However, the memorandum went on to state that

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795

DEQ staff would deny JELD-WEN's permit application because it considered the City of Klamath Falls sewer system to be "legally available" even though the City would require annexation.

JELD-WEN disagrees that the City's sewer system is "legally available." The City lacks the authority to annex JELD-WEN without JELD-WEN's consent and JELD-WEN has no intention of voluntarily consenting to annexation since JELD-WEN already receives all necessary public services from other sources and annexation would cost JELD-WEN significant sums of money.[1] JELD-WEN has received some or all of its water supply from the City system for at least the last 25 years.

JELD-WEN disagreed with DEQ's position in a June 2, 1997 letter to Richard Nichols, attached as Exhibit C. DEQ responded by letter on June 3, 1997, and stated that it agrees that the area proposed by JELD-WEN is acceptable for the replacement drainfield. Despite the acceptability of the replacement drainfield, DEQ said it was unable to issue the permit because it feels the City of Klamath Falls sewer system is physically and legally available. As a result, DEQ is precluded from issuing a permit to construct a replacement drainfield. June 3, 1997 Letter from DEQ to Stanley K. Meyers, attached as Exhibit D. The letter also suggested that JELD-WEN petition the EQC for a declaratory ruling on this issue. JELD-WEN is working on a temporary solution with DEQ while the EQC reviews this petition.

LEGAL ANALYSIS

JELD-WEN's property is close to the Klamath Falls sewer system which makes the City system arguably "physically available" to JELD-WEN, as defined in OAR 340-71-160(5)(f)(A). However, the physical availability of a sewerage system is just one

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[1]Through conversations with City personnel, Jeld Wen anticipates that annexation would result in a property tax assessment equal to approximately $250,000 to $300,000, plus substantial connection fees and monthly user fees.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

prong of a two-prong test. DEQ must also establish that the City's sewerage system is "legally available" before it can deny JELD-WEN's permit.

As previously mentioned, a sewerage system is legally available if "the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(B). The system is not under a Department connection permit moratorium. However, at issue is whether the City of Klamath Falls (i.e., the sewerage system owner) is "willing or obligated" to provide sewer service to JELD-WEN. Since there is no caselaw interpreting the meaning of "willing or obligated" as these words are used in OAR 340-71-160(5)(f)(B), an analysis of this language is limited to an examination of other statutory and regulatory authority and consideration of the plain meaning of the language.

Pursuant to ORS 454.215(1), "(a)ny municipality may own, acquire, construct, equip, operate and maintain, either within or without its statutory or corporate limits, in whole or in part, disposal systems with all appurtenances necessary, useful or convenient for the collection, treatment and disposal of sewage." The Oregon legislature made it clear in ORS 454.215(2) that the authority it granted to municipalities over disposal systems in ORS 454.215(1) is "in addition to, and not in derogation of any power existing in the municipality under any constitutional, statutory or charter provisions now or hereafter existing." In other words, Oregon Revised Statutes enables municipalities to provide disposal systems, but it does not mandate that they provide such services. Moreover, municipalities have the rights, powers and privileges to determine in which manner they shall provide such services.

Under its City charter, Klamath Falls is "obligated" to provide a sewer system to all who are within city limits. Since JELD-WEN is not within city limits, Klamath Falls is not obligated to provide sewer services to JELD-WEN. Accordingly, the only way Klamath Falls sewer system is "legally available" to JELD-WEN, is if Klamath

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795

Falls is "willing" to provide such services. In JELD-WEN's case, Klamath Falls is willing to provide sewer services to JELD-WEN if, and only if, JELD-WEN is annexed to the city. In other words, Klamath Falls' "willingness" to provide sewer services is contingent upon JELD-WEN's annexation to the City. Unless the condition of being annexed to the city is satisfied, Klamath Falls is not willing to deliver sewer services to JELD-WEN. JELD-WEN strenuously opposes annexation.

The power of a municipality to annex territory is entirely a legislative function, granted to the municipality through express authority by the state legislature, and subject only to constitutional restrictions. McQuillan, Municipal Corporations § 7.10 (3rd ed. 1996). In other words, municipalities have no inherent power to annex territory, unless that right is granted by the state legislature. McQuillan at § 7.13. The methods of annexation must specifically be authorized by legislation. McQuillan at § 7.14. Thus, DEQ has no authority to mandate annexation unless that power is expressly granted by the legislature, which it has not done.

ORS Chapter 222 describes seven types of proceedings to annex non-boundary commission territory to a city. These proceedings may be initiated by the city, on its own motion, or by a petition of the landowners in the territory to be annexed. ORS 222.111(2). Since JELD-WEN does not intend to petition for annexation, any annexation proceedings initiated would be done at the city's initiative. Of the seven types of proceedings to annex non-boundary commission territory, five require consent. The five consent annexations are as follows:

1. The general annexation method requires the city council to submit an annexation proposal to the electors of the territory proposed for annexation and to the electors of the annexing city. If a majority of both groups vote in favor of annexation, the territory may be annexed. ORS 222.111(5).

2. Another annexation method involves holding an election in the territory to be annexed and, instead of holding a vote of the electorate, having a public hearing on the annexation. ORS 222.120(2).

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1900, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

3. The third method of annexation requires the written consents of 100% of the property owners and more than 50% of the electors residing in the territory to be annexed. Such consent dispenses with the need to take a vote of the property owners and electors in the territory. Again, as in the second method, the citizens are given the opportunity to approve or disapprove of the annexation via a public hearing. ORS 222.125.

4. The *triple majority method of annexation*, which the court of appeals has determined is unconstitutional, requires the written consents of more than half of the landowners in the territory, who also own more than half of the land in the territory, which represents more than half of the assessed value of all real property in the territory proposed to be annexed. The city council must either hold a public hearing for the city on the annexation or put it to a vote of the city's electorate. ORS 222.170(1).

5. The *double majority annexation* is initiated by filing with the city council written consents to annex from a majority of the electors in a territory and from the owners of more than half of the land in the territory. The city council must either hold a public hearing for the city or have a city election on the annexation. ORS 222.170(2).

Despite the subtle and intricate differences between these annexation methods, a common thread runs throughout all of them. Under each method, the three parties at issue (the landowners in the territory, the electorate in the territory and the electorate in the city) have a voice in the process. Whether by voting, written consent or public hearing, Oregon's legislature mandated that the three groups with a vested interest be heard. Moreover, a landowner's ability to give or withhold consent for annexation of his own land is considered a "privilege" under the privileges and immunities clause of Oregon's constitution. Mid-County Future v. Port. Metro. Area LGBC, 82 Or App 193, 728 P2d 63 (1986). "The landowners can neither bring about an annexation that the electorate might oppose . . . nor unilaterally prevent an annexation that the electorate might favor." Mid-County Future v. Port. Metro. Area LGBC, 106 Or App 647, 653, 809 P2d 1354 rev. denied, 312 Or 80 (1991).

There are only two very limited circumstances in which a city may annex a territory without the landowner's consent. First, the city may annex territory which is surrounded by the corporate boundaries of the city ("island annexation"). Although this

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795

type of annexation may be done without the consent of the land owners in the territory or the residents in the territory to be annexed, such type of annexation is subject to referendum. ORS 222.750. The only other circumstance where a city may annex a territory without consent is if conditions within a territory have caused a danger to the public health as determined by the Division of Health and such conditions may be alleviated by the services provided by the annexing city. ORS 222.855. ORS 222.840 through 222.910 sets forth a detailed and comprehensive process for allowing health hazard annexations and provides such authority only to the Division of Health. The Oregon legislature has not granted DEQ the authority similar to that granted to the Division of Health to require annexation on a finding of a health hazard. Other than these two specific and limited situations, a city must obtain consent before annexing a territory.

The fact that these two situations are so specific, and would leave little doubt as to whether a particular territory may be annexed under these particular provisions, only demonstrates, at great length, the caution the Oregon legislature took in limiting those situations where a city could act unilaterally. Since the JELD-WEN facility is not an island surrounded by the corporate boundaries of Klamath Falls, and because the Division of Health has not determined a health hazard pursuant to ORS 222.840 through 910, the JELD-WEN property may be annexed to the City of Klamath Falls only with the consent of JELD-WEN. As previously stated, JELD-WEN has no intention of consenting voluntarily.

In the event DEQ does not grant JELD-WEN a permit to repair the existing drainfield, and such inability to repair results in violations of water quality regulations, JELD-WEN may be forced to "consent" to annexation in order to have a disposal system in compliance with the law. Forcing a party's consent to annexation has been regarded as the equivalent of forcing a party to vote a certain way. Pursuant to Hussey v. City of Portland, 64 F.3d 1260 (9th Cir. 1995), such coercion is unconstitutional.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

In Hussey, the Environmental Quality Commission ordered the City of Portland to provide sewer services to residents of an unincorporated area of East Multnomah County (known as "Mid-County"). The EQC also required the residents to hook up to the sewer system once available. Although the EQC forbade the City from requiring annexation as a condition of hooking up to the sewers, the City passed an ordinance which provided a subsidy in the form of reduced sewer connection charges in exchange for landowners signing an irrevocable consent to annexation. 64 F3d at 1262. Those landowners who failed to consent to annexation would not receive reduced sewer connection charges. Id.

A group of landowners sued for declaratory and injunctive relief, arguing that imposing financial distress only on electors who opposed annexation was a violation of their personal right to equal protection under the Fourteenth Amendment. The landowners argued, and the court of appeals agreed, that obtaining the consent of electors is the constitutional equivalent of voting. Even though there is no federal or state constitutional right to vote on annexation of territory by a City, once that right is granted through a statute, the right to vote becomes constitutionally protected. 64 F.3d at 1263. Coercing the landowners to consent to annexation (by imposing financial distress on them if they did not consent) was unconstitutional because it abrogated the landowners' right to vote and therefore failed to survive strict scrutiny.

Here, the situation is similar. DEQ's position requires JELD-WEN to give up its constitutionally protected right to consent (i.e., vote) on annexation by Klamath Falls. Rather than the subsidy provided to the landowners in Hussey v. City of Portland, however, the economic coercion in this case is DEQ's denial of JELD-WEN's repair of its drainfield. Without a satisfactorily-repaired drainfield, JELD-WEN runs the risk of violating several water quality regulations. By denying issuance of the permit, DEQ forces

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795

JELD-WEN to consent to annexation to the City. Such coercion distorts the political process and is unconstitutional under Hussey v. City of Portland.

CONCLUSION AND RELIEF REQUESTED

Klamath Falls is willing to provide sewer services only to those parties annexed to the City. JELD-WEN is not presently annexed to the City. It is not willing to voluntarily consent to annexation and it cannot be forced to consent to annexation. Thus, Klamath Falls is not willing to provide sewer services to JELD-WEN.

The sole reason for DEQ's denial of JELD-WEN's permit is because DEQ believed the sewerage system of Klamath Falls was both legally and physically available. Although Klamath Falls system may be physically available, it is not legally available because Klamath Falls is not willing or obligated to provide such services. For these reasons, DEQ is required to issue the Division 71 permit to JELD-WEN.

Respectfully submitted,

SCHWABE, WILLIAMSON & WYATT

By: _____

Jay T. Waldron, OSB #74331
Neal A. Hueske, OSB #91319
Of Attorneys for Plaintiff

NAME AND ADDRESS OF PETITIONER:

JELD-WEN, INC.
3250 Lakeport Blvd.
Klamath Falls, OR 97601
Attention: Rod Wendt

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

that the property owner will receive a permit to construct a system on that property provided procedures and conditions for permit issuance found in OAR 340-71-160 are met.

(4) Approval or Denial:

(a) In order to obtain a favorable site evaluation report the following conditions shall be met:

(A) All criteria for approval of a specific type or types of system, as outlined in OAR 340, Division 71 shall be met;

(B) Each lot or parcel must have sufficient usable area available to accommodate an initial and replacement system. The usable area may be located within the lot or parcel, or within the bounds of another lot or parcel if secured pursuant to OAR 340-71-130(11). Sites may be approved where the initial and replacement systems would be of different types, e.g., a standard subsurface system as the initial system and an alternative system as the replacement system. The site evaluation report shall indicate the type of the initial and type of replacement system for which the site is approved.

EXCEPTION: A replacement area is not required in areas under control of a legal entity such as a city, county, or sanitary district, provided the legal entity gives a written commitment that sewerage service will be provided within five years.

(b) A site evaluation shall be denied where the conditions identified in subsection (4)(a) of this rule are not met;

(c) Technical rule changes shall not invalidate a favorable site evaluation, but may require use of a different kind of system.

(5) Site Evaluation Report Review. A site evaluation report issued by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the site evaluation report issue date, and be accompanied by the review fee. The review shall be conducted and a report prepared by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82; DEQ 8-1983, f. & ef. 5-25-83; DEQ 9-1984, f. & ef. 5-29-84; DEQ 15-1986, f. & ef. 8-6-86

Existing System Evaluation Report

340-71-155 (1) Any person, upon application, may request an evaluation report on an existing on-site sewage disposal system. The application shall be on a form provided by the agent and approved by the Department.

(2) The application is complete only when the form, on its face, is completed in full, signed by the owner or the owner's legally authorized representative, and is accompanied by all necessary exhibits including the fee. A fee shall not be charged for an evaluation report on any proposed repair, alteration or extension of an existing system.

(3) The agent shall:

(a) Examine the records, if available, on the existing system; and

(b) Conduct a field evaluation of the existing system; and

(c) Issue a report of findings to the applicant.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 8-1983, f. & ef. 5-25-83

Permit Application Procedures — General Requirements

340-71-160 (1) No person shall cause or allow construction, alteration, or repair of a system, or any part thereof, without first applying for and obtaining a permit.

EXCEPTION: Emergency repairs as set forth in OAR 340-71-215.

(2) Applications for permits shall be made on forms provided by the Agent and approved by the Department.

(3) An application is complete only when the form, on its face, is completed in full, is signed by the owner or the owner's legally authorized representative, and is accompanied by all required exhibits and fee. Except as otherwise allowed in OAR 340-71-400(6), the exhibits shall include:

(a) Favorable site evaluation report;

(b) Favorable land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission acknowledged comprehensive plan or complies with the statewide planning goals;

(c) Plans and specifications for the on-site system proposed for installation within the area identified in the favorable site evaluation report. The Agent shall determine and request the minimum level of detail necessary to insure proper system construction;

(d) Any other information the Agent finds is necessary to complete the permit application.

(4) The application form shall be received by the Agent only when the form is complete, as detailed in section (3) of this rule.

(5) Upon receipt of a completed application the Agent shall deny the permit if:

(a) The application contains false information;

(b) The application was wrongfully received by the Agent;

(c) The proposed system would not comply with these rules;

(d) The proposed system, if constructed, would violate a Commission moratorium as described in OAR 340-71-460;

(e) The proposed system location is encumbered as described in OAR 340-71-130(8);

(f) A sewerage system which can serve the proposed sewage flow is both legally and physically available, as described below:

(A) Physical Availability. A sewerage system shall be deemed physically available if its nearest connection point from the property to be served is:

(i) For a single family dwelling, or other establishment with a maximum projected daily sewage flow of not more than 450 gallons, within 300 feet;

(ii) For a proposed subdivision or group of two to five single family dwellings, or equivalent projected daily sewage flow, not further than 200 feet multiplied by the number of dwellings or dwelling equivalents;

(iii) For proposed subdivisions or other developments with more than five single family dwellings, or equivalents, the Agent shall make a case-by-case determination of sewerage availability.

EXCEPTION: A sewerage system shall not be considered available if topographic or man-made features make connection physically impractical.

(B) Legal Availability. A sewerage system shall be deemed legally available if the system is not

under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

(6) A permit shall be issued only to a person licensed under ORS 454.695, or to the owner or easement holder of the land on which the system is to be installed.

(7) No person shall construct, alter or repair a system, or any part thereof, unless that person is licensed under ORS 454.695, or is the permittee.

(8) The Agent shall either issue or deny the permit within 20 days after receipt of the completed application.

EXCEPTION: If weather conditions or distance and unavailability of transportation prevent the Agent from acting to either issue or deny the permit within 20 days, the applicant shall be notified in writing. The notification shall state the reason for delay. The Agent shall either issue or deny the permit within 60 days after the mailing date of such notification.

(9) A permit issued pursuant to these rules shall be effective for one year from the date of issuance for construction of the system. The construction-installation permit is not transferable. Once a system is installed pursuant to the permit, and a Certificate of Satisfactory Completion has been issued for the installation, conditions imposed as requirements for permit issuance shall continue in force as long as the system is in use.

(10) Renewal of a permit may be granted to the original permittee if an application for permit renewal is filed prior to the original permit expiration date. Application for permit renewal shall conform to the requirements of sections (2) and (4) of this rule. The permit shall be issued or denied consistent with sections (5), (6), (8), and (9) of this rule.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 19-1981, f. 7-23-81, ef. 7-27-81; DEQ 8-1983, f. & ef. 5-25-83; DEQ 15-1986, f. & ef. 8-6-86

Permit Denial Review

340-71-165(1) A permit denied by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the permit denial notice from the Agent, and be accompanied by the denial review fee. The denial review shall be conducted and a report prepared by the Department.

(2) Permit denials for systems proposed to serve a commercial facility, intended to be used in a commercial activity, trade, occupation or profession, may be appealed through the contested case hearing procedure set forth in ORS Chapter 183 and OAR Chapter 340, Division 11.

(3) If the Agent intends to deny a permit for a parcel of ten acres or larger in size, the Agent shall:

(a) Provide the applicant with a Notice of Intent to Deny;

(b) Specify reasons for the intended denial; and

(c) Offer a contested case hearing in accordance with ORS Chapter 183 and OAR Chapter 340, Division 11.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82

Pre-Cover Inspections

340-71-170 (1) When construction, alteration or repair of a system for which a permit has been issued is complete, except for backfill (cover), or as required by permit, the system installer shall notify the Agent. The Agent shall inspect the installation to determine if it complies with the rules of the Commission, unless the inspection is waived by the Agent in accordance with section (2) of this rule or in accordance with the provisions of OAR 340-71-400(6).

(2) The Agent may, at his own election, waive the pre-cover inspection provided:

(a) The installation is a standard subsurface system installed by a sewage disposal service licensed pursuant to ORS 454.695; and

(b) The inspecting jurisdiction and the Department have developed an impartial method of identifying those installers who have a history of proper installations without excessive numbers of corrections; and

(c) Inspections waived are for installations made by installers identified as having a good history of proper installation; and

(d) A list of installers whose inspections may be waived is available to the public and the Department; and

(e) A representative number of each installer's systems has been inspected, regardless of installation history; and

(f) After system completion the installer certifies in writing that the system complies with the rules of the Commission, and provides the Agent with a detailed as-built plan (drawn to scale) of the installation.

(3) Pre-cover inspection details shall be recorded on a form approved by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 15-1986, f. & ef. 8-6-86

Certificate of Satisfactory Completion

340-71-175 (1) The Agent shall issue a Certificate of Satisfactory Completion, if, upon inspection of installation, the system complies with the rules of the Commission and the conditions of the permit.

(2) If inspected installation does not comply with the rules of the Commission and the conditions of the permit, the permittee shall be notified in writing or a Correction Notice shall be posted on the site. System deficiencies shall be explained and satisfactory completion required. Follow-up inspections may be waived by the Agent. After satisfactory completion a Certificate shall be issued.

(3) If the inspection is not made within seven days after notification of completion, or the inspection is waived, a Certificate of Satisfactory Completion shall be deemed to have been issued by operation of law. In such cases, a modified Certificate shall be issued to the owner.

(4) A system, once installed, shall be backfilled (covered) only when:

(a) The permittee is notified by the Agent that inspection has been waived; or

(b) The inspection has been conducted by the Agent and a Certificate of Satisfactory Completion has been issued; or

State of Oregon

Department of Environmental Quality

Memorandum

Date: May 22, 1997

To: File - JELD-WEN, inc.
BEN FAB Division, IW-File
Klamath County

From: Walt West, IW - WQ

Through: Dick Nichols, Eastern Region WQ Manager

Subject: Drainfield Replacement

On May 2, 1997, JELD-WEN, inc., (JWI) notified our Department that sewage was surfacing from their existing drainfield. I met with Karen Olsen at the facility on May 6, 1997, and observed where the effluent was surfacing. The facilitty's septic tank was being pumped on a regular basis to reduce flow into the drainfield system and to prevent sewage from reaching a nearby drainage ditch and to protect human health. On May 13, 1997, Lawrence Brown of the Department's On-Site program conducted a site evaluation for possible repair. The site is located in Klamath Falls at; T38, R9, S19; Tax Lot 400 lots 4 & 5. The evaluation report findings are summarized below.

The soil in the area proposed to install a replacement drainfield was found to be a silty clay. Permanent Groundwater is predicted to rise to within 48 and 53 inches from the ground surface in both areas evaluated.

The rules for standard drainfield systems require that a permanent water table shall be four feet or more from the bottom of the absorption facility. With trench depths of 18 inches, minimum, the water table could be no closer than 66 inches from the ground surface. [OAR 340-71-220 (1) (b)].

The rules for capping fill systems require that a permanent ground water shall be 4 feet below the bottom of the absorption facility, however, capping fills are limited to soils no finer than silty clay loam. A silty clay is finer than a silty clay loam, therefore, capping fill is not an option. Even with 4 feet of separation and 12 inch trench depths, minimum, the permanent water table shall be no closer than 60 inches from the ground surface. OAR 340-71-265 (1)(c) and (f). Again, at this site the permanent water table is predicted to rise to within 48 and 53 inches from the ground surface.

EXHIBIT B
PAGE 1 OF 3

With these two options eliminated, by rule, a pretreatment device would be required. We believe that with the flows of this facility a recirculating gravel filter would be the only appropriate treatment device. Since the effluent quality is similar to that of sand filter effluent 50 linear feet of disposal trench would be required per 150 gallons per day of flow. Technical specifications for a recirculating gravel filter are attached for your information.

The site conditions are not conducive for installing a system at this time. The sidewalls were smeared in test holes 1 through 8 and in the opinion of this Agent damage would occur to the system operation if installed at this time. Test Holes 9 and 10 were drier but area is limited due to the site's limitations. Should a drainfield system be allowed in conjunction with a recirculating gravel filter, installation would need to be delayed until soil dries sufficiently to prevent smearing of the sidewalls of the drainfield trench during construction.

Observations in the test holes dug between drainlines of the original drainfield indicated blackening and moisture extending to at least 30 inches from the drainline. The drainlines were spongy and very soft. Also, the distribution boxes which were uncovered were completely full indicating that the drainlines were saturated. The person who dug the test holes in the original drainfield drove overtop of the existing drainlines and sank about 6 to 10 inches. Damage to the perforated pipe in these areas is expected.

With respect to system repair, OAR 340-71-160 (5)(f) states that upon receipt of a completed application the Agent shall deny the permit if : A sewerage system which can serve the proposed sewage flows is both legally and physically available. Physical Availability is defined by its nearest connection point from the property to be served expressed in feet. For developments with more than 5 single family equivalents projected daily sewage flow, the Agent shall make a case-by-case determination of sewerage availability. A single family dwelling would be required to connect if the sewer is within 300 feet. At this site, the sewer is less than 50 feet running down Lakeport Blvd.

A sewerage system shall be deemed legally available if the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

At this time with the available information, it would seem to us that our rules will dictate that a repair permit not be issued and that you must connect to the City of Klamath Falls sewerage facility. We know that you have done some initial investigation of this option and found that City policy requires annexation which, in turn, involves a significant increase in your property taxes. Nevertheless, the rules governing this type of situation do not consider the potential financial burden of connection as a basis to allow a repair when sewer is deemed available. Further, we believe that the Environmental Quality Commission (EQC) has ruled in the past that annexation is not

an unreasonable requirement for connection to sewer. Our staff is researching past EQC meeting minutes to find the record of such a ruling. If and when we find it, we will provide you a copy.

Enclosures (2)

EXHIBIT B
PAGE 3 OF 3

June 2, 1997

Mr. Richard Nichols
Eastern Region WQ Manager
Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, Oregon 97701

JELD-WEN's Klamath Falls On-Site Drainfield

Dear Mr. Nichols:

This letter will confirm receipt of the Department of Environmental Quality's ("DEQ") Memorandum dated May 22, 1997 addressed to Ben-Fab, and will also serve to address the analysis upon which the DEQ bases its preliminary conclusion that JELD-WEN, inc. ("JWI") "must connect to the City of Klamath Falls sewerage facility." First of all, let me thank you for your courtesy and candor in providing us with the DEQ's preliminary opinions, as we will incur significant civil engineering charges before we even begin the permit process. However, Bill Fagan, myself, and others here at JWI have carefully reviewed the Memorandum and while we agree that the soils would support a properly engineered on-site drainfield, we respectfully (and strenuously) disagree with your annexation conclusion. As the DEQ's preliminary conclusion may be a dispositive issue to moving forward and properly correcting the current problems, and in as much as we currently have the good fortune of not operating under an emergency situation, I was hoping you would be available to meet with me at your convenience, tomorrow, June 3, in your office to discuss this further.

EXHIBIT C
PAGE 1 OF 2

Essentially, I would like to discuss with you the language from the regulation cited in the Memorandum instructing the DEQ agent to deny a repair permit if "A sewerage system which can serve the proposed sewage flows is both legally and physically available." (Emphasis added). As you know, the JWI property and facilities serviced by the existing standard on-site drainfield for the past 20 years are located within and under the jurisdiction of Klamath County—not the City of Klamath Falls. The County sewerage system is located on the other side of the community. Accordingly, the County sewerage system is not "physically available". Furthermore, the City of Klamath Falls has indicated that it is not willing to allow a connection since we are not part of the City. As a result, the City's sewerage system is not "legally available" to JWI at the present time. We do not believe that OAR 340-71-160(5)(f), cited above, should impede our permit process.

I also note in the DEQ Memorandum a reference to possible prior Environmental Quality Commission rulings forcing a landowner to annex with a City to meet the "legal and physical availability" requisites. I am not aware of any such rulings but would appreciate you forwarding same so they can be reviewed by our legal department.

Again, I remain very hopeful that we can quickly resolve this issue and move forward with preventing an emergency situation. Please call me with your availability for tomorrow or if you have any questions. If I am not available when you call, please feel free to call Bill Fagan also. I look forward to meeting you.

Sincerely,

Stan Meyers

Stanley K. Meyers, P.E.
Vice President, Engineering

EXHIBIT C
PAGE 2 OF 2

Oregon

DEPARTMENT OF
ENVIRONMENTAL
QUALITY

EASTERN REGION
Bend Office

June 3, 1997

RECEIVED
JUN 13 1997
Schwabe, Williamson & Wyatt

Mr. Stanley K. Meyers, P.E.
Vice President, Engineering
JELD-WEN
PO Box 1329
Klamath Falls, OR 97601-0268

Mr. Meyers:

This letter will summarize our telephone conference today. Included in the call were you, Messrs. Charlie Taylor and Bill Fagan of JELD-WEN and Walt West and myself representing DEQ.

The issue discussed relates to the failing on-site sewage disposal system that serves your Klamath Falls wood products complex. The Department has concluded that the City of Klamath Falls sewer is physically and legally available and, as a result, we cannot provide you approval to construct a replacement drainfield. You, on the other hand, disagree that it is available because the City will not allow you to connect unless you annex into the City.

The Department does agree that you have an acceptable area to put a replacement drainfield although because groundwater levels are somewhat shallow, a recirculating gravel filter must be used to pretreat the sewage prior to discharge into the drainfield.

As we concluded in our meeting, the Department believes you should file a petition for declaratory ruling with the Environmental Quality Commission if you wish to pursue construction of a replacement drainfield. I have enclosed the Oregon's Model Rules of Procedure Applicable to Proceedings for Agency Declaratory Rulings for your information. The petition should be filed with the Environmental Quality Commission in care of the Director of DEQ, Langdon Marsh. His address is: 811 SW 6th Avenue, Portland, OR 97204. I have also enclosed a copy of the October 27, 1978 EQC meeting minutes and a supporting document which addresses an issue relative to on-site sewage disposal systems which may have some relevancy to this matter.

If you have questions or comments, please call me or Walt West in this office at (541) 388-6146.

Sincerely,

Richard J. Nichols, Manager
Bend Water Quality Section
Eastern Region

RJN/ns
Enclosures
cc: Susan Greco/Paul Burnet - DEQ - HQ
Larry Knudsen - DOJ - Portland
Stephanie Hallock/file - Bend

EXHIBIT D
PAGE 1 OF 1

2146 NE 4th Street
Suite 104
Bend, OR 97701
(541) 388-6146
DEQ/CR-101 (-4)

SCHWABE WILLIAMSON & WYATT P.C.
ATTORNEYS AT LAW

PACWEST CENTER, SUITES 1600-1800
1211 SOUTHWEST FIFTH AVENUE ▪ PORTLAND, OREGON 97204-3795
TELEPHONE: 503 222-9981 ▪ FAX: 503 796-2900 ▪ TELEX: 650-686-1360

NEAL A. HUESKE
Direct Line: (503) 222-9981
E-Mail Address: nah@schwabe.com

November 19, 1997

VIA HAND DELIVERY
Environmental Quality Commission
811 SW Sixth Avenue
Portland, Oregon 97204

Attention: Ms. Susan Greco

Re: Brief in Support of Petition for Declaratory Ruling
Our File No. 101984-105068

Dear Commission Members:

In accordance with Susan Greco's November 5, 1997 letter to our office, I enclose copies of JELD-WEN, Inc.'s Brief in Support of Petition for Declaratory Ruling. Also enclosed for filing is the original brief with the attached Certificate of Service showing service on Michael Huston.

As requested, a copy of the brief has been faxed to Administrative Law Judge Lawrence Smith, as well as sent via regular mail.

If you have any questions, please give me a call.

Very truly yours,

Neal A. Hueske

Neal A. Hueske

NAH:mfc
cc: Mr. Stanley K. Meyers (JELD-WEN)
Mr. Michael Huston (Oregon Department of Justice)

Exhibit D -
22 pages

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

FOR THE STATE OF OREGON

In re JELD-WEN, Inc., Petitioner.	)	No. _____
	)	BRIEF IN SUPPORT OF PETITION FOR A DECLARATORY RULING

Pursuant to OAR 340-71-160, JELD-WEN, Inc., in early May, 1997, submitted an initial application and $1,200 application fee to DEQ for a permit to repair its existing drainfield. DEQ rejected JELD-WEN's permit application because it incorrectly deemed the City of Klamath Falls' public sewer system to be "legally available" to JELD-WEN, even though JELD-WEN is not within the Klamath Falls city limits and would be required to consent to annexation prior to hookup to the City sewer. DEQ's rejection of JELD-WEN's permit application forces JELD-WEN to choose between shutting down its manufacturing plant or otherwise consenting to annexation against its wishes. Such economic coercion to annexation is illegal under established Oregon law.

Pursuant to ORS 183.410, JELD-WEN, Inc., through its attorneys Schwabe, Williamson & Wyatt, petitioned the Environmental Quality Commission (the "EQC") to

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1800-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

issue a declaratory ruling for an interpretation of OAR 340-71-160. OAR 340-71-160 prohibits the DEQ from issuing a permit to repair an on-site sewerage disposal system, if "a sewerage system which can serve the proposed sewage flow is both legally and physically available." OAR 340-71-160(5)(f). At issue is whether the City of Klamath Falls' sewer system is "*legally available*" when the City of Klamath Falls first requires JELD-WEN to consent to annexation as a precondition to the hookup. Oregon law provides numerous safeguards against the coercive annexation of property without a land owner's consent. DEQ's determination amounts to economic coercion with the result of forcing JELD-WEN to consent to annexation or risk shutting down its facility.

STATEMENT OF UNCONTROVERTED FACTS

Since approximately 1950, JELD-WEN has operated and maintained a septic tank/drainfield system at its door and cutstock manufacturing facilities located in unincorporated Klamath County. The system is used primarily to treat and dispose of domestic wastes generated at the facility.

In 1978, JELD-WEN retained an engineering firm to design upgrades to and repair the existing system. The DEQ approved the 1978 design and granted JELD-WEN a permit to install the upgrades. As a condition of the 1978 plan approval letter from the DEQ, JELD-WEN was required to leave undeveloped areas contiguous to the drainfield for use as a future drainfield. The JELD-WEN system has been included in the facility's NPDES permit in the past. The system has operated successfully since 1978 (and before) without any environmental or public health problems. There have been no regulatory violations at the system.

The JELD-WEN facility is located (and was in 1978) within the unincorporated jurisdiction of Klamath County, outside of the Klamath Falls city limits, but within the urban growth boundary. The Klamath Falls city boundary abuts the JELD-WEN

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

property line, separated by Lakeport Boulevard. There was no available County sewer system in 1978, nor is there today. The City of Klamath Falls, on the other hand, does maintain a City sewer system. However, the City has publicly announced that it is unwilling to allow a connection to its sewer without annexation of the property to be hooked up.

On May 2, 1997, JELD-WEN discovered that its drainfield system was potentially failing. Jeld-Wen immediately notified Walt West and Dick Nichols of the Eastern Region Water Quality Management program of the DEQ's Eastern Region office in Bend, as well as Bob Bagget of the onsite sewer program in Pendleton. Pursuant to OAR 340-71-160 (attached as Exhibit A), JELD-WEN requested appropriate permits in order to repair the existing drainfield. The DEQ informed JELD-WEN that it was necessary first to conduct a Site Evaluation of the system. On May 6 and 13, 1997, the DEQ staff traveled to Klamath Falls and conducted the evaluation, after which JELD-WEN completed an application and submitted a $1,200 application fee.

On May 22, 1997, the DEQ informed JELD-WEN through a memorandum that the area surveyed was satisfactory for a new system if it included a recirculating gravel filter, and if the soil was allowed to dry before installation. See the May 22, 1997 DEQ Memorandum, attached as Exhibit B. However, the memorandum went on to state that the DEQ staff would deny JELD-WEN's permit application because it considered the City of Klamath Falls' sewer system to be "legally available" even though the City would require annexation.

JELD-WEN disagreed that the City's sewer system is "legally available." Under Oregon law, the City lacks authority to annex JELD-WEN's property without JELD-WEN's consent. JELD-WEN will not consent to annexation because JELD-WEN already receives all necessary public services from other sources and annexation would cost JELD-

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

WEN significant sums of money.[1] The only additional benefit JELD-WEN would enjoy from annexation to the City is police coverage. Since the JELD-WEN facility has its own security guards, the benefit of police coverage is minimal.

JELD-WEN disagreed with the DEQ's position in a June 2, 1997 letter to Richard Nichols, attached as Exhibit C. The DEQ responded by letter on June 3, 1997, and stated that it agrees that the area proposed by JELD-WEN is acceptable for the replacement drainfield. Despite the acceptability of the replacement drainfield, the DEQ said it was unable to issue the permit because it feels the City of Klamath Falls sewer system is physically and legally available. As a result, the DEQ stated that it is legally prohibited from issuing a permit to construct a replacement drainfield. June 3, 1997 Letter from the DEQ to Stanley K. Meyers, attached as Exhibit D.

In an effort to avoid violations of water quality regulations and eliminate any potential health hazards, JELD-WEN voluntarily entered into a Mutual Agreement and Order (MAO) with the DEQ to permit the repair of its drainfield while this matter is pending before the EQC. In making the agreed upon repairs, JELD-WEN has incorporated the best available technology at a cost of approximately $150,000 to $200,000.

LEGAL ANALYSIS

JELD-WEN has successfully operated and maintained its drainfield for almost 50 years without a violation of a single DEQ or other health-related or environmental regulation. Despite the success of JELD-WEN's drainfield, DEQ has

[1]Through conversations with City personnel, Jeld Wen anticipates that annexation would result in a property tax assessment equal to approximately $250,000 to $300,000, plus substantial connection fees and monthly user fees.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

arbitrarily determined that now, JELD-WEN should no longer have a drainfield system.[2] The DEQ's position is in contrast to its previous stance taken with JELD-WEN when JELD-WEN applied for and was approved the permission to repair its drainfield in 1978.

DEQ's failure to grant a permit is contrary to its own rule. The DEQ claimed it was unable to issue JELD-WEN's permit because it deemed the City of Klamath Falls sewer system to be physically and legally available. OAR 340-71-160 states that no person shall cause or allow construction, alteration, or repair of an on-site sewerage disposal system, without first applying for and obtaining a permit. OAR 340-71-160(1). Under the regulations, the DEQ "shall" deny the permit if "a sewerage system which can serve the proposed sewage flow is both legally and physically available." OAR 340-71-160(5)(f).

JELD-WEN's property is near the Klamath Falls sewer system which does make the City system arguably "physically available" to JELD-WEN, as defined in OAR 340-71-160(5)(f)(A). However, the physical availability of a sewerage system is just one prong of a two-prong test. The DEQ must also establish that the City's sewerage system is "legally available" before it can deny JELD-WEN's permit.

I. The City of Klamath Falls Is Not "Willing" To Provide Sewer Service If It Imposes a Condition On Its Service.

As previously mentioned, a sewerage system is legally available if "the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service." OAR 340-71-160(5)(f)(B). The

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[2]DEQ has stated, notwithstanding the legal availability of the Klamath Falls sewer system, that the proposed upgrades by JELD-WEN, which include a recirculating gravel filter, would be satisfactory. See the May 22, 1997 DEQ Memorandum, attached as Exhibit B. The Oregon legislature has stated a preference for the recirculating sand filter (a variation) as a viable method of onsite sewage disposal. ORS 454.780.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

system is not under a Department connection permit moratorium. However, at issue is whether the City of Klamath Falls (i.e., the sewerage system owner) is "willing or obligated" to provide sewer service to JELD-WEN. Since there is no caselaw interpreting the meaning of "willing or obligated" as these words are used in OAR 340-71-160(5)(f)(B), an analysis of this language is limited to an examination of other statutory and regulatory authority and consideration of the plain meaning of the language.

Under the Klamath Falls City Code, Klamath Falls provides a sewer system to all who are within city limits. Klamath Falls City Code 4.100 to 4.113. Since JELD-WEN's facility is outside the City limits, the City of Klamath Falls is not **obligated** to provide JELD-WEN with sewer service. DEQ does not argue, nor does the City claim, that the City of Klamath Falls is "obligated" to provide sewer service to JELD-WEN.

In addition, the City of Klamath Falls is not actually "**willing**" to allow JELD-WEN a connection to its sewer; rather, the City is conditioning its willingness only if JELD-WEN will consent to have its property annexed before being hooked up to the sewer. DEQ's position fails to recognize that because the City's position on the sewer hookup is conditioned on consent to annexation, it does not satisfy a "willingness" standard.

Although Oregon does not have any caselaw interpreting what the word "willing" means, other jurisdictions do. For example, in Hernando Flecha v. Quiros, 567 F.2d 1154 (1st Cir. 1977), the court considered whether workers were able and willing to enter into a contract of employment given conditions placed on their employment. Plaintiffs argued that the workers were "ready, willing and able" to work if certain conditions were met. The court's response to such argument was as follows:

> Quite apart from conflicting with what we regard as the statute's intent, this is giving the word "willing" an unnatural meaning. A person who is willing only if certain conditions are met is not "willing and available." On the contrary, by hypothesis, he *would be willing, if.* To carry plaintiffs' ignoring conditions to its logical extent, we ask whether the

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1900, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

> cynic who said that every man has his price would say that every man is "willing and available"? If so, the phrase is meaningless. If not, the injection of any condition is a denial of ready willingness; there is no intermediate position. 567 F.2d at 1156. (emphasis added)

By virtue of its condition that the City of Klamath Falls is willing to let JELD-WEN connect to its sewer line only if JELD-WEN consents to annexation, the City of Klamath Falls is denying the ready willingness that OAR 340-71-160 requires.

II. DEQ's Position Unconstitutionally Requires JELD-WEN To Consent To Annexation Against Its Will and In Violation of Oregon Law.

Aside from an analysis of the plain meaning of the language, and more importantly, the DEQ's argument is unconstitutional. By deeming the City sewer system to be "legally available," DEQ forces JELD-WEN to choose between consenting to annexation or shutting down its manufacturing facility. Such economic coercion abrogates JELD-WEN's rights under Oregon annexation law and the Oregon constitution.

The power of a municipality to annex territory is entirely a legislative function, granted to the municipality through express authority by the state legislature, and subject only to constitutional restrictions. McQuillan, Municipal Corporations § 7.10 (3rd ed. 1996). In other words, municipalities have no inherent power to annex territory, unless that right is granted by the state legislature. McQuillan at § 7.13. The methods of annexation must specifically be authorized by legislation. McQuillan at § 7.14. Thus, the DEQ has no authority to mandate annexation unless that power is expressly granted by the legislature, which it has not done.

Pursuant to ORS 454.215(1), "(a)ny municipality may own, acquire, construct, equip, operate and maintain, either within or without its statutory or corporate limits, in whole or in part, disposal systems with all appurtenances necessary, useful or convenient for the collection, treatment and disposal of sewage." The Oregon legislature

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

made it clear in ORS 454.215(2) that this authority it granted to municipalities over disposal systems "in addition to, and not in derogation of any power existing in the municipality under any constitutional, statutory or charter provisions now or hereafter existing." In other words, Oregon Revised Statutes enables municipalities to provide disposal systems, but it does not mandate that they provide such services, nor does this authority override competing or pre-existing rights of Oregon's citizens under constitutional, statutory or charter provisions. Moreover, municipalities have the rights, powers and privileges to determine in which manner they shall provide such services.

Klamath Falls is willing to provide sewer services to JELD-WEN if, and only if, JELD-WEN is annexed to the city. In other words, Klamath Falls' "willingness" to provide sewer services is contingent upon JELD-WEN's annexation to the City. Unless the condition of being annexed to the city is satisfied, Klamath Falls is not willing to deliver sewer services to JELD-WEN. JELD-WEN strenuously opposes annexation.

A. Oregon's Annexation Process Does Not Allow Annexation of JELD-WEN's Property Without Its Consent.

ORS Chapter 222 describes seven types of proceedings to annex non-boundary commission territory to a city. These proceedings may be initiated by the city, on its own motion, or by a petition of the landowners in the territory to be annexed. ORS 222.111(2). Since JELD-WEN does not intend to petition for annexation, any annexation proceedings initiated would be done at the city's initiative. Of the seven types of proceedings to annex non-boundary commission territory, five require consent. The five consent annexations are as follows:

1. The general annexation method requires the city council to submit an annexation proposal to the electors of the territory proposed for annexation and to the electors of the annexing city. If a majority of both groups vote in favor of annexation, the territory may be annexed. ORS 222.111(5).

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

2. Another annexation method involves holding an election in the territory to be annexed and, instead of holding a vote of the electorate, having a public hearing on the annexation. ORS 222.120(2).

3. The third method of annexation requires the written consents of 100% of the property owners and more than 50% of the electors residing in the territory to be annexed. Such consent dispenses with the need to take a vote of the property owners and electors in the territory. Again, as in the second method, the citizens are given the opportunity to approve or disapprove of the annexation via a public hearing. ORS 222.125.

4. The *triple majority method of annexation*, which the court of appeals has determined is unconstitutional, requires the written consents of more than half of the landowners in the territory, who also own more than half of the land in the territory, which represents more than half of the assessed value of all real property in the territory proposed to be annexed. The city council must either hold a public hearing for the city on the annexation or put it to a vote of the city's electorate. ORS 222.170(1).

5. The *double majority annexation* is initiated by filing with the city council written consents to annex from a majority of the electors in a territory and from the owners of more than half of the land in the territory. The city council must either hold a public hearing for the city or have a city election on the annexation. ORS 222.170(2).

Despite the subtle and intricate differences between these annexation methods, a common thread runs throughout all of them. Under each method, the three parties at issue (the landowners in the territory, the electorate in the territory and the electorate in the city) have a voice in the process. Whether by voting, written consent or public hearing, Oregon's legislature mandated that the three groups with a vested interest be heard. Moreover, a landowner's ability to give or withhold consent for annexation of his own land is considered a "privilege" under the privileges and immunities clause of Oregon's constitution. Mid-County Future v. Port. Metro. Area LGBC, 82 Or App 193, 728 P2d 63 (1986). "The landowners can neither bring about an annexation that the electorate might oppose . . . nor unilaterally prevent an annexation that the electorate might favor." Mid-County Future v.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

Port. Metro. Area LGBC, 106 Or App 647, 653, 809 P2d 1354 rev. denied, 312 Or 80 (1991).

There are only two very limited circumstances in which a city may annex a territory without the landowner's consent. First, the city may annex territory which is surrounded by the corporate boundaries of the city ("island annexation"). Although this type of annexation may be done without the consent of the land owners in the territory or the residents in the territory to be annexed, such type of annexation is subject to referendum. ORS 222.750. The only other circumstance where a city may annex a territory without consent is if conditions within a territory have caused a danger to the public health as determined by the Division of Health and such conditions may be alleviated by the services provided by the annexing city. ORS 222.855. ORS 222.840 through 222.910 sets forth a detailed and comprehensive process for allowing health hazard annexations and provides such authority only to the Division of Health. The Oregon legislature has not granted the DEQ the authority similar to that granted to the Division of Health to require annexation on a finding of a health hazard. Other than these two specific and limited situations, a city must obtain consent before annexing a territory.

The fact that these two situations are so specific, and would leave little doubt as to whether a particular territory may be annexed under these particular provisions, only demonstrates, at great length, the caution the Oregon legislature took in limiting those situations where a city could act unilaterally. Since the JELD-WEN facility is not an island surrounded by the corporate boundaries of Klamath Falls, and because the Division of Health has not determined a health hazard pursuant to ORS 222.840 through 910, the JELD-WEN property may be annexed to the City of Klamath Falls only with the consent of JELD-WEN. As previously stated, JELD-WEN has no intention of consenting voluntarily.

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

B. DEQ's Refusal to Approve JELD-WEN's Drainfield Permit Unconstitutionally Coerces JELD-WEN To Consent To Annexation.

In the event the DEQ does not grant JELD-WEN a permit to permanently use the existing drainfield, JELD-WEN may be forced to "consent" to annexation in order to have a disposal system in compliance with the law. Forcing a party's consent to annexation has been regarded as the equivalent of forcing a party to vote a certain way. Pursuant to Hussey v. City of Portland, 64 F.3d 1260 (9th Cir. 1995), such coercion is unconstitutional.

In Hussey, the Commission ordered the City of Portland to provide sewer services to residents of an unincorporated area of East Multnomah County (known as "Mid-County"). The Commission also required the residents to hook up to the sewer system once available. Although the Commission forbade the City from requiring annexation as a condition of hooking up to the sewers, the City passed an ordinance which provided a subsidy in the form of reduced sewer connection charges in exchange for landowners signing an irrevocable consent to annexation. 64 F3d at 1262. Those landowners who failed to consent to annexation would not receive reduced sewer connection charges. Id.

A group of landowners sued for declaratory and injunctive relief, arguing that imposing financial distress only on electors who opposed annexation was a violation of their personal right to equal protection under the Fourteenth Amendment. The landowners argued, and the court of appeals agreed, that obtaining the consent of electors is the constitutional equivalent of voting. Even though there is no federal or state constitutional right to vote on annexation of territory by a City, once that right is granted through a statute, the right to vote becomes constitutionally protected. 64 F.3d at 1263. Coercing the landowners to consent to annexation (by imposing financial distress on them if they did

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

not consent) was unconstitutional because it abrogated the landowners' right to vote and therefore failed to survive strict scrutiny.

Here, the situation is similar. The DEQ's position requires JELD-WEN to give up its constitutionally protected right to consent (i.e., vote) on annexation by Klamath Falls. Rather than the subsidy provided to the landowners in Hussey v. City of Portland, however, the economic coercion in this case is the DEQ's denial of JELD-WEN's repair of its drainfield. Without a satisfactorily-repaired drainfield, JELD-WEN runs the risk of violating several water quality regulations. By denying issuance of the permit, the DEQ forces JELD-WEN to consent to annexation to the City. Such coercion distorts the political process and is unconstitutional under Hussey v. City of Portland.

Although the issue at hand is an environmental law issue and not a land use issue, consideration of Dolan v. City of Tigard, 512 U.S. 374 (1994) is also enlightening. In Dolan, the City Planning Commission conditioned approval of the petitioner's building permit application upon petitioner's dedication of land for a public greenway and a pedestrian/bicycle pathway. The U.S. Supreme Court determined that

> Under the well-settled doctrine of "unconstitutional conditions," the government may not require a person to give up a constitutional right -- here the right to receive just compensation when property is taken for a public use -- in exchange for a discretionary benefit conferred by the government where the benefit sought has little or no relationship to the property." 512 U.S. at 385.

For JELD-WEN, the situation is similar. DEQ's refusal to issue a permit to JELD-WEN requires JELD-WEN to give up its constitutionally protected right to consent (i.e., vote) on annexation by Klamath Falls. Without a satisfactorily-repaired drainfield, JELD-WEN runs the risk of violating several water quality regulations. Wtihout its drainfield permit, JELD-WEN must either consent to annexation or quit operating its facility. By denying issuance of the permit, the DEQ forces JELD-WEN to consent to annexation to the City for which

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

JELD-WEN will receive little, if any, benefit. Such coercion is unconstitutional under Dolan v. City of Tigard.

CONCLUSION AND RELIEF REQUESTED

Klamath Falls is willing to provide sewer services only to those parties annexed to the City. JELD-WEN is not presently annexed to the City. It is not willing to voluntarily consent to annexation and it cannot be forced to consent to annexation. Thus, Klamath Falls is not willing to provide sewer services to JELD-WEN.

The only reason for DEQ's denial of JELD-WEN's permit is because the DEQ believed the sewerage system of Klamath Falls was both legally and physically available. Although Klamath Falls system may be physically available, it is not legally available because Klamath Falls is not "willing or obligated" to provide such services, unless JELD-WEN consents to annexation. JELD-WEN requests that the EQC make a declaratory ruling that for purposes of interpreting OAR 340-71-160, a public sewer system is not "legally available" if the owner of the system requires the applicant to consent to annexation as a precondition to hookup to the system. For these reasons, DEQ must issue the Division 71 permit to JELD-WEN.

Dated this 19th day of November, 1997.

Respectfully submitted,

SCHWABE, WILLIAMSON & WYATT

By: Neal A. Hueske

Jay T. Waldron, OSB #74331
Neal A. Hueske, OSB #91319
Of Attorneys for Petitioner

NAME AND ADDRESS OF PETITIONER:

JELD-WEN, INC.
3250 Lakeport Blvd.
Klamath Falls, OR 97601
Attention: Rod Wendt

SCHWABE, WILLIAMSON & WYATT
Attorneys at Law
Suites 1600-1800, Pacwest Center
1211 S.W. Fifth Avenue
Portland, Oregon 97204-3795
Telephone (503) 222-9981

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

OF THE STATE OF OREGON

In Re:	)	PETITION FOR DECLARATORY RULING
JELD-WEN, INC.,	)	
Petitioner.	)	BRIEF OF THE DEPARTMENT OF ENVIRONMENTAL QUALITY

Statement of Issues

(1) Whether the Department of Environmental Quality (DEQ or the Department) can consider a sewerage system to be "legally available" under its regulations if the owner of the sewer system requires the landowner to become annexed in order to be connected?

Yes, because the city is "willing" to extend its sewer system with the reasonable and lawful condition that the landowner consent to annex to the city.

In addition, it is at least arguable that the city is "obligated" to extend its sewer system without annexation, under its current acknowledged comprehensive and land use regulations. Petitioner, the landowner, should make a good faith effort to exhaust this possible administrative remedy.

(2) Whether DEQ is justified in denying Jeld-Wen's application for repair of an existing and previously permitted septic tank drainfield system?

It is not clear that the Environmental Quality Commission (EQC or the Commission) agreed to address this issue. If the EQC wishes to do so, DEQ recommends a "yes" answer, on the basis that "the sewerage system owner is willing or obligated to provide sewer service."

Standard of Review

As to legal and policy questions, the EQC makes a *de novo* or new decision. As to factual questions, the EQC decides based "on the facts stated in the petition." OAR 137-02-040(2). The hearings officer or EQC may ask the petitioner to stipulate to alternative facts.

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Exhibit E-
65 pages

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1515 SW 5TH AVENUE, SUITE 410
PORTLAND, OREGON 97201
PHONE (503) 229-5725

Official Notice

DEQ asks the hearings officer and EQC to take official notice of selected provisions of the City of Klamath Falls' Comprehensive Plan, land use regulations and Annexation Agreement — Appendix A.

Summary of the Facts

DEQ adopts the statement of facts presented in the petition.

Summary of the Argument

The question is: Is the City of Klamath Falls' (City) sewer system "legally available?" DEQ recommends the following answer: Yes, for either or both of two reasons.

First, the City is "willing" to extend its sewer system. The condition that Jeld-Wen consent to annex is reasonable and lawful. Consents to annex are specifically recognized and given force by the legislature in ORS chapter 222. The 9th Circuit opinion in *Hussey v. City of Portland* is distinguishable from this case, both on the facts and the law.

Second, the City may be "obligated" to extend sewer services to Jeld-Wen *without* the required consent to annex. Careful review of the City's acknowledged Comprehensive Plan and land use regulations revealed no policy or provision requiring a consent to annex in exchange for sewer services. DEQ requests that any ruling by the hearings officer or EQC require petitioner to make a good faith effort to pursue this alternative.

Both environmental and land use policies favor the City's sewer system over an on-site system.

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PHONE (503) 229-5725

ARGUMENT

A. Existing EQC Rules Govern This Case

This is not a case that calls for the hearings officer or the EQC to announce major new policies. To the contrary, the EQC has a fairly specific policy on the subject at hand. It is found in OAR 340-71-755(5), which provides:

> (5) Upon receipt of a completed application the Agent *shall deny the permit if*:
> (a) The application contains false information;
> (b) The application was wrongfully received by the Agent;
> (c) The proposed system would not comply with these rules;
> (d) The proposed system, if constructed, would violate a Commission moratorium as described in OAR 340-71-460;
> (e) The proposed system location is encumbered as described in OAR 340-71-130(8);
> (f) *A sewerage system which can serve the proposed sewage flow is both legally and physically available as described below*:
> (A) Physical Availability. A sewerage system shall be deemed physically available if its nearest connection point from the property to be served is:
> (i) For a single family dwelling, or other establishment with a maximum projected daily sewage flow of not more than 450 gallons, within 300 feet;
> (ii) For a proposed subdivision or group of two to five single family dwellings, or equivalent projected daily sewage flow, not further than 200 feet multiplied by the number of dwellings or dwelling equivalents;
> (iii) For proposed subdivisions or other developments with more than five single family dwellings, or equivalents, the Agent shall make a case-by-case determination of sewerage availability.
>
> EXCEPTION: A sewerage system shall not be considered available if topographic or man-made features make connection physically impractical.
>
> (B) *Legal Availability. A sewerage system shall be deemed legally available if* the system is not under a Department connection permit moratorium, and the *sewerage system owner is willing or obligated to provide sewer service.*
>
> *(Emphases added.)*

The "availability" concept in the rule faithfully implements a legislative directive, in ORS 454.655(4), which provides in part:

> "No permit shall be issued if a community or area-wide sewerage is *available* which will satisfactorily accommodate the proposed sewage discharge."
>
> *(Emphasis added.)*

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DEQ agrees with petitioner's description of the applicable rules:

> Under the regulations, DEQ "shall" deny the permit if "a sewerage system which can serve the proposed sewage flow is both legally and physically available." OAR 340-71-160(5)(f). A sewerage system shall be deemed legally available if the system is not subject to a DEQ connection permit moratorium *and* 'the sewerage system owner is willing or obligated to provide sewer service.' OAR 340-71-160(5)(f)(13).
>
> Jeld-Wen Petition, p. 2, lines 7-12.

There is no connection moratorium at issue, so this case quite clearly hinges upon the question of whether the sewerage system owner, the City of Klamath Falls, is "willing or obligated" to extend its sewer service to petitioner.

B. The City Is Willing to Extend Sewer Service

1. The Required Consent to Annex Is Reasonable and Lawful

The City of Klamath Falls is "willing" to provide sewer service to the Jeld-Wen property, subject to the condition that Jeld-Wen consent in writing to annexation by the City.[1] The City's condition is a reasonable exercise of authority granted to it by the state constitution and statutes. Jeld-Wen's argument that this condition demonstrates that the City is *un*willing to provide sewer service to the property focuses on Jeld-Wen's own refusal to agree to the condition. Under the rule at issue, however, the focus is on whether the service provider is "willing" to provide the service, not whether the property owner is "willing" to pay the costs to gain access to a system that is both "physically and legally available."

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[1] ORS chapter 222 provides a number of different ways in which a city can accomplish an annexation: First, the city may submit the annexation question to the electors of the territory to be annexed. ORS 222.111(5). Second, a city can annex contiguous territory if all the owners of land in the territory, and more than half the electors living in the territory, consent in writing to annexation. ORS 222.125. (This is the "double-majority" method.) Third, a city can annex contiguous territory "if more than half of the owners of land in the contiguous territory, who also own more than half of the land in the contiguous territory and of real property therein representing more than half of the assessed value of all real property in the contiguous territory consent in writing to annexation." ORS 222.170. (This is the "triple-majority" method.) Fourth, a city MUST annex territory within the city's urban growth boundary if ordered to do so by the EQC pursuant to ORS 222.850 to 222.915. (This is the "health hazard" annexation method.) These alternative methods for annexation do not equate landowner consents with elector votes, and they do not substitute one for the other.

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ORS 222.115 expressly authorizes cities to enter into contracts with landowners to provide city services extraterritorially in exchange for irrevocable consents to annexation.[2] The City of Klamath Falls must exercise this authority "reasonably and not arbitrarily." *Portland Gen. Elec. Co. v. City of Estacada*, 194 Or 145, 159, 241 P2d 129 (1952). (Cities must exercise their annexation powers "reasonably and not arbitrarily.") "Reasonable" is variously defined as "fair," "proper," "synonymous with rational, equitable, fair, suitable, moderate." Black's Law Dictionary, Abridged Fifth Ed., p. 656 (1983).

The City's condition is "fair" and "equitable" in that it appears to be applied uniformly. There is no claim that the City has singled out Jeld-Wen. The City's condition is "proper" and "suitable," because it is authorized by state law and because city boundaries typically are tied to city service.

2. The Court's Decision in *Hussey* Is Distinguishable

Petitioner's argument relies heavily, if not entirely, on one federal court case — ***Hussey v. City of Portland***, 64 F3d, 1260 (9th Cir. 1995).[3] Petitioner's description of the case may be accurate (Petition, p. 9, lines 1-19), but petitioner's suggestion that "[h]ere, the situation is similar" is mistaken (Petition, p. 9, line 20).

The factual and legal key to *Hussey* was the City of Portland ordinance that provided a *subsidy* in the form of reduced sewer connection charges in exchange for consents to annex. In the court's own words, "[w]e hold that Portland's offer of a subsidy to electors who consent to annexation impermissibly burdens Hussey's right to vote." 64 F3d at 1262.

There is clearly no subsidy in this case. Petitioner appears to concede this point, but argues that, instead, the "economic coercion" is DEQ's denial of Jeld-Wen's permit

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[2] ORS 222.115 states:

> "A contract between a city and a landowner relating to extraterritorial provision of service and consent to eventual annexation of property of the landowner shall be recorded and, when recorded, shall be binding on all successors with an interest in that property."

[3] To aid the hearings officer and EQC, the entire case can be found in Appendix B.

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application for a replacement drainfield. This argument, if we understand it, appears to rest on the inaccurate premise that petitioner has some continuing entitlement to its current on-site system.

There are several other ways of distinguishing ***Hussey***. For example, because the Jeld-Wen company is not an elector, it is doubtful that Jeld-Wen has the same constitutional status as the homeowners and electors in ***Hussey***. Also, in ***Hussey***, the EQC specifically "forbade the city from requiring annexation as a condition of using its sewer system." 64 F3d at 1262. There is no such order in this case. Hussey may be distinguished still further from the matter at hand. In Hussey, the City's consent form stated that the agreement "constitutes a waiver of the right to vote * * * and such persons shall count as a yes vote." This language seemed to strongly influence the Hussey court. The Klamath Falls annexation agreement contains no comparable language. (Appendix A, Annexation Agreement.) The City's condition does not expressly or impliedly control or establish how a person must vote in a future annexation election and so does not implicate or burden an elector's right to vote. These distinguishing factors will be addressed further at the request of the hearings officer or the EQC.

C. The City May Be Obligated to Extend Sewer Services

The City's Comprehensive Plan expressly states that "[a]ll new subdivisions, partitions or developments outside the City will be required to annex or to execute an agreement to consent to annex" before such developments can be served with City *water*. Appendix A, Klamath Falls' Comprehensive Plan, Water Service Policies, #183, page 210. This language does not appear elsewhere in the Comprehensive Plan, and is found only in the plan policies for water service. The Comprehensive Plan policies for sewer service do not condition sewer service outside the City limits differently than they do sewer service

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inside the City limits. Appendix A, Klamath Falls Comprehensive Plan, Sewer Service Policies, #185-191, page 220.[4]

The only other plan provisions applicable to the timing and the manner of sewer services inside the City's urban growth boundary are in the Urban Growth Management Agreement (UGMA) between the City of Klamath Falls and Klamath County. Appendix A. The UGMA is part of the Comprehensive Plan for the City and for the County, and it establishes how the two local governments will coordinate land use decision-making in the area inside the urban growth boundary but outside the City limits. UGMA, Section 2: Intent of Agreement. (Appendix A, page 27.) Section 5 of the UGMA addresses Urban Services, and provides:

> The City of Klamath Falls, Klamath County [and a few special districts] are recognized as *the preferred ultimate providers of urban services* within the Urban Growth Area. To this end *the following shall prevail*:
>
> 1. Extension of water and/or sewer services *shall be permitted* when they are consistent with the policies and proposals of the Comprehensive Plan and with any adopted functional plans for water and/or sewer which are consistent with the Comprehensive Plan.

UGMA, Section 5: Urban Services. (Appendix A, page 28.) This provision may be interpreted to "obligate" the City to provide sewer service to the Jeld-Wen property, and to preclude the City from requiring Jeld-Wen to consent to annexation.

The City is one of a few "preferred ultimate providers of urban services" inside the urban growth boundary. The Jeld-Wen property is inside the urban growth boundary. Jeld-Wen Petition, page 3, lines 8-9. The City *must* allow extension of sewer services to the Jeld-Wen property if that extension is otherwise consistent with applicable Comprehensive Plan policies. Since the City seems limited to applying only what is in its plan, and since its plan does *not* include a requirement that the property owner consent to annexation, the City

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[4] The implementation measures for sewer service to the comprehensive plan cross-reference portions of the city code. The city code is no longer numbered in a way consistent with the cross-reference in the plan. The existing code provision relating to sewer service is § 14.710. Appendix A.

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arguably cannot insist that Jeld-Wen consent to annexation, and may otherwise be obligated to extend sewer services to the Jeld-Wen property.

D. Environmental and Land Use Planning Policies Favor Connection to the City's System Over an On-site System

When the legislature enacted ORS 454.655 and when the EQC first adopted the rule in question (both of which occurred in the 1970s), they concluded that sound environmental policies favor a sewage system, especially an area-wide or community system, to an on-site system. In DEQ's opinion, this judgment remains valid today.

Although the art and science of on-site sewage disposal systems (septic tank and drain-fields) is much improved from just a generation ago, use of a centralized sewage treatment and disposal system will, in almost all cases, be preferable for the positive protection of public health and the environment. This is particularly the case when it comes to protection of the state's groundwater resources. Effective operation and maintenance of a centralized, municipal system is much more likely to occur. This provides a higher level of confidence that sewage will be consistently and reliably treated and disposed in an acceptable manner. The impact of a failure of a centralized system may be bigger, but correction of the failure can generally be facilitated much easier than with an individually-owned on-site system.

We turn to a brief consideration of the state's land use policies. In 1973, the legislature created the state's land use planning program and the Land Conservation and Development Commission (LCDC) to implement that program. At the time, the legislature found that:

> "Uncoordinated use of lands within this state threaten the orderly development, the environment of this state and the health, safety, order, convenience, prosperity and welfare of the people of this state."

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and that

> "City and county governments are responsible for the development of local comprehensive plans. The purpose of ORS 197.065 to 197.075 and 197.020 is to enhance coordination among cities, counties and special districts to assure effectiveness and efficiency in the delivery of urban services required under those local comprehensive plans."

ORS 197.005(1) and (5). These concerns are addressed by the Statewide Planning Goals adopted by LCDC. In particular, Statewide Planning Goal 11 is to "[p]lan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development." Goal 11 also states that "[u]rban and rural development shall be guided and supported by types and levels of urban and rural public facilities and services appropriate for, but limited to the needs and requirements of the urban, urbanizable and rural areas to be served." The Jeld-Wen property is inside the City's urban growth boundary, and so the extension of the urban sewer system to this property is consistent with and furthers these land use policies. In addition, Statewide Planning Goal 6 is to "[maintain and improve the quality of air, water and land resources of the state." These land use policies compliment the environmental policies discussed above, and weigh in favor of a centralized sewage treatment and disposal system, especially in urban areas where a concentration of separate, on-site systems can threaten the quality of the water and land resources of the state.

Therefore, for reasons of sound environmental policy and consistent with the state's land use planning policies, DEQ respectfully requests a ruling that will allow the agency to continue to deny permits for onsite systems (whether a repair or a failure or for new development) when annexation is a requirement for connection to a community sewerage facility. DEQ will provide any technical information that the hearings officer or EQC may find helpful on this point.

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PORTLAND, OREGON 97201
PHONE (503) 229-5725

CONCLUSION

With DEQ's support, petitioner requested an EQC declaratory ruling on the meaning of "legal availability." The ruling should declare that the City is willing to extend sewer service with the reasonable condition that Jeld-Wen consent to annex.

An additional question arises because the City's annexation policy on sewers is not reflected in the Comprehensive Plan and land use regulations. The EQC ruling should request or require that petitioner resolve this question with the City.

If either the hearings officer or the EQC would find it helpful, DEQ would be glad to submit a proposed ruling in a form that complies with the model rules.

DATED this 19th day of November, 1997.

for Michael B. Huston #75189
Celeste J. Doyle #92596
Assistant Attorneys General
for the Department of Environmental Quality

MBHBRIEF.PLE

DEPARTMENT OF JUSTICE
1515 SW 5TH AVENUE, SUITE 410
PORTLAND, OREGON 97201
PHONE (503) 229-5725

CERTIFICATE OF FILING

I certify that on this 19th day of November, 1997 I caused to be filed with the hearings officer of the Environmental Quality Commission the Brief of the Department of Environmental Quality.

CERTIFICATE OF SERVICE

I certify that on this 19th day of November, 1997 I caused to be served a true and complete copy of the foregoing Brief by messenger to the following:

Lawrence Smith
Hearings Officer
Oregon Employment Department
Hearings Section
Suite 225
800 NE Oregon Street, #6
Portland, Oregon 97232

Susan Greco
Rules Coordinator
DEQ — Director's Office
811 SW Sixth Avenue
Portland, Oregon 97204

Jay Waldron
Schwabe, Williamson & Wyatt
1600-1800 Pacwest Center
1211 SW Fifth Avenue
Portland, Oregon 97204

I further certify that on this 19th day of November 1997 I caused to be served a true and complete copy of the foregoing Brief by first class mail to the following:

Jeffrey D. Ball
Attorney at Law
500 Klamath Avenue
Klamath Falls, Oregon 97601

Kitty Telles
Administrative Assistant

MBHBRIEF.PLE

DEPARTMENT OF JUSTICE
1515 SW 5TH AVENUE, SUITE 410
PORTLAND, OREGON 97201
PHONE (503) 229-5725

that the property owner will receive a permit to construct a system on that property provided procedures and conditions for permit issuance found in OAR 340-71-160 are met.

(4) Approval or Denial:

(a) In order to obtain a favorable site evaluation report the following conditions shall be met:

(A) All criteria for approval of a specific type or types of system, as outlined in OAR 340, Division 71 shall be met;

(B) Each lot or parcel must have sufficient usable area available to accommodate an initial and replacement system. The usable area may be located within the lot or parcel, or within the bounds of another lot or parcel if secured pursuant to OAR 340-71-130(11). Sites may be approved where the initial and replacement systems would be of different types, e.g., a standard subsurface system as the initial system and an alternative system as the replacement system. The site evaluation report shall indicate the type of the initial and type of replacement system for which the site is approved.

EXCEPTION: A replacement area is not required in areas under control of a legal entity such as a city, county, or sanitary district, provided the legal entity gives a written commitment that sewerage service will be provided within five years.

(b) A site evaluation shall be denied where the conditions identified in subsection (4)(a) of this rule are not met;

(c) Technical rule changes shall not invalidate a favorable site evaluation, but may require use of a different kind of system.

(5) Site Evaluation Report Review. A site evaluation report issued by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the site evaluation report issue date, and be accompanied by the review fee. The review shall be conducted and a report prepared by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82; DEQ 8-1983, f. & ef. 5-25-83; DEQ 9-1984, f. & ef. 5-29-84; DEQ 15-1986, f. & ef. 8-6-86

Existing System Evaluation Report

340-71-155 (1) Any person, upon application, may request an evaluation report on an existing on-site sewage disposal system. The application shall be on a form provided by the agent and approved by the Department.

(2) The application is complete only when the form, on its face, is completed in full, signed by the owner or the owner's legally authorized representative, and is accompanied by all necessary exhibits including the fee. A fee shall not be charged for an evaluation report on any proposed repair, alteration or extension of an existing system.

(3) The agent shall:

(a) Examine the records, if available, on the existing system; and

(b) Conduct a field evaluation of the existing system; and

(c) Issue a report of findings to the applicant.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 8-1983, f. & ef. 5-25-83

Permit Application Procedures — General Requirements

340-71-160 (1) No person shall cause or allow construction, alteration, or repair of a system, or any part thereof, without first applying for and obtaining a permit.

EXCEPTION: Emergency repairs as set forth in OAR 340-71-215.

(2) Applications for permits shall be made on forms provided by the Agent and approved by the Department.

(3) An application is complete only when the form, on its face, is completed in full, is signed by the owner or the owner's legally authorized representative, and is accompanied by all required exhibits and fee. Except as otherwise allowed in OAR 340-71-400(6), the exhibits shall include:

(a) Favorable site evaluation report;

(b) Favorable land use compatibility statement from the appropriate land use authority signifying that the proposed land use is compatible with the Land Conservation and Development Commission acknowledged comprehensive plan or complies with the statewide planning goals;

(c) Plans and specifications for the on-site system proposed for installation within the area identified in the favorable site evaluation report. The Agent shall determine and request the minimum level of detail necessary to insure proper system construction;

(d) Any other information the Agent finds is necessary to complete the permit application.

(4) The application form shall be received by the Agent only when the form is complete, as detailed in section (3) of this rule.

(5) Upon receipt of a completed application the Agent shall deny the permit if:

(a) The application contains false information;

(b) The application was wrongfully received by the Agent;

(c) The proposed system would not comply with these rules;

(d) The proposed system, if constructed, would violate a Commission moratorium as described in OAR 340-71-460;

(e) The proposed system location is encumbered as described in OAR 340-71-130(8);

(f) A sewerage system which can serve the proposed sewage flow is both legally and physically available, as described below:

(A) Physical Availability. A sewerage system shall be deemed physically available if its nearest connection point from the property to be served is:

(i) For a single family dwelling, or other establishment with a maximum projected daily sewage flow of not more than 450 gallons, within 300 feet;

(ii) For a proposed subdivision or group of two to five single family dwellings, or equivalent projected daily sewage flow, not further than 200 feet multiplied by the number of dwellings or dwelling equivalents;

(iii) For proposed subdivisions or other developments with more than five single family dwellings, or equivalents, the Agent shall make a case-by-case determination of sewerage availability.

EXCEPTION: A sewerage system shall not be considered available if topographic or man-made features make connection physically impractical.

(B) Legal Availability. A sewerage system shall be deemed legally available if the system is not

under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

(6) A permit shall be issued only to a person licensed under ORS 454.695, or to the owner or easement holder of the land on which the system is to be installed.

(7) No person shall construct, alter or repair a system, or any part thereof, unless that person is licensed under ORS 454.695, or is the permittee.

(8) The Agent shall either issue or deny the permit within 20 days after receipt of the completed application.

EXCEPTION: If weather conditions or distance and unavailability of transportation prevent the Agent from acting to either issue or deny the permit within 20 days, the applicant shall be notified in writing. The notification shall state the reason for delay. The Agent shall either issue or deny the permit within 60 days after the mailing date of such notification.

(9) A permit issued pursuant to these rules shall be effective for one year from the date of issuance for construction of the system. The construction-installation permit is not transferable. Once a system is installed pursuant to the permit, and a Certificate of Satisfactory Completion has been issued for the installation, conditions imposed as requirements for permit issuance shall continue in force as long as the system is in use.

(10) Renewal of a permit may be granted to the original permittee if an application for permit renewal is filed prior to the original permit expiration date. Application for permit renewal shall conform to the requirements of sections (2) and (4) of this rule. The permit shall be issued or denied consistent with sections (5), (6), (8), and (9) of this rule.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 19-1981, f. 7-23-81, ef. 7-27-81; DEQ 8-1983, f. & ef. 5-25-83; DEQ 15-1986, f. & ef. 8-6-86

Permit Denial Review

340-71-165(1) A permit denied by the Agent shall be reviewed at the request of the applicant. The application for review shall be submitted to the Department in writing, within 30 days of the permit denial notice from the Agent, and be accompanied by the denial review fee. The denial review shall be conducted and a report prepared by the Department.

(2) Permit denials for systems proposed to serve a commercial facility, intended to be used in a commercial activity, trade, occupation or profession, may be appealed through the contested case hearing procedure set forth in ORS Chapter 183 and OAR Chapter 340, Division 11.

(3) If the Agent intends to deny a permit for a parcel of ten acres or larger in size, the Agent shall:

(a) Provide the applicant with a Notice of Intent to Deny;

(b) Specify reasons for the intended denial; and

(c) Offer a contested case hearing in accordance with ORS Chapter 183 and OAR Chapter 340, Division 11.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 5-1982, f. & ef. 3-9-82

Pre-Cover Inspections

340-71-170 (1) When construction, alteration or repair of a system for which a permit has been issued is complete, except for backfill (cover), or as required by permit, the system installer shall notify the Agent. The Agent shall inspect the installation to determine if it complies with the rules of the Commission, unless the inspection is waived by the Agent in accordance with section (2) of this rule or in accordance with the provisions of OAR 340-71-400(6).

(2) The Agent may, at his own election, waive the pre-cover inspection provided:

(a) The installation is a standard subsurface system installed by a sewage disposal service licensed pursuant to ORS 454.695; and

(b) The inspecting jurisdiction and the Department have developed an impartial method of identifying those installers who have a history of proper installations without excessive numbers of corrections; and

(c) Inspections waived are for installations made by installers identified as having a good history of proper installation; and

(d) A list of installers whose inspections may be waived is available to the public and the Department; and

(e) A representative number of each installer's systems has been inspected, regardless of installation history; and

(f) After system completion the installer certifies in writing that the system complies with the rules of the Commission, and provides the Agent with a detailed as-built plan (drawn to scale) of the installation.

(3) Pre-cover inspection details shall be recorded on a form approved by the Department.

Stat. Auth.: ORS Ch. 454
Hist.: DEQ 10-1981, f. & ef. 3-20-81; DEQ 15-1986, f. & ef. 8-6-86

Certificate of Satisfactory Completion

340-71-175 (1) The Agent shall issue a Certificate of Satisfactory Completion, if, upon inspection of installation, the system complies with the rules of the Commission and the conditions of the permit.

(2) If inspected installation does not comply with the rules of the Commission and the conditions of the permit, the permittee shall be notified in writing or a Correction Notice shall be posted on the site. System deficiencies shall be explained and satisfactory completion required. Follow-up inspections may be waived by the Agent. After satisfactory completion a Certificate shall be issued.

(3) If the inspection is not made within seven days after notification of completion, or the inspection is waived, a Certificate of Satisfactory Completion shall be deemed to have been issued by operation of law. In such cases, a modified Certificate shall be issued to the owner.

(4) A system, once installed, shall be backfilled (covered) only when:

(a) The permittee is notified by the Agent that inspection has been waived; or

(b) The inspection has been conducted by the Agent and a Certificate of Satisfactory Completion has been issued; or

State of Oregon
Department of Environmental Quality

Memorandum

Date: May 22, 1997

To: File - JELD-WEN, inc.
BEN FAB Division, IW-File
Klamath County

From: Walt West, IW - WQ

Through: Dick Nichols, Eastern Region WQ Manager

Subject: Drainfield Replacement

On May 2, 1997, JELD-WEN, inc., (JWI) notified our Department that sewage was surfacing from their existing drainfield. I met with Karen Olsen at the facility on May 6, 1997, and observed where the effluent was surfacing. The facilitty's septic tank was being pumped on a regular basis to reduce flow into the drainfield system and to prevent sewage from reaching a nearby drainage ditch and to protect human health. On May 13, 1997, Lawrence Brown of the Department's On-Site program conducted a site evaluation for possible repair. The site is located in Klamath Falls at; T38, R9, S19; Tax Lot 400 lots 4 & 5. The evaluation report findings are summarized below.

The soil in the area proposed to install a replacement drainfield was found to be a silty clay. Permanent Groundwater is predicted to rise to within 48 and 53 inches from the ground surface in both areas evaluated.

The rules for standard drainfield systems require that a permanent water table shall be four feet or more from the bottom of the absorption facility. With trench depths of 18 inches, minimum, the water table could be no closer than 66 inches from the ground surface. [OAR 340-71-220 (1) (b)].

The rules for capping fill systems require that a permanent ground water shall be 4 feet below the bottom of the absorption facility, however, capping fills are limited to soils no finer than silty clay loam. A silty clay is finer than a silty clay loam, therefore, capping fill is not an option. Even with 4 feet of separation and 12 inch trench depths, minimum, the permanent water table shall be no closer than 60 inches from the ground surface. OAR 340-71-265 (1)(c) and (f). Again, at this site the permanent water table is predicted to rise to within 48 and 53 inches from the ground surface.

EXHIBIT B
PAGE 1 of 3

With these two options eliminated, by rule, a pretreatment device would be required. We believe that with the flows of this facility a recirculating gravel filter would be the only appropriate treatment device. Since the effluent quality is similar to that of sand filter effluent 50 linear feet of disposal trench would be required per 150 gallons per day of flow. Technical specifications for a recirculating gravel filter are attached for your information.

The site conditions are not conducive for installing a system at this time. The sidewalls were smeared in test holes 1 through 8 and in the opinion of this Agent damage would occur to the system operation if installed at this time. Test Holes 9 and 10 were drier but area is limited due to the site's limitations. Should a drainfield system be allowed in conjunction with a recirculating gravel filter, installation would need to be delayed until soil dries sufficiently to prevent smearing of the sidewalls of the drainfield trench during construction.

Observations in the test holes dug between drainlines of the original drainfield indicated blackening and moisture extending to at least 30 inches from the drainline. The drainlines were spongy and very soft. Also, the distribution boxes which were uncovered were completely full indicating that the drainlines were saturated. The person who dug the test holes in the original drainfield drove overtop of the existing drainlines and sank about 6 to 10 inches. Damage to the perforated pipe in these areas is expected.

With respect to system repair, OAR 340-71-160 (5)(f) states that upon receipt of a completed application the Agent shall deny the permit if : A sewerage system which can serve the proposed sewage flows is both legally and physically available. Physical Availability is defined by its nearest connection point from the property to be served expressed in feet. For developments with more than 5 single family equivalents projected daily sewage flow, the Agent shall make a case-by-case determination of sewerage availability. A single family dwelling would be required to connect if the sewer is within 300 feet. At this site, the sewer is less than 50 feet running down Lakeport Blvd.

A sewerage system shall be deemed legally available if the system is not under a Department connection permit moratorium, and the sewerage system owner is willing or obligated to provide sewer service.

At this time with the available information, it would seem to us that our rules will dictate that a repair permit not be issued and that you must connect to the City of Klamath Falls sewerage facility. We know that you have done some initial investigation of this option and found that City policy requires annexation which, in turn, involves a significant increase in your property taxes. Nevertheless, the rules governing this type of situation do not consider the potential financial burden of connection as a basis to allow a repair when sewer is deemed available. Further, we believe that the Environmental Quality Commission (EQC) has ruled in the past that annexation is not

an unreasonable requirement for connection to sewer. Our staff is researching past EQC meeting minutes to find the record of such a ruling. If and when we find it, we will provide you a copy.

Enclosures (2)

EXHIBIT 12
PAGE 3 of 3

June 2, 1997

Mr. Richard Nichols
Eastern Region WQ Manager
Department of Environmental Quality
2146 NE 4th Street, Suite 104
Bend, Oregon 97701

JELD-WEN's Klamath Falls On-Site Drainfield

Dear Mr. Nichols:

This letter will confirm receipt of the Department of Environmental Quality's ("DEQ") Memorandum dated May 22, 1997 addressed to Ben-Fab, and will also serve to address the analysis upon which the DEQ bases its preliminary conclusion that JELD-WEN, inc. ("JWI") "must connect to the City of Klamath Falls sewerage facility." First of all, let me thank you for your courtesy and candor in providing us with the DEQ's preliminary opinions, as we will incur significant civil engineering charges before we even begin the permit process. However, Bill Fagan, myself, and others here at JWI have carefully reviewed the Memorandum and while we agree that the soils would support a properly engineered on-site drainfield, we respectfully (and strenuously) disagree with your annexation conclusion. As the DEQ's preliminary conclusion may be a dispositive issue to moving forward and properly correcting the current problems, and in as much as we currently have the good fortune of not operating under an emergency situation, I was hoping you would be available to meet with me at your convenience, tomorrow, June 3, in your office to discuss this further.

EXHIBIT C
PAGE 1 of 2

Essentially, I would like to discuss with you the language from the regulation cited in the Memorandum instructing the DEQ agent to deny a repair permit if "A sewerage system which can serve the proposed sewage flows is both legally and physically available." (Emphasis added). As you know, the JWI property and facilities serviced by the existing standard on-site drainfield for the past 20 years are located within and under the jurisdiction of Klamath County—not the City of Klamath Falls. The County sewerage system is located on the other side of the community. Accordingly, the County sewerage system is not "physically available". Furthermore, the City of Klamath Falls has indicated that it is not willing to allow a connection since we are not part of the City. As a result, the City's sewerage system is not "legally available" to JWI at the present time. We do not believe that OAR 340-71-160(5)(f), cited above, should impede our permit process.

I also note in the DEQ Memorandum a reference to possible prior Environmental Quality Commission rulings forcing a landowner to annex with a City to meet the "legal and physical availability" requisites. I am not aware of any such rulings but would appreciate you forwarding same so they can be reviewed by our legal department.

Again, I remain very hopeful that we can quickly resolve this issue and move forward with preventing an emergency situation. Please call me with your availability for tomorrow or if you have any questions. If I am not available when you call, please feel free to call Bill Fagan also. I look forward to meeting you.

Sincerely,

Stan Meyers

Stanley K. Meyers, P.E.
Vice President, Engineering

EXHIBIT C
PAGE 2 of 2

Oregon

June 3, 1997

RECEIVED
JUN 13 1997
Schwabe, Williamson & Wyatt

DEPARTMENT OF
ENVIRONMENTAL
QUALITY
EASTERN REGION
Bend Office

Mr. Stanley K. Meyers, P.E.
Vice President, Engineering
JELD-WEN
PO Box 1329
Klamath Falls, OR 97601-0268

Mr. Meyers:

This letter will summarize our telephone conference today. Included in the call were you, Messrs. Charlie Taylor and Bill Fagan of JELD-WEN and Walt West and myself representing DEQ.

The issue discussed relates to the failing on-site sewage disposal system that serves your Klamath Falls wood products complex. The Department has concluded that the City of Klamath Falls sewer is physically and legally available and, as a result, we cannot provide you approval to construct a replacement drainfield. You, on the other hand, disagree that it is available because the City will not allow you to connect unless you annex into the City.

The Department does agree that you have an acceptable area to put a replacement drainfield although because groundwater levels are somewhat shallow, a recirculating gravel filter must be used to pretreat the sewage prior to discharge into the drainfield.

As we concluded in our meeting, the Department believes you should file a petition for declaratory ruling with the Environmental Quality Commission if you wish to pursue construction of a replacement drainfield. I have enclosed the Oregon's Model Rules of Procedure Applicable to Proceedings for Agency Declaratory Rulings for your information. The petition should be filed with the Environmental Quality Commission in care of the Director of DEQ, Langdon Marsh. His address is: 811 SW 6th Avenue, Portland, OR 97204. I have also enclosed a copy of the October 27, 1978 EQC meeting minutes and a supporting document which addresses an issue relative to on-site sewage disposal systems which may have some relevancy to this matter.

If you have questions or comments, please call me or Walt West in this office at (541) 388-6146.

Sincerely,

Richard J. Nichols, Manager
Bend Water Quality Section
Eastern Region

RJN/ns
Enclosures
cc: Susan Greco/Paul Burnet - DEQ - HQ
Larry Knudsen - DOJ - Portland
Stephanie Hallock/file - Bend

EXHIBIT D
PAGE 1 of 1

2146 NE 4th Street
Suite 104
Bend, OR 97701
(541) 388-6146

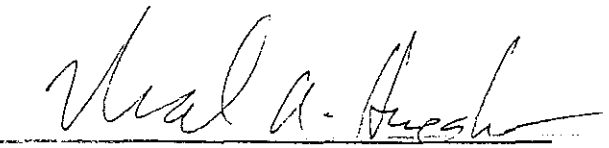
CERTIFICATE OF SERVICE

I hereby certify that on November 19, 1997, I served the foregoing BRIEF IN SUPPORT OF PETITION FOR DECLARATORY RULING on the following party at the following address:

MICHAEL B. HUSTON, OSB #75189
Oregon Department of Justice
1515 S.W. Fifth Avenue, Suite 410
Portland, OR 97201

by hand delivering a true copy thereof, certified by me as such, in a sealed envelope, addressed to said attorney at said attorney's last-known address.

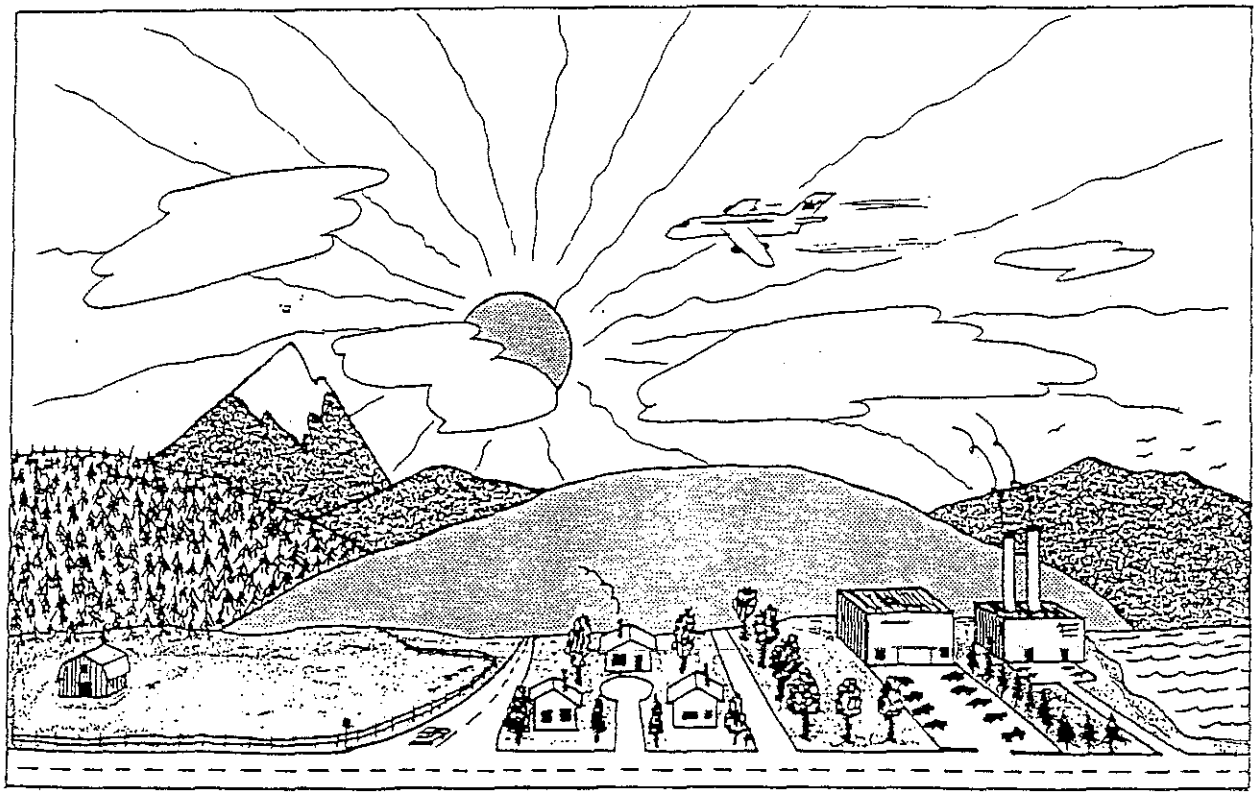
Dated: November 19, 1997.



NEAL A. HUESKE, OSB #91319
Of Attorneys for Petitioner

City of Klamath Falls

COMPREHENSIVE PLAN



Adopted April 20, 1981

—PLANNING DIVISION—

DEPARTMENT OF PUBLIC SERVICES
CITY OF KLAMATH FALLS
KLAMATH FALLS, OREGON

CITY OF KLAMATH FALLS COMPREHENSIVE PLAN

Produced by the
City of Klamath Falls
Citizen Involvement Program
and
Department of Public Services
Planning Division

with the assistance of the
Departments of Public Works, Public Safety, & Legal Services

* * *

CONSULTANTS

Eliot Allen & Associates, Project Management
BWR Associates, Air Quality
HGE Engineers, Sewer Service
Dr. Joseph Hopkins, Cultural Resources
Klamath Consulting Services, Research, Analysis and Editing
Peter Powers, Cartography and Production
STRAMM Engineers, Water Service
Wilsey & Ham, Research, Analysis and Editing

* * *

COOPERATING AGENCIES

Klamath Falls Public School Districts

Klamath County Departments of Planning and Public Works and County Museum

Klamath County Economic Development Association

Klamath County Special Service Districts
- Schools
- Enterprise Irrigation
- Klamath Irrigation
- Soil and Water Conservation

Klamath Housing Authority

State of Oregon
- Housing Division
- Department of Economic Development
- Emergency Services Division
- Department of Fish & Wildlife
- Department of Geology & Mineral Industries
- Employment Division
- Health Division
- Department of Land Conservation & Development
- Public Utilities Commissioner
- Department of Transportation
- Water Resources Department
- Oregon Institute of Technology

United States Government
- Soil Conservation Service
- Forest Service
- Extension Service
- Bonneville Power Administration
- Corps of Engineers
- Bureau of Reclamation
- Postal Service
- Department of Defense (Air Force)

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O. WATER SERVICE ELEMENT

Water Service - History (1)

The water supply for the town of Linkville was primarily from cisterns catching rain water, and from the numerous springs around the area. In addition, some of the hot water wells also were used as drinking water sources, the hot water being retained in a holding tank until it was cool. These numerous small springs, the cisterns, and a few hand-dug wells provided sufficient amounts of water for the town for several years.

In April 1895, the City granted a franchise to H. V. Gates to construct and operate a water system in conjunction with an electric service he was also providing. The deep springs near Conger Avenue were to be the major source for the system; in 1896, the first reservoir, located at Fifth and Grant Streets, was completed.

In 1911, the California Oregon Power Company (COPCO) purchased the Klamath Falls Light and Water Company. Over the next few years, the new owners replaced some of the smaller rock reservoirs with steel ones and drilled three wells to supplement the springs. With the addition of new pumps in 1920, the company could provide a 1,300-gallon-per-minute flow and served over a thousand customers.

The expansion of the railroads and the resulting growth of the lumber industry in the Basin in the mid-1920's boosted the population of Klamath Falls. To help meet the increased water needs, COPCO constructed an 800,000-gallon reservoir adjacent to the existing facility at North Sixth and Grant Streets, and two more wells were drilled.

The City continued to spread and a 400,000-gallon reservoir was constructed in 1930 and the old original reservoir was abandoned. By 1931, the water was needed further eastward, so COPCO built a 400,000-gallon steel tank up on the hills. During the decade of the 1940's, the COPCO system had an annual growth of customers of 33 percent; the number of feet of distribution mains during this time increased on the average of 2.1 percent per year. Oregon Water Corporation purchased the COPCO system in 1950, and expanded and operated the water system until 1978. The City of Klamath Falls now owns and operates the facilities.

Most of the wells are adjacent to the original Conger Springs area. One is located at the north end of Link River on Nevada Street, and one south of town on Kelly Road. Not all of the wells are in use at one time. Average consumption is 4.2 million gallons per day in winter, with peaks having reached 13 million gallons per day in hot summer weather.

According to material gleaned from an annual report to the Oregon Public Utilities Commission, the average annual increase of water consumption in the area has been 2.4 percent. Residential service

grew from a count of 8,469 in 1970 to 9,918 in 1976, commercial and industrial grew from 996 to 1,071 in the same time span, private fire protection from 46 to 59, public fire protection diminished from 4 to 3 in seven years, and public authority services jumped from 34 to 65.

Water Service - Current Conditions (2)

Area. Based on that population projection, the water system was modeled for both existing and future flow conditions. A maximum daily demand of 24.6 million gallons per day (mgd) and a peak hour of 46.4 mgd were used for analysis of future conditions. A demand of this magnitude is expected sometime around the year 2003, if the consumption and population projections are reasonably accurate. Approximately 30 percent (5,100 gpm) of the maximum daily demand was assumed to occur in areas outside the existing system, with the remaining 70 percent (12,000 gpm) of the flow occurring within the existing service area.

Water Service - Problems and Future Alternatives (1)

178. Some areas have low pressure, which may hinder adequate fire protection.

179. Some areas do not have sufficient pipeline capacity for distribution needs.

180. Deterioration of older lines will accelerate and replacement costs will increase.

181. Maintenance costs will continue to rise.

182. Costs will continue to rise for extending services to new developments.

183. The majority of the distribution system is geographically skewed away from the primary source wells, requiring costly transmission and storage compensations.

184. Some higher elevation buildable lands cannot be served without creating new, higher pressure zones.

185. There are problems of poor fire hydrant proximity and sufficient fire flow in some portions of the urban area.

186. Ineffective utilization of existing lots will continue to force capital improvement costs upward.

187. The several small districts on the fringes of the urban area are not the most efficient service providers and tend to hasten development prior to the time a full range of urban services are available.

D E T A I L E D A S S E S S M E N T N O T E

ELEMENT: WATER SERVICE

THE CONTENT OF THIS ELEMENT IS SUPPLEMENTED BY THE FOLLOWING DETAILED ASSESSMENT WHICH WILL BE ADOPTED BY REFERENCE WITH THE COMPREHENSIVE PLAN.

CITY OF KLAMATH FALLS WATER

DISTRIBUTION SYSTEM ANALYSIS (STRAMM)

COPIES OF THIS ASSESSMENT MAY BE AVAILABLE FROM THE ORIGINATING AGENCY OR CAN BE INSPECTED AT THE CITY PLANNING DEPARTMENT OFFICES.

Water Service - Goals (1)

32. To provide a timely, orderly, and efficient arrangement of water facilities and services.

Water Service - Policies (1)

171. The City will continue to develop well sources, storage capacities, and distribution capabilities to ensure the availability of adequate water supply and pressure in the system's service area.

172. Adequate water service, either existing or immediately attainable, will be a precondition to any development project.

173. All water system extension will be within the Urban Growth Boundary.

174. The City will maintain a water rate structure capable of maintaining and improving the water system.

175. All water users should make equitable contributions to the improvement of the water system and pay all costs associated with the extension of the water system service to them.

176. Water lines in proposed developments will be adequately sized to meet future needs at the projected usage or density, including fire flow requirements.

177. The high standard of water service within the community will be maintained.

178. In the event of a water shortage or a lack of funding, the City water service will set policy establishing the following user priorities for water service: (1) existing users within the City; (2) new users within City limits; (3) users within the County at the time of purchase of Oregon Water Corporation; (4) new users within Urban Growth Boundary; (5) all other.

179. Extension of water service in any case will be based upon the priorities outlined in the above policy No. 178, ability to serve, return on City investment, and required fire service as expressed by the Public Works Director.

180. The City will serve as the preferred provider of water service within the Urban Growth Boundary. In line with this, the City will not extend service to development outside the Urban Growth Boundary.

181. Water Service will be provided in terms of the following priorities:

    a. Existing City residents at time of purchase.

    b. Existing customers outside of City at time of purchase.

    c. Any new development inside City.

d. Platted lots outside City which were platted prior to April 2, 1979.

e. New development outside City.

182. Water Service will be provided outside the City only when an excess in supply exists.

183. Water will be provided to property outside the City which was platted prior to April 2, 1979 provided there is no more than one living unit per platted lot. All new subdivisions, partitions or developments outside the City will be required to annex or to execute an agreement to consent to annex.

Water Service - Implementation Measures (1)

111. Public education and involvement will be supported.

112. A detailed capital improvement program will be developed.

113. The City will apply for Federal or State funds for upgrading of the water system.

114. Development standards should be prepared for new areas with water system requirements.

115. A water rate will be established which charges the same amount for additional units over base rate rather than a decreasing scale, and rates of large users will be reviewed to ensure they are equitable in relation to small users.

116. All plans for water system improvements and water line extensions will be submitted to appropriate regulatory agencies for review and approval prior to construction.

117. The City will have a leadership role to coordinate with adjoining private water systems to develop proper planning and engineering of areas within the UGB.

118. The City shall implement a water rate structure that sets charges according to cost of providing service for different areas. Areas with system deficiencies requiring extensive maintenance and areas on the urban fringe requiring new facilities would be charged more than areas with existing systems not in need of extensive repair.

For implementation measures, also see City Code, Chapter 4, Public Utilities and Services: Water; Chapter 10, Community Development: Article 2, Land Development and Article 5, Standards.

Sewer Service - History (1)

As the population of Linkville and later Klamath Falls grew, homes became more numerous and the demand for sewage disposal greater. Open land dwindled and individual septic tanks were no longer practical or safe.

On April 21, 1919, the residents of the City voted a bond issue for the construction of a sewer system. The sale of $45,000 worth of bonds was authorized by the Council in May, and on June 22 an engineer was hired to begin the initial phases necessary for the construction of a sewer district. In 1920 a contract was entered into by the City with a construction firm to begin the actual work. The initial area to be serviced was the downtown neighborhood. A septic tank was constructed to serve as a treatment site before outflow into Lake Ewauna, 260 feet away. This initial unit was energized by gravity flow only.

It became apparent during the 1920's that the septic tank system was inadequate. An investigation of existing conditions and a feasibility study for a treatment plant were begun in 1925. Voters approved bonding of a new plant in 1928 and $300,000 worth of bonds were put on sale. This first treatment facility was constructed by the City in 1929, across Lake Ewauna near the railroad bridge, and it was only the second mechanical plant designed and built in Oregon. In 1943 the U.S. government built a "Clarigester" type treatment plant (a combination clarifier and digester process) at the end of Owens Street in the Mills Addition to handle the government housing, now known as the Shasta View Apartments. This plant was eventually sold to the City. In 1945, the U.S. Navy constructed a treatment plant at Kingsley Field, but it was never operated. It was given to the City after the war and when Kingsley Field Air Force Base was activated in the mid-1950's, it was upgraded and put into to use.

The two City plants continued operations until 1958. At that time a trickling filter plant was constructed at the west end of Spring Street to replace the older facilities. It had a capacity of primary treatment for six million gallons per day, but the secondary treatment, the trickling filter, could only handle 2.4 million gallons per day. In 1970, the Spring Street sewage treatment facility was modified from the trickling filter operation to the conventional activated sludge process. New aeration basins, a secondary clarifier, sludge thickener, and a blower and centrifuge building were constructed. This modification increased the plant capacity to 6.0 million gallons per day average daily flow.

In 1960 restrictions were placed on hot water discharges into the system, curtailing such discharges considerably. In 1968, because of the necessity for upgrading the existing plant and lines, a monthly sewer fee for all users was initiated.

Sewer Service - Current Conditions (1)

The Spring Street Sewage Treatment Facility utilizes a conventional activated sludge process and has the capacity of 6.0 million gallons per day (mgd) average daily flow.

Presently, the system serves nearly 5,000 hook-ups. (See Sewer Service map). The average daily flow on a yearly basis is approximately 3.05 mgd (11,540 cubic meters per day) which is about half of the design capacity of the activated sludge treatment plant. During periods of heavy rainfall or snow melt, the flow received increases because of the infiltration problems in the system.

The sewage flows entering the treatment plant are primarily domestic in nature, originating in the residential and commercial areas. Industrial discharges that do occur are generally low in toxicity because of low flow and/or weak composition. The local major industries are primarily lumber, and the mills generally have their own treatment facilities. The agricultural industries within the City are mainly dairy products, and although the organic load is high, at the present time the capacity of the plant is not hindered.

Currently the Spring Street Sewage Treatment Plant is producing effluent far superior to the degree of treatment required by the Waste Discharge Permit. This facility continuously attains BOD (Biochemical Oxygen Demand) and SS (Suspended Solids) reduction to less than 10 mg/l and normally to 2-5 mg/l; the inflow of BOD and SS to the system averages some 11,000 pounds each per day. Because of the topography of the City, several sewage lift stations are in use within the system.

In addition to the Spring Street Plant, the City also has a treatment plant at Kingsley Field which handles approximately .24 mgd. It serves the air base, the Falcon Heights military housing area, and the Gatewood area of the City. This treatment plant is an activated sludge type that uses compressed air for aeration and anaerobic digesters for sludge disposal. The plant effluent meets the Waste Discharge Permit standards before it is discharged into Lost River.

The southeastern portion of the urban area outside the City limits is serviced by the South Suburban Sanitary District. This district uses a lagoon system consisting of four oxidation ponds. The entire South Suburban Sanitary District collection system drains by gravity flow into the pump stations at the treatment facility. Flow rates average 2.01 mgd during the dry season and 2.67 mgd during the wet season; the average peak is 3.63 million gallons per day.

Planning for sanitary facilities requires consideration from a regional perspective. According to the "Klamath Basin Waste Water Facilities Plan Draft" of June 1977, contaminated groundwater in the Klamath Basin, caused by failing septic tanks in unincorporated areas, is causing severe health hazards. In addition, the two major sewage agencies are expected to have difficulty meeting future demands. The treatment plant capacity at the City's Spring Street facility is inadequate; and South Suburban Sanitary District's stabilization

lagoons will not meet secondary treatment standards. Cost-effective alternatives have been identified which intertie the two treatment systems, solving plant capacity and treatment standard problems. The draft plan also identifies alternatives to serve several areas on the periphery of the City that are urbanized or partially urbanized. These areas include Eastside, Pelican City, Wocus, Greensprings and Riverside, and Weyerhauser Road sanitary areas. The City has participated with adjoining jurisdictions in the regional "208" planning process, (Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566).

As development throughout the urban area continues, it is clear that a regionally coordinated plan for sanitary sewer service will be necessary in order to most effectively utilize existing systems, and provide new services in a logical manner.

Sewer Service - Problems and Future Alternatives (1)

188. A few isolated properties are not able to receive sewer service.

189. Inflow of storm drainage waters, and infiltration of groundwater constitutes an occasional over-burden on the treatment plant.

190. Areas with excessive slope (greater than 30 degrees) create problems in establishing proper sewer lines.

191. Certain problems exist in current sewer line sizes and layout due to age of system and technological changes, i.e., deterioration of older lines.

192. The Environmental Protection Agency has required that no toxic industrial materials can be flushed into the municipal sewer system after 1982. Also, requirement for tertiary treatment in 1980 may be enforced by the U.S. Government.

193. Treatment quality standards will increase, as will standards for quality of discharge.

194. Maintenance costs will increase.

195. New industries may create treatment problems or require special treatment procedures for sewage.

196. New technology may change the process of sewage treatment, altering cost figures.

197. Other substandard antiquated facilities that exist within the Urban Growth Boundary such as failed septic fields, settling ponds, and holding lagoons, may become a problem that the City would have to deal with.

198. Coordination with sewage districts and other areas outside the City necessitates planning for future sewage treatment facilities.

D E T A I L E D A S S E S S M E N T N O T E

ELEMENT: SEWER SERVICE

THE CONTENT OF THIS ELEMENT IS SUPPLEMENTED BY THE FOLLOWING DETAILED ASSESSMENT WHICH WILL BE ADOPTED BY REFERENCE WITH THE COMPREHENSIVE PLAN.

KLAMATH BASIN REGIONAL WASTEWATER

FACILITIES PLAN (HGE ENGINEERS)

COPIES OF THIS ASSESSMENT MAY BE AVAILABLE FROM THE ORIGINATING AGENCY OR CAN BE INSPECTED AT THE CITY PLANNING DEPARTMENT OFFICES.

Sewer Service - Goals (1)

33. To provide timely, orderly, and efficient arrangement of sewer facilities and services.

Sewer Service - Policies (1)

185. The City will endeavor to provide all residents within the City adequate sanitary sewer service.

186. Adequate sewer service, either existing or immediately attainable, will be a precondition to a development project.

187. All users will make equitable contributions to improvement or replacement of the sewage treatment system.

188. All users will be required to meet Federal discharge standards.

189. In order to meet urban needs, separation of sanitary and storm sewer effluents will be completed and maintained.

190. The expansion of the sewer system will be a major factor in managing urbanization.

191. The City will, in the planning for sewage treatment facilities, take into consideration regional needs and coordinate with special districts and other unincorporated areas requiring treatment of sewerage through the "208" planning process (Clean Water Act of 1977, Pub. L. 95-217, 91 Stat. 1566).

Sewer Service - Implementation Measures (1)

119. Steps will be taken to eliminate storm drainage water from sanitary sewer lines.

120. Public education and involvement on sewer system needs will be supported.

121. A detailed capital improvement program will be developed.

122. The City will apply for Federal or State funds to improve and maintain the sewer system.

123. Plans for all sewer improvements will be submitted to appropriate regulatory agencies for review and approval.

124. Plans and alternatives to deal with major plant failures will be developed.

125. Plans and alternatives to meet the Federal Water Pollution Control Act Amendment of 1972, 33. U.S.C.A. 1251 et. seg. (1978) tertiary sewage treatment requirement will be developed.

126. The City will implement an ongoing maintenance program to provide maximum life to the existing sewer system.

For implementation measures also see City Code, Chapter 4, Public Utilities and Services: Sewer; and Chapter 10, Community Development: Article 2, Land Development and Article 5, Standards.

URBAN GROWTH MANAGEMENT AGREEMENT

WHEREAS, the City of Klamath Falls, Oregon, hereinafter referred to as the City, and Klamath County, Oregon, hereinafter referred to as the County, are authorized under the provisions of Oregon Revised Statutes Chapter 190.030 to enter into intergovernmental agreements for the performance of any or all functions that a party to the agreement has authority to perform; and

WHEREAS, Oregon Revised Statutes Chapters 197.175, 197.190, 197.250, 197.275 and 197.285 and Oregon Administrative Rule 660-03-010 require counties and cities to prepare and adopt comprehensive plans consistent with statewide planning goals, and to enact ordinances or regulations to implement the comprehensive plans; and

WHEREAS, Statewide Planning Goal Number 14 requires that establishment and change of urban growth boundaries shall be a cooperative process between the city and county that surrounds it; and

WHEREAS, the City and County recognize the need for coordination and cooperation in the management of growth in and around the Klamath Falls Urban Area; and

WHEREAS, this agreement establishes a process for maintaining current and ongoing planning efforts, essential to assure the citizens of the City and County that growth occurs in an orderly and efficient manner; and

WHEREAS, this requires powers and procedures to be put in place by which a plan for the management of the unincorporated area but within the Urban Growth Boundary can be implemented and by which urban growth can be modified.

NOW THEREFORE BE IT RESOLVED, that the City and the County do hereby enter into this agreement which shall provide the basis for future intergovernmental planning and regulatory action, and which may be modified as new governmental and procedural modifications warrant.

Section 1: Definitions

Terms contained herein and not defined within this agreement shall be construed as defined within the Comprehensive Plan or Community Development Ordinance for the City.

Party: The applicant, or any person who appears orally or in writing at a public hearing conducted pursuant to the provisions of this agreement and had the right to be notified under the procedures contained or adopted within this agreement, or the City or the County.

Urban Area: Those lands which lie within the designated Urban Growth Boundary, either within or without the City.

Urban Growth Boundary: The line drawn around the Urban Area which separates rural from urbanizable land for a period of 20 years from adoption and acknowledgement of the Comprehensive Plan of Klamath County.

Urbanizable Land: Urbanizable lands are those lands within the Urban Growth Boundary which are identified and (1) determined to be necessary and suitable for future urban area; (2) can be served by public facilities and services; (3) are needed for the expansion of an urban area.

Section 2: Intent of Agreement

1. The City and the County do hereby agree to establish a procedure for the implementation of the Urban Growth Boundary through use of land use regulation procedures within the Urban Growth Area. The 1981 Klamath County Comprehensive Plan Land Use Map, as adopted by the Klamath County Board of Commissioners on _____, shall be the plan map for the unincorporated area within the Urban Growth Boundary. The 1981 City of Klamath Falls Comprehensive Plan Land Use Map, as adopted by the City Council for the City of Klamath Falls on April 20, 1981, shall be the plan map for the incorporated area within the Urban Growth Boundary.

2. The provisions of this agreement, as amended, shall establish the procedure for review and action on comprehensive plan amendments, implementing ordinances, land use actions, public improvement projects and other related matters.

3. The adopted Urban Growth Boundary shall define the geographical limits of urbanization.

4. The City and the County shall encourage urbanization to occur in an orderly and efficient manner, resulting in a compact, balanced urban area meeting long-term social and economic needs of the residents of the urban area regardless of political boundaries. Urbanization within the Urban Growth Area shall be controlled in accordance with Section 9 herein.

5. The very nature of planning requires continual refinement of various elements of the planning process. This includes the preparation of implementing ordinances, e.g., the County's Land Development Code, the City's Community Development Ordinance and this Urban Growth Management Agreement. As the comprehensive plans are implemented, the City and County will work together in a coordinated effort to achieve the goals of these implementing ordinances.

6. Nothing in this agreement shall prohibit the City or County from referring any application to its respective Planning Commission for information and recommendation.

Section 3: Term of This Agreement

This agreement becomes effective as of _____, 1981. This agreement shall be reviewed and may be amended, at the time established for review of the City or County Comprehensive Plan or at any other time by mutual consent of both parties, after public hearing by the City and the County.

Any modifications in this agreement shall be consistent with the City and County Comprehensive Plans.

Section 4: Annexations

The City may annex land after having received a request for annexation when affirmative findings are made in relation to the following:

1. The land is contiguous with the city limits and within the Urban Growth Boundary.

2. The development of the property is compatible with the rational and logical extension of utilities and roads to the surrounding area.

3. The City is capable of providing and maintaining its full range of urban services to the property without negatively impacting the City's ability to adequately serve all areas within the existing City limits.

4. The proposal is in compliance with the comprehensive plans of the City and the County.

Requests for annexation to the City for areas outside the Urban Growth Boundary shall be considered as a request for an amendment to the Urban Growth Boundary and shall be subject to the approval of the City and County as an amendment pursuant to Section 8 herein.

Requests for annexation shall be handled in conformance with the provisions of Oregon Revised Statutes Chapter 222.

Section 5: Urban Services

The City of Klamath Falls, Klamath County, South Suburban Sanitary District, Klamath County Drainage Service District, Klamath County Fire District No. 1 and Stewart-Lennox Fire Protection District are hereby recognized as the preferred ultimate providers of urban services within the Urban Growth Area. To this end the following shall prevail:

1. Extension of water and/or sewer services shall be permitted when they are consistent with the policies and proposals of the comprehensive plan and with any adopted functional plans for water and/or sewer which are consistent with the comprehensive plan.

2. All City services shall be provided and maintained to City standards and under the supervision of the City, unless some other arrangement acceptable to the City has been made for the maintenance and supervision of services.

3. Provision of urban services shall occur beyond the Urban Growth Boundary only after a determination by affected agencies that a "danger to public health" as defined by Oregon Revised Statutes Chapter 413.705 (5) exists. The service thus authorized shall serve only the area in which the danger exists.

4. The City and the County shall coordinate the preparation and maintenance of utility extension plans. These plans shall provide a basis for the extension of services within the Urban Growth Area.

5. Approval of on-site sewage disposal permits shall be in conformance with the State Department of Environmental Quality's approved coordination plan. From August 1, 1981, until such time as the City's Comprehensive Plan and Community Development Ordinance are acknowledged, the City and County shall both sign off on on-site sewage disposal permits for areas inside the Urban Growth Boundary. After both County and City Comprehensive Plans have received acknowledgment, permit approvals inside the Urban Growth Boundary and outside City limits, will be the responsibility of the County. (on-site systems)

Section 6: Special Districts

Before the County shall create any special districts for the provision of urban services, the County shall first determine the ability of a preferred provider to provide such services. Said provider shall submit to the County an analysis of its abilities to provide the service desired. The County shall review such an analysis and shall incorporate its findings into the decision as to whether or not to create a new district. No district shall be formed unless it is found by the County that the service desired cannot be feasibly provided by any preferred provider.

Section 7: Public Works Construction Standards

The County and City shall cooperatively develop construction and physical development standards related to public works projects in order to assure that an adequate transition may be made from a semi-rural to an urban environment and from County to City jurisdiction.

Roads shall be compatible with City street alignments and extensions. Prior to annexation of any property to the City, the City and County shall meet to discuss jointly the current status and future responsibilities of any roads within or adjacent to such property.

Section 8: Amendments to the Urban Growth Boundary

1. Purpose

The purpose of a revision to the Urban Growth Boundary (UGB) is to provide for flexibility for individuals within the planning process and in response to individual land use changes as a result of changing public needs, and the rate of development and in order to carry out the statewide planning goals.

2. Review Process - Individual Request - (Quasi-judicial)

This UGB revision process is a review procedure which shall result in a decision by the City Council and the Board of County Commissioners on a proposed UGB revision submitted by an individual property owner.

A. An application for a revision of the UGB may be initiated by the owner or group of owners of the subject property or their authorized representative.

1) All applications shall be submitted to the County Planning Department and shall be made on a form provided by the Department.

2) The application form and all additional required information shall be accompanied by a filing fee. Such fee shall be an amount agreed upon from time to time by the City and County and adopted by resolution by each governing body. This fee shall be to defray the costs of the review procedure.

B. Within five (5) working days of receipt of an application, the County Planning Department shall forward to the City Planning Department a complete copy of the application and shall schedule a hearing before the Hearings Officer.

The hearing shall be held no sooner than forty-five (45) days and no later than ninety (90) days after the receipt of the application.

The Hearings Officer shall be chosen by the City Council and the Board of County Commissioners and shall be jointly funded.

C. Both the City and the County shall prepare a staff report on the proposed UGB revision and submit it to the Hearings Officer no later than thirty (30) days after the receipt of the application.

D. The Hearings Officer shall conduct a public hearing on the request at the time and place designated on the notice of public hearing. After consideration of all pertinent information and testimony, the Hearings Officer shall announce his recommendation at that time or within fifteen days thereof; provided, however, the matter may be continued to a future hearing and recommendation announced at the close of such hearing. The recommendation of the Hearings Officer shall be to approve, conditionally approve, or disapprove the request. Said recommendation shall incorporate findings in support of such recommendation and shall be in writing. A copy thereof shall be mailed to the applicant, the City Council and the Board of Commissioners within fifteen (15) days of the end of the public hearing.

E. Within fifteen (15) working days of receipt of the Hearings Officer's recommendation, the City Council and the Board of Commissioners shall each, at their respective public hearings, review the findings and recommendation of the Hearings Officer. Such review shall be on the record only. Each governing body shall either approve or deny the application for a revision of the UGB within thirty (30) days after the hearing is conducted.

(1) Denial - If either one of the governing bodies votes to deny the request, the application is denied.

(2) Approval - To approve an application for a revision of the UGB, both bodies are required to vote to approve the application.

(3) If the individual Quasi-judicial request for a revision is approved, the County Planning Department shall revise the Urban Growth Boundary on their comprehensive plan map and issue a copy of the revised map to the City and other appropriate agencies.

F. Any Quasi-judicial decision made by either the City Council or by the County Board of Commissioners may be appealed to State Land Use Board of Appeals, as provided by Oregon Revised Statutes.

G. An appeal will be filed with the jurisdiction which decision is in opposition to the appellant.

3. Review Process - City or County Request - (Legislative)

This Urban Growth Boundary (UGB) revision process is a review procedure which shall result in a negotiated legislative policy decision by the City Council and the Board of Commissioners to determine whether the Urban Growth Boundary should be revised.

A. Initiation by the City Council or the Board of Commissioners - The City Council or the Board of Commissioners may initiate proceedings for a legislative revision of the Urban Growth Boundary (UGB).

1) The governing body that initiates the procedure for revision shall first declare by resolution at a public meeting the specific and compelling reasons to hold legislative hearings for a revision of the UGB.

2) Within five (5) working days a copy of that resolution shall be sent to the other governing body, the City Planning Department, County Planning Department, and other appropriate agencies and groups in accordance with goals one (1) and two (2) of the statewide Goals and Guidelines.

3) Upon receipt of the resolution a public hearing will be scheduled within forty (40) working days with both the County Board of Commissioners and the City Council, for a joint session. The 40 working day schedule will allow either jurisdiction the option of sending the request to their respective planning commissioners for their consideration and recommendation.

4) Staff reports, any relevant testimony and general discussion will be heard at the joint sessions.

5) At the close of testimony, the City and County shall discuss the application in preparation to vote. At the end of discussion, the body that submitted the request shall vote on the matter. Following the completion of this vote, the second body shall vote on the matter. This vote will either approve or deny the request for the revision of the UGB.

a. Denial - If either one of the governing bodies' votes to deny the request, the application is denied.

b. Approval - To approve an application for ~~a revision of the UGB~~, both bodies are required to vote to approve the application.

c. If the request for a revision is approved, both planning departments shall revise the Urban Growth Boundary on their comprehensive plan maps and issue a copy of the revised map to other jurisdictions and other appropriate agencies.

6) Each jurisdiction will be subject to their appropriate rules of procedure for public hearings.

7) The chairman of the County Board of Commissioners will be presiding chairman of this commission the first year; thereafter the chairman will be decided on by a majority vote of the group from which the chairman is to be chosen.

8) No chairman will serve more than one consecutive year. Chairmen will shift each year from one jurisdiction to another.

4. Review Criteria

Each application for a revision to the Urban Growth Boundary, either Quasi-judicial or legislative, shall include a map and sufficient information to make a decision based on the following factors:

A. Demonstrated need to accommodate urban population growth requirements consistent with LCDC goals;

B. Need for housing, employment opportunities, and livability;

C. Orderly and economic provision for public facilities and services;

D. Maximum efficiency of land uses within and on the fringe of the existing urban area;

E. Environmental, energy, economic and social consequences;

F. Retention of agricultural land as defined, with Class I being the highest priority for retention and Class IV of the County Comprehensive Plan soil classifications (Class VI of the state goals classifications) the lowest priority;

G. Compatability of the proposed urban uses with nearby agricultural activities; and

H. Compatability with the policies regarding the UGB specified in the comprehensive plan.

Section 9: Land Use Regulatory Procedures

The City and County recognize that those unincorporated lands which are within the Urban Growth Area could ultimately become a part of the City and, until such event occurs, will impact directly upon the existence and the operation of the City. It is the intent of the City and County, therefore, to administer a mutually beneficial policy relating to land use regulation within said unincorporated lands until such time as these lands become urbanized and/or annexed.

In line with this policy, any proposed land use regulatory action received by the County shall be subsequently acted upon in accordance with the accompanying "Table of Land Use Regulatory Action Referral

and Response". For the purposes of this table, the following shall apply:

1. "Inform" shall mean that the land use regulatory action shall be processed by the County and shall be transmitted to the City for agency review and comment prior to action being taken. Any such comment shall become a part of the record. City comments shall be in writing and sent to the County within fifteen (15) working days.

2. "Refer and Comment" shall mean that the land use regulatory action shall be processed by the County, but shall have first been transmitted to the City for review and comment by the City. Any City comment shall become part of the record.

3. "Refer and Recommend" shall mean that the land use regulatory action shall be processed by the County, but shall have first been transmitted to the City for recommendation by the City. Any such recommendation by the City shall be addressed by the County in making its final decision and shall become part of the record.

Upon receipt of any comment from the City, the County shall then continue to process the application within its normal framework. It is the intent of the City and County that inclusion of such comments shall provide standing for appeal.

Review Procedure: Refer and Comment

For any land use regulatory action submitted to the City to Refer and Comment, the County shall submit the application along with a staff report to the City within fifteen (15) working days of receipt of said application. Upon receipt of an application, the City Planning Director shall review the application and shall make a determination on the impact of the application of the City. Such comments shall be in writing and shall be returned to the County within fifteen (15) working days of receipt.

Review Procedure: Refer and Recommend

For any land use regulatory action submitted to the City to Refer and Recommend, the County shall submit the application along with a staff report to the City within fifteen (15) working days of receipt of said application. Upon receipt of an application, the City Planning Director shall schedule a public hearing before the City Planning Commission. The City Planning Commission shall conduct a public hearing on the requested land use at the time and place designated on the notice of public hearing. Such hearing may be continued from time to time to a date certain. After consideration of all pertinent information and testimony which shall include the County's staff report, the City Planning Commission shall announce its recommendation. The recommendation of the City Planning Commission shall be to approve, disapprove, or conditionally approve the requested land use action. Such decision shall incorporate findings in support of such recommendation as provided herein and shall be in writing.

Such a recommendation shall be filed with the City Recorder. Upon receipt of the recommendation from the Commission, the City Recorder shall set a date for public hearing before the Council. The Council shall conduct a public hearing on the record of the Commission hearing. Such hearing may be continued from time to time to a date certain. The scope of the Council hearing shall be limited to the record made before the Commission. If the Council determines that new testimony should be taken, it shall refer to the matter back to the Commission for a hearing of such new testimony.

At the close of testimony, the Council may continue the hearing for decision only to a date certain to provide an opportunity to draw findings. The decision rendered by the Council shall sustain or reverse the recommendations of the Commission and shall be in writing. If the determination of the Council is contrary to the recommendations of the Commission, the Council shall refer the matter back to the Commission. The Commission shall conduct a public hearing on the Council's deliberations and any additional testimony or evidence as may be submitted. The Commission shall report its reconsiderations back to Council. In the event the report back from the Commission is adverse to the recommendations referred to it by the Council, or in the event the Council desires to approve any land use action contrary to the recommendations of the Commission, then a decision may be rendered. City recommendations shall be in writing and returned to the County no later than 45 days after receipt.

Land Within City Limits

Land use regulatory actions within the City limits shall be referred to the County for information and/or comment if they may have significant impacts on land or land uses under County jurisdiction.

Any land use regulatory actions which may affect another agency substantially shall be referred to said agency for information and/or comment.

TABLE OF LAND USE REGULATORY ACTION
REFERRAL AND RESPONSE

	County Activity	Land Between City Limits and Urban Growth Boundary	Land Outside Urban Growth Boundary but Abutting City Limits
1.	Comprehensive Plan Amendment (Other than UGB Revision)	Refer and Recommend	Refer and Recommend
2.	Land Development Code Amendment	Refer and Recommend	Refer and Recommend
3.	Zone Change	Refer and Recommend	Refer and Comment
4.	Subdivision	Refer and Recommend	Refer and Comment
5.	Planned Unit Development	Refer and Recommend	Refer and Comment
6.	Major Land Partition	Refer and Comment	Refer and Comment
7.	Minor Land Partition	Inform	Inform
8.	Temporary Use Permit	Inform	Inform
9.	Conditional Use Permit	Refer and Comment	Inform
10.	Site Plan Permit	Refer and Comment	Inform
11.	On-site Sewage Disposal Permit	Inform	Inform

Approvals

Approved by the Klamath County Board of Commissioners on this 25TH day of NOVEMBER, 1981.

Chairman
Klamath County Board of Commissioners

Commissioner

Commissioner

Approved by the City of Klamath Falls City Council on this 7th day of December, 1981.

Mayor, City of Klamath Falls

VACATIONS AND REPLATS

13.005 Procedure. A person who desires to vacate all or any part of any street, plat, public square or other public place, shall submit an application in accordance with the provisions of Section 10.515.

13.010 Combined Vacations. Vacation of two or more streets, plats, public squares or other public places or any portion thereof, may be concurrently applied for and considered, provided they are contiguous or in the case of streets, parallel and separated by no more than one block.

13.015 Vacation on Council's Own Resolution. The Council may initiate vacation proceedings authorized by ORS 271.130 and make such vacations without an application or consent of abutting property owners. Such vacation shall not be made before the dates set for Commission and Council hearings, nor if the owners of a majority of the area affected, computed on the basis provided in ORS 271.130, object in writing thereto, nor shall any street area be vacated without the consent of the owners of abutting property if the vacation will substantially affect the market value of such property, unless the Council provides for paying damages. Provisions for paying such damages may be made by a local assessment.

13.020 Commission Hearing Date and Notice. Upon receipt of an acceptable application or Council resolution, the Director shall fix a date for a public hearing before the Commission in accordance with Section 10.515. Notice of such hearing shall be given in accordance with Section 10.625.

13.025 Hearings - Planning Commission. The Commission shall conduct a public hearing on the application or resolution and any objections thereto and make a recommendation to the Council to either grant or deny the proposed vacation, in whole or in part, as appears to be for the public interest. Such recommendation shall be in writing and accompanied by findings supporting the decision. The following factors, among others, shall be considered by the Commission:

(1) Whether the consent of the owners of the requisite area has been obtained.

(2) Whether the notice of the proposed vacation has been duly given.

(3) Whether the public interest will be prejudiced by vacation of such plat or part thereof.

(4) Whether the proposed vacation conforms to the Comprehensive Plan, all applicable provisions of Chapters 10 to 14 and any applicable street plans.

13.030 **Council Hearing Date and Notice.** Upon receipt of a Commission recommendation, the Planning Department shall fix a date for public hearing and provide notification of Council hearings upon the vacation application or resolution in accordance with the provisions of Section 10.625.

13.035 **Hearings - City Council.** At the time fixed by the Council for hearing the application or resolution and any objections filed thereto or at any postponement or continuation of such matters, the Council shall hear the application or resolution and objections and shall determine:

(1) Whether the consent of the owners of the requisite area has been obtained.

(2) Whether notice has been duly given.

(3) Whether the public interest will be prejudiced by the vacation of such plat or street or parts thereof.

(4) Whether the proposed vacation is in conformance with the Comprehensive Plan, all applicable provisions of Chapters 10 to 14, and any applicable street plan.

The Council shall by ordinance make such decision a matter of record and vacate such area as requested; otherwise, it shall deny said application. The Council may, upon hearing, approve the application in part and deny it in part and make such conditions, or either as appear to be for the public interest.

13.040 **Vacation Records to be Filed.** Certified copies of the vacating ordinance and map shall be filed for record by the City Recorder with the County Clerk, the County Assessor, County Surveyor and City Surveyor.

13.045 **Title to Vacated Areas.** The title to the street or other public area vacated shall attach to the lands bordering on such area in equal portions; except that where the area has been originally dedicated by different persons and the fee title to such area has not been otherwise disposed of, original boundary lines shall be adhered to and the street area which lies on each side of such boundary lines shall attach to the abutting property on such side. If the public square is vacated, the title thereto shall vest as provided by ORS 271.060.

13.050 **Vacation for Purposes of Replatting or Rededication.** No street or plat or portion thereof shall be vacated upon the application of any person when it is proposed to replat or rededicate all or part of any street or plat in lieu of the original unless such petition is accompanied by a plan showing the proposed manner of replatting or rededicating. If the proposed manner of replatting or rededicating or any modification thereof, which may

subsequently be made meets with the approval of the Council, it shall require a suitable guarantee to be given for the carrying out of such replatting or rededicating or may make any vacation conditional or to take effect only upon the consummation of such replatting or rededicating.

13.055 Certification. No ordinance for the vacation of all or part of a street or plat shall be passed by the Council until the City Recorder has filed in his office or endorsed on the petition for each vacation, a certificate showing that all City liens and all taxes have been paid on the lands covered by the street or plat or portion thereof to be vacated.

13.105 **Authority to Annex.** Pursuant to the provisions of Sections 13.105 to 13.140, the boundaries of the City may be extended by the annexation of land not within the City, provided such land is contiguous to the City or separated from it by a stream only.

13.110 **Hearing Date/Notice.** Upon receipt of an application for annexation or upon initiation by the Council by resolution, the Director shall set a date for public hearing upon the proposed annexation before the Commission. Notice of the hearing shall be provided pursuant to the provisions of Sections 10.605 to 10.635.

13.115 **Hearing - Commission.** The Commission shall conduct a public hearing on the annexation at the time and place designated on the notice of public hearing. After consideration of all pertinent information and testimony, the Commission shall announce its recommendation at that time or within thirty five days thereof; provided however, the matter may be continued to a future hearing and the decision announced at the close of such hearing. The recommendation of the Commission shall be to approve, disapprove or modify the proposed annexation boundary. Said decision shall incorporate findings as to whether or not the proposed annexation conforms to the Comprehensive Plan and shall be in writing. The recommendation shall be filed with the City Recorder and a copy mailed to the applicant.

13.120 **Hearing Date - Council.** Upon receipt of the recommendation from the Commission, the City Recorder shall set a date for public hearing before the Council in accordance with Section 10.630.

13.125 **Hearing - Council.** The Council shall conduct a public hearing on the record of the Commission hearing. The scope of the Council hearing shall be limited to the record made before the Commission. If the Council determines that new testimony should be taken, it shall refer the matter back to the Commission for a hearing of such new testimony. The Council shall announce its decision at that time or within thirty five days thereof; provided however, the matter may be continued to a future hearing and the decision announced at the close of such hearing.

13.130 **Decision of Council.** The Council shall, by ordinance containing a legal description of the land in question, reverse or modify the recommendation of the Commission or may refer the matter back to the Commission for further consideration. Upon reconsideration by the Commission, the Council shall, by ordinance containing a legal description of the land in question, sustain, reverse or modify the recommendation of the Commission. Any decisions made by the Council shall incorporate findings as to whether or not the proposed annexation conforms to the Comprehensive Plan and shall be in writing.

13.135 **Conformance with Oregon Revised Statutes.** If the decision of the Council is that the annexation would be consistent with the Comprehensive Plan, the Council shall conform to all applicable legislative procedure requirements of ORS Chapter 222.

Land Use Designation of Annexed Property. Any land area annexed to the City shall be assigned a land use and zoning classification as provided within the table below, provided however, that the City pursuant to Section 10.505 or a landowner may request that the City land use and zoning designations contained within said table may be amended by following provisions contained within the Comprehensive Plan and Sections 12.670 to 12.710. Said request may be considered and acted upon concurrently with annexation proceedings. Such concurrent proceedings shall comply with amendment procedures of the Comprehensive Plan and the provisions of Sections 12.670 to 12.710.

COUNTY DESIGNATIONS		CITY DESIGNATIONS	
Land Use	Zone	Land Use	Zone
Urban Residential	RS	Residential	SF
	RL		MD
	RM		MD
	RH		A
General Commercial	CN	Commercial	NC
	CC		NC
	CG		GC
	CR		GC
Trans. Com.	CT		GC
	CH		GC
Industrial	IL	Industrial	CI
	HI		I

(County Zoning Definitions)

RS - Suburban Residential
DL - Low Density Residential
RM - Medium Density Residential
RH - High Density Residential
CN - Neighborhood Commercial
CC - Community Commercial
CG - General Commercial
CT - Transportation Commercial
CH - Highway Commercial
CR - Recreation Commercial

(City Zoning Definitions)

SF - Single Family
MD - Medium Density
A - Apartment
NC - Neighborhood Commercial
GC - General Commercial
CI - Commercial Industrial
I - Industrial

[Amended by Ordinance 6413, Enacted January 3, 1983]

14.700 General. Easements for sewers, water mains, electric lines or other public utilities shall be dedicated wherever necessary. The easement shall be at least 16 feet wide and either centered on lot or parcel lines or inside street rights of way. Easements shall be indicated on the plat. Electrical lines and other wires, including but not limited to communication, street lighting and cable television shall be placed underground.

SANITARY SEWER

14.710 General. Sanitary sewers shall be installed to serve each lot or parcel in a development and to connect the land development to existing city mains. Designs approved by the Public Works Director shall take into account the capacity and grade to allow for desirable extension beyond the land development.

SIDEWALKS

14.720 General. Sidewalks or bikeways shall be installed on either or both sides of all streets and in any special pedestrian ways within the land development and when the Commission determines such improvements are necessary. When desirable for public convenience, a sidewalk or bikeway may be required to connect to a cul de sac or to pass through an unusually long or oddly shaped block or otherwise provide appropriate circulation. Sidewalks shall conform to the specifications provided in Exhibit N, Drawing Number 170, of Section 10.310 and bikeways shall conform to the requirements of Section 14.450 to 14.490.

STREET LIGHTS

14.730 General. Street lights shall be installed and shall be served from an underground source of supply. The city shall order the installation through its franchisee. Any costs over and above base costs established by the Oregon Public Utility Commission shall be paid by the developer to the franchisee.

STREET NAME SIGNS

14.740 General. Street name signs shall be installed to the specification of the Public Works Director. The City shall perform the installations, the cost of which shall be paid by the developer.

SURVEY MONUMENTS

14.800 General. Survey monuments and procedures for monumenting all partitions and subdivisions shall conform to ORS 92.060 and ORS 92.065. The City Surveyor may authorize the setting of another type of monuments in circumstances where setting the required monuments is impracticable.

ANNEXATION AGREEMENT

THIS ANNEXATION AGREEMENT, made and entered into this _____ day of _____, 1997, by and between the City of Klamath Falls, a municipal corporation of the State of Oregon, hereinafter referred to as "CITY", and _____, hereinafter referred to as "OWNER".

WITNESSETH:

WHEREAS, OWNER owns certain real property described in Exhibit "A" hereto, which Exhibit is hereby incorporated herein and which real property is known for the purposes of this Agreement as the "Property"; and

WHEREAS, OWNER desires to annex the Property to CITY and OWNER desires to obtain water service from CITY for the Property; and

WHEREAS, the parties have agreed upon the terms and conditions pursuant to which said utility service should be provided and maintained and desire to reduce such agreement to writing; and

WHEREAS, it is to the best interest of both parties that the Property be provided with said utility service in conformity with the ordinances, codes, rules and regulations of CITY, that the Property be annexed to the CITY when fully developed and when desired by CITY and said Property is eligible for annexation in accordance with present or hereafter enacted laws of the state of Oregon and ordinances of the CITY as applicable; and

WHEREAS, CITY has the power and authority to supply the said utility service to the Property and the Council of CITY has determined that OWNER should be granted the use of said utility service on the terms set forth below and OWNER agrees to said terms; NOW THEREFORE,

IN CONSIDERATION of the foregoing and the mutual promises and agreements herein stated, the parties mutually contract and agree with each other as follows:

1. ANNEXATION. OWNER desires the Property to be annexed to CITY as soon as possible after the provisions of this Agreement are met and the Property is developed and improvements installed thereupon, and, thereafter, OWNER hereby gives OWNER's express, continuing, written consent to annexation of the Property, and the whole thereof, to the City of Klamath Falls and does hereby make application and constitute this Agreement to be OWNER's continuing petition to CITY for said annexation and agrees to execute such separate, further or additional application, petition and consent as may be hereafter required by CITY or the laws of the state, as now or hereafter enacted, for such annexation.

OWNER and CITY mutually agree that CITY cannot bind itself by an enforceable contract to pass future legislation annexing the Property, but CITY agrees it will process and consider, in a manner usual in such a request, the application and consent of OWNER for the annexation.

2. ZONE CHANGE. Following the annexation, OWNER acknowledges that the Property will need to be rezoned to a City zone designation by the CITY. City staff and owner agree to consult with respect to the appropriate zone designation.

3. KLAMATH COUNTY PERMITS. OWNER shall obtain necessary written authority from Klamath County to install improvements upon the Property.

4. UTILITY PERMITS. OWNER shall obtain all necessary permits for utility service installation for the Property.

5. SUPPLY OF UTILITY SERVICE. CITY shall supply OWNER water service according to City's general rules and regulations regarding supply of the service

as currently exist or may in the future be amended. Any water to be supplied shall come from the same supply as serves inhabitants of the CITY for domestic and fire service systems within structures. Pursuant to Chapter 4 of the City Code, in case of shortage of supply of water, CITY reserves the right to give preference in the matter of furnishing service to customers and interest of CITY from the standpoint of public convenience or necessity and water service to users, including OWNER, outside the City limits shall, at all times, be subject to the prior and superior rights of the customers within the CITY. After annexation of the Property, said Property shall have the same rights to water service as any other property within CITY.

6. PAYMENT OF UTILITY SERVICE RATES. OWNER shall pay the monthly water service rates including demand charges for the services described hereinabove as established by CITY ordinance or resolution, subject to future amendment, for utility service supplied outside the City limits and until such time as the Property is annexed to CITY.

7. BINDING EFFECT OF AGREEMENT AND ASSIGNABILITY RESTRICTION. This Agreement is binding upon and shall inure to the benefit of the heirs, executors, administrators, personal representatives, successors and assigns of the parties, provided OWNER may not assign or transfer this Agreement without prior written consent of CITY. If there is more than one OWNER, each OWNER is jointly and severally bound hereby. This Agreement is not personal but is for the benefit of the Property described in Exhibit "A" hereto and shall run with all said real property and be binding upon OWNER and all successive Owners of all or part of said Property.

8. RECORDING AGREEMENT. CITY shall cause an executed copy of a Memorandum of this Agreement to be recorded in the deed or other real property records of the Klamath County Clerk.

9. OTHER MUNICIPAL SERVICES. Except for water service, the CITY shall not extend or supply municipal services to the Property, with such other services including but not limited to those of police and fire protection. Upon annexation to the City, such police and fire protection and other municipal services will be provided the Property in the same fashion as the same are provided other properties within the City.

IN WITNESS WHEREOF, CITY and OWNER have caused this instrument to be executed by their duly authorized officers (OWNER has hereunto set OWNER's hand) as of the day and year first above written.

CITY OF KLAMATH FALLS

By: _____
City Manager

Attest: _____
City Recorder

OWNER

_____

_____

STATE OF OREGON }
COUNTY OF KLAMATH } ss.

On the _____ day of _____, 1997, personally appeared James R. Keller and Elisa D. Fritz, who, each being first duly sworn, did say that the former is the City Manager and the latter is the City Recorder of the City of Klamath Falls, an Oregon municipal corporation, and that the instrument was signed on behalf of said municipal corporation; and each of them acknowledged said instrument to be its voluntary act and deed.

BEFORE ME:

_____
Notary Public for Oregon

STATE OF OREGON
COUNTY OF KLAMATH } ss

On the _____ day of _____, 1997, personally appeared _____ and acknowledged said instrument to be his/her/their voluntary act and deed.

BEFORE ME:

_____
Notary Public for _____
My Commission Expires: _____

Updated September, 1997

Employment of Qualified Business Firms (continued)

(4) A shorter interval than 12 months shall be used only if the eligible business firm was not conducting trade or business in the enterprise zone 12 or more months prior to when the firm applies for precertification, in which case employment is averaged over the interval between the firm's commencing trade or business in the zone and its applying for precertification.

(5) For purposes of determining the time before which annual employment is averaged, the date on which any of the activities described in OAR 123-065-0710(2) first occurs may be used instead of the date of the application for precertification, but only in the case of a waiver of precertification by the Department of Revenue under ORS 285.613(8).

(6) Only if hiring, construction, reconstruction, modifications or installation have not yet begun, may an eligible business firm change the computed level of Existing Employment by submitting a new application for precertification, although such computed levels may be revised at anytime as necessary to correct for errors, including but not limited to the improper counting of part-time, temporary, seasonal, construction or ineligible workers.

Statutory Authority: ORS 285.035(5), 285.065 & 285.575(1)
Stats. Implemented: ORS 285.600 & 285.617
Hist.: NEW

Employment Requirements to Qualify

123-065-0820 In order to receive and begin an exemption from taxation on qualified property in an enterprise zone, a precertified business firm must file for the exemption with the county assessor in accordance with OAR 123-065-0970, the firm must qualify, such that:

(1) Following the application for precertification but on or before April 1 of the first initial year as mandated in OAR 123-065-0960(1), the business firm must have:

(a) Entered into a first-source hiring agreement prior to hiring new employees pursuant to OAR 123-070-0300 to 123-070-0370;

(b) Added to or increased the employment of the firm by one or more new employees;

(c) Reached a level of total employment of the firm equal to or greater than the Existing Employment multiplied by 1.1 and rounded per OAR 123-065-0810(3);

(d) Satisfied the employment requirement of section (5) of this rule, if necessary; and

(e) Not violated the stipulations under OAR 123-065-0840.

(2) To receive any subsequent exemption, a qualified business firm must file another exemption application with the county assessor in accordance with OAR 123-065-0970, even if the exemption is on additional qualified property that:

IV

With the possible exception of slot machines in the form of video lottery terminals, California has no obligation to negotiate with the Tribes on the Proposed Gaming Activities, and the trial court judgment is reversed to that extent. We affirm the district court's judgment that the State need not negotiate over banked or percentage card games with traditional casino themes. We remand to the district court to consider the limited question of whether California permits the operation of slot machines in the form of the state lottery or otherwise.

AFFIRMED in part, REVERSED in part, and REMANDED. Each party to bear its own costs.

WALLACE, Chief Judge, concurring:

I concur with parts I and II of this opinion. However, I concur only in the result of part III, because the discussion of the legislative history of the Indian Gaming Regulatory Act (Act) is unnecessary. Having concluded that the plain language of the Act controls this case, our opinion should end. The discussion of the Act's legislative history gives the impression that the Act is not as clear as we say, and that some additional reason is required before we hold as we do. "Where we are not prepared to be governed by what the legislative history says—to take, as it were, the bad with the good—we should not look to the legislative history at all. This text is eminently clear, and we should leave it at that." *United States v. Taylor*, 487 U.S. 326, 345, 108 S.Ct. 2413, 2424, 101 L.Ed.2d 297 (1988) (Scalia, J., concurring).

activity in which the state allows others to engage, and no resort to legislative history is necessary to support this conclusion. Because Connecticut allowed charities to operate games of chance, it had to negotiate with the tribe over these games.

Michelle HUSSEY, James Hussey, Mary Fran Mathis, John Rutherford, and Teresa Rutherford, Plaintiffs–Appellants,

v.

CITY OF PORTLAND, a municipal corporation, Defendant–Appellee.

No. 93–35641.

United States Court of Appeals, Ninth Circuit.

Argued and Submitted Oct. 31, 1994.

Memorandum Jan. 19, 1995.

Memorandum Withdrawn Aug. 18, 1995.

Decided Aug. 18, 1995.

Homeowners residing outside city brought civil rights action against city for declaratory and injunctive relief, challenging constitutionality of city ordinance requiring nonresidents to consent to annexation as condition of receiving subsidy, or reduction in hook-up costs, for mandated sewer connections. Parties cross-moved for summary judgment. The United States District Court for the District of Oregon, Helen J. Frye, J., 1993 WL 244023, entered summary judgment for city. Homeowners appealed. The Court of Appeals, Rymer, Circuit Judge, held that: (1) under Oregon statute allowing city to annex territory with consent of majority of electors in territory and consent of majority of landowners in territory, consents by electors were constitutional equivalent of "voting" for equal protection purposes; (2) ordinance was subject to strict scrutiny test for purposes of equal protection analysis; and (3) ordinance was violative of equal protection under strict scrutiny analysis.

Reversed.

The Tribes also assert that the State is barred by issue preclusion from relitigating *Cabazon*'s finding that California "regulates ... gambling in general." 480 U.S. at 211, 107 S.Ct. at 1089. Since we do not apply the *Cabazon* "criminal/regulatory" test here, we need not reach this argument.

1. Constitutional Law ⇐225(2)
Municipal Corporations ⇐29(1)

Under Oregon statute allowing city to annex territory with consent of majority of electors in territory and consent of majority of landowners in territory, consents by electors were constitutional equivalent of "voting" for equal protection purposes, despite fact that Oregon Boundary Commission would have to approve any boundary changes before they took effect; consents had to be returned by registered voters, were official expressions of elector's will, and were required to resolve political issues, and majority of consents were required for success. U.S.C.A. Const.Amend. 14; ORS 199.490(2)(a)(B).

See publication Words and Phrases for other judicial constructions and definitions.

2. Municipal Corporations ⇐34

There is no federal or Oregon state constitutional right to vote on annexation of territory by city.

3. Elections ⇐1

Once citizens are granted right to vote on matter, exercise of that vote becomes protected by Constitution, even though state was not obliged to allow any vote at all.

4. Constitutional Law ⇐225(2)

City ordinance requiring nonresidents to consent to annexation by city as condition of receiving subsidy, or reduction in hook-up costs, for mandated sewer connections, severely and unreasonably interfered with right of nonresidents to vote on annexation and, thus, ordinance was subject to strict scrutiny test for purposes of equal protection analysis. U.S.C.A. Const.Amend. 14; ORS 199.490(2)(a)(B); Portland, Or., City Ordinance 165188.

5. Constitutional Law ⇐225.2(1)

For equal protection purposes, while it is beyond cavil that voting is of most fundamental significance under constitutional structure, courts do not subject every voting regulation to strict scrutiny. U.S.C.A. Const. Amend. 14.

6. Elections ⇐21

When First and Fourteenth Amendment rights of voters are subjected to severe restrictions by state election law provisions, regulation must be narrowly drawn to advance state interest of compelling importance.

7. Constitutional Law ⇐225.2(1)

For purposes of equal protection analysis of state election law, there must be substantial regulation of elections if they are to be fair and honest. U.S.C.A. Const.Amend. 14.

8. Constitutional Law ⇐225(2)
Municipal Corporations ⇐29(1)

Under strict scrutiny equal protection analysis, city ordinance requiring nonresidents to consent to annexation by city as condition of receiving subsidy, or reduction in hook-up costs, for mandated sewer connections could only stand if it was narrowly drawn to advance state interest of compelling importance. U.S.C.A. Const.Amend. 14; ORS 199.490(2)(a)(B); Portland, Or., City Ordinance 165188.

9. Constitutional Law ⇐225(2)
Municipal Corporations ⇐29(1)

City ordinance requiring nonresidents to consent to annexation by city as condition of receiving subsidy, or reduction in hook-up costs, for mandated sewer connections was violative of equal protection under strict scrutiny analysis; city's goals, of promoting stability of neighborhoods and aligning service and tax boundaries, were not compelling and ordinance was not narrowly drawn to achieve goals and, as such, ordinance was unconstitutional infringement on fundamental right to vote, designed to distort political process by granting substantial subsidies based solely on whether voter consents to annexation. U.S.C.A. Const.Amend. 14; ORS 199.490(2)(a)(B); Portland, Or., City Ordinance 165188.

Elden M. Rosenthal and B. Carlton Grew, Rosenthal & Greene, Portland, OR, for plaintiffs-appellants.

Tracy Pool Reeve, Office of the City Attorney, Portland, OR, for defendant-appellee.

Appeal from the United States District Court for the District of Oregon.

Before: FLETCHER, D.W. NELSON, and RYMER, Circuit Judges.

ORDER

The memorandum disposition filed January 19, 1995 is withdrawn. With the memorandum disposition withdrawn, the Petition for Rehearing and the Motion to Certify Questions of State Law to the Oregon Supreme Court are moot.

OPINION

RYMER, Circuit Judge:

We must decide whether the City of Portland's ordinance requiring non-residents to consent to annexation as a condition of receiving a subsidy, or reduction in hook-up costs, for mandated sewer connections, violates their federal constitutional rights to free speech or equal protection.

Michelle and James Hussey along with several of their neighbors [1] are homeowners residing in an area of East Multnomah County outside the City of Portland called "Mid-County" who are required to connect to the City sewer system. When Portland decided to offer connection at a reduced charge to those who signed irrevocable consents to annexation, Hussey sued for declaratory and injunctive relief under 42 U.S.C. §§ 1983 and 1988. On cross-motions for summary judgment, the City prevailed. Hussey appeals, arguing that since consent of a majority of electors (registered voters), as well as homeowners, is required for annexation under Oregon law, the City has infringed the electors' rights to political speech, and that by imposing financial distress upon those who refuse to consent, the City has violated their rights to equal protection. We hold that Portland's offer of a subsidy to electors who consent to annexation impermissibly burdens Hussey's right to vote.[2] We have jurisdiction under 28 U.S.C. § 1291, and we reverse.

I

In 1986, the State of Oregon's Environmental Quality Commission ordered the City of Portland to provide sewer services to residents of Mid-County, who must connect to the sewers. The Commission forbade the City from requiring annexation as a condition of using its sewer systems.

Some of the Mid-County area is within the City; some is not. Historically, Portland has charged the actual costs of installing sewers against the properties benefitted. In this case, however, it adopted a program to minimize financial distress faced by City residents, funded by sewer customers within the City, and decided to extend the same program to owners of single family residential property outside the City limits but inside the Portland Urban Services Boundary if they consented to annexation. Hussey is in this group.

City Ordinance 165188, implementing the program, was enacted March 11, 1992. It provides a sewer connection subsidy to homeowners who irrevocably consent to annexation as both landowners and electors. The subsidy, which depends on lot size and the date on which the property owner consents, can be thousands of dollars.

Under Oregon law, annexation may be accomplished in several ways, two of which are relevant here: in a conventional election by a majority of the ballots cast, ORS § 222.120(4)(a); or by the written consent of a majority of all voters registered in the territory to be annexed, and the written consent of owners of a majority of the land in that territory—the so-called "double majority" method. ORS § 199.490(2)(a)(B). Under both approaches, either all the territory will be annexed or none of it will be.

1. Mary Fran Mathis, John Rutherford and Teresa Rutherford. Together they are referred to as "Hussey."

2. We do not reach Hussey's other constitutional argument, that the ordinance violates his First Amendment rights to speech.

II

Hussey argues that imposing financial distress only on electors who oppose annexation violates his personal right to equal protection under the Fourteenth Amendment because once a governmental entity extends the right to vote on a particular subject to its citizens, that right to vote has the same constitutional significance as the right to vote on any other issue, and that the government therefore should be bound by the same constitutional standards as in a conventional election. Since Oregon law requires the assent of electors for annexation, Hussey submits that Portland may not restrict that form of voting without a compelling state interest. There can be none, in his view, as the integrity of the political process is at stake.

Portland, on the other hand, denies that there is any financial penalty involved and argues that, in any event, as a matter of law there is no inherent state or federal constitutional right to vote on annexation. Further, the City contends that because ORS § 199.490(2)(a)(B), the statute applicable here, does not provide for a right to vote, the constitutional standards that govern a conventional election are not implicated in Hussey's case.

A

[1] As the position of both parties turns on whether consents by electors are the constitutional equivalent of "voting," we address this issue first. We conclude that they are. Both must be returned by registered voters; both are official expressions of an elector's will; both are required to resolve political issues; and both require a majority for success. Without the consent of a double majority of registered voters and landowners, Portland would have had to conduct an election to annex Mid–County. And, the consent forms themselves state that if Portland attempts to annex Mid–County by election, "this agreement constitutes a waiver of the right to vote.... [and] such persons shall count as yes votes."

[2, 3] Portland correctly points out that there is no federal or Oregon state constitutional right to vote on annexation. "There is no federal constitutional right to vote on municipal annexations. We are also unable to find any such right in the Oregon Constitution." *Mid–County Future Alternatives Comm. v. City of Portland*, 310 Or. 152, 795 P.2d 541, 549, *cert. denied*, 498 U.S. 999, 111 S.Ct. 558, 112 L.Ed.2d 564 (1990) (citation omitted); *Hunter v. City of Pittsburgh*, 207 U.S. 161, 178–79, 28 S.Ct. 40, 46, 52 L.Ed. 151 (1907) ("The State ... at its pleasure, may ... expand or contract the territorial area, unite the whole or a part of it with another municipality.... with or without the consent of the citizens."). Nevertheless, once citizens are granted the right to vote on a matter, the exercise of that vote becomes protected by the Constitution even though the state was not obliged to allow any vote at all. The Supreme Court has subjected to strict scrutiny statutes governing the eligibility of voters to participate in school district elections, for example. "The need for exacting judicial scrutiny of statutes distributing the franchise is undiminished simply because, under a different statutory scheme, the offices subject to election might have been filled through appointment." *Kramer v. Union Free School Dist.*, 395 U.S. 621, 628–29, 89 S.Ct. 1886, 1890, 23 L.Ed.2d 583 (1969).

Although we acknowledge a state's considerable latitude in matters of suffrage, we are not persuaded by Portland's argument that "consents" are not votes but are just "consents." Labelling cannot be dispositive; otherwise a state could escape the laws protecting voters in a gubernatorial election, for example, merely by declaring that the governorship would be determined by which candidate has the most "consents."

The best support for Portland's position that this annexation does not involve voting rights is found in two decisions by other circuits. In *Carlyn v. City of Akron*, 726 F.2d 287 (6th Cir.1984), the Sixth Circuit held that voting rights were not implicated by an annexation procedure initiated by the petition of a landowner. Although without the landowner's petition, annexation could only be initiated by a majority vote of the electorate, the ultimate authority for any annexation rested with the county commission-

ers. It was this fact that the court thought dispositive.

> Ohio has not committed any final authority to voters in the township concerned.... The vote accorded by Ohio to township voters would simply have the function of putting the issue before [the] Board.

Id. at 289.

The Fourth Circuit has taken the same view, explaining that although "[i]t is true that three-fourths of the [landowners] in the area to be annexed must request annexation before the ... annexing city may" do so, this procedure does not implicate voting rights because the ultimate annexing authority is vested in the governing board of the annexing city. *Berry v. Bourne*, 588 F.2d 422, 424 (4th Cir.1978).

As in *Berry* and *Carlyn*, ultimate annexation authority in this case rests not with the voters, but with the Oregon Boundary Commission. We decline, however, to follow the reasoning of those cases.

Contrary to the statements in *Berry* and *Carlyn*, traditional voting often has no direct, dispositive effect, but rather takes effect only when acted upon by others. For example, voters do not choose the president, the electoral college does. But that does not show that citizens do not vote in presidential elections. Similarly, voter approval of a bond referendum does not compel a municipality to issue the bonds. If other financing is available, or interest rates move adversely, the government may decline to issue the bonds notwithstanding the voters' authorization. Yet the Supreme Court has explicitly held that municipal bond referendums *do* involve voting. *Cipriano v. City of Houma*, 395 U.S. 701, 706, 89 S.Ct. 1897, 1900, 23 L.Ed.2d 647 (1969). We decline to hold, therefore, that the annexation proceeding here did not involve voting merely because the Boundary Commission—as well as electors and landowners—would have to approve any boundary changes before they took effect.

Although we do not agree with the reasoning of *Berry* and *Carlyn*, we have no quarrel with their results. Neither of the annexation methods at issue in those cases granted electors any say in the proceedings; the consent of landowners alone was required. Without the participation of voters, there can be no voting.

We find more persuasive two state supreme court decisions which held that annexation proceedings similar to the one at issue here were sufficiently similar to voting to be treated as such. In *Town of Fond du Lac v. City of Fond du Lac*, 22 Wis.2d 583, 126 N.W.2d 201 (1964), the Wisconsin Supreme Court invalidated an annexation ordinance because some of the signatures on the annexation petition had been coerced: two residents were offered a year's free rent if they would sign the petition, while two others were told they would be evicted if they failed to sign. The court declared that:

> The signing of a petition for annexation is more than the exercise of a private right or of a property right. The right of an elector to participate in an annexation proceeding partakes of the nature of a political right "analogous to voting upon the question" and therefore must be the elector's "individual act ... discharging his duty in shaping and influencing this particular affair of government." ... The signing of an annexation petition, like voting, constituting participation in a governmental process is governed by a higher standard of conduct than prevails in the marketplace—votes are not a commodity of commerce.

Id., 126 N.W.2d at 203–04.

The California Supreme Court reached a similar conclusion in *Curtis v. Board of Supervisors of Los Angeles County*, 7 Cal.3d 942, 104 Cal.Rptr. 297, 501 P.2d 537 (1972). California permitted persons owning a majority of land within a proposed annexation area to prevent an annexation election by filing a written protest. Residents who wished to vote in the election challenged the law. Defendants argued that no voting rights were involved since the landowners' written protest was not an election. The court, however, determined that since the protest prevented an election, it was still subject to strict scrutiny:

> We find it unnecessary to decide whether [the protest] procedure constitutes an

> "election;" our obligation of "active and critical analysis" is not limited to statutes establishing electoral qualifications as such, but extends to laws which "touch upon" or burden the right to vote.

Id., 104 Cal.Rptr. at 304, 501 P.2d at 544 (footnote omitted).

> We conclude that a statute which confers power to halt an election, and thus to prevent all qualified voters from casting their vote, must be considered to "touch upon" and to "burden" the right to vote, and therefore must be examined under the strict equal protection standards.

Id. at 306, 501 P.2d at 546.

Portland may pursue annexation either by calling for an election, which no one disputes would involve voting, or by the consent of a double majority of landowners and registered voters. The conclusion is inescapable that the common thread between these procedures is that both require the consent of the governed. That is what voting is. Because the consent forms are analytically like votes, and are a substitute for them, legally they must be treated as votes.

B

[4] Hussey contends that the Portland ordinance impinges on fundamental "personal rights protected by the Constitution," and is therefore subject to strict or close scrutiny. *City of Cleburne v. Cleburne Living Center*, 473 U.S. 432, 440, 105 S.Ct. 3249, 3254, 87 L.Ed.2d 313 (1985). The right allegedly impinged on is the right to vote.

[5] While "[i]t is beyond cavil that voting is of the most fundamental significance under our constitutional structure," *Burdick v. Takushi*, 504 U.S. 428, 433, 112 S.Ct. 2059, 2063, 119 L.Ed.2d 245 (1992) (quotations omitted), courts do not "subject every voting regulation to strict scrutiny." *Id.*

[6] "[W]hen a state election law provision imposes only reasonable, nondiscriminatory restrictions upon the First and Fourteenth Amendment rights of voters, the State's important regulatory interests are generally sufficient to justify the restrictions." *Id.* at 434, 112 S.Ct. at 2063–64 (quotations omitted). However, "when those rights are subjected to severe restrictions, the regulation must be narrowly drawn to advance a state interest of compelling importance." *Id.* (quotations omitted).

The Court has "upheld generally applicable and even-handed restrictions that protect the integrity and reliability of the electoral process itself." *Anderson v. Celebrezze*, 460 U.S. 780, 788 n. 9, 103 S.Ct. 1564, 1570, 75 L.Ed.2d 547 (1983). For example, the Court found reasonable a prohibition on write-in votes where it was relatively easy for candidates to appear on the ballot. *Burdick*, 504 U.S. at 441, 112 S.Ct. at 2067. Similarly permissible are brief residency requirements for voters. *Marston v. Lewis*, 410 U.S. 679, 680–81, 93 S.Ct. 1211, 1212, 35 L.Ed.2d 627 (1973) (fifty-day residency requirement permits county recorder time to certify correctness and completeness of registrations).

Nevertheless, the Court has subjected to strict scrutiny—and struck down as unconstitutional—other statutes that more seriously interfere with the right to vote. *See, e.g., Harper v. Virginia Board of Elections*, 383 U.S. 663, 670, 86 S.Ct. 1079, 1083, 16 L.Ed.2d 169 (1966) ("[W]here fundamental rights and liberties are asserted under the Equal Protection Clause, classifications which might invade or restrain them must be closely scrutinized.... [T]he right to vote is too precious, too fundamental to be so burdened or conditioned" by a poll tax.); *Kramer*, 395 U.S. at 633, 89 S.Ct. at 1892 (granting franchise in school district elections only to property owners and parents of school children fails strict scrutiny).

[7] We have no difficulty concluding that the subsidy here is unlike the reasonable, minor restrictions present in *Burdick* and *Marston*, and is similar to, but more distorting than, the poll tax at issue in *Harper*. In *Burdick* and *Marston*, the statutes promoted traditional goals of elections: accurate and complete voter registration, and channeling votes to legitimate candidates. While "there must be a substantial regulation of elections if they are to be fair and honest," *Storer v. Brown*, 415 U.S. 724, 730, 94 S.Ct. 1274, 1279, 39 L.Ed.2d 714 (1974), the Portland ordinance does not fall into this category of

legislation which is subject only to limited scrutiny.

Instead, the Portland ordinance severely and unreasonably interferes with the right to vote. Like the poll tax in *Harper* which was "closely scrutinized," 383 U.S. at 670, 86 S.Ct. at 1083, the subsidy here disproportionately affects the poor. But unlike a poll tax, which applies regardless of how a voter casts his ballot, this subsidy is conditioned on how an elector votes. In this way, the Portland ordinance is even more distorting than a poll tax.

Portland argues that its ordinance should only be subjected to the rational basis test, relying on *Blackwell v. City of St. Charles*, 726 F.Supp. 256 (E.D.Mo.1989), *aff'd per curiam*, 917 F.2d 1150 (8th Cir.1990). Although *Blackwell* does apply rational basis scrutiny to an annexation scheme similar to Portland's, the annexation there differed in one critical respect: landowners, and not voters, were asked to consent to annexation. As we scrutinize the Portland ordinance more closely only because it involves the consent of voters, which we equate with voting under the facts of this case, and not because it involves the consents of landowners, *Blackwell* does not speak to the annexation proceeding at issue here.

[8] Like other "severe restrictions" on the right to vote, therefore, the Portland ordinance can only stand if it is "narrowly drawn to advance a state interest of compelling importance." *Norman v. Reed*, 502 U.S. 279, 289, 112 S.Ct. 698, 705, 116 L.Ed.2d 711 (1992).

C

[9] Portland does not argue that its ordinance can survive strict scrutiny, and it cannot. While Portland's stated goals of promoting stability of neighborhoods and aligning service and tax boundaries are certainly legitimate, they are not compelling. Portland is free to charge residents of unincorporated areas its estimated actual cost of servicing them. Moreover, it is not necessary that Portland link its subsidy to a person's vote. It could offer the subsidy to all Mid-County homeowners as an inducement to vote for annexation, but has chosen not to. The Portland ordinance has, in effect, created a classic Prisoners' Dilemma, thereby subverting the process through which citizens consent to be governed.

The Portland ordinance fails the close scrutiny test both because Portland's goals are not "compelling" and because the ordinance is not "narrowly drawn" to achieve that goal. *Norman*, 502 U.S. at 289, 112 S.Ct. at 705. As such, the Portland ordinance is an unconstitutional infringement on the fundamental right to vote. It is designed to distort the political process by granting substantial subsidies based solely on whether a voter consents to annexation, and it cannot stand.

REVERSED.

Margaret GREENE, in her capacity as Chairman of the Samish Indian Tribe of Washington; Samish Indian Tribe, of Washington, Plaintiffs–Appellees,

v.

Bruce E. BABBITT,* in his capacity as Secretary of the Interior, Defendant–Appellant.

No. 92–37010.

United States Court of Appeals, Ninth Circuit.

Argued and Submitted May 4, 1994.

Decided Aug. 22, 1995.

After Secretary of Interior denied recognition to Native American tribe, tribe and its chairperson challenged informal recognition

* Bruce E. Babbitt, the current Secretary of Interior, is substituted for former Secretary Lujan. *See* Fed.R.App.Pro. 43(c)(1).

Proposed Schedule:
Jeld-Wen Declaratory Ruling

Thurs. October 23 ..... Meeting with Petitioner and DEQ
(at the Portland Legal Office of DOJ)

Wed. November 19 ..... Deadline for Briefs
(simultaneous briefing)

Mon. November 24 ..... Oral Argument
(if convenient to Hearings Officer — room location: Attorney General's conference room, Portland DOJ, Suite 410, 1515 SW Fifth Avenue)

Thurs. December 4 ..... Deadline for additional Written Argument
(at option of Hearings Officer)

Thurs. December 11 ..... Issuance of Proposed Ruling

Thurs. December 18 ..... Final Staff Reports

Fri. January 9 ..... EQC Meeting
(including short oral argument — will ask for time specific)

Fri. February 20 ..... EQC Meeting
(only if EQC requests — for example, drafting of alternative ruling)

MH:kt/JELDWEN.FOR

Exhibit F-
1 page

Oregon

DEPARTMENT OF ENVIRONMENTAL QUALITY

November 5, 1997

Jay T. Waldron
Schwabe Williamson & Wyatt
PacWest Center, Suite 1600
1211 S.W. 5th Avenue
Portland OR 97204-3795

RE: Petition for Declaratory Ruling regarding OAR 340-71-160(5)(f)

Dear Mr. Waldron:

This letter will serve as the Notice of Declaratory Ruling Hearing as required by OAR 137-02-030. The hearing will take place on November 24, 1997 at 1:30 p.m. at the Department of Justice. The address is 1515 S.W. 5th Avenue, 4th Floor in Portland Oregon. Administrative Law Judge Lawrence Smith will be the presiding officer.

Briefs should be submitted prior to 5:00 p.m. on November 19, 1997. Please fax your brief to Mr. Smith at (503) 238-5410. Copies should also be sent to the Environmental Quality Commission in care of myself. The Department will be submitting a simultaneous brief which will be forwarded to you.

If you should have any questions regarding this process, please feel free to call me.

Sincerely,

Susan M. Greco
Rules Coordinator

cc: Lawrence Smith
Michael Huston
Celeste Doyle

Exhibit G-
1 page

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
TDD (503) 229-6993
DEQ-1

Oregon

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY

EASTERN REGION
Hermiston Office

DATE: January 9, 1998

TO: Environmental Quality Commission

FROM: Sue Oliver
DEQ, Hermiston

SUBJECT: Meeting of the Environmental Quality Commission, January 9, 1998
Agenda Item C (Umatilla Chemical Disposal Facility)

Attached is a compendium of items related to the "Advance Agreement" that is in effect between EG&G (the contractor at the Tooele Chemical Demilitarization Facility) and the United States government. The Advance Agreement includes, among other things, an agreement to the definition of certain terms used in the Federal Acquisition Regulation (FAR) clause 52.228-7 (c)(2)(i) & (ii) related to liability to third parties. This same FAR clause is in effect for the United States' contract with Raytheon Demilitarization Company for the construction and operation of the Umatilla facility, but no "Advance Agreement" similar to that used for the Tooele facility is in place for Umatilla. This material was assembled to assist you in today's discussion related to adding Raytheon Demilitarization Company to the Umatilla permit.

The attached documents include:

256 E Hurlburt #117
Hermiston, OR 97838
(503) 567-8297
TDD (503) 229-6993
(541) xxx

TOCDF 5

Contract No. DACA87-89-C-0076

ADVANCE AGREEMENT

Introduction

Pursuant to FAR Clause 31.109, the United States and EG&G Defense Materials, Inc. (EG&G) hereby agree as follows:

This Advance Agreement is coterminous with the Contract.

The Tooele Chemical Demilitarization Facility (TOCDF) includes all facilities created or operated under the Contract.

The parties acknowledge and recognize that this is a Contract which will produce quantities of hazardous residues and waste. This special circumstance necessitates the clarification through an advance determination of allowability of the reasonable, necessary and allowable costs which the contractor may incur in connection with and as a consequence of contract performance.

The purpose of this Advance Agreement is to avoid possible subsequent disallowance or disputes based on unreasonableness or nonallocability for special and unusual costs.

The Advance Agreement, and all statements as to allowability made herein, is intended by the parties to be subject to and in accordance with the cost principles referenced in FAR, part 31, including FAR 31.201, all other provisions of this Contract, and all applicable law and regulation. Payment of all costs herein referred to is subject to the availability of funds under the Contract.

This Agreement does not supersede or replace the indemnification provided pursuant to P.L. 85-804 within this Contract, but is to be used in addition to other remedies.

Operating Compliance Costs

Costs incurred by EG&G to comply with applicable environmental and OSHA requirements in construction, equipment installation, systemization, operation, maintenance and closure of the TOCDF, including costs related to the storage, shipment, treatment or disposal of wastes or residue produced or from operation of the TOCDF will be considered allowable if:

1) Necessary to comply with a requirement lawfully imposed by a regulatory or judicial body of competent jurisdiction, or,

2) As approved by the Government for compliance with environmental and OSHA requirements, or,

3) As otherwise determined reasonable under the standards of FAR 31.201-3.

Operating compliance costs include, but are not limited to, the costs of preventing environmental damage; conducting all operational duties in compliance with the Contract and all applicable laws and regulations; compliance with all written regulatory, administrative or judicial notices, letters, agreements or orders; and closure activities or other activities to prevent, or correct or address any environmental condition or requirement.

Environmental Remediation

The definition of "Environmental Remediation," as used herein, includes, but is not limited to, response, removal, and restoration actions, corrective actions or measures, studies, or monitoring actions and costs of investigation and defense arising from environmental pollution, contamination, or releases related to or arising from the performance of the Contract. Any costs of environmental remediation are allowable if:

1) directed by judicial or other enforceable order to address environmental conditions pre-existing this Contract;

2) incurred as the result of a judicial, or other enforceable order to address environmental conditions after the proper regulatory certified closure of the TOCDF;

3) incurred at an off site location, if those aspects of the handling and processing of wastes which are within EG&G's direct and sole management control were performed in accordance with the Contract.

Penalties

Any fine or penalty including the reasonable costs of defense by EG&G shall be an allowable cost if incurred by reason of failure of the Government-furnished equipment, facilities or services to achieve compliance with appropriate Federal, State or local safety or environmental requirements and incurred in the performance of the Contract, since the Contract terms and conditions assume the suitability of the Government-furnished equipment, facilities or services.

The parties to this Contract agree that they intend that all work under the Contract shall be in accordance with applicable Federal and State or local laws and regulations, including environmental laws. Should EG&G suspect that the facility is operating or is likely to operate in noncompliance with applicable lawful environmental requirements, EG&G will notify the contracting officer or his authorized representative. If EG&G then proceeds upon Army direction that the reported condition does not pose a situation noncompliance, or if the Army fails to provide direction or action in a timely manner, any resultant costs or fines and penalties will be allowable.

Liability to Third Parties

The United States and EG&G also agree on the following meaning for the terms listed below, as they are used in the clause "Insurance-Liability to Third Persons," FAR 52.228-7(c)(2)(i)&(ii):

1) "Loss of property" includes loss of use, evacuation or abandonment, temporary or otherwise, of property, real, personal, or mixed, due to a threat of or actual release of any contaminant, toxic substance, waste, or residue.

2) "Damage to property" includes any diminution of value occasioned by the actual, potential, or perceived release or threat of release of any contaminant, toxic substance, waste, or residue.

3) "Bodily injury" includes medical monitoring arising from an actual or perceived release or threat of release of any contaminant, toxic substance, waste, or residue.

4) "expenses incidental to such liabilities" include all reasonable costs associated with investigation, negotiation, litigation, or settlement of claims against EG&G. Such claims require either final judgment, or in the case of settlement, approval in writing by the Contracting Officer or his authorized representative.

Contracting Officer
STEVEN D. HERMAN

Dated: 2/08/94

Authorized EG&G Representative
HENRY T. SILVESTRI
President and General Manager
EG&G Defense Materials, Inc.

2ND ITEM of Level 1 printed in FULL format.

Title 48 -- Federal Acquisition Regulations System; Revised as of October 1, 1989

CHAPTER 1--FEDERAL ACQUISITION REGULATION
SUBCHAPTER H--CLAUSES AND FORMS

PART 52--SOLICITATION PROVISIONS AND CONTRACT CLAUSES
Subpart 52.2--Texts of Provisions and Clauses

52.228-7 Insurance -- Liability to Third Persons.

48 CFR 52.228-7

As prescribed in 28.311-2, insert the following clause in solicitations and contracts, other than construction contracts and those for architect-engineer services, when a cost-reimbursement contract is contemplated unless the head of the contracting activity waives the requirement for use of the clause:

INSURANCE -- LIABILITY TO THIRD PERSONS (APR 1984)

(a) (1) Except as provided in subparagraph (2) immediately following, or in paragraph (h) of this clause (if the clause has a paragraph (h)), the Contractor shall provide and maintain workers' compensation, employer's liability, comprehensive general liability (bodily injury), comprehensive automobile liability (bodily injury and property damage) insurance, and such other insurance as the Contracting Officer may require under this contract.

(2) The Contractor may, with the approval of the Contracting Officer, maintain a self-insurance program; provided that, with respect to workers' compensation, the Contractor is qualified pursuant to statutory authority.

(3) All insurance required by this paragraph shall be in a form and amount and for those periods as the Contracting Officer may require or approve and with insurers approved by the Contracting Officer.

(b) The Contractor agrees to submit for the Contracting Officer's approval, to the extent and in the manner required by the Contracting Officer, any other insurance that is maintained by the Contractor in connection with the performance of this contract and for which the Contractor seeks reimbursement.

(c) Except as provided in paragraph (h) of this clause (if the clause has a paragraph (h)), the Contractor shall be reimbursed --

(1) For that portion (i) of the reasonable cost of insurance allocable to this contract and (ii) required or approved under this clause; and

(2) For certain liabilities (and expenses incidental to such liabilities) to third persons not compensated by insurance or otherwise without regard to and as an exception to the limitation of cost or the limitation of funds clause of this contract. These liabilities must arise out of the performance of this contract, whether or not caused by the negligence of the Contractor or or the Contractor's

RELATED TO "ADVANCE AGREEMENT" (C)(2)(i)(ii)

agents, servants, or employees, and must be represented by final judgments or settlements approved in writing by the Government. These liabilities are for --

(i) Loss of or damage to property (other than property owned, occupied, or used by the Contractor, rented to the Contractor, or in the care, custody, or control of the Contractor); or

(ii) Death or bodily injury.

(d) The Government's liability under paragraph (c) of this clause is subject to the availability of appropriated funds at the time a contingency occurs. Nothing in this contract shall be construed as implying that the Congress will, at a later date, appropriate funds sufficient to meet deficiencies.

(e) The Contractor shall not be reimbursed for liabilities (and expenses incidental to such liabilities) --

(1) For which the Contractor is otherwise responsible under the express terms of any clause specified in the Schedule or elsewhere in the contract;

(2) For which the Contractor has failed to insure or to maintain insurance as required by the Contracting Officer; or

(3) That result from willful misconduct or lack of good faith on the part of any of the Contractor's directors, officers, managers, superintendents, or other representatives who have supervision or direction of --

(i) All or substantially all of the Contractor's business;

(ii) All or substantially all of the Contractor's operations at any one plant or separate location in which this contract is being performed; or

(iii) A separate and complete major industrial operation in connection with the performance of this contract.

(f) The provisions of paragraph (e) of this clause shall not restrict the right of the Contractor to be reimbursed for the cost of insurance maintained by the Contractor in connection with the performance of this contract, other than insurance required in accordance with this clause; provided, that such cost is allowable under the Allowable Cost and Payment clause of this contract.

(g) If any suit or action is filed or any claim is made against the Contractor, the cost and expense of which may be reimbursable to the Contractor under this contract, and the risk of which is then uninsured or is insured for less than the amount claimed, the Contractor shall --

(1) Immediately notify the Contracting Officer and promptly furnish copies of all pertinent papers received;

(2) Authorize Government representatives to collaborate with counsel for the insurance carrier in settling or defending the claim when the amount of the liability claimed exceeds the amount of coverage; and

(3) Authorize Government representatives to settle or defend the claim and to represent the Contractor in or to take charge of any litigation, if required by

the Government, when the liability is not insured or covered by bond. The Contractor may, at its own expense, be associated with the Government representatives in any such claim or litigation.

(End of clause)

(R 7-203.22 1966 DEC)

(R 1-7.204-5)

Alternate I (APR 1984). If the solicitation includes the provision at 52.228-6, Insurance -- Immunity from Tort Liability, and the successful offeror represents in the offer that the offeror is partially immune from tort liability as a State agency or as a charitable institution, add the following paragraph (h) to the basic clause:

(h) Notwithstanding paragraphs (a) and (c) of this clause --

(1) The Government does not assume any liability to third persons, nor will the Government reimburse the Contractor for its liability to third persons, with respect to loss due to death, bodily injury, or damage to property resulting in any way from the performance of this contract or any subcontract under this contract; and

(2) The Contractor need not provide or maintain insurance coverage as required by paragraph (a) of this clause; provided, that the Contractor may obtain any insurance coverage deemed necessary, subject to approval by the Contracting Officer as to form, amount, and duration. The Contractor shall be reimbursed for the cost of such insurance and, to the extent provided in paragraph (c) of this clause, for liabilities to third persons for which the Contractor has obtained insurance coverage as provided in this paragraph, but for which such coverage is insufficient in amount.

(End of clause)

(R 1-7.404-9(a))

(R 7-402.26 1962 SEP)

Alternate II (APR 1984). If the solicitation includes the provision at 52.228-6, Insurance -- Immunity from Tort Liability, and the successful offeror represents in the offer that the offeror is totally immune from tort liability as a State agency or as a chartiable institution, substitute the following paragraphs (a) and (b) for paragraphs (a) through (g) of the basic clause:

(a) The Government does not assume any liability to third persons, nor will the Government reimburse the Contractor for its liability to third persons, with respect to loss due to death, bodily injury, or damage to property resulting in any way from the performance of this contract or any subcontract under this contract.

(b) If any suit or action is filed, or if any claim is made against the Contractor, the cost and expense of which may be reimbursable to the Contractor under this contract, the Contractor shall immediately notify the Contracting Officer and promptly furnish copies of all pertinent papers received by the

Contractor. The Contractor shall, if required by the Government, althorize Government representatives to settle or defend the claim and to represent the Contractor in or take charge of any litigation. The Contractor may, at its own expense, be associated with the Government representatives in any such claim or litigation.

(End of clause)

(R 7-402.26(b) 1960 OCT)

(R 1-7.404-9(b))

SOURCE: 48 FR 42478, Sept. 19, 1983, 48 FR 43273, Sept. 22, 1983

AUTHORITY: 40 U.S.C. 486(c); 10 U.S.C. Chapter 137; and 42 U.S.C. 2473(c).

SECTION I - CONTRACT CLAUSES

E FOLLOWING FEDERAL ACQUISITION REGULATION (FAR), DoD FAR SUPPLEMENT
AUSES AND PROVISIONS, THE FULL TEXT OF WHICH WILL BE MADE AVAILABLE UPON
QUEST, ARE INCORPORATED HEREIN BY REFERENCE WITH THE SAME FORCE AND EFFECT
IF SET FORTH IN FULL TEXT.

E TEXT OF THE CLAUSES INCORPORATED BY REFERENCE HEREIN ARE AVAILABLE FROM
E CONTRACT SPECIALIST INDICATED IN BLOCK 7 OF THE STANDARD FORM 33 OR (AS
PPLICABLE) THE CONTRACTING OFFICER AND WILL BE FURNISHED UPON REQUEST.
HER DOCUMENTS ARE AVAILABLE AS INDICATED IN THE SCHEDULE.

Y COMPANY/INDIVIDUAL WISHING TO PURCHASE A COPY OF THE FEDERAL ACQUISITION
EGULATION (FAR), THE ARMY FAR SUPPLEMENT OR THE DoD FAR SUPPLEMENT, MAY DO
FROM THE SUPERINTENDENT OF DOCUMENTS, US GOVERNMENT PRINTING OFFICE,
SHINGTON, DC 20402.

IA7001)

	CLAUSE TITLE	REFERENCE	DATE
.	CONTRACTING OFFICER'S REPRESENTATIVE	252.201-7000 DoD FAR SUP.	(DEC 1991)
.	STATUTORY PROHIBITIONS ON COMPENSATION TO FORMER DEPARTMENT OF DEFENSE EMPLOYEES	252.203-7000 DFARS	(NOV 1995)
.	SPECIAL PROHIBITION ON EMPLOYMENT	252.203-7001 DFARS	(NOV 1995)
.	DISPLAY OF DoD HOTLINE POSTER	252.203-7002 DoD FAR SUP.	(DEC 1991)
.	DISCLOSURE OF INFORMATION	252.204-7000 DoD FAR SUP.	(DEC 1991)
.	CONTROL OF GOVERNMENT PERSONNEL WORK PRODUCT	252.204-7003 DFARS	(APR 1992)
.	PROVISION OF INFORMATION TO COOPERATIVE AGREEMENT HOLDERS	252.205-7000 DoD FAR SUP.	(DEC 1991)
.	ACQUISITION FROM SUBCONTRACTORS SUBJECT TO ON-SITE INSPECTION UNDER THE INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY	252.209-7000 DFARS	(NOV 1995)
0.	ACQUISITION STREAMLINING	252.210-7003 DFARS	(DEC 1991)
1.	PRICING ADJUSTMENTS	252.215-7000 DoD FAR SUP.	(DEC 1991)

(ENCLOSURE 10)

State of Oregon
Department of Environmental Quality **Memorandum**

Date: January 5, 1998

To: Environmental Quality Commission

From: Langdon Marsh, Director

Subject: Agenda Item C, EQC Meeting January 9, 1998
Umatilla Chemical Agent Disposal Facility, Class 3 Permit Modification
to Add Raytheon Demilitarization Company as Co-Permittee and Co-Operator

Statement of Purpose

The purpose of this staff report is to present to the Environmental Quality Commission (Commission) the Department's conclusions and recommendations concerning the addition of Raytheon Demilitarization Company as a Co-Permittee and Co-Operator on the Hazardous Waste Permit for the Umatilla Chemical Agent Disposal Facility. The Department has prepared a draft Order (included as Attachment B) for your review and discussion. The Department has also prepared revised permit conditions (included as Appendix 3 to the draft Order) for discussion and incorporation into the Umatilla permit in the event you make affirmative findings at your meeting today.

Background

In February, 1997, the Commission and the Department issued a hazardous waste treatment and storage permit (OR6 213 820 917) to the U.S. Army for the construction and operation of a hazardous waste incineration facility to be located at the Umatilla Chemical Depot. At the time the permit was signed, the Army had not yet named the contractor for the construction and operation of the Umatilla facility. In its final Order the Commission required the Army to submit a permit modification request to add the contractor (when selected) to the hazardous waste permit as a Co-Permittee and Co-Operator. The Army submitted its permit modification request to the Department in March, 1997. Discussion of this proposed permit modification has occurred at three of the Commission's 1997 meetings (August 22, October 2, and November 21).

Authority of the Commission with Respect to the Issue

The permit modification is required by Oregon Revised Statute (ORS) 466.060, Oregon Administrative Rules (OAR) 340-105-040, OAR 340-105-041, and the "Findings and Conclusions of the Commission and Order," dated February 10, 1997 (Paragraphs 79 and 80). ORS 466.060

requires the Commission to make findings related to the technical and financial capabilities of the Permittee, and the Permittee's ability and willingness to comply with permit conditions, or any other conditions imposed on the Permittee by the Commission.

Alternatives and Evaluation

1. Make affirmative findings approving the permit modification request.

   The Commission could choose today to make the finding that Raytheon Demilitarization Company (RDC) has the financial and technical capability to build and operate the facility, and that RDC has shown a willingness to comply with the hazardous waste permit. In this case, the Department would revise the Order and permit conditions in accordance with Commission discussion today, and prepare final documents for the Chairman's signature.

2. Deny the permit modification request.

   If the Commission is unable to make affirmative findings, the U.S. Army (as represented by the Program Manager for Chemical Demilitarization and the Umatilla Chemical Depot) would remain as the sole owner and named permittee on the hazardous waste permit. Failure to add Raytheon to the hazardous waste permit will not preclude the U.S. Army from proceeding with construction and operation of the facility in accordance with the hazardous waste permit (presumably Raytheon would continue as the Army's contractor). The Army would continue to be required to maintain an on-site oversight presence at the Umatilla Chemical Disposal Facility.

Summary of Public Input Opportunity

The Permittee opened a 60-day public comment period for the proposed modification on April 16, 1997, and held a public meeting on May 19, 1997, as required by the Resource Conservation and Recovery Act (RCRA) rules governing Class 3 permit modifications. The Department opened a public comment period on the modification request on August 29, 1997 (scheduled to close October 14) and held a public hearing on October 1, 1997. On October 10 the public comment period was extended through November 4, 1997. On November 4, 1997, the public comment period was again extended, for written comments, to November 17, 1997.

Additional oral testimony was provided to the Commission during Agenda Item C-1 of the November 21 meeting. At that meeting the Commission also directed that the Department open a limited public comment period from November 26 through December 10, 1997, to accept written comments on the Secretary of the Army's Memorandum of Decision concerning the indemnification of Raytheon Demilitarization Company (which had originally been provided with

an illegible table of chemical agents). All public comments received have been provided verbatim to the Commission. A summary of public comments has been prepared by the Department and is included as Appendix 1 to the draft Order in Attachment B.

Discussion and Conclusions

One of the most significant issues related to this permit modification is that of Raytheon Demilitarization Company's level of liability insurance, especially as related to damages to third parties. The minimum amount of liability insurance required by regulation is $1 million per occurrence and $2 million aggregate. The Department and the Commission did not believe that the minimum requirements were sufficient to meet the standard of ORS 466.105(5) which states that the Permittee must "Maintain sufficient liability insurance or equivalent financial assurance in such amounts as determined by the department to be reasonably necessary to protect the environment and the health, safety and welfare of the people of this state."

In its Notice of Deficiency the Department requested additional information concerning the insurance policies carried by Raytheon Demilitarization Company. The insurance information and the Indemnification granted to Raytheon from the Department of the Army in early November, were reviewed by the Department, Commission, Attorney General, and the Department of Administrative Services.

In response to continuing Commission concerns, Raytheon Company (parent company of Raytheon Demilitarization Company) provided to the Commission a "Financial and Performance Guarantee" in which Raytheon Company "guarantees payment of all debts and the faithful performance of all obligations of Contractor to the DEQ and/or the State of Oregon to the extent the same are not reimbursed by insurance or the foregoing indemnification under Public Law 85-804...."

The Financial and Performance Guarantee, combined with the 75-year operating history of Raytheon Company, the permit requirement to maintain the liability insurance, and the indemnification provision, lead the Department to conclude that Raytheon Demilitarization Company, in conjunction with Raytheon Company, has demonstrated the adequate financial and technical capability required by ORS 466.060 to operate the Umatilla Chemical Disposal Facility.

The issue of "willingness to comply" is also significant, as it was in 1996 when the Commission was considering issuing the permit to the Army. The Department has reviewed the compliance histories of other Raytheon facilities, especially that of the Johnston Atoll Chemical Agent Disposal System (JACADS). Although Raytheon Demilitarization Company is not actually named on the EPA permit for JACADS, it is Raytheon employees who operate the facility. As with the review done for the original permit decision, the Department identified and reviewed past violations of the JACADS RCRA permit. There have been numerous violations of the JACADS

permit, some more serious than others, and the Department noted that additional training often improved the compliance record.

For that reason the Department has included a new permit condition with this modification requiring the Permittee to identify how it will use training to rectify instances of non-compliance. The Department has concluded that Raytheon Demilitarization Company, in accordance with the requirements of ORS 466.060, has demonstrated the ability and willingness to operate the Umatilla facility in compliance with permit conditions. The Department will maintain a significant oversight presence during construction of the facility, and is increasing the number of Umatilla staff at the Hermiston office to insure permit compliance.

Intended Future Actions

The Department will proceed as directed by the Commission at today's meeting.

Department Recommendation

The Department recommends that the Commission find that Raytheon Demilitarization Company has met the requirements of Oregon Revised Statutes to demonstrate adequate technical and financial ability, and has demonstrated a willingness to comply with permit requirements.

The Department further recommends that the Commission instruct the Department to prepare final documents (Order and Permit Modifications) for the Chairman's signature to add Raytheon Demilitarization Company as Co-Permittee and Co-Operator of the Umatilla Chemical Agent Disposal Facility, Permit No. OR6 213 820 917.

Attachments

Attachment A: Oregon Revised Statutes and Administrative Rules (excerpts applicable to today's findings).

Attachment B: Draft "Findings and Conclusions of the Commission and Order," In the Matter of the Application of the United States Army to Add Raytheon Demilitarization Company as a Co-Permittee and Co-Operator of the Umatilla Chemical Agent Disposal Facility, Permit # OR6 213 820 917, January, 1998. {Includes Appendix 1 (Summary of Public Comments), Appendix 2 (Index to the Administrative Record), and Appendix 3 (Revisions to the Hazardous Waste Permit)}

Reference Documents (available upon request)

- "Findings and Conclusions of the Commission and Order," In the Matter of the Application of the United States Army for a Permit to Construct and Operate a Chemical Weapons Demilitarization Facility at the Umatilla Chemical Depot, Oregon Environmental Quality Commission, February 10, 1997.

- "Class 3 Permit Modification Request for Revision of Part A Application and Submittal of Operator Capability Information/Compliance History," submitted by U.S. Army Umatilla Chemical Depot, Hermiston, Oregon, March, 1997.

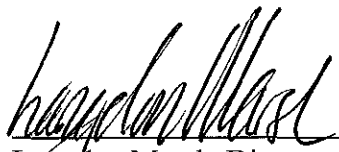
- "Notice of Deficiency, Class 3 Permit Modification Request No. UMCDF-001-E(1)," Oregon Department of Environmental Quality, May 12, 1997.

- "Response to the State of Oregon Department of Environmental Quality May 12, 1997, Notice of Deficiency," submitted by U.S. Army, July 11, 1997 (as appended July 16, 1997).

- Environmental Quality Commission Staff Report, Agenda Item C-2, November 21, 1997.

- Letter from Raj Malhotra, Project Manager, Program Manager for Chemical Demilitarization, to Brett McKnight, DEQ Hazardous Waste Manager, responding to the Commission's questions from the November 21, 1997, meeting (Includes a copy of the Memorandum of Decision from the Secretary of the Army to Include an Indemnification Clause, with a legible table of chemical agents), December 10, 1997.

Approved:



Langdon Marsh, Director
Report Prepared By: Sue Oliver
Phone: 541-567-8297
Date Prepared: December 31, 1997

ATTACHMENT A

APPLICABLE OREGON REVISED STATUTES AND OREGON ADMINISTRATIVE RULES

Oregon Revised Statutes 466.060: Criteria to be met by owner and operator before issuance of permit.

(1) Before issuing a permit for a facility designed to treat or dispose of hazardous waste or PCB, the permit applicant must demonstrate, and the Commission must find, that the owner and operator meet the following criteria:

(a) The owner, any parent company of the owner and the operator have adequate financial and technical capability to properly construct and operate the facility; and

(b) The compliance history of the owner including any parent company of the owner and the operator in owning and operating other similar facilities, if any, indicates an ability and willingness to operate the proposed facility in compliance with the provisions of ORS 466.005 to 466.385 and 466.890 or any condition imposed on the permittee by the Commission.

(2) If requested by the permit applicant, information submitted as confidential under paragraph (a) of subsection (1) of this section shall be maintained confidential and exempt from public disclosure to the extent provided by Oregon law.

OAR 340-120-010 Contents of an Authorization to Proceed Request

(1) An Authorization to Proceed request shall demonstrate that the proposed facility meets the criteria presented in section (2) of this rule. If the facility does not meet all of the criteria, the Department shall deny the request.

(2) Criteria that must be met to obtain an Authorization to Proceed:

(a) Need *(not provided here)*
(b) Capacity *(not provided here)*
(c) Technology and Design *(not provided here)*
(d) Location *(not provided here)*
(e) Property Line Setback *(not provided here)*
(f) Groundwater Protection *(not provided here)*

(g) Owner and Operator Capability.

The owner, any parent company of the owner and the operator must demonstrate adequate financial and technical capability to properly construct and operate the facility. As evidence of financial capability, the following shall be submitted:

(A) Financial statements of the owner, any parent company of the owner, and the operator audited by an independent certified public accountant for three years immediately prior to the application;

(B) The estimated cost of construction and a plan detailing how the construction will be funded; and

(C) A three year projection, from the date the facility is scheduled to begin operating, of revenues and expenditures related to operating the facility. The projection should have sufficient detail to determine the financial capability of the owner, any parent company of the owner and the operator to properly operate the facility.

(h) Compliance History

(A) The compliance history in owning and operating other similar facilities, if any, must indicate that the owner, any parent company of the owner

and the operator have an ability and willingness to operate the proposed facility in compliance with the provisions of ORS 466 and any permit conditions that may be issued by the Department or Commission. As evidence of ability and willingness, the following shall be submitted:

(i) A listing of all responses to past actual violations identified by EPA or the appropriate state regulatory agency within the five years immediately preceding the filing of the request for an Authorization to Proceed at any similar facility owned or operated by the applicant, owner, any parent company of the owner or operator during the period when the actions causing the violations occurred; and

(ii) Any written correspondence from EPA and the appropriate state regulatory agency which discusses the present compliance status of any similar facility owned or operated by the applicant, owner, any parent company of the owner or operator.

(B)Upon request of the Department, the applicant shall also provide responses to the past violations identified prior to the five years preceding the filing of an authorization to Proceed and the specific compliance history for a particular facility owned or operated by the applicant, any parent company of the owner or operator.

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ATTACHMENT B
FINDINGS AND CONCLUSIONS OF THE COMMISSION AND ORDER

Regarding ORS 466.060 Criteria and Permit Modification Request to Incorporate Raytheon Demilitarization Company as Co-Permittee

U.S. Army Umatilla Chemical Depot
Umatilla Chemical Disposal Facility
I.D. Number: OR6 213 820 917

BEFORE THE ENVIRONMENTAL QUALITY COMMISSION

OF THE STATE OF OREGON

In the Matter of the Application of the United States Army for a Permit Modification to Include Raytheon Demilitarization Company as Co-Permittee and Operator in the Hazardous Waste Permit for the Umatilla Chemical Disposal Facility, Permit Number OR6 213 820 917.	FINDINGS AND CONCLUSIONS OF THE COMMISSION AND ORDER

General Background Findings

1. This is a proceeding in which the U.S. Army (Permittee) and Raytheon Demilitarization Company (Raytheon) seek a permit modification to include Raytheon as Co-Permittee and operator for the Umatilla Chemical Disposal Facility (UMCDF), hazardous waste permit number OR6 213 820 917. The Commission has jurisdiction pursuant to ORS 466.005 *et seq.*

2. The UMCDF is located within the boundaries of the Umatilla Chemical Depot (Umatilla Depot) near Hermiston, Oregon. The Umatilla Depot is owned and operated by the U.S. Army for the storage of chemical agent munitions. The Umatilla Depot also conducts hazardous waste storage, maintenance, inspection, and generation activities. The application before the Commission relates only to permitted activities at the UMCDF, and will not affect other permitted hazardous waste activities at the Umatilla Depot.

3. On February 7, 1997, the Commission met and voted unanimously to make affirmative findings in the matter of the Application of the United States Army for a Permit to

Construct and Operate a Chemical Weapons Demilitarization Facility at the Umatilla Chemical Depot.

4. On February 10, 1997, the Commission Chair signed THE FINDINGS OF THE COMMISSION AND ORDER (WITH APPENDICES), and approved the Permit for the Storage and Treatment of Hazardous Waste at the Umatilla Chemical Disposal Facility.

5. The Commission's February, 1997, FINDINGS AND ORDER (Paragraph 79) required the Permittee to submit a permit modification request to add private contractors, when selected, to the Hazardous Waste Permit as a Co-Permitee.

6. On February 10, 1997, the Permittee awarded the construction and operations contract for the UMCDF to Raytheon Demilitarization Company, a wholly-owned subsidiary of Raytheon Company.

General Findings Pertaining to Permit Modification Development

7. On February 14, 1997, the Department of Environmental Quality (Department) sent a letter to the Permittee describing the statutory and regulatory requirements for a Class 3 permit modification request to include Raytheon as Co-Permittee, in accordance with OAR 340-105-040(b) and 40 CFR 270.40(a) adopted as Oregon Rule by OAR 340-100-002.

8. On March 28, 1997, the Permittee and Raytheon (Applicants) submitted a Class 3 Permit Modification Request to the Department to incorporate Raytheon as Co-Permittee.

9. On May 12, 1997, the Department issued a Notice of Deficiency (NOD) and requested additional information to complete the modification application.

10. On July 11,1997, the Applicants submitted a Response to the Department's Notice of Deficiency.

11. On July 16, 1997, the Applicants submitted supplemental information related to the Response to the Notice of Deficiency.

12. On September 2, 1997, the Department informed the applicants that the permit modification application was considered complete in accordance with 40 CFR 124.3(c), adopted as Oregon Rule by OAR 340-100-002.

13. On November 3, 1997, the Secretary of the Army signed a MEMORANDUM OF DECISION TO INCLUDE AN INDEMNIFICATION CLAUSE for Contract DAAA09-97-C-0025 (Raytheon Demilitarization Company's Umatilla construction and operations contract), in accordance with

Public Law 85-804. The indemnification of Raytheon includes a definition of the "unusually hazardous risks" that would be indemnified under the contract.

14. On December 9, 1997, Contract DAAA09-97-C-0025 was modified to incorporate the Secretary of the Army's November 3rd MEMORANDUM OF DECISION.

General Findings Pertaining to Draft Permit Modification and Public Participation

15. In accordance with the applicable rules pertaining to a Class 3 permit modification, the Applicants held a public comment period from April 5 to June 16, 1997. A notice of the comment period was sent to the Umatilla mailing list and published in local newspapers.

16. On May 19, 1997, the Applicants conducted a public meeting regarding the proposed modification in accordance with 40 CFR 270.42(c).

17. On August 29, 1997, the Department issued for public comment an INVITATION TO COMMENT ON EQC FINDINGS AND CLASS 3 PERMIT MODIFICATION REQUEST TO INCORPORATE CO-PERMITTEE. The INVITATION TO COMMENT was sent out to the Umatilla Chemical Depot mailing list, and a FACT SHEET was prepared pursuant to 40 CFR 124. 8 and 124.10 (adopted by OAR 340-100-002) and placed in information repositories.

18. On October 1, 1997, the Department conducted a public hearing in Hermiston, Oregon, to gather testimony in regards to the proposed permit modification. Two members of the public provided testimony.

19. On October 10, 1997, the Department extended the comment period for the permit modification request to November 4, 1997.

20. On November 4, 1997, the Department again extended the comment period, for written comments only, to November 17, 1997. The Department also notified the Umatilla mailing list that the Commission would accept oral comments at their regularly scheduled meeting on November 21, 1997.

21. On November 26, 1997, the Department sent a legible copy of the Secretary of the Army's MEMORANDUM OF DECISION concerning the indemnification to the Umatilla mailing list, and extended the comment period to December 10, 1997, only as related to the issue of contractor indemnification.

22. A number of submittals containing comments were received by the Department during the various comment periods. The Commission was provided complete copies of all

comments received, including written transcripts of public testimony at the October 1, 1997, public hearing.

23. A summary of the comments received was tabulated by the Department and is attached to this Order as Appendix 1. All comments and attached submittals were placed in the Administrative Record.

General Findings Pertaining to Development of Criteria Findings Required by ORS 466.060 and OAR 340, Division 120

24. Oregon law requires that the Commission make findings on specific criteria before a final hazardous waste treatment permit modification can be approved: ORS 466.055, 466.060, OAR 340 Division 120, OAR 340-105-40, OAR 340-105-41, and 40 CFR 270.42(c) adopted as Oregon rule by OAR 340-100-002.

25. On August 22, 1997, the Commission held a work session on the proposed hazardous waste permit modification to add Raytheon Demilitarization Company to the Umatilla hazardous waste permit. The Commission was briefed by Department staff and other interested parties. The Commission concurred with the Department's recommendation that a draft permit modification be issued for public comment.

26. On October 2, 1997, the Commission held a second work session and heard presentations from the U.S. Army Program Manager for Chemical Demilitarization, and representatives of Raytheon Demilitarization Company. The Commission also heard from Department staff concerning the required findings and the draft permit modification language. The Commission requested clarifying documentation from the Applicants regarding liability and contractor indemnification. During the time allotted for public testimony the Commission heard from Ms. Tamra Mabbott, Morrow County Planning Director, who expressed Morrow County's concerns about the collection of impact fees from the U.S. Army.

27. On November 12, 1997, the Chairman and Chief Executive Officer of Raytheon Company (Mr. Dennis Picard) signed a financial and performance guarantee that guaranteed "...payment of all debts and faithful performance of all obligations of contractor [Raytheon Demilitarization Company] to the DEQ and/or the State of Oregon...."

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28. On November 21, 1997, the Commission accepted public testimony on the proposed permit modification from Judge Louis Carlson of Morrow County, Mr. Mark Brown of the Oregon Clearinghouse for Pollution Reduction, Mr. J.R. Wilkinson of the Confederated Tribes of the Umatilla Indian Reservation, and Ms. Karyn Jones of GASP. The Commission requested clarifying documents from the Applicants concerning contractor indemnification, and directed the Department to develop a draft Order and permit modification language for discussion and possible action at the January 9, 1998, Commission meeting.

29. An Administrative Record has been compiled and is maintained at the Department's Eastern Region office in Bend. An index to items pertaining to this modification is attached to this document as Appendix 2.

Findings and Conclusions Required by Statute and Regulation

30. ORS 466.060 and OAR 340, Division 120 require that certain specific affirmative findings be made by the Commission before a Co-Permittee can be added to a hazardous waste treatment permit.

31. The U.S. Army and Raytheon Demilitarization Company permit modification request is subject to these findings.

32. Pursuant to ORS 466.020 the Commission has previously adopted rules at OAR 340, Division 120 which implement, in part, ORS 466.060. These rules distinguish between off-site and on-site facilities. The Umatilla Chemical Disposal Facility is considered an on-site facility.

33. OAR 340-120-010(2)(h) requires:

> (h) *Compliance History.*
>
> (A) The compliance history in owning and operating other similar facilities, if any, must indicate that the owner, any parent company of the owner and the operator have an ability and willingness to operate the proposed facility in compliance with the provision of ORS 466 and any permit conditions that may be issued by the Department or Commission. As evidence of ability and willingness, the following shall be submitted:
>
> (i) A listing of all responses to past actual violations identified by EPA or the appropriate state regulatory agency within the five years immediately preceding the filing of the requests for an Authorization to Proceed at any similar facility owned or operated by the applicant, owner, any parent company of the owner or operator during the period when the actions causing the violations occurred; and

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(ii) Any written correspondence from EPA and the appropriate state regulatory agency which discusses the present compliance status of any similar facility owned or operated by the applicant, owner, any parent company of the owner or operator.

(B) Upon request of the Department, the applicant shall also provide responses to the past violations identified prior to the five years preceding the filing of an Authorization to Proceed and the specific compliance history for a particular facility owned or operated by the applicant, any parent company of the owner or operator.

34. Raytheon Engineers and Constructors or its subsidiaries, including Raytheon Demilitarization Company, have operated the Johnston Atoll Chemical Disposal System (JACADS) since 1986.

35. The Department has reviewed the JACADS compliance history and incident reports submitted by the Applicants and commenters in accordance with OAR 340-120-010 and is satisfied with the permittee's response to non-compliance issues. (See Appendix 2, Nos. 15, 24, 26, 27, 29, 30, 40, 42, 44, 45, 46, 57, 59, 60, 61, 62, 69, 78, 89, 90, 91, and 95.)

36. The Applicants maintain an internal self-audit program to review safety and environmental management issues, and have willingly provided the results of such audits to the regulatory agencies involved. (See Appendix 2, Nos. 9, 29, and 30.)

37. Raytheon Demilitarization Company has demonstrated an ability and willingness to operate the UMCDF in compliance with the provisions of ORS 466 and permit conditions imposed by the Department and Commission.

38. OAR 340-120-010(2)(g) requires:

(g) *Owner and Operator Capability.* The owner, any parent company of the owner and the operator must demonstrate adequate financial and technical capability to properly construct and operate the facility. As evidence of financial capability, the following shall be submitted:

(A) Financial statements of the owner, any parent company of the owner, and the operator audited by an independent certified public accountant for three years immediately prior to the application;

(B) The estimated costs of construction and a plan detailing how the construction will be funded; and

(C) A three year projection, from the date the facility is scheduled to begin operating, of revenues and expenditures related to operating the facility. The projection should have sufficient detail to determine the financial capability of the owner, any parent company of the owner and the operator to properly operate the facility.

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39. Raytheon Demilitarization Company has provided the necessary information pursuant to the requirements of OAR 340-120-010(2)(g). (See Appendix 2, Nos. 1, 9, 29, 31, and 82.)

40. Raytheon Company, parent company of Raytheon Demilitarization Company, is an established company with a 75-year operating history and has provided the Commission with a Financial and Performance Guarantee for Raytheon Demilitarization Company. (See Appendix 2, No. 76.)

41. ORS 466.105(5) requires the permittee to:

> (5) Maintain sufficient liability insurance or equivalent financial assurance in such amounts as determined by the department to be reasonably necessary to protect the environment and the health, safety and welfare of the people of this state.

42. The Applicants have submitted proof of insurance pursuant to ORS 466.105, and have been responsive to Department and Commission requests for additional information. (See Appendix 2, Nos. 9, 25, 29, 30, 31, 40, 49, 68, 76, , and 82.)

Now, therefore, IT IS ORDERED that:

1. These findings, conclusions and order shall constitute the Commission's final permit decision and response to public input.

2. Nothing contained herein shall be deemed to waive or restrict any authority of the Commission or any other entity of the State of Oregon to take such action as may be deemed necessary within the scope of their respective authorities to prevent or abate an imminent hazard to public health or the environment.

3. These findings, conclusions and order are based upon representation of the Applicants and evidence in the administrative record. Upon evidence of any material misrepresentation or material change in facts, the Commission reserves the right, in its discretion, to reopen these proceedings.

4. The Commission shall issue the hazardous waste permit modification to the United States Army and Raytheon Demilitarization Company containing the terms and conditions agreed upon by the Commission as of the date of this Order, including those additional permit conditions specifically ordered by the Commission as reflected in Appendix 3.

5. This Order shall be an Order In Other Than A Contested Case, and no administrative appeal of the permit modification shall be provided to the applicant or third parties.

DATED this _____ day of _____, 1998.

Henry Lorenzen
Chair

Carol A. Whipple
Vice-Chair

Linda A. McMahan
Member

Tony Van Vliet
Member

Melinda Eden
Member

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Henry Lorenzen, Chair
For the Environmental Quality Commission

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APPENDIX 1
SUMMARY OF PUBLIC COMMENTS

Regarding ORS 466.060 Criteria and Permit Modification Request to Incorporate Raytheon Demilitarization Company as Co-Permittee

U.S. Army Umatilla Chemical Depot
Umatilla Chemical Disposal Facility
I.D. Number: OR6 213 820 917

January 9, 1998

On February 12, 1997, a hazardous waste treatment and storage permit was issued to the U.S. Army to destroy the chemical agent munitions currently stored at the Umatilla Chemical Depot located near Hermiston, Oregon. On March 28, 1997, the U.S. Army and Raytheon Demilitarization Company (Applicants) applied for a hazardous waste treatment and storage Class 3 permit modification to incorporate Raytheon Demilitarization Company as a Co-Permittee to the hazardous waste treatment and storage permit at the Umatilla Chemical Disposal Facility. This modification request was made in accordance with Oregon hazardous waste rules and pursuant to the Environmental Quality Commission Order issued in February, 1997.

Class 3 permit modification procedures require two public comment periods. The first comment period lasts for 60 days and requires that the Applicants hold a public information meeting. For this modification request the first comment period was from April 5 to June 16, 1997 and the Applicants held a public meeting on May 19, 1997. Two written comments were submitted to the Department of Environmental Quality (Department) during this initial comment period.

The second comment period began August 29, 1997, and after two extensions, was closed for written comments on November 17, 1997. During this time, the Department held a public hearing in Hermiston, Oregon, on October 1, 1997. The Environmental Quality Commission (Commission) accepted public testimony in La Grande, Oregon, on October 2, 1997. Two persons provided oral testimony at the October 1 hearing and one person testified at the October 2 Commission meeting. The Commission also received oral testimony at the November 21 meeting in Portland, Oregon, and instructed the Department to open a limited public comment period (November 26 to December 10, 1997) for the public's review of an Army document that had originally included an illegible table.

All comments received during each comment period were provided to the Commission for review. Comments were also placed in the administrative record maintained at the Department of Environmental Quality office in Bend, Oregon. A summary of comments is provided in Table 1 of this Appendix.

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Table 1. Summary of Public Comments Received.

Date Received	From (Organization)	In Favor of Adding Raytheon as Co-Permittee?	Summary of Comment
June 16, 1997	Mr. James B. Stengle (Commissioner, Chemical Demilitarization Citizens Advisory Commission)	No	• Raytheon has a history of non-compliance at the Johnston Atoll Chemical Agent Disposal Facility (JACADS). • The permit modification should be denied until a fully operational Chemical Stockpile Emergency Preparedness Program (CSEPP) is in place. • There has not yet been "full and open involvement" for the public.
June 16, 1997	Ms. Susan Jones and Ms. Karyn Jones (GASP)	Indeterminate (Assumed No)	• There should be a full review of compliance history at JACADS. • Unscheduled facility inspections should be allowed. • DEQ's public outreach has been inadequate.
Sep. 22, 1997	Anonymous	No	• Commenter suggested investigation of prior Raytheon business practices at Hanford.
Sep. 22, 1997	Hon. Frank J. Harkenrider (Mayor, City of Hermiston)	Yes	• In favor of adding Raytheon to the UMCDF hazardous waste permit.
Oct. 1, 1997	Mr. Mark Brown [Oregon Clearinghouse for Pollution Reduction (OCPR)]	No	From oral and written testimony provided at public hearing in Hermiston, Oregon: • Raytheon does not have a good track record at JACADS, and compliance history at JACADS does not satisfy the requirements of Oregon statutes. • The public comment process was flawed due to DEQ's failure to provide EPA compliance documents. • Attachments to Mr. Brown's comments included two reports from Greenpeace concerning JACADS performance, and a listing of shutdowns at the Tooele facility.
Oct. 1, 1997	Mr. Stephen McFadden	Indeterminate	From oral testimony provided at public hearing in Hermiston, Oregon: • Mr. McFadden warned of the toxic effects associated with nerve gas.
Oct. 2, 1997	Ms. Tamra Mabbott (Planning Director, Morrow County)	No	From oral testimony provided at the Oct. 2 EQC meeting in La Grande, Oregon: • Morrow County requested that the EQC add permit conditions to help Morrow County mitigate the social, economic, and environmental impacts of UMCDF on the local communities. • Morrow County requested that Raytheon not be named on the permit unless compliance with ORS Chapter 554 (related to mitigation fees) is made a permit condition.

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Table 1. Summary of Public Comments Received.

Date Received	From (Organization)	In Favor of Adding Raytheon as Co-Permittee?	Summary of Comment
Oct. 8, 1997	Louis A. Carlson (Judge, Morrow County Court) [Letter to Governor Kitzhaber, copy to Langdon Marsh, Director of DEQ]	(Not Applicable)	• Judge Carlson requested assistance from the Governor in requiring Raytheon to pay mitigation fees.
Oct. 10, 1997	Louis A. Carlson (Judge, Morrow County Court) [Letter to Ms. Karyn Jones, copy to Langdon Marsh, Director of DEQ]	(Not Applicable)	• Judge Carlson explained to Ms. Jones about Morrow County Court's above letter to Governor Kitzhaber.
Oct. 16, 1997	Laura M. Pryor (Judge, Gilliam County Court) [Letter to Governor Kitzhaber, copy to Langdon Marsh, Director of DEQ]	(Not Applicable)	• Judge Pryor wrote to Governor Kitzhaber to express her support for Morrow County's efforts to require the Army and Raytheon to pay mitigation fees.
Oct. 16, 1997	Ms. Jane Haley (The Oregon Center for Environmental Health)	No	• Raytheon has "a poor track record and cavalier corporate culture" toward permit compliance.
Nov. 3, 1997	Mr. Michael J. Farrow (Natural Resources Director, Confederated Tribes of the Umatilla Indian Reservation)	Indeterminate	• Request for an extension to the comment period to review more documents.
Nov. 3, 1997	Ms. Susan Jane Rich and Mr. Oliver Luby (Northwest Environmental Defense Center)	No	• Based on review of the DEQ's Notice of Deficiency, and Raytheon's response to the Notice, Raytheon has not "exhibited the appropriate degree of caution" concerning compliance issues.
Nov. 6, 1997	Mr. Mark Brown (OCPR, GASP, Oregon Sierra Club, Oregon Wildlife Federation, and Chemical Weapons Working Group)	No	• Raytheon's compliance history at JACADS demonstrates that Raytheon does not meet the criteria in Oregon statutes for demonstration of past compliance. • Attachments to Mr. Brown's comments included EPA RCRA compliance reports from 1987-1995 and "15-day reports" from 1995 (7), 1996 (5), and 1997 (2). Other attachments included the Source Emissions Characterization from the JACADS risk Assessment (1996), and a Class 2 Permit Modification Approval from EPA (1997).

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Table 1. Summary of Public Comments Received.

Date Received	From (Organization)	In Favor of Adding Raytheon as Co-Permittee?	Summary of Comment
Nov. 4, 1997	Craig Williams (Chemical Weapons Working Group, GASP, Oregon Sierra Club, Oregon Wildlife Federation)	No	• Previous errors in administrative permit processing invalidates the original permit. • Raytheon is not qualified to be a Co-Permittee based on JACADS RCRA non-compliance, Raytheon corporate fines, and responsibility for various CERCLA ("Superfund") sites. • The growing body of scientific evidence about the Gulf War Syndrome and other documented exposures, show that there are health effects related to exposure to low-levels of nerve agents, such as what might be produced during the operation of UMCDF.
Nov. 17, 1997	Terry Tallman (Mayor, City of Boardman)	No	• Supports Morrow County's request that the permit modification not be granted unless a permit condition is added related to the payment of mitigation fees.
Nov. 14, 1997	U.S. Army and Raytheon Demilitarization Company	Yes	• Comments related to revision of proposed Permit Condition 11.M in light of the Financial and Performance Guarantee provided by the parent company (Raytheon Company). • Commenters warrant that "Raytheon Demilitarization Company will continue to be insured until its obligations under the permit are discharged."
Nov. 17, 1997	Craig Williams (Chemical Weapons Working Group, GASP, Oregon Sierra Club, Oregon Wildlife Federation, and 10 Oregon citizens)	No	This comment was submitted as a revision to the comment received on Nov. 4, 1997. New points raised by Commenters include: • Misrepresentation and misconduct by both the Army and Raytheon in presenting the facts about the quantitative and health risk assessments • The Army and Raytheon have intentionally "ignored[d] and cover[ed] up known evidence of the threat of low level agent exposure which exists at JACADS." • Commenters also cite reports, transcripts, and named and unnamed sources (from both JACADS and the Tooele facility) that health, safety, and environmental rules are routinely ignored.

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Table 1. Summary of Public Comments Received.

Date Received	From (Organization)	In Favor of Adding Raytheon as Co-Permittee?	Summary of Comment
Nov. 17, 1997	Craig Williams (Chemical Weapons Working Group, GASP, Oregon Sierra Club, Oregon Wildlife Federation, and 10 Oregon citizens) **Revision to Comment #18, above**	No	• Additional documentation concerning JACADS and Tooele facilities.
Nov. 17, 1997	Karyn Jones (Chemical Weapons Working Group, GASP, Oregon Sierra Club, Oregon Wildlife Federation, and 10 Oregon citizens) **Addendum to Comment #18, above**	No	• Additional material related to the JACADS facility, including permit modification documents, and 15-day incident reports. • Commenters also included excerpts from the journal of Don Smith, a Quality Assurance Specialist formerly employed at the Tooele Facility.
Nov. 20, 1997	Fred Hissong, Jr. (President, Raytheon Demilitarization Company) [Letter to Langdon Marsh, DEQ Director]	Not Applicable	• Mr. Hissong provided Mr. Marsh information concerning contract expenditures.
Nov. 21, 1997	Louis A. Carlson (Judge, Morrow County Court)	No	From oral testimony provided at the November 21, 1997, meeting of the EQC in Portland, OR: • Judge Carlson requested that the EQC delay their decision on the permit modification until such time as the Army agrees to negotiate with the local Counties for the payment of impact fees. Alternatively, Judge Carlson recommended that the EQC include a new permit condition requiring the payment of the impact fees.
Nov. 21, 1997	J.R. Wilkinson (Program Manager, Department of Natural Resources, Confederated Tribes of the Umatilla Indian Reservation)	No	From oral testimony provided at the November 21, 1997, meeting of the EQC in Portland, OR: • There was insufficient time for review of the documents sent to him prior to the meeting. • Raytheon is not carrying an adequate amount of liability insurance. • Expressed support for Morrow County's position related to impact fees.

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Table 1. Summary of Public Comments Received.

Date Received	From (Organization)	In Favor of Adding Raytheon as Co-Permittee?	Summary of Comment
Nov. 21, 1997	Mr. Mark Brown (OCPR)	No	From oral testimony provided at the November 21, 1997, meeting of the EQC in Portland, OR: • The public involvement process has been flawed, and an illegible document was provided for public review. • Raytheon's compliance history does not met the criteria in Oregon Statutes. • Expressed concern about the indemnification provision being applied to Raytheon.
Nov. 21, 1997	Ms. Karyn Jones (GASP)	No	From oral testimony provided at the November 21, 1997, meeting of the EQC in Portland, OR: • Expressed support for Morrow County's position related to impact fees. • There was insufficient time for review of the documents sent to her prior to the meeting. Expressed concern about the indemnification provision being applied to Raytheon.
Dec. 5, 1997	Craig Williams (Chemical Weapons Working Group, GASP, Oregon Sierra Club, Oregon Wildlife Federation, and 10 Oregon citizens)	No	This comment was submitted as an addendum to the comment received on Nov. 17, 1997. New points raised by Commenters include: • A fatal industrial accident at JACADS that occurred on Nov. 27, 1997, further undermines Raytheon's position that they have the ability to meet statutory criteria for technical ability. • Commenters state that the Army and Raytheon have misrepresented their safety record at JACADS.
Dec. 10, 1997	J.R. Wilkinson (Program Manager, Department of Natural Resources, Confederated Tribes of the Umatilla Indian Reservation)	Indeterminate (Assumed No)	• The indemnification clause does not ensure that adequate compensation will be available in the event of a release of chemical agent. • Commenter also expressed concern about emergency response capabilities, funding of clean-up efforts, and compensation to property owners.
Dec. 10, 1997	Ms. Karyn Jones, Ms. Susan Jones, and Ms. Debbie McCoy-Burns (GASP)	Indeterminate (Assumed No)	• Commenters were concerned about the list of chemical agents provided and whether the Umatilla Chemical Depot will be receiving additional shipments of agents.

Table 1. Summary of Public Comments Received.

Date Received	From (Organization)	In Favor of Adding Raytheon as Co-Permittee?	Summary of Comment
Dec. 10, 1997	Mr. Mark Brown (Vice President for Education, OCPR)	No	• The list of chemical agents provided (related to the indemnification) fails to list combustion by-products. • The list of chemical agents fails to address synergistic effects of combustion by-products. • There are agents listed that are not currently stored at the Umatilla Chemical Depot, and the commenter is concerned that the Army is planning additional shipments to the Umatilla Depot.
Dec. 10, 1997	Mr. Raj Malhotra	Yes	• Mr. Malhotra responded to specific questions posed by the EQC at the Nov. 21, 1997 meeting.
Dec. 11, 1997	Ms. Grace Nelson	No	• Objects to the permit modification and the indemnification granted to Raytheon.

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APPENDIX 2
INDEX TO THE ADMINISTRATIVE RECORD

Regarding ORS 466.060 Criteria and Permit Modification Request to Incorporate Raytheon Demilitarization Company as Co-Permittee

U.S. Army Umatilla Chemical Depot
Umatilla Chemical Disposal Facility
I.D. Number: OR6 213 820 917

January 9, 1998

This Appendix includes a listing of specific documents in the Administrative Record related to the permit modification request to Incorporate Raytheon Demilitarization Company as Co-Permittee on the Umatilla Chemical Disposal Facility hazardous waste permit. It is not all-inclusive, but it does include all public comments received and information provided by the Applicants in response to regulatory requirements and Commission requests.

See Appendix 1 for more detailed descriptions of the public comments listed.

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
1.	Raytheon Additional Information Requested	01/01/1996	Booklet	Dept. of Army	RMalhotra	DEQ	BMcKnight	Includes 1996 Annual Report
2.	Federal Insurance Fund to Cover Damages	01/14/1997	Letter	House of Reps.	PDeFazio	EQC	HLorenzen	
3.	Discussion of Liability Related to HW Permit	01/22/1997	Memo	DEQ	BMcKnight	DEQ	LMarsh	Thru: DEQ BMcKnight
4.	Letter in Response to Federal Liability Issue	02/07/1997	Letter					
5.	Army Awards Umatilla Agent Disposal Contract	02/10/1997	Release	US Army	Internet	Public		
6.	Transmittal of Umatilla Chemical Documents	02/13/1997	Memo	DEQ	BMcKnight	Addressees		
7.	Public Notice for Request to Modify Permit	02/13/1997	Ad	US Army		Public		
8.	Permits Modification to Incorporate Raytheon	02/14/1997	Letter	DEQ	BMcKnight	US Army	MBaldo	Also to PMCD, WPringle
9.	Class 3 for Revision to Include Raytheon	03/01/1997	Request	US Army	DEQ			UMCDF Tracking No. 97-001-E(1), See No 2518, Folder
10.	Modifications to the HW Permit Fact Sheet	03/01/1997	FactSheet	DEQ	SOliver			
11.	No Requirement to Modify the ACDP for Raytheon	03/20/1997	Memo	DEQ	FMoore	PMCD	CShaheen	CC: PBrewer
12.	Memo of Decision, Indemnification Clause	03/27/1997	Memo	Dept. of Army				
13.	Cover Letter for Prmt Mod, with Raytheon	03/28/1997	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	
14.	UMCDF-97-002-RDC(3E) Admin. Tracking Folder	03/31/1997	Folder					Raytheon as Co-Permittee; See No. 482 on Bookshelf
15.	RCRA Compliance History	04/01/1997	Report	DEQ				Compliance History to be Provided in Accordance with 40 CFR 270.42
16.	Request to Modify HW Permit to Incorporate Raytheon	04/05/1997	Article	US Army		Public		

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
17.	Class 3 Permit Mod Request Receipt	04/07/1997	Letter	DEQ	BMcKnight	US Army	MBaldo	Also to PMCD, RMalhotra
18.	Recommendation to Re-Notice Permit Mod Request	04/11/1997	Letter	DEQ	BMcKnight	US Army	MBaldo	Also to RMalhotra
19.	OAR 340-120-025 Does Not Apply to UMCDF	04/15/1997	FaxMemo	DEQ	FMoore	Raytheon	ABean	
20.	Public Notice for Request to Modify to Include Raytheon	04/15/1997	Notice	US Army		Public		
21.	Request to Modify HW Permit to Include Raytheon	04/16/1997	Article	US Army		Public		
22.	Public Notice for Request to Modify Permit	04/18/1997	Notice	US Army		Public		
23.	Letter No. RDC970029, Period for Public Review	05/09/1997	Letter	Raytheon	HCampbell	DEQ		
24.	NOD Class 3 Permit Mod Req UMCDF-97-001-E(1)	05/12/1997	NOD	DEQ	BMcKnight	PMCD	RMalhotra	
25.	Public Law 85-804; Liability & Indemnification	05/23/1997	Law					
26.	Class 3 Mod for Addition of Raytheon as Co-Permittee	06/13/1997	Letter	CDCAC	JStengle	DEQ	BMcKnight	
27.	Comments Regarding Addition of Raytheon	06/16/1997	Memo	GASP	KJones			
28.	Interpretation of the Public Law 99-145	06/18/1997	Letter	Dept. of the Army	RMalhotra	DEQ	BMcKnight	
29.	Response to 5/12/97 NOD for Class 3 Mod	07/01/1997	Report	US Army		DEQ		Class 3 for Incorporation of Raytheon
30.	Replacement & Additional Pages for Response to NOD	07/16/1997	InsertPgs	Dept. of Army	RMalhotra	DEQ	BMcKnight	
31.	Insurance Policy Information Request	08/13/1997	Letter	DEQ	BMcKnight	UMCDF	RMalhotra	
32.	Staff Report for Class 3 to Incorporate Raytheon as Co-Permittee	08/22/1997	Report	DEQ		EQC		
33.	Tape 4, Sides 1&2, EQC meeting	8/22/97	Cassette					
34.	More Information Request re: Raytheon	08/28/1997	Letter	DEQ	SHallock	Raytheon	SKasley	
35.	Bill Enabling Counties to Impose a Fee for Recovery	08/28/1997	Letter	Morrow County	LCarlson	Dept. of Army	JGorrell	

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
36.	Invitation to Comment on EQC Findings and Class 3 Permit Modification Request to Incorporate Raytheon as Co-Permittee	08/29/1997	Chance to Comment	DEQ		Public		
37.	Draft Permit Modifications for UCD	08/29/1997	FactSheet	DEQ		Public		
38.	Completeness Letter and Transmittal	09/02/1997	Letter	DEQ	SOliver	UCD	RMalhotra	Also to MJacoby, SKasley. Class 3 Permit Mod to Incorporate Raytheon
39.	Public Comment Period Opens for Umatilla Incinerator Permit Modification	09/03/1997	Release	DEQ	SOliver	Public		
40.	Response to 8/28/97 Request for Additional Information Regarding Addition of Raytheon	09/16/1997	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	
41.	Comments Regarding Raytheon as Co-Permittee	09/16/1997	Comment	City of Hermiston	FHarken-rider	DEQ	BMcKnight	
42.	Raytheon Compliance history	09/22/1997	Comment	Anonymous		DEQ	BMcKnight	
43.	Attorney General Review Regarding Incorporation of Raytheon	09/24/1997	Memo	DEQ	BMcKnight	EQC	Commissio ners	
44.	Written Comments and Supporting Documents Regarding Incorporating Raytheon	10/01/1997	Comment	OrCPR	MBrown	DEQ	BMcKnight	
45.	Public Hearing in Hermiston	10/01/1997	Transcript	Bridges and Associates	WBridges	DEQ		
46.	Department Review of Raytheon Contracts with Waste Receiving and Processing Facility and the Initial Pretreatment module	10/01/1997	Memo	DEQ	HButler	Admin Record		
47.	Handouts at 10/2/97 EQC meeting	10/02/1997	Handouts	DEQ	BMcKnight	EQC		
48.	EQC Agenda from October 2-3, 1997	10/02/1997	Agenda					
49.	Public Hearing for EQC, Public Comments on Incorporating Raytheon	10/02/1997	Cassettes					
50.	Documents related to Worksession, including proposed permit revisions	10/2/97	Memo	DEQ	SOliver	EQC	Commissio ners	Used for discussion at LaGrande worksession

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
51.	Previous Comments Submitted by Morrow County During the Umatilla Permitting Comment Period	10/03/1997	Memo	DEQ	FMoore	DEQ	LMarsh	
52.	Suit Related to UCD, conditions and permit requirements	10/08/1997	Letter	Morrow County	Court		KJones	
53.	Addition of Permit Condition Requiring Fees	10/08/1997	Letter	Morrow County	LCarlson	State Capitol	JKitzhaber	
54.	Suit Related to UCD Incinerator	10/08/1997	Letter	Morrow County	LCarlson	GASP	KJones	
55.	Extension of Comment Period Class 3 Permit Modification Request to Incorporate Co-Permittee	10/10/1997	Chance to Comment	DEQ	SOliver	Public		
56.	Fee for Storage of Chemical Agents within the County	10/13/1997	Letter	Gilliam county	LPryor	State Capitol	JKitzhaber	
57.	Comments Regarding the Proposed Class 3 Permit Mod to Incorporate Raytheon	10/16/1997	Comment	OR Center for Environ-mental Health	JHaley	DEQ	BMcKnight	
58.	Modification which has similar language to the Tooele Modification	10/18/1997	Fax	SAIC	KKinkade	DEQ	WThomas	
59.	Public Comment Re: Class 3 Permit Mod to Incorporate Raytheon	10/31/1997	Comment	NW Environ-mental Defense Fund	SRich	DEQ	BMcKnight	Also Signed by OLuby
60.	Class Three Permit Mod to Incorporate Raytheon Public Comments	11/03/1997	Comment	CTUIR	MFarrow	DEQ	LMarsh	
61.	Written Comments regarding the Class 3 Permit Mod to Incorporate Raytheon	11/03/1997	Comment	OR Clear-inghouse for Pollution Reduction	MBrown	DEQ	BMcKnight	
62.	Comments on Class 3 Permit Mod to Incorporate Raytheon	11/04/1997	Report	CWWG	CWilliams	DEQ		From GASP; OR Chapter of the Sierra Club, OR Wildlife Federation and the CWWG
63.	Request to Extend Comment Period For Class 3	11/04/1997	Letter	DEQ	SHallock	CTUIR	MFarrow	

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
64.	A Chance to Comment on Extension of Comment Period Class 3 Permit Mod to Request to incorporate Co-Permittee	11/04/1997	Chance to Comment	DEQ	SOliver	Public		
65.	Request for Proposal Requiring the System Contractor to Sign Application as Plant Operator	11/05/1997	Memo	PMCD	JBacon	DEQ	LMarsh	Included in EQC Packet
66.	Public Comments Received through 11/4/97	11/05/1997	Memo	DEQ	BMcKnight	EQC	Commissioners	
67.	Morrow County Requests EQC to Add Permit Condition Requiring Compliance with ORS Chapter 554	11/05/1997	Comment	Morrow County	LCarlson	DEQ	LMarsh	Also to BMcKnight
68.	US Army's Indemnification of Raytheon Demilitarization Company	11/06/1997	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	
69.	Public Hearing at Hermiston Community Center; Hearing Officer Report	11/06/1997	Memo	DEQ	WThomas	DEQ	BMcKnight	
70.	US Army Indemnification of Raytheon Demilitarization Company	11/06/1997	Letter	Dept. of Army	RMalhotra	Dept. of Army	BMcKnight	Enclosed is a memo of decision
71.	EQC Agenda for 11/21/97 in Portland	11/07/1997	Agenda					
72.	City of Boardman in Support of Morrow County Request for Funds	11/10/1997	Comment	City of Boardman	TTallman	DEQ	LMarsh	Also to BMcKnight
73.	In Response to Letter, Documents Enclosed	11/10/1997	Letter	Dept. of Army	RMalhotra	Morrow County	CAlbrecht	Documents Sent: Memo of Agreement; Cooperative Agreement between US Army and DEQ
74.	Comments Regarding Draft Class 3 Permit Modification Proposed Language	11/12/1997	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	
75.	Information Related to Adding Raytheon to the Umatilla Permit	11/12/1997	Info. Packet	DEQ	SOliver	Interested Parties	EQC	Included Memo of Decision; Financial and Performance Guarantee; Proposed Army/Raytheon Contract Modification Language; EQC Agenda attached.

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
76.	Raytheon Company's Financial Guarantee Regarding the UCD Class 3 Permit Mod Request Adding Raytheon Demil	11/12/1997	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	Also from MJacoby
77.	Staff Report for Nov. 21 Meeting Re: Addition of Raytheon as Co-Permittee	11/14/1997	Memo	DEQ	SOliver	EQC	Commissioners	Attached Staff Report Dated11/21/97 From LMarsh
78.	CWWG Comments Received Regarding Addition of Raytheon	11/17/1997	Comment	CWWG	CWilliams	DEQ	BMcKnight	
79.	Comments from GASP, Sierra Club, OR Wildlife Federation, CWWG on the Class 3 for Addition of Raytheon	11/17/1997	Comment Addendum	GASP	KJones	DEQ		
80.	Morrow County Comments Concerning Incorporation of Raytheon as Co-Permittee	11/18/1997	Letter	DEQ	LMarsh	Morrow County	LCarlson	
81.	Transmittal and Summary of Additional Comments Received Concerning the Permit Modification to Incorporate Raytheon	11/18/1997	Memo	DEQ	BMcKnight	EQC	Commissioners	
82.	Re: Information Missing from Raytheon, in Staff Report	11/20/1997	Memo	Raytheon Demil	FHissong	DEQ	LMarsh	
83.	Tape 1, Sides 1 & 2, EQC meeting	11/21/97	Cassette					
84.	Tape 2, Sides 3 & 4, EQC meeting	11/21/97	Cassette					
85.	Tape 3, Side 5, EQC meeting	11/21/97	Cassette					
86.	Transmittal of Toxic Chemicals/Precursors Table	11/25/1997	Transmittal	Dept. of Army	RMalhotra	DEQ	BMcKnight	
87.	A Chance to Comment on Extension of Comment Period Class 3 Permit Mod to Incorporate Co-Permittee	11/26/97	Chance to Comment	DEQ	SOliver	Public		
88.	Comment Regarding the Class 3 to Incorporate Raytheon and re: the Indemnification	12/01/1997	Comment		GNelson	DEQ		
89.	Comment received from CWWG regarding Death at JACADs	12/05/1997	Comment	CWWG	CWilliams	DEQ	BMcKnight	
90.	Comment Re: Class 3 Modification to Incorporate Raytheon	12/10/1997	Comment	CTUIR	JRWilkinson	DEQ	BMcKnight	

No.	Document Description	Date	Type	From (Org.)	From (Name)	To (Org.)	To (Name)	Additional Comments
91.	Comment Regarding Incorporating Raytheon, Class 3 Permit Mod	12/10/1997	Comment	ORCPR	MBrown	DEQ	BMcKnight	
92.	Response to Questions Posed by EQC at 11/21/97 Public Info Meeting	12/10/1997	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	
93.	Comment re: Class 3 Permit Mod to Incorporate Raytheon	12/10/1997	Comment	GASP	KJones	DEQ		
94.	Response to EQC request for information about CDA protest of Pine Bluff contract award to Raytheon	12/15/97	Letter	Dept. of Army	RMalhotra	DEQ	BMcKnight	
95.	Transmittal of Additional Comment Received by Mark Brown	12/16/1997	Memo	DEQ	NWesley	EQC		
96.	Copy of the "Advance Agreement" between EG&G and the Army related to Contract for Tooele facility	12/18/97	Fax	Tooele Facility	TThomas	Umatilla	RMalhotra	Agreement on definitions related to F.A.R. Clause

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APPENDIX 3
REVISIONS TO THE HAZARDOUS WASTE PERMIT

Related to ORS 466.060 Criteria and Permit Modification Request to Incorporate Raytheon Demilitarization Company as Co-Permittee

U.S. Army Umatilla Chemical Depot
Umatilla Chemical Disposal Facility
I.D. Number: OR6 213 820 917

January 9, 1998

INTRODUCTION

Adding Raytheon Demilitarization Company to the UMCDF hazardous waste permit requires some administrative modifications to the current permit related to the Introduction, Signature, and Definition pages (pages 1, 3, and 8-16, respectively). In addition to the administrative modifications, the Department will add several new permit conditions to address the results of the Department's review of the application, and concerns expressed by the Commission and the public during the public comment period. With the exception of Permit Condition II.M. (discussed below), no significant changes were made to the proposed permit conditions that were originally released for public comment on August 29, 1997.

SIGNATURE, INTRODUCTION, AND DEFINITION PAGES

OAR 340-105-001(4)(b) requires that owners and operators of hazardous waste management units have permits during the active life of the unit. The Signature page (Page 1 of 290), Introduction Page (Page 3 of 290), and Definition Pages (Pages 8-16 of 290) are all being changed to illustrate that the Owner and Operator is the U.S. Army (as represented by the Umatilla Chemical Depot and U.S. Army Program Manager for Chemical Demilitarization) and to add Raytheon Demilitarization Company as Co-Permittee and Co-Operator. The U.S. Army has, however, the ultimate responsibility and is still designated as "Permittee, Owner and Operator." A copy of the revised Signature, Introduction, and Definition Pages are included in this Appendix on Pages 3-3, 3-4, and 3-5, respectively, with changes from the February permit highlighted in **bold** font. There were several minor changes made to these pages from the original proposed conditions published in August, including a phone number and address change. These changes are identified by ~~**strike-out**~~ for deletions and **underline** for additions.

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PERMIT CONDITION I.X. (SIGNATORY REQUIREMENT)

40 CFR 270.11(b) (adopted as Oregon Rule by OAR 340-100-002) allows for either the principal executive officer or responsible corporate officer, who is identified as a permittee, to duly authorize a representative to submit reports required by the permit. This permit modification allows each of the Permittees to authorize appropriate representatives to submit reports. The revised permit condition is included in this Appendix on Page 3-5, with changes from the February permit highlighted in **bold** font. There was one correction to a company name from the original proposed condition published in August, highlighted in **underline**.

PERMIT CONDITION II.F.2 (TRAINING PLAN)

40 CFR 264.16 requires that "Facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures the facility's compliance with the requirements of [the permit]." From the review of the Application and the Response to the Notice of Deficiency, the Department concluded that additional training and an aggressive "lessons-learned" program was an important and successful factor in correcting instances of non-compliance. The new Permit Condition II.F.2 requires that the Permittees submit a modified Training Plan to the Department to describe how additional training will be utilized at UMCDF when there are instances of non-compliance. The new Permit Condition is included in this Appendix on Page 3-5, with changes from the February permit highlighted in **bold** font.

PERMIT CONDITION II.M (LIABILITY REQUIREMENTS)

Permit Condition II.M. is intended to insure that the Co-Permittee would carry adequate amounts of liability insurance coverage in the event of a chemical release during operations at the UMCDF. This permit condition has been revised since it was published as a proposed condition in August, 1997 to clarify the annual reporting requirement warranting that the insurance policies (or their equivalent) in effect at the time of this modification are being maintained. Part of the condition was deleted in light of the Financial and Performance Guarantee now provided by Raytheon Company.

In addition, a comment was received from Raytheon Demilitarization Company requesting that the proposed Permit Condition II.M. be modified because although Raytheon Company "will endeavor to procure comparable coverage and limits for new policies in the...insurance market...whether we can duplicate existing policies and coverages is not known." The Department acknowledges that Raytheon Company cannot predict future availability of insurance, but maintenance of an acceptable level of liability coverage is considered necessary to protect local communities from the ramifications of a chemical release during storage or from UMCDF operations. The revision to Permit Condition II.M. is included in this Appendix on Page 3-6, with changes from the February permit highlighted in **bold** font, and changes from the original proposed conditions published in August identified by ~~**strike-out**~~ for deletions and **underline** for additions.

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Signature Page (Revision from February, 1997 in **bold**)

PERMIT

for the
Storage and Treatment of Hazardous Waste

State of Oregon
Department of Environmental Quality
2146 N.E. 4th St., Suite 104
Bend, Oregon 97701

Telephone: (541) 388-6146

Issued in accordance with the applicable provisions of Oregon Revised Statutes Chapter 466 and the regulations promulgated thereunder in Oregon Administrative Rules Chapter 340 Divisions 100 through 120.

ISSUED TO:

PERMITTEE:
OWNER AND OPERATOR:

U.S. Army Umatilla Chemical Depot
Hermiston, OR 97838-9544
Telephone: (541) 564-5200

CO-PERMITTEE:
CO-OPERATOR:

Raytheon Demilitarization Company
~~**P.O. Box 1188**~~ **78068 Ordnance Road**
Hermiston, OR 97838
Telephone: (541)564-8550

U.S. Army Program Manager
for Chemical Demilitarization
78072 Ordnance Road
Hermiston, OR 97838-9544
Telephone: (541)564-~~7064~~ 9750

This permit is effective as of February 12, 1997, and shall remain in effect until February 12, 2007, unless revoked and reissued (40 CFR 270.41), terminated (40 CFR 270.43), or continued in accordance with OAR 340-105-051.

ISSUED BY:

ENVIRONMENTAL QUALITY COMMISSION

Henry Lorenzen
Chair

Date _____

DEPARTMENT OF ENVIRONMENTAL QUALITY

Langdon Marsh
Director

Date _____

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Introduction Page (Revision from February, 1997 in **bold**)

INTRODUCTION

Permittee: U.S. Army Umatilla Chemical Depot

Environmental Protection Agency Identification Number: OR6 213 820 917

The Permittee shall proceed expeditiously in procuring a contractor, beginning construction and commencing operation of the Umatilla Chemical Disposal Facility (UMCDF) in order to eliminate the significant risk to human health and the environment posed by the continued storage of the chemical weapons and chemical agents at the Umatilla Chemical Storage Depot.

Pursuant to Oregon Revised Statutes Chapter 466 and the hazardous waste regulations promulgated thereunder by the Oregon Environmental Quality Commission in Chapter 340 of the Oregon Administrative Rules (OAR), this permit is issued to the U.S. Army Umatilla Chemical Depot (Permittee, **Owner and Operator), the Program Manager for Chemical Demilitarization (Permittee, Owner and Operator), and the Raytheon Demilitarization Company (Co-Permittee and Co-Operator)** to operate a hazardous waste treatment and storage chemical demilitarization facility located in Umatilla County in Hermiston, Oregon, off Interstate Hwy-84 at exit 177 at latitude 45° 50′ 30″ and longitude 119° 26′ 00″. A map depicting the Umatilla Chemical Depot Site Plan as shown in FIGURE 1 on page 290 of this permit.

For purposes of clarification, the designations Co-Permittee and Co-Operator hereinafter will be referred to as Permittee, and Operator, respectively. The use of Co-Permittee as Permittee and Co-Operator as Operator shall not change legal obligations and/or responsibilities.

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Permit Condition I.B. (Definitions) (Revision from February, 1997 in **bold**)

I.B. DEFINITIONS

"Co-Permittee"	**This term shall mean the Raytheon Demilitarization Company.**
"Co-Operator"	**This term shall mean the Raytheon Demilitarization Company.**
"Operator"	**This term shall mean the U.S. Army as represented by the Umatilla Chemical Depot and the Program Manager for Chemical Demilitarization.**
"Owner"	**This term shall mean the U.S. Army as represented by the Umatilla Chemical Depot and the Program Manager for Chemical Demilitarization.**
"Permittee"	**This term shall mean the U.S. Army as represented by the Umatilla Chemical Depot and the Program Manager for Chemical Demilitarization. Duties of the Permittee shall also mean duties of the Permittee and Co-Permittee.**

Permit Condition I.X. (Revision from February, 1997 in **bold**)

I.X. SIGNATORY REQUIREMENT

All applications, reports or information required by this permit, or otherwise submitted to the Department, shall be signed and certified by the Umatilla Chemical Depot Commander, **the Project Manager for the Umatilla Chemical Disposal Facility representing the Program Manager for Chemical Demilitarization, and the Project Manager for Raytheon Demilitarization Company**, or by a duly authorized representative for these persons, in accordance with 40 CFR §270.11.

Permit Condition II.F.2. (Revision from February, 1997 in **bold**)

II.F. TRAINING PLAN

II.F.1. (unchanged)

II.F.2. Within 60 days from this permit condition's effective date, the Permittee and Co-Permittee shall submit to the Department a Class 1 permit modification request, with prior approval of the Department, to modify the Training Plan specified in permit condition II.F.1 to

describe how the Permittee and Co-Permittee will develop and implement new training when instances of non-compliance or potential non-compliance are identified within the Chemical Stockpile Disposal Program.

Permit Condition II.M. (Revision from February, 1997 in **bold**)

II.M LIABILITY REQUIREMENTS

The Permittee **or its parent company,** shall maintain and keep the current liability policies of comprehensive general liability (CGL), umbrella liability and following form excess liability, architects and engineers professional liability and contractors pollution policy and following form excess liability, first catastrophic excess liability, and second catastrophic insurance. A policy compendium shall be sent to the Department ~~annually~~ by February 12, 1999, and annually thereafter, which shall include, at a minimum, ~~that portion defining 'insured' or liability responsibility and/or a review of the necessary insurance policies that illustrates Raytheon Demilitarization/Raytheon Parent Company liability coverage equal to or in excess of the amounts submitted on 7/11/97 to demonstrate compliance. In addition, within 60 days of the effective date of this permit modification, the Co-Permittee shall submit to the Department a written warranty from the Chief Executive Officer or Treasurer of Raytheon, Inc., (parent company) claiming that the Parent Company's insurance and assets will be used to effectuate the Co-Permittee's third-party liability insurance policies at the UMCDF, if necessary.~~ a description of each applicable policy and the definition of "insured" for each policy.

The Permittee shall include a statement signed by the Chief Executive Officer or Treasurer of Raytheon Company attesting that the compendium represents liability coverage equal to, or in excess of, the amounts submitted to demonstrate compliance on July 11, 1997.

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Permit Condition I.B. (Definitions) (Revision from February, 1997 in **bold**)

I.B. DEFINITIONS

"Co-Permittee"	**This term shall mean the Raytheon Demilitarization Company.**
"Co-Operator"	**This term shall mean the Raytheon Demilitarization Company.**
"Operator"	**This term shall mean the U.S. Army as represented by the Umatilla Chemical Depot and the Program Manager for Chemical Demilitarization.**
"Owner"	**This term shall mean the U.S. Army as represented by the Umatilla Chemical Depot and the Program Manager for Chemical Demilitarization.**
"Permittee"	**This term shall mean the U.S. Army as represented by the Umatilla Chemical Depot and the Program Manager for Chemical Demilitarization. Duties of the Permittee shall also mean duties of the Permittee and Co-Permittee.**

Permit Condition I.X. (Revision from February, 1997 in **bold**)

I.X. SIGNATORY REQUIREMENT

All applications, reports or information required by this permit, or otherwise submitted to the Department, shall be signed and certified by the Umatilla Chemical Depot Commander, **the Project Manager for the Umatilla Chemical Disposal Facility representing the Program Manager for Chemical Demilitarization, and the Project Manager for Raytheon Demilitarization Company**, or by a duly authorized representative for these persons, in accordance with 40 CFR §270.11.

Permit Condition II.F.2. (Revision from February, 1997 in **bold**)

II.F. TRAINING PLAN

II.F.1. (unchanged)

II.F.2. Within 60 days from this permit condition's effective date, the Permittee and Co-Permittee shall submit to the Department a Class 1 permit modification request, with prior approval of the Department, to modify the Training Plan specified in permit condition II.F.1 to

describe how the Permittee and Co-Permittee will develop and implement new training when instances of non-compliance or potential non-compliance are identified within the Chemical Stockpile Disposal Program.

Permit Condition II.M. (Revision from February, 1997 in **bold**)

II.M LIABILITY REQUIREMENTS

The Permittee **or its parent company,** shall maintain and keep the current liability policies of comprehensive general liability (CGL), umbrella liability and following form excess liability, architects and engineers professional liability and contractors pollution policy and following form excess liability, first catastrophic excess liability, and second catastrophic insurance. A policy compendium shall be sent to the Department ~~annually~~ by February 12, 1999, and annually thereafter, which shall include, at a minimum, ~~that portion defining 'insured' or liability responsibility and/or a review of the necessary insurance policies that illustrates Raytheon Demilitarization/Raytheon Parent Company liability coverage equal to or in excess of the amounts submitted on 7/11/97 to demonstrate compliance. In addition, within 60 days of the effective date of this permit modification, the Co-Permittee shall submit to the Department a written warranty from the Chief Executive Officer or Treasurer of Raytheon, Inc., (parent company) claiming that the Parent Company's insurance and assets will be used to effectuate the Co-Permittee's third-party liability insurance policies at the UMCDF, if necessary.~~ a description of each applicable policy and the definition of "insured" for each policy.

The Permittee shall include a statement signed by the Chief Executive Officer or Treasurer of Raytheon Company attesting that the compendium represents liability coverage equal to, or in excess of, the amounts submitted to demonstrate compliance on July 11, 1997.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
HYDROPOWER PROGRAM
525 NE Oregon Street
PORTLAND, OREGON 97232-2737

F/NWO3

December 2, 1997

Gene Foster
Oregon Dept. of Environmental Quality
811 SW 6th
Portland, Oregon 97204

Dear Mr. Foster:

Enclosed you will find the draft of the 1997 National Marine Fisheries Service (NMFS) Annual Report to the Oregon Department of Environmental Quality (ODEQ) on Total Dissolved Gas. The report is an annual requirement that accompanies the ODEQ waiver of the total dissolved gas water quality standard allowing implementation of the NMFS spill program. The report follows an outline developed through consultations between the ODEQ, NMFS and the Fish Passage Center (FPC). The 1997 report represents contributions from several authors from several agencies and tribal organizations. This year the FPC provided the NMFS with invaluable assistance in assembling the report.

The draft report is being distributed through an extensive mailing to state and federal fisheries agencies, Indian tribes, the Integrated Scientific Advisory Board and other interested parties for review and comment. The purpose of this mailing is to solicit a broad review and comment prior to the preparation of the final report. In order for NMFS to complete the final report and deliver it to the Department by the specified January 15, 1998 we will require your comments be returned to my office by December 31, 1997.

If at anytime during your review of the report you should wish to discuss components of the document, please contact me at telephone number (503) 231-2306.

Sincerely,

Lisa Hensler

for Mark J. Schneider, Ph.D.
Chief, Facilities Branch
Hydro Program

1997
Draft
Annual Report
To the
Oregon Department of
Environmental Quality
December 1, 1997

Introduction

In late 1991 and early 1992, the National Marine Fisheries Service (NMFS) determined that three "species" of salmon from the Snake River Basin were endangered or threatened under the Endangered Species Act (ESA). The listed species included sockeye salmon, spring/summer chinook salmon, and fall chinook salmon. In March of 1995, an ESA Section 7 Biological Opinion (Opinion) on the operation of the Federal Columbia River Power System was issued. The Opinion established a set of reasonable and prudent alternatives (RPA) with the objective of improving the operation and configuration of the federal power system to meet a no jeopardy requirement of the ESA, and to fulfill the United States commitment to uphold tribal treaty fishing rights. There are several RPA relative to spill and dissolved gas contained in the document. These include:

1. RPA #2 - Recommends that the U.S Army Corps of Engineers (COE) spill water at the Snake and Columbia River hydroelectric projects to increase fish passage efficiency (FPE) during the period of spring/summer chinook migration at all projects. The objective of spilling water over a hydroelectric project is achieving an FPE of 80% (That is 80% of the juvenile migrants pass the project via non-turbine routes. i.e., through spill or through the bypass system). The only exception to this RPA is under specified low flow conditions (according to the National Marine Fisheries established Technical Management Team) or as limited by water quality conditions.
2. RPA #16 – Directs the Bonneville Power Administration (BPA), Bureau of Reclamation (BOR) and the COE to participate in the development and implementation of a monitoring and evaluation program to investigate the effects of the dissolved gas supersaturation.
3. RPA #18 – The COE is directed to participate in the development and implementation of a gas abatement program at all projects using structural modifications.

The purpose of the spill program is to improve the downstream passage of ESA listed stocks by providing a route with less associated mortality than turbine passage. It is recognized that spilling water generates atmospheric gas supersaturation of the river that can have detrimental effects on fish. In providing spill as an alternate passage route the associated mortality due to dissolved gas supersaturation needs to be balanced against mortality of turbine passage.

In 1997, the NMFS requested that the Oregon Department of Environmental Quality (DEQ) consider a waiver of the Oregon water quality standard for total dissolved gas supersaturation (TDGS). Because of the risk associated with dissolved gas supersaturation, the requested waiver was for a twelve-hour average of 115 and 120 percent TDGS in the forebay and tailrace of a project, respectively. The waiver was granted for the 1997 spill season and specified several stipulations including the provision of an annual report. In 1996, the NMFS also prepared an annual report as part of the waiver compliance. The 1996 draft report was reviewed by the Northwest Power Planning Council's Independent Scientific Advisory Board (ISAB). The ISAB recommended that the NMFS coordinate more closely with the DEQ in their future endeavors regarding the study and evaluation of spill, total dissolved gas, and the biological effects. The approach suggested by the ISAB would benefit both the determination of needed

information and the provision of relevant responses. Considerable effort was expended in the spring of 1997 to develop with staff at the DEQ an outline of the products that would be included in the annual report. An agreed upon outline was presented to the Environmental Quality Commission (EQC) on April 18, 1997 (Appendix 1). This report follows that outline. Efforts were made to include all information pertinent to the outstanding questions posed by the EQC.

1997 Water Conditions

The 1997 water year was characterized as being well above average. The April through July runoff volume at Lower Granite was the fourth highest observed since 1928, while the April through September runoff volume at The Dalles Dam was the third highest observed since 1928. Reservoirs were primarily operated to meet flood control requirements during the spring and early summer periods. The average monthly flows at Lower Granite and McNary Dams are contained in Table 1.

Table 1. Average monthly flows at Lower Granite and McNary dams.

Month	Average Monthly Flow (kcfs)	
	Lower Granite	McNary
April	121.98	313.03
May	169.03	449.16
June	161.30	482.26
July	68.80	274.61
August	46.14	198.32

Flows often exceeded the hydraulic capacity of the projects. The maximum hydraulic capacity at each of the projects is listed in the table below. However, due to unit outages, maintenance schedules facility issues and peak-operating efficiency ranges, projects rarely operated at full hydraulic capacity. The daily hydraulic capacity for each project is contained in Appendix 2.

Table 2. Maximum hydraulic capacity at federal projects.

Project	Hydraulic Capacity (kcfs)
Lower Granite	130
Little Goose	130
Lower Monumental	130
Ice Harbor	106
McNary	232
John Day	322
The Dalles	375
Bonneville	288

Spill during the spring passage season was primarily uncontrolled and resulted from high natural runoff and flood control operations. Total dissolved gas levels routinely exceeded the State waivers; however, as will be discussed later in this report little spill this year can be directly attributed to the Biological Opinion spill program.

1. Physical Monitoring of Total Dissolved Gas

Due to uncontrolled spill the total dissolved gas levels during the spring were well in excess of the 115/120 % water quality waiver provided by the state water quality agencies during most of the spring and early summer period. The entire northwest region was experiencing above average water conditions during the spring on 1997. Consequently, very few management actions could be undertaken to try to reduce TDGS. The magnitude of the 1997 water year prompted the system operators to empty storage reservoirs for flood control. In addition, the operators justified drawing the reservoirs to "empty" based on using them for TDGS abatement during the fish migration season. However, as demonstrated this year there is very little dissolved gas management to be derived from these actions. Flood control determined all operations that occurred during the spring and early summer period.

The following graphs contain the final TDGS data provided by the COE for the federal projects in the State of Oregon. The hourly data provided by the COE were summarized as the average of the 12 highest hourly measurements in the 24-hour period. Also presented on the graph are the high and low values obtained in the 24-hour period. The data are presented in Appendix 3.

McNary Dam - There was generally good agreement between the monitors measuring TDGS on the Washington and Oregon sides of the dam (Fig. 1). In general, the TDGS levels reflect the levels of spill at the upriver projects (Ice Harbor on the Snake and Priest Rapids on the Mid Columbia). The installation of spillway deflectors (gas abatement structures) at Ice Harbor Dam resulted in lower levels of TDGS below the project during 1997 and was reflected in the McNary Dam forebay. The TDGS levels at Ice Harbor Dam during periods of uncontrolled spill rarely exceeded 130% of saturation, as compared to highs near 140% in past years. The 115% forebay criterion at McNary Dam was violated from April through June. The limited powerhouse capacity at McNary Dam resulted in high dissolved gas levels in the tailrace. The tailrace TDGS criterion of 120% was violated from April until well into July.

John Day Dam – The forebay monitors routinely measured TDGS that exceeded the State waiver from the end of April through the beginning of July (Fig. 2). The level of TDGS reflects the limited hydraulic capacity at the upstream McNary project. Prior to 1997, the John Day project was not equipped with any gas abatement structures. In 1997, work began on installation of spillway deflectors. Only two out of the 20 spillways were equipped with spillway deflectors this year. Because of the limited gas abatement structures, spill at this project lead to high levels of TDGS. Construction operations affected spill levels and TDGS in the early part of the spring migration during 1997. Delays occurred in the installation of spillway deflectors at John Day Dam due to a contested contract and high spring river flow conditions. This delay prevented the full use of the spillbays until after May 5, 1997. Spill was limited to spillbays 1-15, with no spill possible in spillbays 16-20. On April 25, a completed flow deflector was installed in spillbay 18, and the concrete placed for the deflector in spillbay 19. Spill was distributed over bays 1-18 and 20, from then until May 5. On May 5, all spillbays were available for spill. This limited spillbay condition at John Day Dam resulted in TDGS level exceeding 140% during late April and early May. The TDGS again exceeded 140% around mid May and generally continued at these high levels until late June. Once flows decreased at the end of June, the summer spill was more easily managed and TDGS did not exceed the criterion. The highest

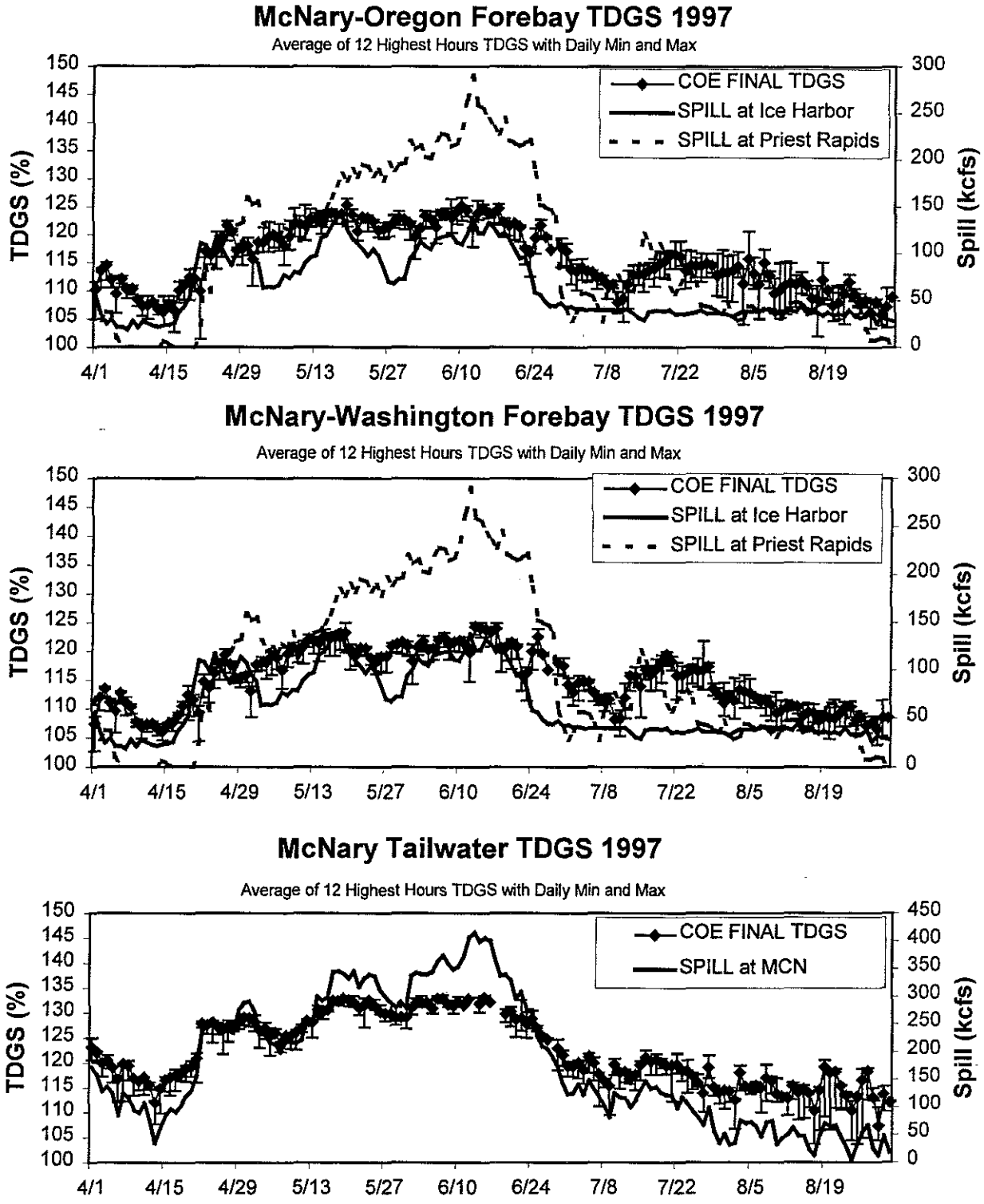


Figure 1. McNary Dam forebay and tailrace measurements of TDGS and associated upriver spill levels.

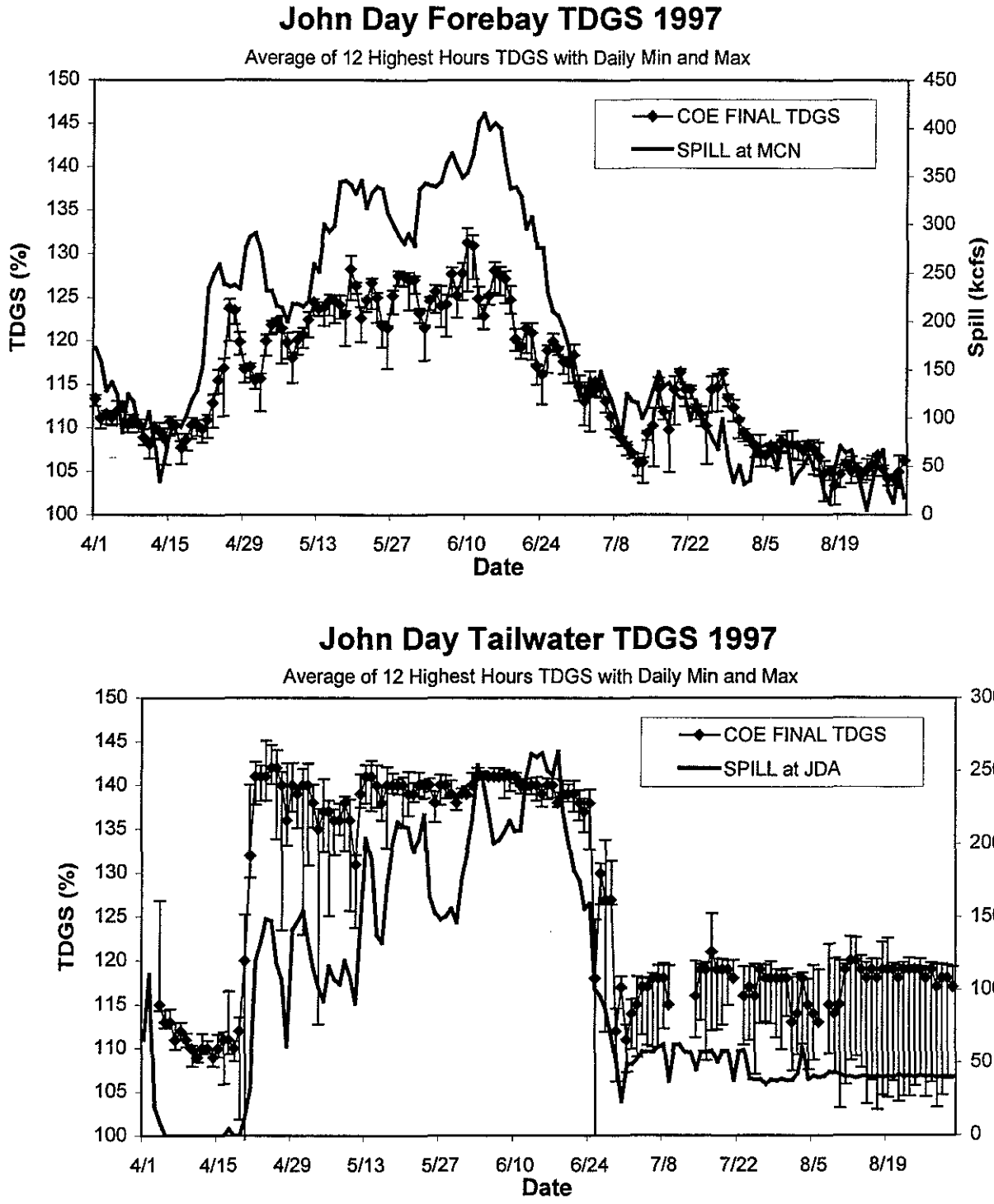


Figure 2. John Day Dam forebay and tailrace measurements of TDGS and associated upriver spill levels.

Levels of TDGS in the federal hydrosystem were generally measured below John Day Dam during the spring.

The Dalles Dam – The TDGS in The Dalles Dam forebay reflected the conditions in the John Day tailrace. The State Waiver for TDGS was exceeded from late April through the beginning of July. Once John Day Dam was able to maintain a controlled spill program, the TDGS in The Dalles dam forebay met the State standard. The State waiver for TDGS was exceeded in the tailrace for the same period (Fig. 3).

Bonneville Dam - Except for a two-week period in early April, the State waiver for TDGS in the forebay of the project was violated for all of the spring period and for many days during the summer period (Fig. 4). Like all the other lower river projects, the TDGS in the tailrace of the project exceeded the State waiver from late April through June. In early July, when flows decreased, the spill program could again be managed to the State's standards. The same pattern of exceedences was observed at all the downriver monitoring sites.

Figures 5 and 6 demonstrate that TDGS levels decrease with distance from the federal hydroelectric system. However, in spite of distance from the dams in 1997 the water quality criteria were exceeded through most of April, May and June at these downriver sites.

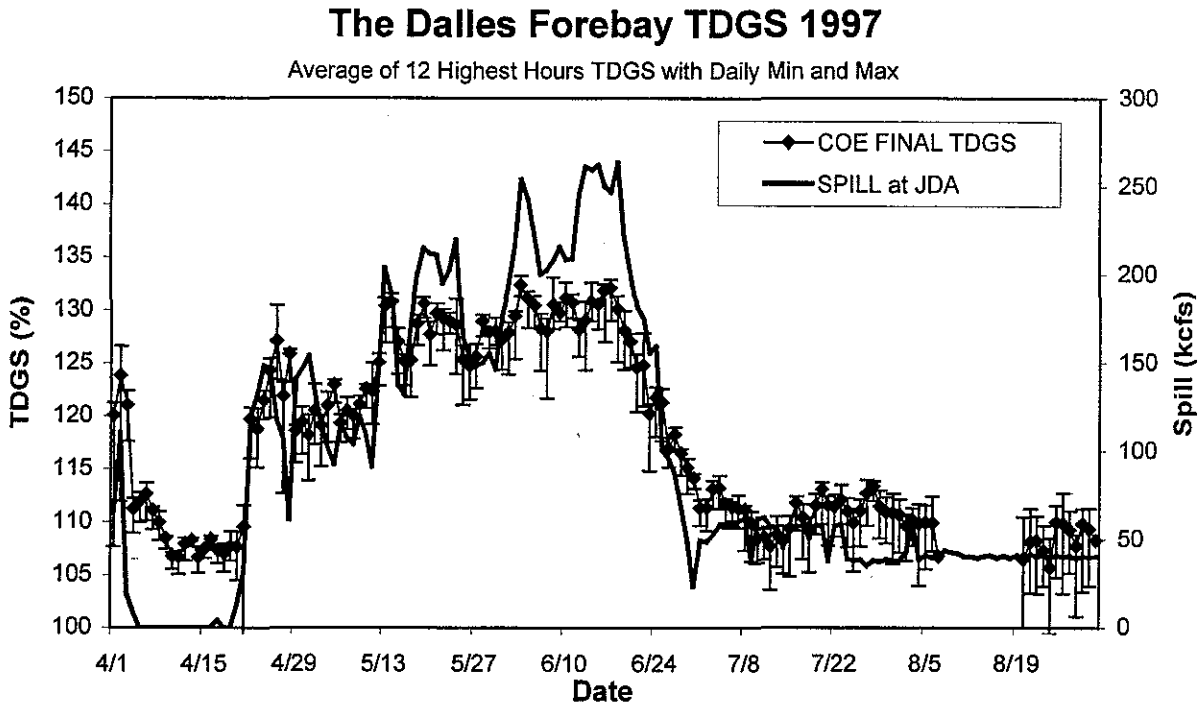
In conclusion, it is apparent that in an above average water year, as observed in 1997, there are limited management actions available to decrease TDGS. The State waiver criterion for TDGS were exceeded by anywhere from 10-20% at all forebays and tailraces during the latter part of April and all of May and June. As the summer progressed and flows decreased, the COE was able to manage spill to the State waivers for TDGS.

2. The Factors Causing Spill

The pre-season runoff volume forecasts, based on accumulated snowpack to-date and assumptions regarding precipitation during the remainder of the runoff season, indicated that 1997 would be an above average runoff year of a magnitude even greater than 1996. The hydrosystem regulators and operators anticipated that there would be substantial involuntary spill occurring throughout the migration season.

Spill can be either voluntary or involuntary. Voluntary spill is not a physical constraint, in that it can be terminated by the hydrosystem operators at any time. Spill for fish passage, as described in the NMFS Biological Opinion, is an example of voluntary spill when flows are controllable. Voluntary spill can be managed so as not to exceed the total dissolved gas caps, or may be managed to varying amounts based on the data obtained from a biological monitoring program. Conversely, involuntary spill is a physical constraint because it is caused by a project or system physical limitation. There are two primary causes of involuntary spill: flow levels exceeding the hydraulic capacity of a hydroelectric project (excess hydraulic capacity spill), or spill from a water supply that exceeds the available power markets (lack of market spill).

In any given year, the federal operators and regulators are directed to spill according to the Opinion. Dependent on the water year a certain amount of Opinion spill is by definition, involuntary spill. In 1997, data was collected by the BPA and the COE to allow for the distinction of voluntary and involuntary spill. This allowed the following analysis that addresses the impact of the presence of the hydrosystem on the total dissolved gas levels during an above average water year. The results of the analysis are presented in Figures 7 through 10. A daily accounting of the types of spill and the data used to estimate the types of spill are contained in



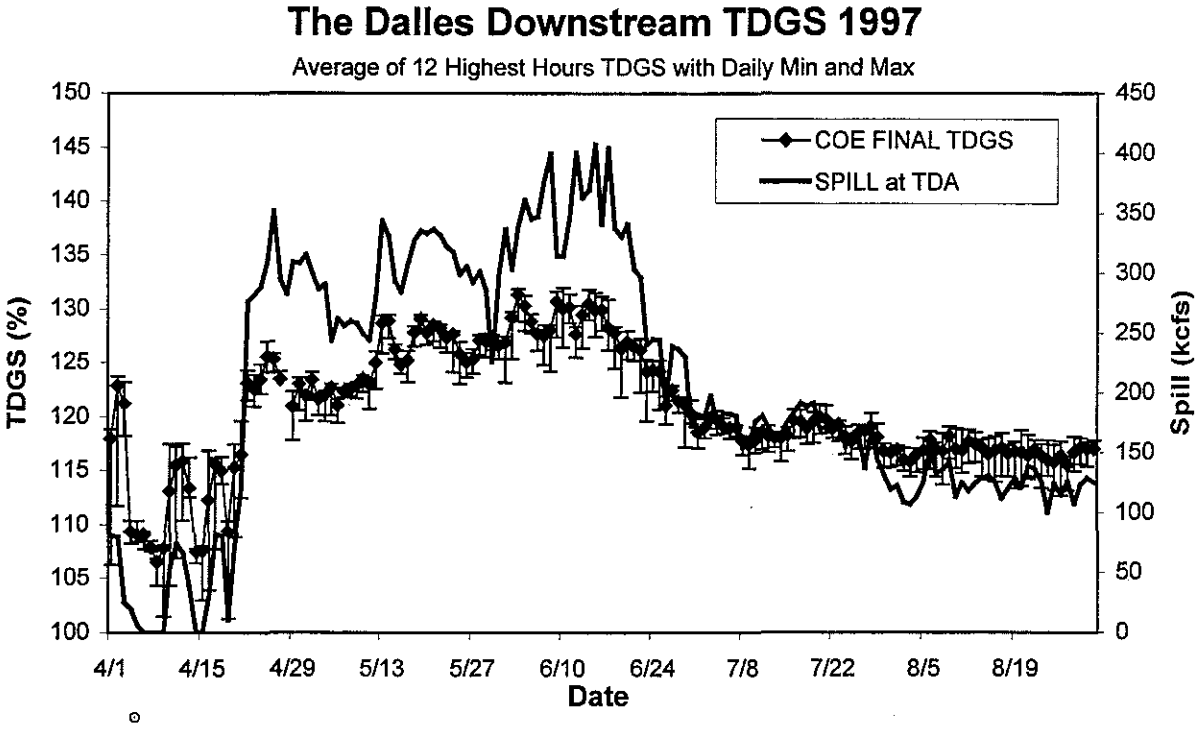
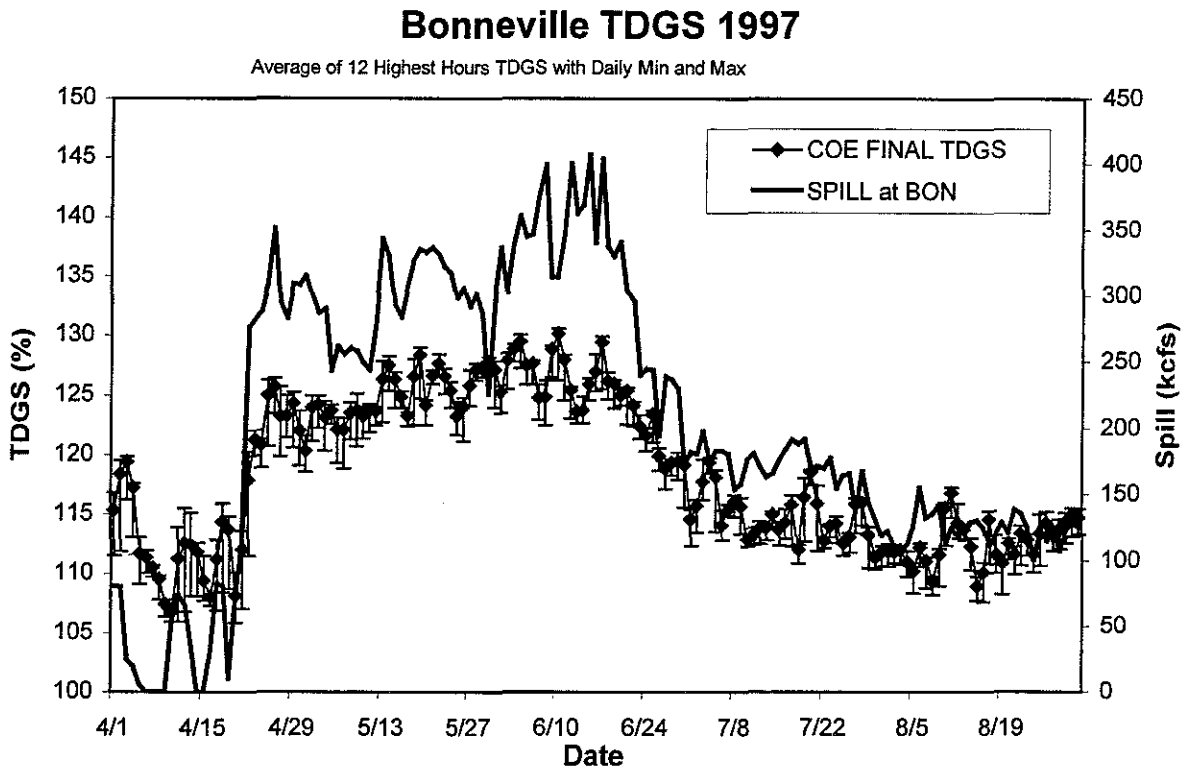


Figure 3. The Dalles Dam forebay and tailrace measurements of TDDGS and associates upriver spill levels.



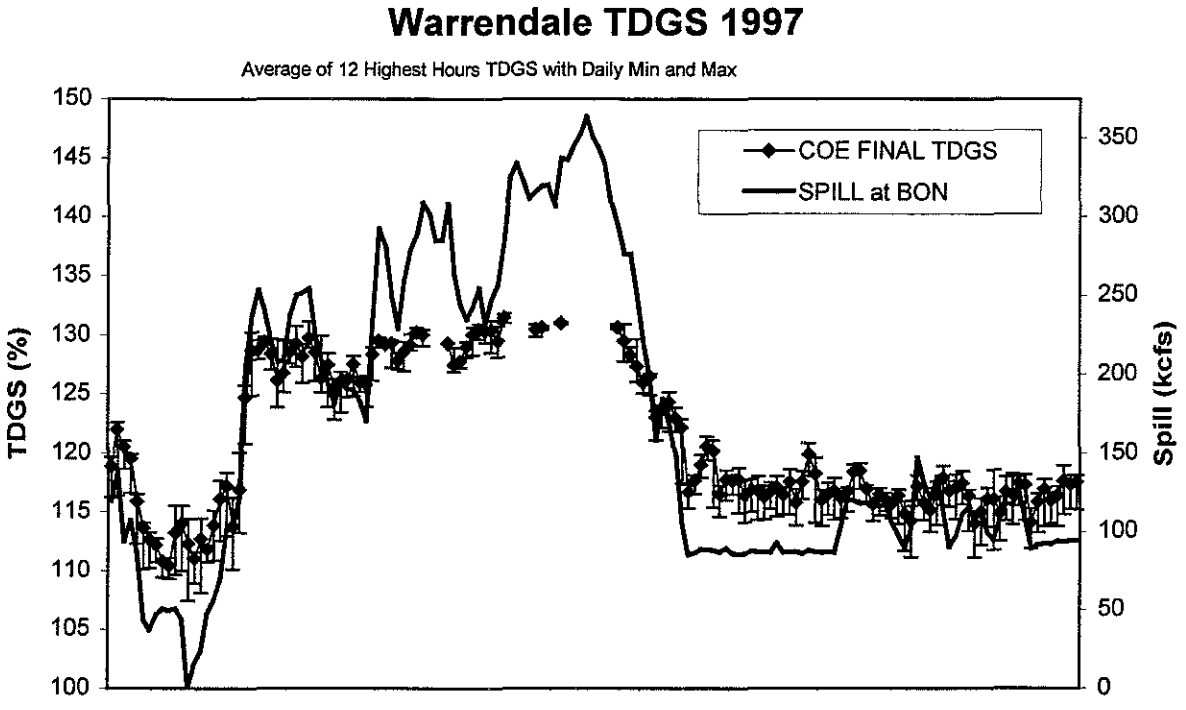
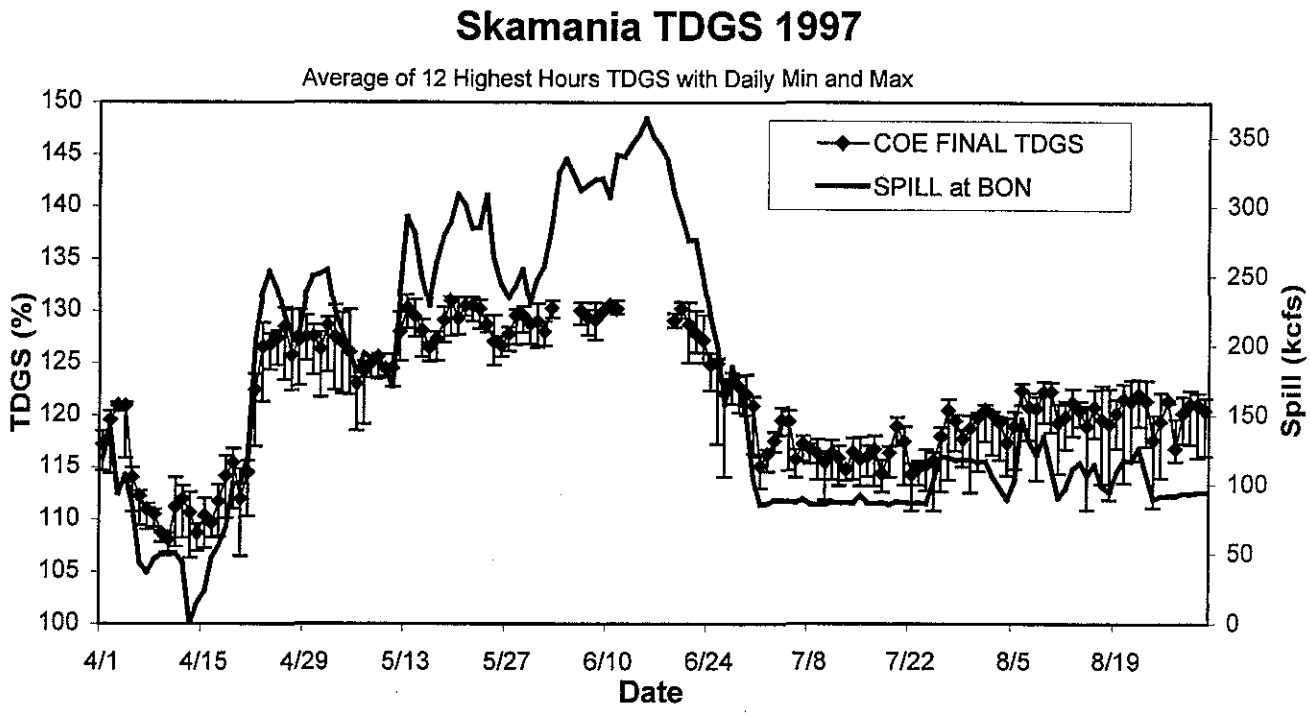


Figure 4. Bonneville Dam forebay and tailrace measurement of DGS and associated upriver spill levels.



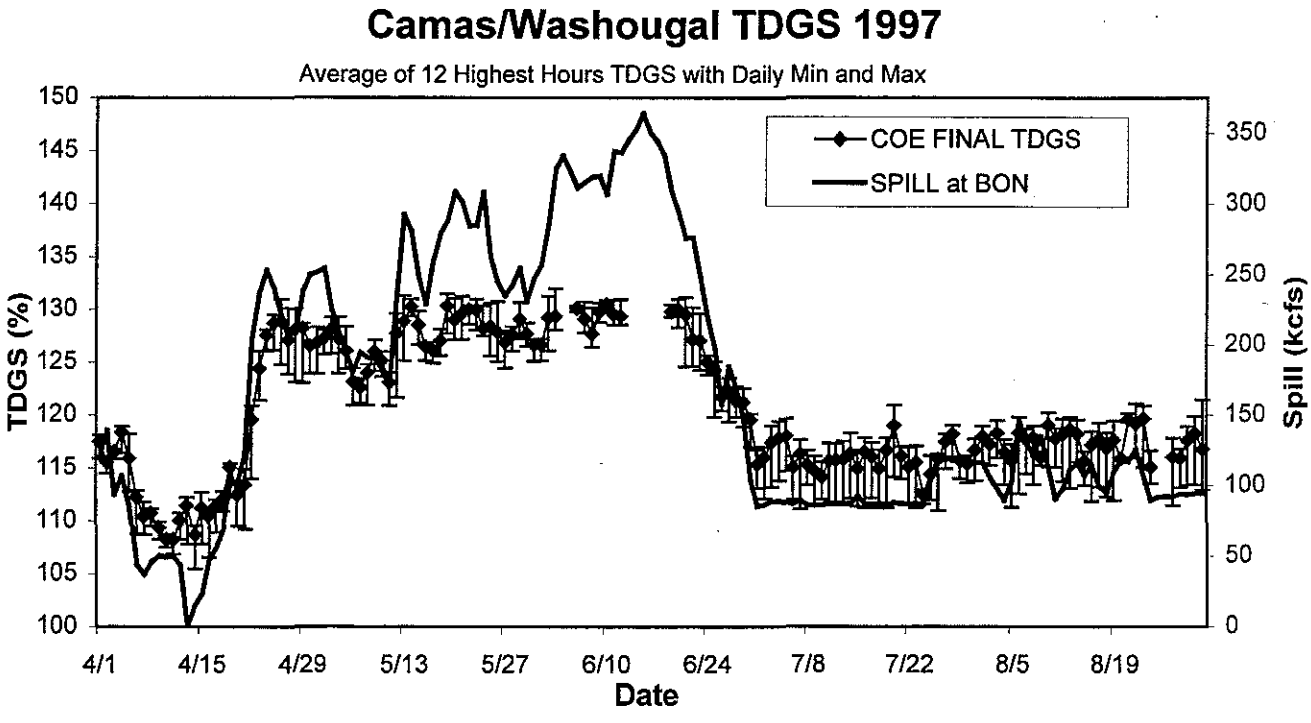
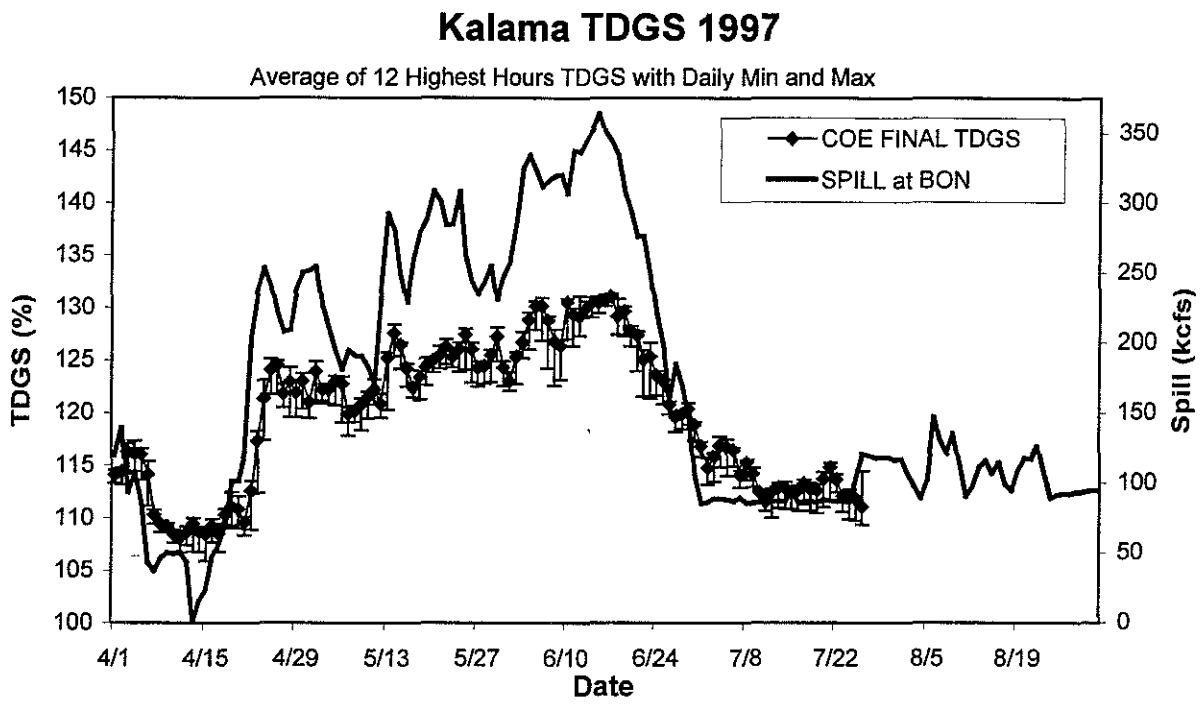


Figure 5. TDGS measurements at stations below Bonneville Dam.



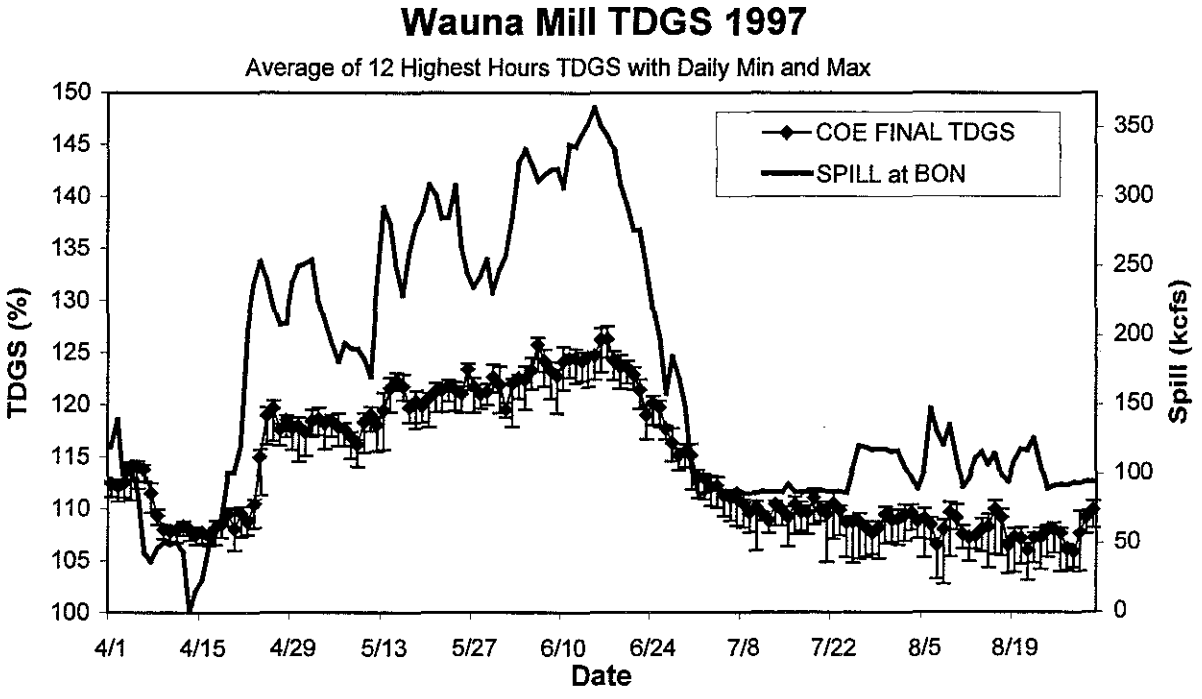


Figure 6. TDGS measurements at stations below Bonneville Dam.

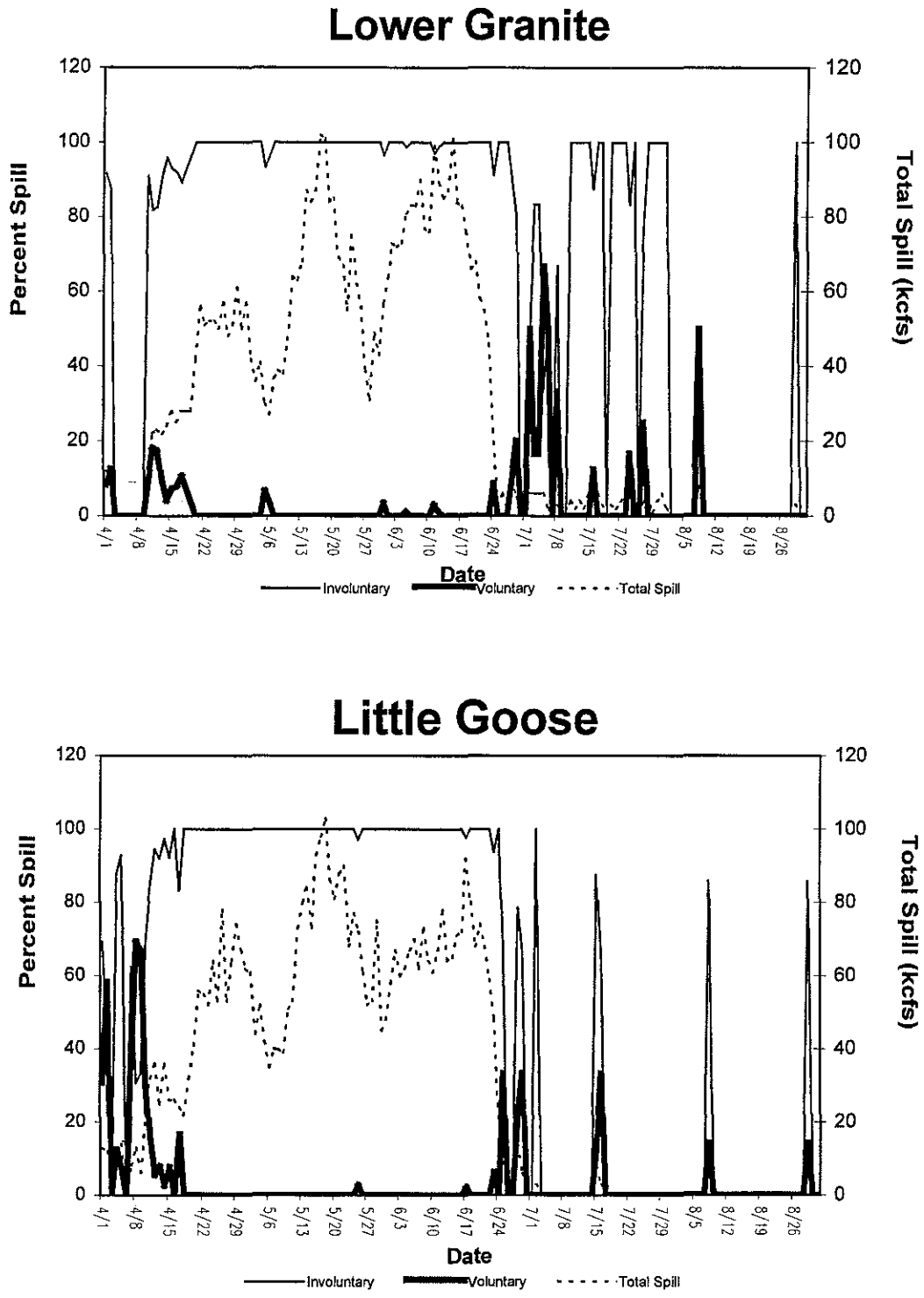


Figure 7. Total spill and the portion considered voluntary and involuntary at Lower Granite and Little Goose dams from April through August 1997.

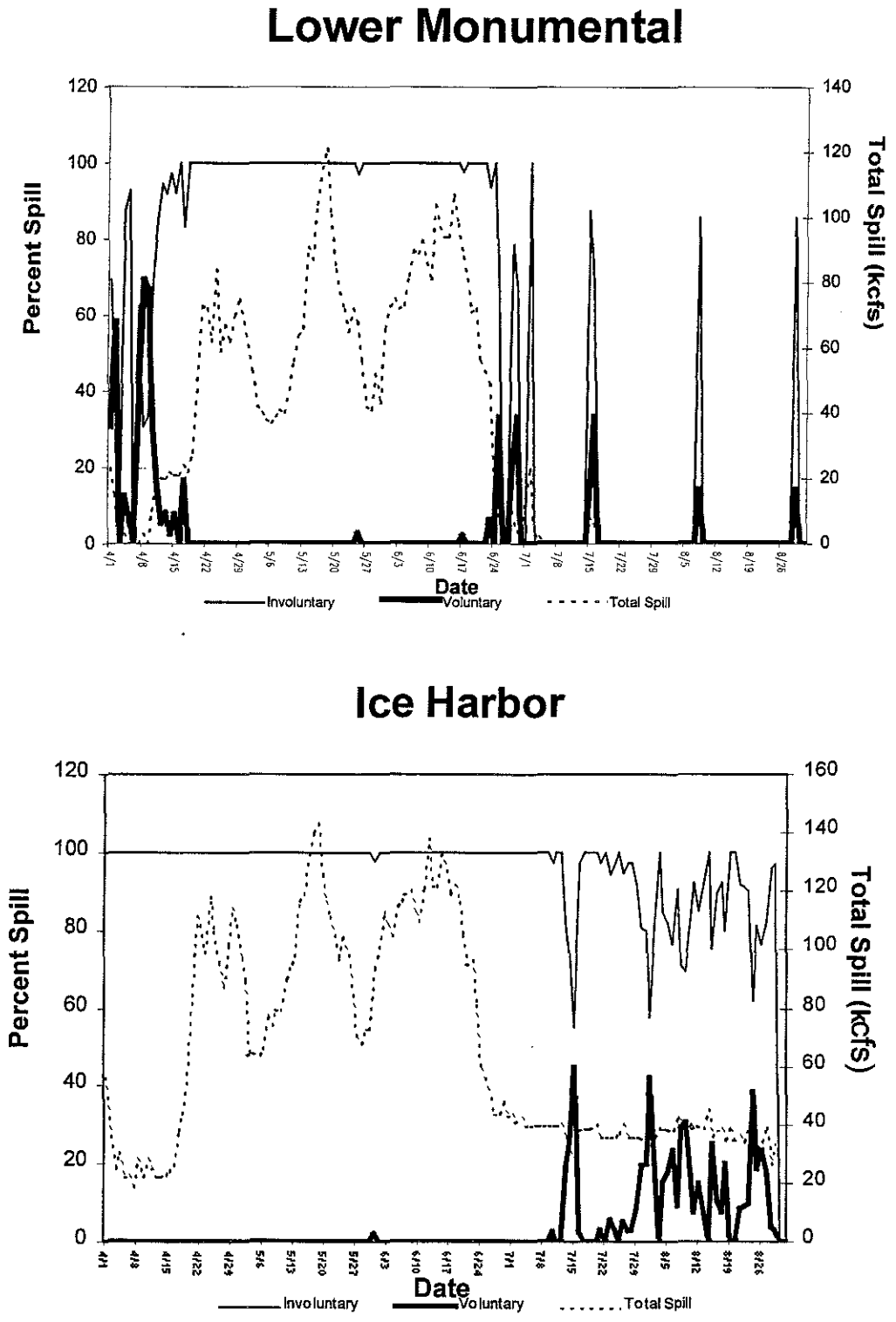


Figure 8. Total spill and the portion considered voluntary and involuntary at Lower Monumental and Ice Harbor dams from April through August.

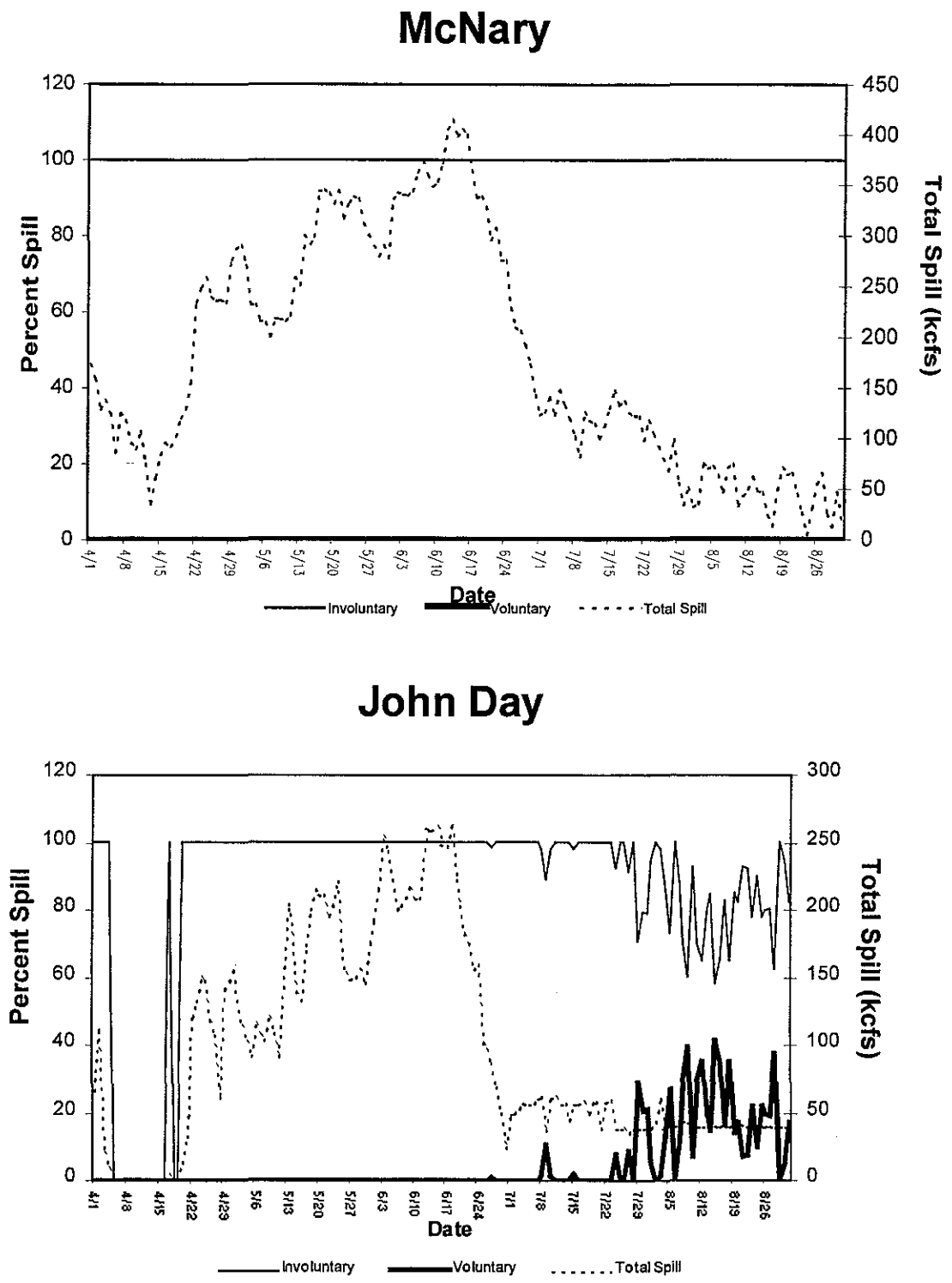


Figure 9. Total spill and the portion considered voluntary and involuntary at McNary and John Day dams from April through August.

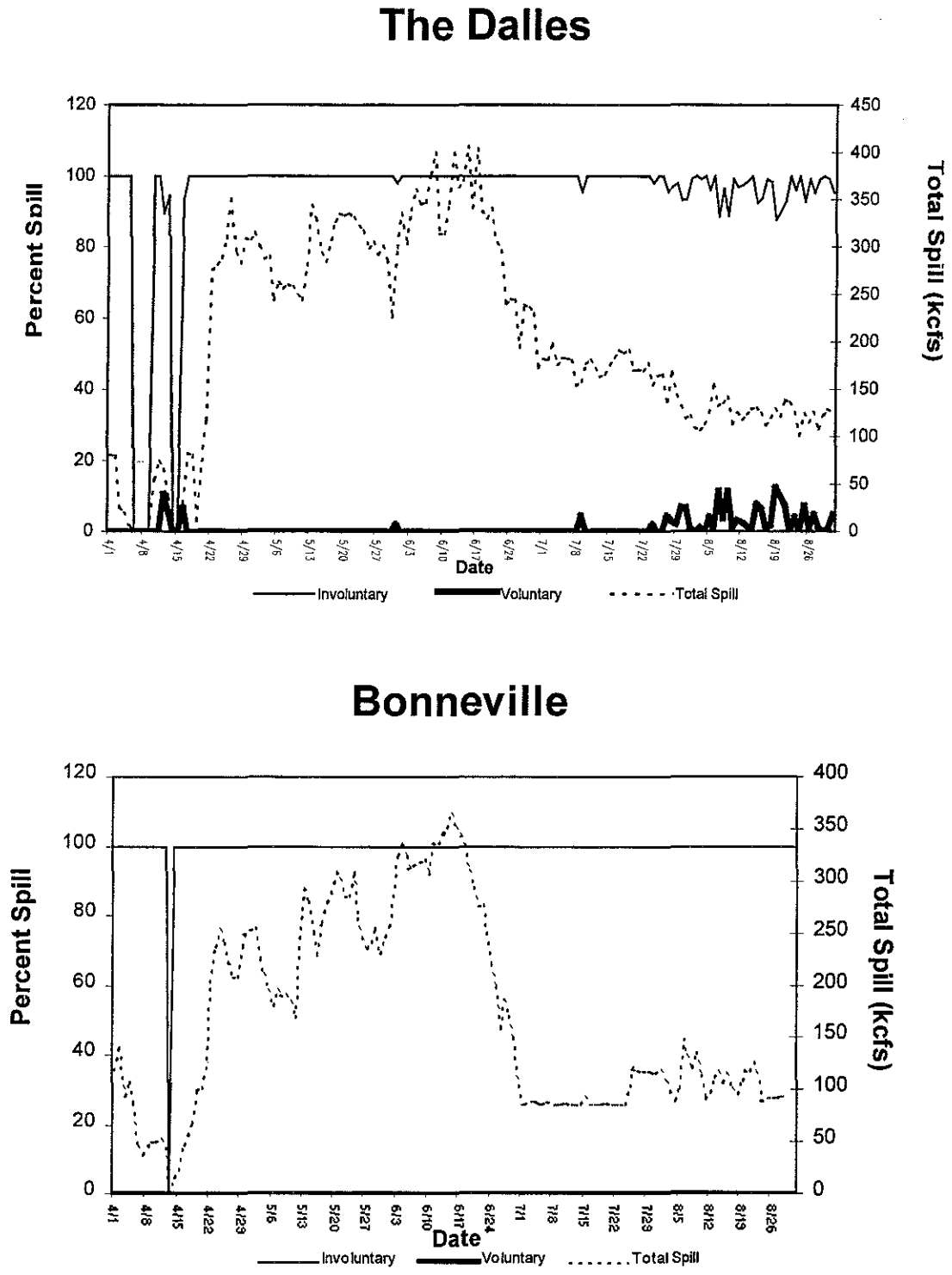


Figure 10. Total spill and the portion considered voluntary and involuntary at The Dalles and Bonneville dams.

Appendix 2. The Appendix also contains a list of definitions that lead to the derivation of the tables.

As can be seen from both the graphs and the tables contained in Appendix 2, spill during 1997 was almost exclusively involuntary. In other words, spill was due to the high water year and resulted from flows in excess of hydraulic capacity and lack of power market. In 1997, the BPA made significant efforts to market as much lack of market spill as possible during the migration season. This action was taken to reduce involuntary spill from lack of market opportunities that contribute to high levels of TDGS. In spite of these efforts, substantial lack of market spill occurred throughout the season.

In the Snake River, a small amount of spring spill and some summer spill was voluntary and can be considered fish spill as called for by the Biological Opinion. In the lower Columbia, all spill at McNary and Bonneville dams was involuntary. At John Day and The Dalles dams, some summer spill was voluntary. However, it is important to note that whenever voluntary spill occurred in the system, the projects where spill occurred complied with the State waivers for TDGS. Exceedences of the criteria occurred during periods of involuntary spill.

Figure 11 summarizes the total amount of spill at each project from April through August. The graph again illustrates that given the 1997 water year; very little spill can actually be called voluntary. Some will contend that spill would have occurred because of the requirement to spill for the Biological Opinion. However, that distinction is not correct since the spill that is termed involuntary in 1997 would have occurred whether or not there was a Biological Opinion Spill Program.

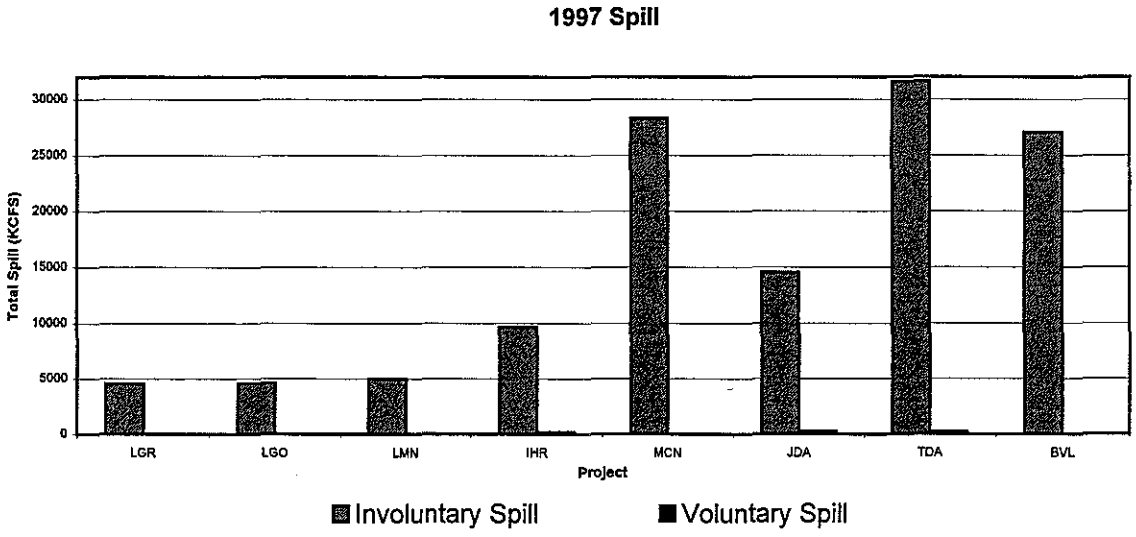


Figure 11. The total amount of voluntary and involuntary spill summarized by project for April through August.

3. Biological Monitoring for Real-Time Spill Management

Juvenile Migrants

The SMP successfully detected increasing frequencies of signs of gas bubble trauma (GBT) reflecting the changing water quality conditions. A total of 50,719 juvenile salmon were examined for signs of gas bubble trauma between April and August. Of the fish sampled 2,497 or 4.9% showed signs of GBT in their fins. The signs observed were broken down by rank: 1,726, or 3.4% were rank 1 (1-5% of a fin covered with bubbles); 549, or 1.1% were rank 2 (5-25%); and 220 or 0.4% were rank 3 or greater (> 25%). This breakdown and predominance of rank 1 signs is very similar to what was observed in 1996.

The biological criterion that was established by NMFS for the termination of the spill program was violated 25 times. However, the violations always occurred during periods of involuntary spill due to river flow in excess of hydraulic capacity, and to a lessor extent in 1997, due to lack of market for energy production spill. The TDGS during the violations was well in excess of the 115 and 120 percent waiver limit.

Table 3. Exceedences of NMFS criteria for signs of GBT.

Summary of GBT Monitoring Program Exceedences by Site*		
Site	**1996**	**1997**
Bonneville	1	5
John Day	2	0
McNary	0	1
Ice Harbor	0	1
Lower Monumental	8	6
Little Goose	1	0
Lower Granite	0	0
Rock Island	11	12
Total	**23**	**25**

*Sample size greater than or equal to 100 fish.

Figures 11-18 depict the observations of signs by sample at each site. The prevalence of signs varied over the season and was related to flow and spill volume. The 1997 data is presented along with the 1995 and 1996 data. The 1996 water year was similar to 1997, while in 1995 the State waivers were rarely violated. The graphs show similar increases in the prevalence of signs in years when flow is considerably above average (1996-1997) reflecting the uncontrolled situation of the hydrosystem.

As in 1996, the highest percentage of signs was observed in the sample collected at Rock Island Dam. The incidence of signs appears relative to the amount of water released and spilled at upstream projects. The highest incidence observed in the federal hydrosystem was at Bonneville Dam. The incidence was consistent with the high TDGS measured in the tailrace at John Day Dam.

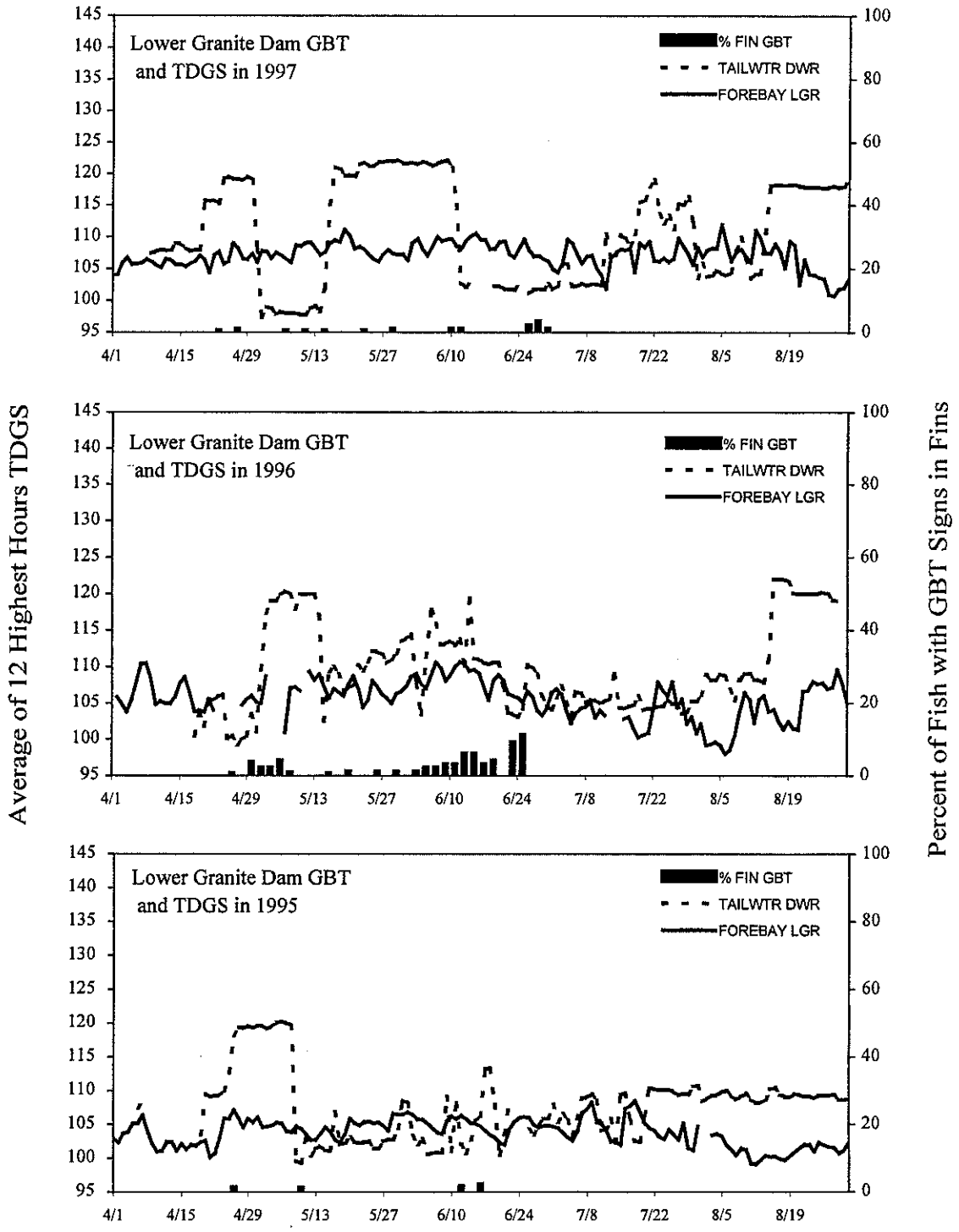


Figure 12. Data collected at Lower Granite Dam from the smolt monitoring program for GBT, presented with information of TDGS for 1995-1997.

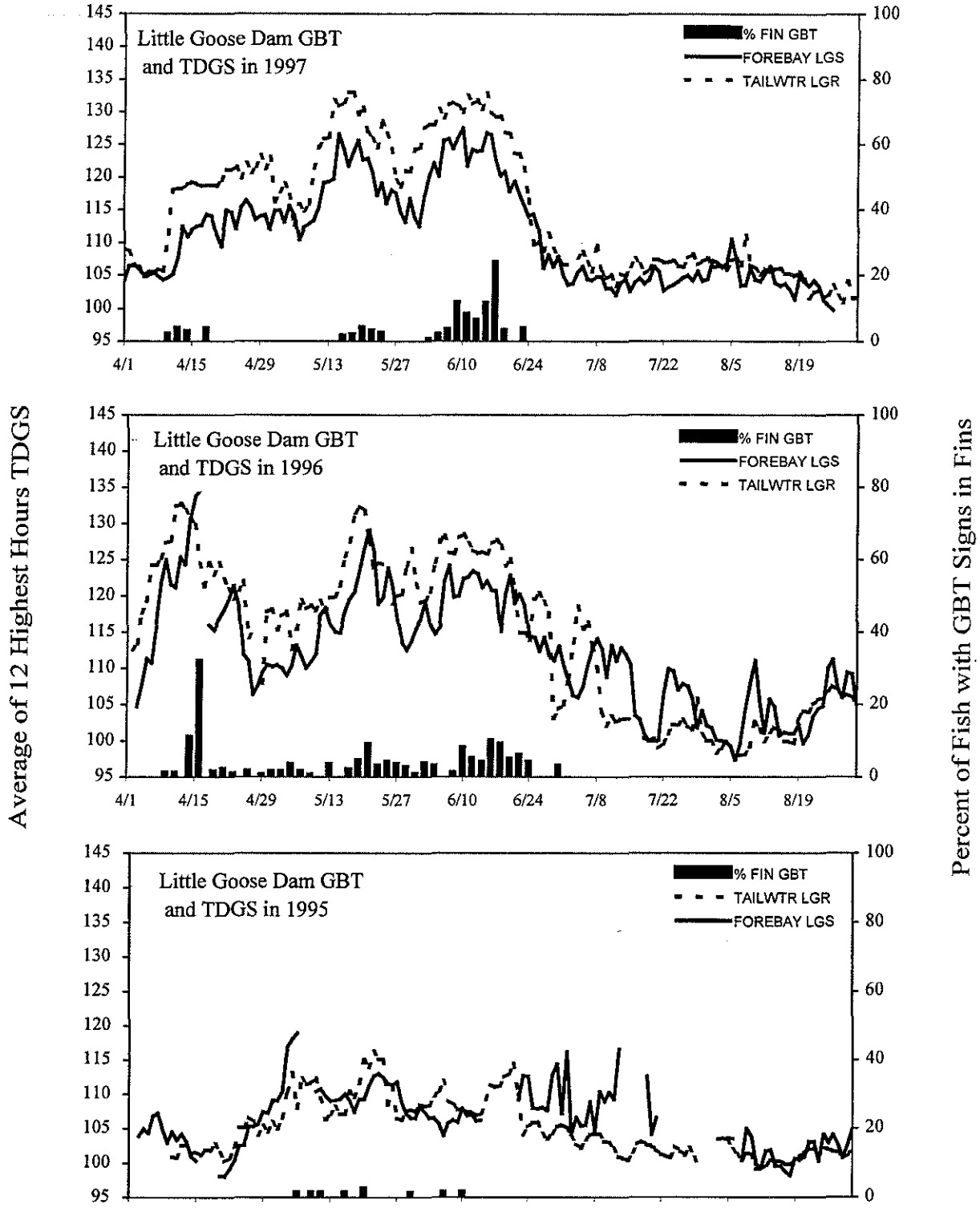


Figure 13. Data collected at Little Goose Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997

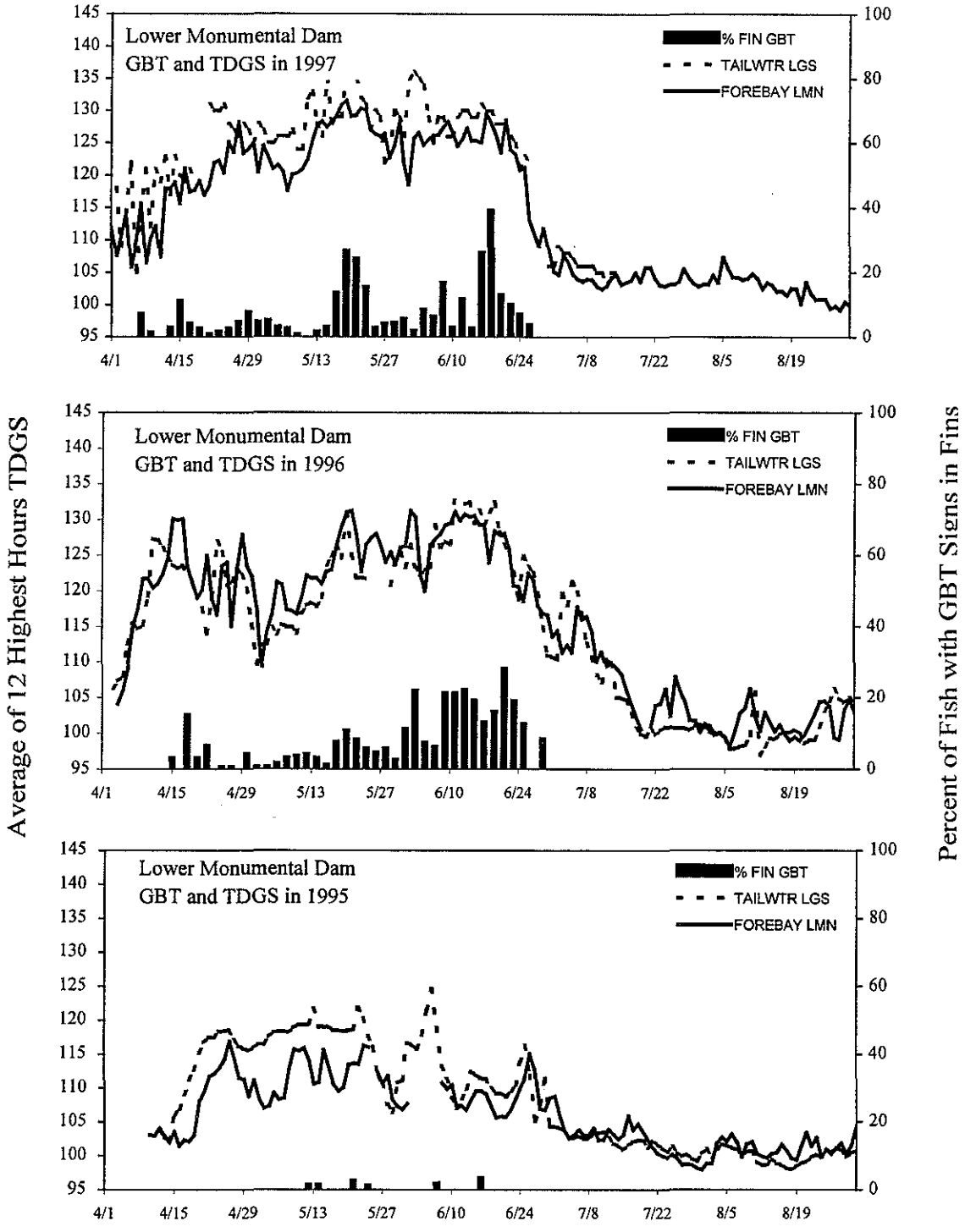
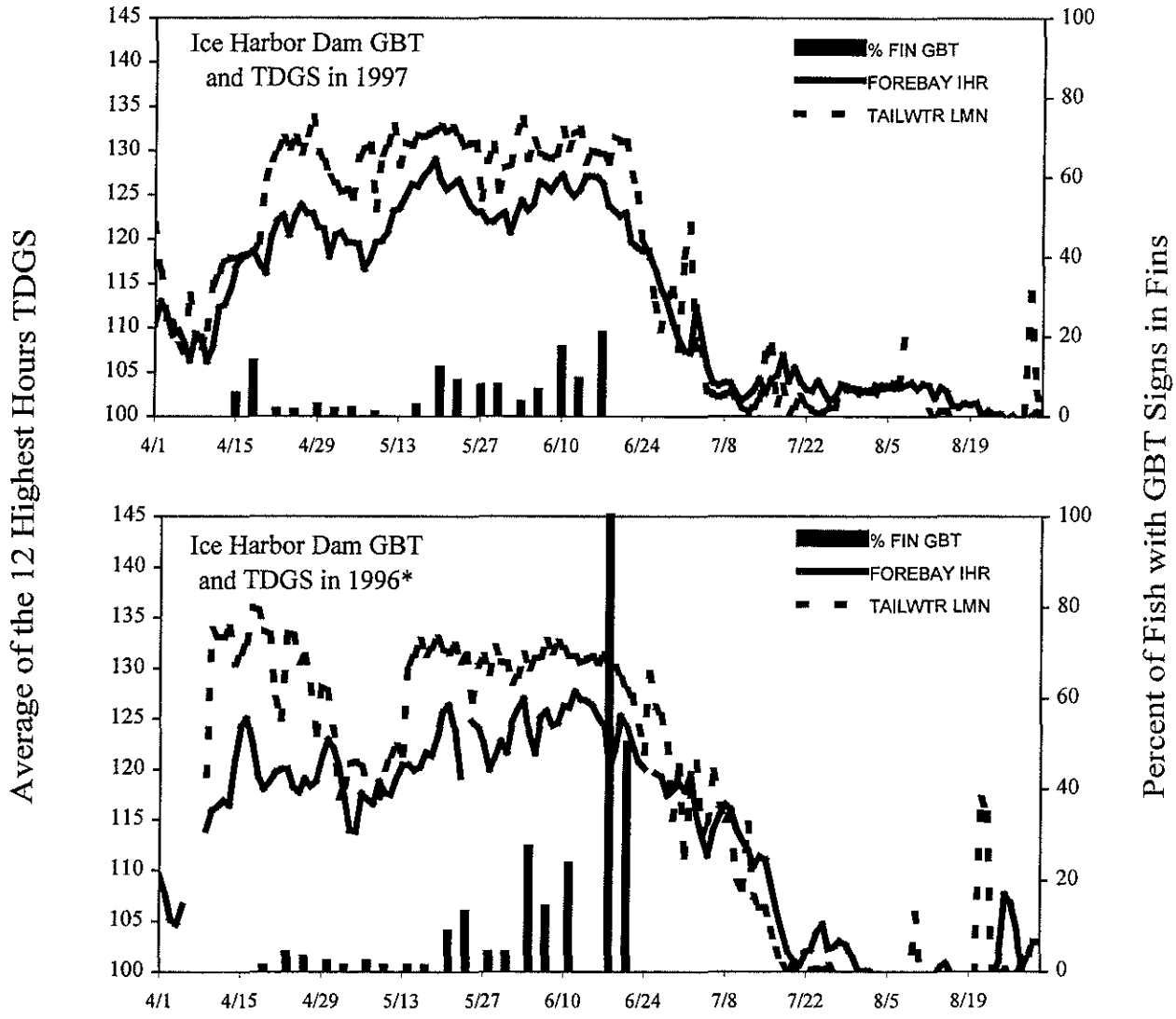


Figure 14. Data collected at Lower Monumental Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997.



*The last 2 GBT bars in the 1996 plot are based on small samples sizes(n = 2 and 18 for 6/18 and 6/21 respectively).

Figure 15. Data Collected at Ice Harbor Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997.

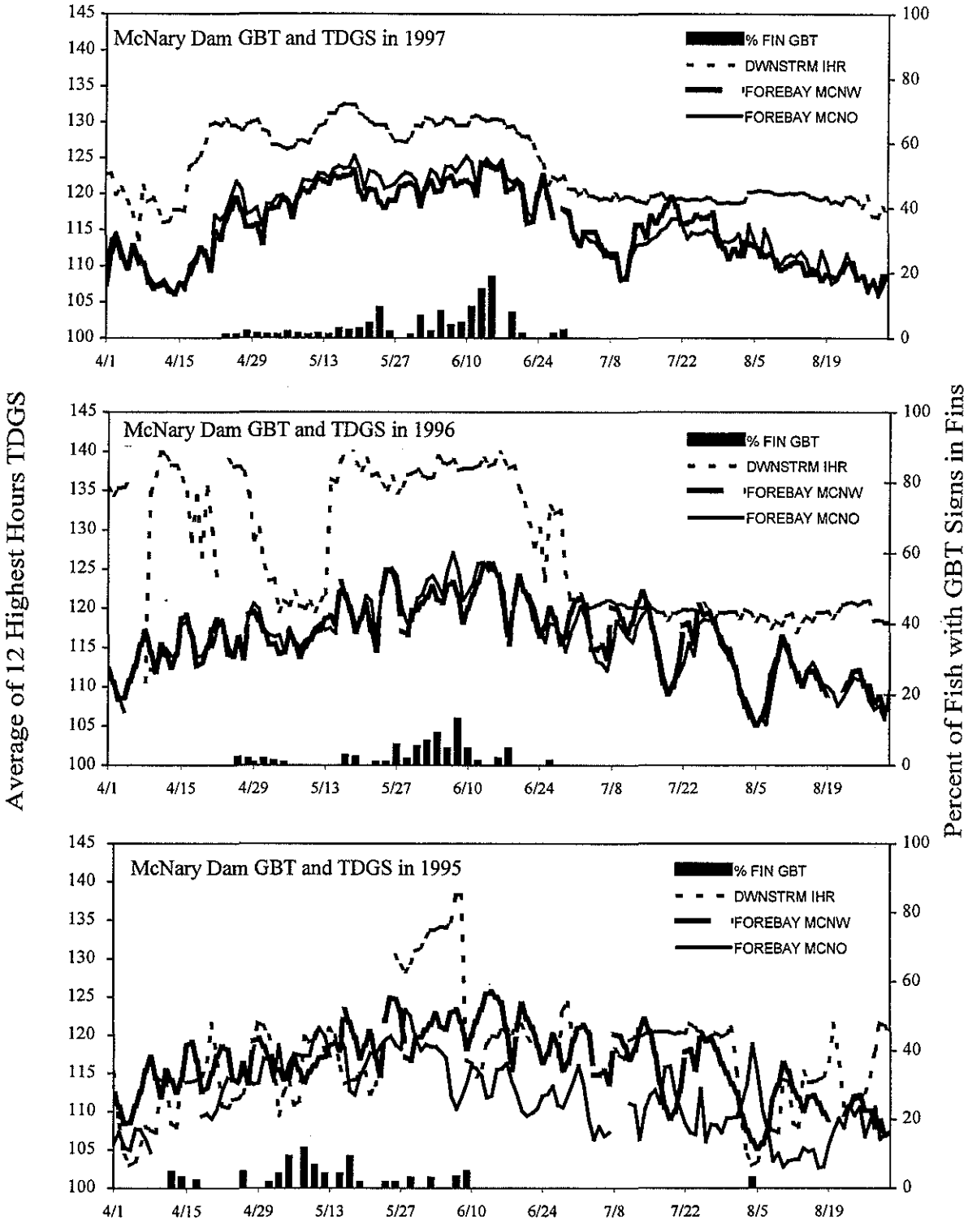


Figure 16. Data collected at McNary Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997.

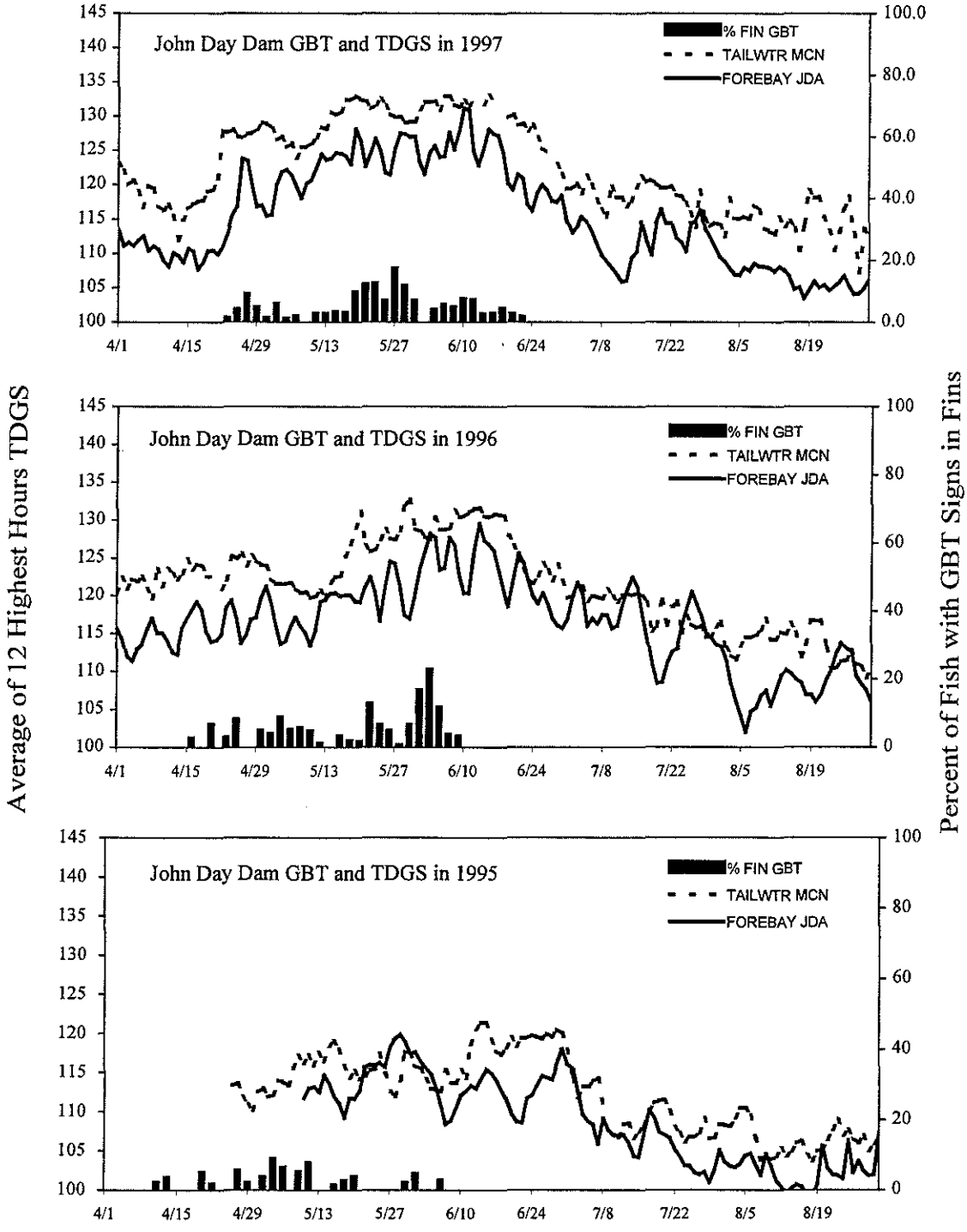


Figure 17. Data Collected at John Day Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997

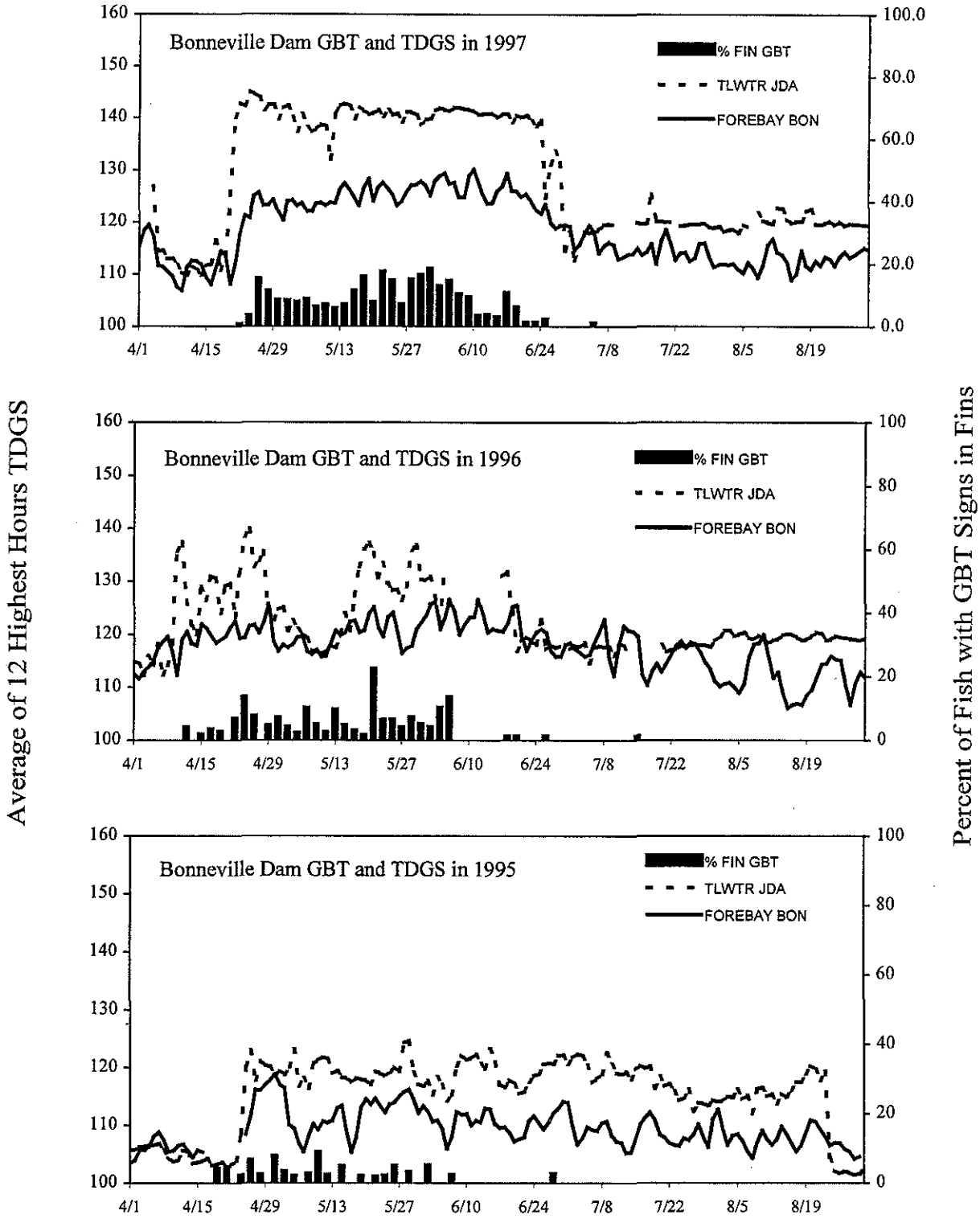


Figure 18. Data collected at Bonneville Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997.

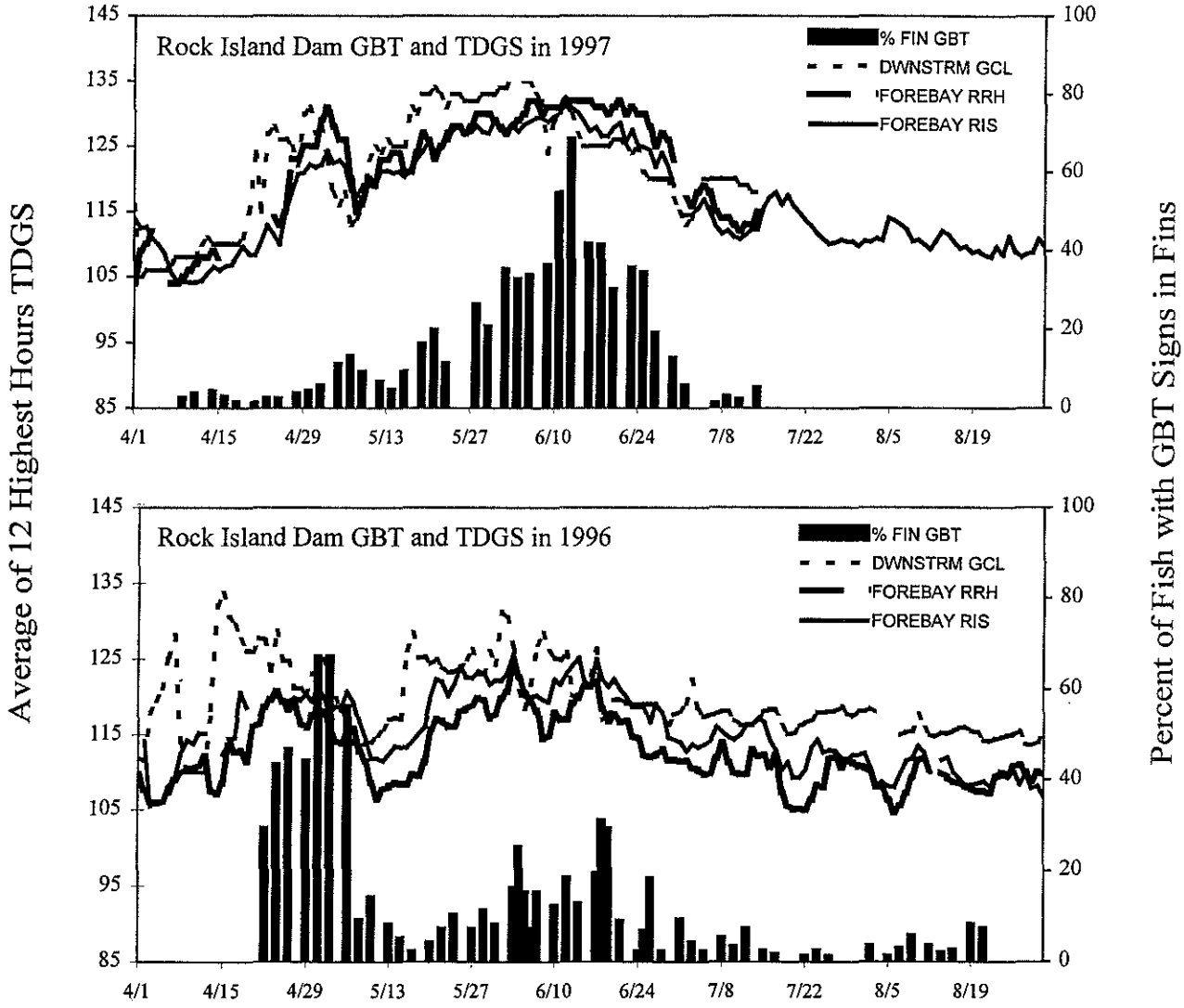


Figure 19. Data collected at Rock Island Dam from the smolt monitoring program for GBT presented with information on TDGS for 1995-1997.

Severity of GBT

In addition to the prevalence of signs of GBT in the migrating population, the SMP also records the incidence of severe signs of GBT. Laboratory research indicated that not only the prevalence, but also the severity of signs increases with the length of time exposed to high levels of TDGS. The incidence of severe GBT signs increased from 1995 to 1997 in juvenile salmonids examined at Lower Snake River and Lower Columbia River dams during the monitoring program. The table below summarizes the increase in severe signs observed during GBT monitoring at Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day and Bonneville dams.

Table 4. Summary of Fish with severe GBT at Lower Snake and Lower Columbia River sites.

	Juvenile salmonids		
Year	# Fish Examined	# Severe GBT	Percent
1995 (4X)	55,219	0	0.00
1995 (DS)	16,021	0	0.00
1996	38,925	47	0.12
1997	42,751	117	0.27

4X refers to the power of the magnifying lens used to examine fish in 1995
DS refers to fish examined with dissecting scope in 1995.

The number of days of TDGS greater than 120% and greater than 130% for the years 1995, 1996 and 1997 are summarized below. Five representative tailwater monitoring stations were used to calculate an index of the total number of days TDGS levels were greater than 120% from April 1 to August 31 and also number of days greater 130%. The COE monitoring sites used to calculate the index of high TDGS were Lower Granite Tailwater, Little Goose Tailwater, Ice Harbor Tailwater, McNary Tailwater, and John Day Tailwater. These sites are representative of the conditions in the Lower Snake River and the Lower Columbia River during the period when GBT monitoring occurred.

Table 5. The number of days when TDGS exceeded 120% and 130% at Lower Snake River and Lower Columbia River sites.[1]

	1997		1996		1995	
COE TDGS Monitor	**Days>120**	**Days>130**	**Days>120**	**Days>130**	**Days>120**	**Days>130**
John Day Tailwater	73	69	52	21	29	0
McNary Tailwater	77	33	91	12	4	0
Ice Harbor Tailwater[2]	80	22	105	66	20	16
Little Goose Tailwater	68	23	57	7	4	0
Lower Granite Tailwater	52	15	52	7	0	0
All Index Sites	**350**	**162**	**357**	**113**	**57**	**16**

[1]Approximate number of days based on graphs of COE TDGS data.
[2]Values for 1995 at Ice Harbor may underestimate total.

From the data, it was observed that during 1995 very few sites exceeded the State waiver limits for TDGS. The only exception was at Ice Harbor, where TDGS often exceeded the 130% level. Under these conditions, no fish were observed with severe signs of GBT. In 1996, there were significantly more violations of the State waivers due to the high runoff volumes experienced. Severe signs were observed in 0.12% of the fish observed. The water conditions in 1997 were even greater than those observed in 1996. This is demonstrated by adding the overall number of days at each site where the TDGS waiver was violated. The TDGS conditions experienced by fish in 1997 were more severe than those observed in 1996, as suggested by the table above. More days above 130% occurred at all sites in 1997 than in 1996, with the exception of Ice Harbor. In 1996, the Ice Harbor site contributed the bulk of the violations of the TDGS waiver. The more severe conditions experienced in 1997 are reflected by the higher occurrence of severe signs of GBT than were observed in other years. The increased incidence of severe GBT, where fish had bubbles in greater than 25% of a fin, was directly related to the increased number of days that TDGS levels exceeded 130% during the juvenile salmonid outmigration over these three years.

In summary, the 1997 GBT juvenile monitoring program again lends support to the conclusion that the 115/120% total dissolved gas spill program called for under the Biological Opinion is not likely to detrimentally impact migrating juvenile salmonids. Few signs are observed when flow and spill are controlled and management actions can be taken. The 1996 and 1997 data suggest that the monitoring program can detect changes in the prevalence and severity of signs, when they occur.

Adult Migrants

It is difficult to sample adult migrants for GBT in the Columbia and Snake rivers. Any form of adult sampling has significant impact on migration delay and potential mortality of fish. Consequently, the adult monitoring is conducted in conjunction with on-going research at the adult sampling facilities. Presently only Bonneville, Priest Rapids and Lower Granite dams are equipped with adult sampling facilities. A trap does exist at Ice Harbor Dam, but its operation has been shown to detrimentally affect adult migrants.

The adult salmonid GBT data are collected by the Columbia River Inter-tribal Fish Commission at Bonneville Dam, by the National Marine Fisheries Service at Lower Granite Dam and by the Washington Department of Fish and Wildlife at Priest Rapids Dam. The data are transmitted weekly to the FPC and are sent to the DEQ in-season. The frequency of monitoring is dependent on the on-going research activity. The data for the 1997-sampling season are presented in the table below. The daily information is available in Appendix 5.

Table 6. Summary of adult salmonid GBT monitoring for 1997.

Site	Species	# Fish Examined	# Fish with GBT Signs	Percent Signs
Bonneville	Chinook	1042	5	0.5%
	Steelhead	336	24	7.1%
	Sockeye	648	101	15.6%
Lower Granite	Chinook	6312	5	0.1%
Priest Rapids	Chinook	280	9	3.2%
	Steelhead	95	2	2.1%
	Sockeye	852	36	4.2%

Sockeye salmon collected at Bonneville Dam displayed the most significant signs of GBT in the system during 1997. The highest incidence of signs in these fish were observed during the first half of June when uncontrolled flow and spill were the highest levels observed this year. During this time period steelhead at Bonneville Dam were also showing increased incidence of signs of GBT. Signs of GBT in chinook at Bonneville Dam were surprisingly low. At the projects further up the river the signs of GBT in adult salmonids observed were lower than at the first project encountered. The Priest Rapids data were collected weekly beginning July 15 through August 12 and may reflect the later sample dates, when flow and spill had decreased substantially. The Lower Granite sample is only for chinook and is consistent with the lack of signs of GBT observed in chinook at Bonneville.

4. Update on Gas Bubble Research

The following section is meant to update the EQC regarding the preliminary findings of research conducted during 1997. The research studies presented are part of the NMFS Research Plan and are designed to address the critical uncertainties identified by the NMFS 1996 Gas Expert Panel. The goal of the research is to assure that the biological monitoring for gas bubble disease represents in-river fish and is suitable for measuring TDGS induced GBT signs. The research studies are grouped according to the specific objective of the NMFS Research Plan that they are designed to address.

Objective 1: Determine if there is a difference in the incidence and severity of signs of GBD between migratory fish in the reservoir and in the fish sampled through the Smolt Monitoring Program.

Research for Objective 1:

A. Field test juveniles exposed to TDGS. Expose juvenile salmonids to TDGS, release them upstream of the project, and recapture them in the smolt bypass system. Evaluate changes in incidence of GBD signs resulting from dam passage.

Randall F. Absolon and Earl M. Dawley
Fish Ecology Division, Northwest Fisheries Science Center
National Marine Fisheries Service

This study was designed to answer the question of whether gas bubble disease (GBD) signs change as a result of the hydrostatic conditions juvenile salmonids encounter when they enter the turbine intake of hydroelectric projects in their downstream migration. This question needs to be answered to substantiate the effectiveness of the current monitoring of juvenile salmonids for GBD signs, and implications this would have for river managers.

The 1996 study using hatchery steelhead was not as conclusive as we had hoped due to the length of time between release in the forebay and recapture at the juvenile facility. This year there were insufficient numbers of test fish available in the Snake River, so the study was conducted at John Day Dam using juvenile coho salmon. At this time, there are not sufficient numbers of PIT tag recorders in the lower river, so the survival part of the study could not be conducted. Coho salmon were available and approximate the size of juvenile chinook salmon.

The research objective was to determine whether juvenile coho salmon with laboratory-induced signs of GBD retain the same prevalence and severity of signs of GBD following passage through a turbine intake at John Day Dam.

Juvenile coho salmon were collected from the smolt monitoring facility at John Day Dam and by the gatewell dipnetting used to recapture marked fish. The only fish not used in the study were those that were severely injured or appeared to be near death at the time of collection. No other sorting of test fish occurred. Test fish were first PIT tagged to provide an unique identification number that was used to compare pre-release and recapture examination records. Circular tanks (1,114 L capacity) were used to hold test fish while they were exposed to dissolved gas supersaturation. After 48 hours exposure averaging 114.6% total dissolved gas saturation (TDGS), test fish were examined to quantify the severity of subcutaneous emphysema. Computer records were made for each fish prior to release and signs of GBD were videotaped. A NMFS designed release canister was used to release the test fish in front of Turbine Slot 8B. Gatewell dipnetting was conducted in Slot 8B to recapture test fish. Test fish were separated from the dip net catch based on the presence of the recent PIT tag scar. These fish were re-examined using the same technique as the pre-release exam. After re-exam, all test fish and all other fish collected in the dipnetting effort were allowed to recover from the anesthesia and were then released into the juvenile bypass conduit.

During tests, dissolved gas levels in John Day Dam Forebay ranged from 119 to 127% averaging 122.5% of saturation (Fish Passage Center weekly reports). The average time between release and recapture was 50 min. During that time, test fish that entered the gatewell had descended to a depth that produced a hydrostatic head pressure of about 3 atmospheres.

In the conduct of 12 tests replicated through time, we released 759 coho salmon in front of the turbine intake. At release, the mean prevalence of fish displaying GBD signs was 65% and the mean severity index was 1.7. From the gatewell, we dip netted a total of 372 of those test fish. At recapture, the mean prevalence of fish displaying GBD signs was 64% and the mean severity index was 1.6. There was no significant difference in prevalence or severity of GBD signs between fish released and fish recovered. Of the fish recovered through dipnetting, the severity of GBD signs decreased in 25%, remained the same in 59% and increased in 15% of the total.

Data analyses are continuing, and final conclusions from the two years of study are incomplete, but will be presented in the annual report to BPA in December, 1997.

B. Compare incidence and severity of GBD signs in juvenile salmonids collected from the reservoir (In-river sample) and in the fish sampled through the Smolt Monitoring Program (Bypass sample). All data and/or results are preliminary.

Thomas J. Backman
Columbia River Inter-tribal Fish Commission

Comparisons between smolts sampled in-river and at the Smolt Monitoring Program are based on data collected from April 20 to July 28, 1997. Research on juvenile salmonids was conducted at Lower Monumental reservoir and McNary reservoir. Data has been aggregated by statistical weeks (Sunday to Saturday).

Total GBT: Table 1 and 2 compares the total number of fish with signs of gas bubble trauma, regardless of the bubbles specific location (fins, operculum, lateral line etc.) on the fish, between samples.

Table 1: Lower Monumental – Total GBT

	In-river Sample		Bypass Sample			
Statistical Week	**Smolts Exam.**	**No. GBT (%)**	**Smolts Exam.**	**No. GBT (%)**	**Statistical Value[a]**	**Range of TDGS[b]**
4/20 – 4/26	393	4 (1%)	510	23 (5%)	10.56 **	**115** – 124%
4/27 – 5/03	659	9 (1%)	771	49 (6%)	25.34 **	121 – 126%
5/04 – 5/10	394	1 (0.3%)	572	16 (3%)	11.11 **	115 – 118%
5/18 – 5/24	262	52 (20%)	474	111 (23%)	1.26	125 – **131%**
Total	**1,708**	**66 (4%)**	**2,327**	**199 (9%)**		115 – 131%

Table 2: McNary – Total GBT

	In-River Sample		Bypass Sample			
Statistical Week	**Smolts Exam.**	**No. GBT (%)**	**Smolts Exam.**	**No. GBT (%)**	**Statistical Value [a]**	**Range of TDGS[b]**
4/27 – 5/03	39	2 (5%)	600	10 (2%)	-	**114** – 119%
5/11 – 5/17	285	12 (4%)	600	12 (2%)	3.35	120 – 124%
5/25 – 5/31	334	7 (2%)	404	11 (3%)	0.31	121 – 123%
6/01 – 6/07	355	9 (3%)	605	34 (6%)	5.40 *	121 – 125%
6/15 – 6/21	264	7 (3%)	318	39 (12%)	20.42**	122 – **125%**
6/22 – 6/28	679	2 (0.3%)	300	4 (1%)	3.31	117 – 123%
Total	**1,956**	**39 (2%)**	**2,827**	**110 (4%)**		114 – 125%

[a] based on results from a G-test, where $G_{0.05,1} = 3.84_{crit.}$
*represents a significant difference $P < 0.05$, α 0.05
**represents a highly significant difference $P < 0.01$,α 0.05
[b] represents 24-hour daily average, with high and low values for the week. Lower Monumental values provided by the Fish Passage Center.

GBT Fin Comparison: Table 3 and 4 compares the number of juvenile salmonids with signs of gas bubbles trauma specifically located in the fishes fins (caudal, anal and dorsal) only.

Table 3: Lower Monumental –Fin only

	In-river Sample		Bypass Sample			
Statistical Week	**Smolts Exam.**	**No. GBT Fin (%)**	**Smolts Exam.**	**No. GBT Fin (%)**	**Statistical Value [a]**	**Range of TDGS[b]**
4/20 – 4/26	393	3 (1%)	510	8 (2%)	1.26	**115** –124%
4/27 – 5/03	659	8 (1%)	771	41 (5%)	20.10 **	121 - 126%
5/04 – 5/10	394	1 (0.3%)	572	12 (2%)	7.40 **	115 –118%
5/18 – 5/24	262	51 (20%)	474	99 (21%)	0.21	125 –**131%**
Total	**1,708**	**63 (4%)**	**2,327**	**160 (7%)**		115 –131%

Table 4: McNary –Fin only

	In-River Sample		Bypass Sample			
Statistical Week	**Smolts Exam.**	**No. GBT Fin (%)**	**Smolts Exam.**	**No. GBT Fin (%)**	**Statistical Value [a]**	**Range of TDGS[b]**
4/27 – 5/03	39	2 (5%)	600	6 (1%)	-	114 – 119%
5/11 – 5/17	285	11 (4%)	600	8 (1%)	5.41*	120 – 124%
5/25 – 5/31	334	6 (2%)	404	4 (1%)	0.89	121 – 123%
6/01 – 6/07	355	6 (2%)	605	24 (4%)	4.19*	121 – 125%
6/15 – 6/21	264	4 (2%)	318	29 (9%)	17.89**	122 – 125%
6/22 – 6/28	679	0 (0.0%)	300	1 0.3%)	2.36	117 – 123%
Total	**1,956**	**29 (1%)**	**2,827**	**72 (3%)**		114 – 125%

[a] based on results from a G-test, where $G_{0.05,1} = 3.84_{crit.}$

*represents a significant difference $P < 0.05$, α 0.05

**represents a highly significant difference $P < 0.01$,α 0.05

[b] represents 24-hour daily average, with high and low values for the week. Lower Monumental values provided by the Fish Passage Center.

1997 GBT Severity

Rank 1 =≤5% fin occlusion
Rank 2 = 6% to 25% fin occlusion
Rank 3 = 26% to 50% fin occlusion
Rank 4 = >50% fin occlusion

Of the In-river smolts with GBT: 66% were of severity rank 1, 23% were severity rank 2 and 11% were rank 3 or higher.

Of the Bypass smolts with GBT: 70% were of severity rank 1, 23% were severity rank 2 and 7% were rank 3 or higher.

Note: Severity proportions do not include fish with signs in the lateral line, operculum, eyes and other non-fin areas (i.e., comparison is fin only).

Conclusions:

1) In-river juveniles consistently had fewer signs of gas bubble trauma when compared to fish sampled at down river SMP sites. Often, these differences were statistically significant.
2) When TDGS levels increase the number of fish with signs of GBT increases in both samples.
3) Juveniles sampled in-river and at the SMP sites had similar GBT severity ranks.

We are currently developing new methods to analysis this years field data. Work is being conducted on a variety of physical measurements (TDGS, Δ P, temperature, etc…) and biological measurements (species composition, travel time, exposure history, distribution, fork-length etc…) taken within the McNary and Lower Monumental reservoir.

Summary (abstract) of future research related to objective 1.

Until the next field season, we will continue to analyze the data, prepare a written report to the funding agency (BPA), and make oral presentations as requested. Next year we will select a dam(s) for comparison that is different from Lower Monumental and McNary, the target dams of

1996 and 1997 field research. In addition to sampling in the forebay of the selected dam(s), we will also propose to sample the tailrace area. Thus, we will expand the comparison to include pre and post dam in-river sampled fish with SMP collected data. We also plan on building a new purse seine to sample depths up to 40 feet, an improvement over our existing purse seine that samples within the upper 20 feet of the water column.

C. **Continue laboratory research on GBD signs, hydrostatic pressure and TDGS body burden.**

No research has been conducted relative to this objective.

Objective 2. Determine the progression of GBD signs as the result of exposure to TDGS and the relation between signs, health and survival of aquatic species indigenous to the Columbia and Snake Rivers.

Research for Objective 2:

A. Continue net pen field research correlating resident fish signs of GBD and mortality.

Earl Dawley
National Marine Fisheries Service
Coastal Zone and Estuarine Studies

Effects of Dissolved Gas Supersaturation on Fish Residing in the Snake and Columbia Rivers, 1997

Large amounts of spill at dams has commonly generated levels of dissolved gas supersaturation that are higher than established by state and federal water quality criteria for the Columbia and Snake Rivers. Large spill volumes are sometimes provided voluntarily to increase passage of migrating juvenile salmon through non-turbine routes. However, total dissolved gas supersaturation (TDGS) resulting from spill in past decades has led to gas bubble disease (GBD) in fish. Therefore, during the period of high spill in 1997, we monitored the prevalence and severity of gas bubble disease by sampling resident fish in Ice Harbor reservoir and downstream from Ice Harbor and Bonneville Dams.

We made non-lethal visual examinations of fish using 2.5- to 5-power magnification lenses to assess external signs of GBD (subcutaneous emphysema on fins, head, eyes, and body surface). Subsamples of 10 resident fish per week from each reach were examined more closely with 20-power magnification for gas bubbles in the lateral line, brachial arteries, and gill lamellae. Subsamples of resident non-salmonid fish species were held in pens for 4 days and then examined for prevalence and severity of GBD. Three types of pens were used: surface cages held at a depth of 0 to 0.5 m, deep submerged-cages held at a depth of 2 to 3 m, and large net-pens with a sloping bottom that extended from the surface to a depth of 4 m.

Below Ice Harbor Dam weekly samples of up to 100 salmonids were taken with purse seines and examined for external signs of GBD. Chinook salmon were more closely examined with a dissecting microscope for gas bubbles in the lateral line.

Gas Bubble Disease Signs in Resident Fish

Signs of GBD in fish were prevalent in Ice Harbor Reservoir, downstream from Ice Harbor Dam and downstream from Bonneville Dam. Twenty of the 27 species captured displayed signs of GBD. Between 29 April and 16 July, signs of GBD were observed in 8% of resident fish captured in Ice Harbor Reservoir; approximately 26% of these fish displayed severe signs (greater than 25% of a fin covered with emphysema or other body surfaces with emphysema). Total dissolved gas saturation levels did not exceed 130% and were in the mid-120% range for approximately 45 days ending in mid-June before dropping below 120%.

From 14 April to 29 July, signs of GBD were observed in 3.4% of resident fish captured downstream of Ice Harbor Dam; approximately 28% of these fish displayed severe signs. TDGS levels reached 133% and remained near 130% for about two months before dropping to approximately 120% and remaining there for the rest of the season. The incidence of GBD was lower this year than in past years despite the high spill levels. Recently installed flow deflectors in Ice Harbor Dam spillway ("flip-lips") substantially decreased TDGS levels.

From 14 March to 22 August, signs of GBD were observed in 7.0% of resident fish captured downstream from Bonneville Dam, about 33% of these fish displayed severe signs. TDGS levels reached 143.5% and remained near 130% for most of May and June before dropping to approximately 120%.

Gas Bubble Disease in Juvenile Salmonids

From 24 April to 10 June, signs of GBD were observed in 10.7% of the 738 juvenile salmonids examined for signs of GBD downstream from Ice Harbor Dam. These fish were captured mid-channel via purse seine and examined according to FPC protocols. Prevalence of GBD in fish examined at Ice Harbor Dam, 5.2%, was consistently less through the period of high dissolved gas than in cohorts traversing the 15 km reach downstream from the dam.

From 14 March to 22 August, we examined 1,003 juvenile salmonids for signs of GBD downstream from Bonneville Dam; only six displayed signs of GBD. The majority of salmonids (98.5%) were captured from 14 March to 23 March when daily average TDGS did not exceed 117%.

Gas Bubble Disease in Captive Fish

The three species (smallmouth bass, yellow perch, and peamouth) of resident non-salmonid fish used for the net-pen studies were taken from the river and often had signs of GBD at introduction to the pens. After 4 days of holding, GBD signs among the captive fish usually persisted and generally showed an increase in prevalence.

Upstream from Ice Harbor Dam, fish held in the 0- to 4-m pen showed increases of external GBD signs in 5 of the 17 holding periods; prevalence of external GBD signs ranged from 0 to 25.5%. When prevalence of external GBD signs increased, mortality ranged from 4.0 to 19.4%.

Downstream from Ice Harbor Dam, fish held in the 0- to 4-m pen showed increases of external GBD signs in 19 of the 24 holding periods; prevalence of external signs ranged from 0 to 59.1%. When prevalence of external signs of GBD increased, mortality ranged from 0.9 to 57.1%.

Model of Gas Bubble Disease Impacts

Our original research goal was to use data collected over multiple years to develop a model to estimate GBD induced mortality based on measured dissolved gas levels from the Columbia River Operations Hydro-met System. However, because dead fish can rarely be recovered from the river, it was necessary to use captive fish to assess mortality. Our first step in developing the model was to analyze the relationship between external GBD signs and TDGS exposure of resident fish. The second step was to establish the relationship between external GBD signs and mortality based on data from the 0-4 m net-pen holding experiments.

In an iterative process using 1994, 95, and 96 GBD signs data and TDGS measurements, we developed a mathematical equivalence for TDGS exposure duration and level, termed the exposure index (EI) that correlated well with prevalence of GBD signs. The relationship was best described by the second-order polynomial regression:

$$\%\text{GBD signs} = 0.05(EI)^2 \times 0.21(EI) + 0.62], R^2 = 0.79.$$

Based on the large amount of data from multiple locations utilized to formulate this regression, and the reasonably good coefficient of determination, we accept this model as a reasonably accurate predictor of external GBD signs given any specific 7 day dissolved gas exposure.

Unfortunately our ability to predict mortality from 1994, 95, and 96 captive fish data was poor. There was no clear correlation between external GBD signs and mortality in captive fish when data from all species were combined. However, when the data were separated by species (smallmouth bass, yellow perch, and peamouth), a stronger correlation was produced, but the increase was not statistically significant. In 1997, we focused our sampling and net-pen holding efforts on these three resident species to strengthen the previous data set. Our focused efforts did not yield a mortality model that was statistically significant for any of the three species nor a promising direction in which to pursue a mortality model.

Recommendation

We believe that it is unnecessary to continue sampling and holding resident fish to evaluate the effects of TDGS in the three reaches evaluated in this study (Priest Rapids/Hanford, Ice Harbor, and downstream from Bonneville). When TDGS levels are held below 120% GBD signs are virtually non-existent in resident fish and when they exceed 120%, the model relating TDGS to GBD signs will reliably predict the extent to which resident fish display external GBD signs. Evaluating mortality sustained due to TDGS has proven more difficult, and after 4 years of data collection, we believe that it is not feasible to develop a general model. A similar lack of correlation between GBD signs and mortality of juvenile salmonids was observed in studies by Biological Resources Division researchers (Matthew Mesa, USGS, BRD, Columbia River Research Lab., Cook WA 98605, Pers. commun., November 1997). We speculate that the variables that compromise model development include changes in tolerance related to species, individual variability, temperature, depth, and lateral distribution in the river reaches.

B. Laboratory studies correlating TDGS exposure and GBD signs with mortality of juvenile and adult salmonids and sublethal effects.

Matthew Mesa, Lisa Weiland, and Alec Maule
USGS-Biological Resources Division
Columbia River Research Laboratory

We conducted experiments to assess the progression of gas bubble trauma (GBT) and the relation of GBT signs to mortality from 13 May through 30 July 1997. Sampling and examination procedures were the same as those of previous years, and consisted of assessing GBT in the lateral line, fins, gills, opercles, mouth and eyes. All trials were conducted at 12°C. A total of 6 trials were completed using juvenile spring chinook salmon (*Oncorhynchus tshawytscha*), with two trials conducted at 112% total dissolved gas (TDGS), three trials at 120% TDGS, and one trial at 130% TDGS. We also completed 10 trials using juvenile steelhead *(O. mykiss)*, with five trials each conducted at 120% and 130% TDGS. For this document, we will report on data from the lateral line, fins, gills, and cumulative mortality.

Chinook salmon experiments

112% TDGS: We conducted two trials at 112% TDGS, examining a total of 248 live fish; both trials lasted 22 d. There were no mortalities, and mean occlusion of the lateral line with gas bubbles never exceeded 1% of the length of the lateral line. Prevalence of lateral line bubbles was low, most commonly below 15%. Average severity ratings of GBT in the fins (combined dorsal, anal, and caudal) was low during the first 12 d, but then increased to peak values of about 0.3-0.4 during the remaining 10 d. This sign of GBT also was quite variable among individuals. Prevalence of fin bubbles was low to moderate, ranging from about 12-50% of a sample. Gill bubbles were virtually non-existent during both trials.

120% TDGS: Although we conducted three trials at 120% TDGS, we noted during one of them (our third) that fish were moderately infected with bacterial kidney disease. Therefore, we will report on data from our first two trials only. During these trials, which lasted about 100 and 140 h, we examined a total of 228 live fish. Cumulative mortality during the two trials differed substantially. For the first trial, mortality began about 44 h after exposure to TDGS and increased rapidly during the next 56 h, eventually reaching about 60% mortality after 100 h. For the second trial, mortality was very low until about 90 h and then increased gradually, eventually reaching about 30% mortality after 144 h. During both trials, mean lateral line occlusion increased gradually, reaching about 25-40% occlusion after 80-100 h. Prevalence of lateral line bubbles was high, being 80-100% for most sample periods. Average severity of GBT in the fins also increased gradually in both trials, reaching ratings of about 1-2 after 80-100 h. Fin bubbles were moderately to highly prevalent, occurring in more than 60% of the fish during most sample periods. The mean number of gill filaments occluded with bubbles was low during the first 60 h, increased somewhat thereafter, but was highly erratic. Peak values averaged around 15 filaments affected. Prevalence of bubbles in the gills was low (< 40%) during the first 70 h, but then increased to about 50% or more of a sample during later periods.

130% TDGS: We conducted one 8 h trial at 130% TDGS, examining 64 live fish. Cumulative mortality exhibited a sigmoid shaped curve and reached 50% mortality at about 8 h. Mean occlusion of the lateral line increased steadily during the trial, reaching a peak of about 50% of the length of the lateral line after 8 h. Bubbles in the lateral line were common, with

prevalence being 100% for all sample periods except the first. Mean severity of GBT in the fins also increased gradually, reaching a peak rating of about 0.8 after 7 h. The prevalence of bubbles in the fins mirrored the trend observed in severity, gradually increasing from about 10% at 1 h to 80% at 8 h. The mean number of gill filaments with gas bubbles was zero for the first 4 h, but then increased rapidly thereafter to an average of about 30-40 filaments affected. Prevalence of gill bubbles was low for the first 5 h, but peaked at about 60% of a sample during hours 7 and 8.

Steelhead experiments

120% TDGS: We conducted five trials at 120% TDGS, examining live 148 fish. The trials lasted from 48-100 h. Because these fish were significantly larger than the chinook salmon we used--which led to problems with loading density--sample sizes were reduced from 8 to 4 fish per time period. Mortality varied considerably among the trials. For example, during one trial mortality started at about 24 h post-exposure and continued rapidly before killing about 100% of the fish by 50 h. In contrast, another trial had a very low and gradual progression of mortality, reaching only 30% mortality after 100 h. The other trials fell in between these extremes. Mean occlusion of the lateral line was extremely variable during all trials, but never exceeded 10% on average. Prevalence of lateral line bubbles, however, was moderate to high (i.e., > 50%) for most sample periods. Severity of bubbles in the fins was also highly variable, but generally increased during the trials before reaching ratings of about 1.0 after 50 h. Bubbles in the fins were common, with most trials showing 70-100% prevalence during most sample periods. The mean number of gill filaments with bubbles, like most of the data from these experiments, was highly variable. Peak values ranging from 20-30 filaments affected were reached after 40-50 h in some trials, but definite trends were difficult to discern. Prevalence of gill bubbles was also variable, with most sample periods being less than or equal to 50%.

130% TDGS: We conducted five trials at 130%, examining 188 live fish. These trials lasted from 7-11 h. Cumulative mortality was variable among the trials, but not to the extent of that seen during the 120% TDGS trials. In one trial, mortality started at 3 h and increased rapidly before reaching a peak of about 70% mortality after 7 h. For the other trials, mortality started at about 5 h and increased gradually before reaching peaks of about 50% mortality after 9-11 h. Mean occlusion of the lateral line showed relatively little variation, gradually increasing to values of about 10-20% of the length of the lateral line by 9-10 h. Prevalence of lateral line bubbles was high, commonly being 100% for all sample periods except the first two. Severity of GBT in the fins was more variable, but generally increased after 4 h to ratings ranging from 0.2-1 after 9-10 h. Prevalence of fin bubbles was low during the first 4 h (about 25%), but then increased to values greater than 60% for most of the remaining sample periods. The mean number of gill filaments occluded with bubbles was low (< 10) during the first 8 h, but then increased to values of about 20-50 during the last few hours of most trials. Prevalence of gill bubbles was variable, ranging from 25-100% of a sample during the trials.

Conclusions

Our research is making substantial contributions to a biologically sound monitoring program and ongoing field research. We believe our results can be useful when trying to assess the severity of dissolved gas supersaturation exposures in juvenile salmonids in the wild. Our work clearly shows that GBT is a progressive trauma; that is, many of the signs of GBT become progressively worse over time. In addition, we feel it is important to use both prevalence and severity of GBT signs to assess the relative severity of TDGS exposure and provide an "early

warning" of potentially lethal exposures in the field. To date, we have been unable to discern any definite relations between GBT signs and the potential for mortality. We believe this is in part due to the mechanism of bubble development in the gills and the extreme individual variation in susceptibility to GBT.

Future research

Future research at our laboratory will be directed toward further examination of the progression of GBT signs in steelhead, the potential effects of activity on GBT development, the rate of disappearance of GBT signs, and the effects of GBT on pathogenic disease resistance and stress responses in juvenile salmonids.

C. Assess survival of fish exposed to TDGS and released to the river.

See Objective 1A.

D. Investigate the cause of headburns.

Head Burn and Gas Bubble Disease

Gary Fredricks
National Marine Fisheries Service

The affliction of adult salmonids known as head burn was defined by Elston (1996) as an "exfoliation of the skin and underlying connective tissue of the jaw and cranial region of salmonids". Head burn has been noted in Columbia River salmon for many years. However, it drew little attention until recently when large scale controlled spill programs began in response to efforts to recover Endangered Species Act listed Snake River salmon. Observers, critical of dissolved gas levels higher than state standards, pointed out that bubbles that form under the skin as a result of gas bubble disease (GBD) could cause the skin to more easily abrade or slough off and cause fish to exhibit the signs of head burn. This opinion seemed to be supported by the observation that the prevalence of head burn appeared to be correlated with high spill and river flow. There was, however, no explanation why fish only exhibited skin exfoliation on the head when GBD signs are typically exhibited on fins, head and other body surfaces.

Head burn was considered by the Gas Bubble Disease expert panel conducted by NMFS in 1995. While none of the panel members could explain the absence of other GBD signs in fish with head burn, they could not rule out the possibility that head burn was caused by gas bubble disease. When asked to rank the importance of investigating head burn as a result of GBD, many panelists rated it low (not believed to be related to gas bubble disease) (Summary Report, 1996). After consideration of review comments by these panelists and other regional fishery experts, the NMFS's Gas Bubble Disease Research Plan stated "Head burn studies were assessed as a low priority by most reviewers. This issue remains an important problem for adult salmonids, particularly during periods of high flow and spill. Individuals knowledgeable in the field of gas bubble disease research indicate that this trauma is likely not a sigh of GBD. Its cause, however, remains unknown. This work will not be conducted under the GBD Research Plan."

Efforts to address the cause of head burn were transferred to the Corps' Fish Passage Operations and Maintenance (FPOM) Coordination Team. A workshop held on January 22, 1997, addressed the current knowledge regarding head burn. Several observations were discussed, the most important of which were probably observations by biologists and physiologists at the dams and hatcheries. In discussing examinations of head burn fish at the dams or at the hatcheries, it was pointed out by several examiners that none of these fish had the typical signs of GBD. In one case it was noted that a high percentage of radio tagged fish that exhibited head burn were known to have fallen back through a dam at some point in their migration to Lower Granite Dam. One fish in particular was known not to have head burn when first examined at Lower Granite Dam but when the same fish was caught a second time in the ladder (after falling back) it had a head burn. This fish did not exhibit typical GBD signs. It became clear from the discussions at this workshop that there were several possible causes of head burn including skin abrasion, sunburn, dissolved gas supersaturation and bacterial or fungal pathogens. Several of the workshop participants pointed out that head burn, as observed at the dams and hatcheries, is not a typical sign of sunburn, pathogen infection or gas bubble disease. While the exact cause of head burn remains unknown, it does appear that the evidence is leaning towards an abrasion injury perhaps resulting from fallback through a dam.

The majority of head burns have been noted on adult salmon examined at the Lower Granite Dam adult trap. The percentage of headburn observed at this dam in 1993 through 1997 was 9.8, 5.2, 6.4, 4.8 and 9.6 percent, respectively. Average combined spill at the lower Snake dams during the month of May (when most head burns are reported) during each year was 30.8, 18.7, 25.7, 47.8 and 70[1] thousand cubic feet per second, respectively. While comparing average spills may not be the best way to assess the importance of spill and resultant dissolved gas levels on prevalence of head burn, this comparison does indicate that the prevalence of head burn was much lower in the highest spill years (when dissolved gas is relatively constant and well above 120%) than would be expected if dissolved gas was the main causative agent.

Head burn monitoring will continue in 1998. Pending available funding and the presence of head burn, physiological examinations will be proposed for adults passing Lower Granite Dam. Details regarding these actions will be discussed in sessions of the Corps' FPOM Coordination Team prior to the 1998 fish passage season.

Literature Cited:

Elston, R. 1996. Investigation of Head Burns in Adult salmonids. Phase 1: Examination of fish at Lower Granite Dam, July 2, 1996. 12 p. Final report prepared for the Bonneville Power Administration. Contract number 96AP95973.

Summary Report; Panel on Gas Bubble Disease. 1996. Northwest Fisheries Science Center, Seattle, Washington. April 1996.

[1] Preliminary estimate for 1997.

Objective 3. Describe the migratory distribution of juvenile and adult salmonids, particularly with respect to vertical distribution in the reservoir and relate fish distribution to the distribution of TDGS.

Research for Objective 3:

A. Determine the lateral and vertical distribution of migrants in relation to plume and TDGS.

1) John Beeman
USGS - Biological Resources Division
Columbia River Research Laboratory

The following information is from a study entitled *Gas bubble research and monitoring of juvenile salmonids* which is funded by the Bonneville Power Administration (BPA study # 96-210). More specifically, this information is from Objective 1: *Vertical and horizontal distribution of individual juvenile salmonids based on radiotelemetry*. The information contained in this letter is preliminary and is from the first year of a planned 2-year field effort.

The general study design was to implant juvenile hatchery steelhead and chinook salmon with pressure-sensitive radio transmitters. At sunset the fish were released in the Ice Harbor Dam tailrace (approximately 1.0-1.5 km below the dam) and their vertical and horizontal movements were recorded once per hour as they migrated to McNary Dam 67.5 km downstream. The date, time, fish spatial location, fish depth, water depth, water temperature, barometric pressure, and total dissolved gas pressure were recorded each time a tagged fish was located by boat in the reservoir. Secchi disk information was collected beginning 12 May.

Nine releases of juvenile steelhead were made from 22 April through 30 May for a total of 45 fish released. A total of 21 juvenile chinook salmon were released over nine dates between 03 May and 01 June. Juvenile steelhead were located 520 times with a median of 11 times per fish (range 1-37). Juvenile chinook were located 498 times with a median of 20 times per fish (range 2-66).

The median depths of tagged juvenile steelhead and chinook salmon were 2.6 m (range 0-11.4 m) and 2.0 m (range 0-12.6 m), respectively. Median total dissolved gas at steelhead and chinook salmon locations was 120% (range 113-132%), resulting in a median compensation depth of 2.0 m. Sixty-one percent of the steelhead locations and 44 % of the chinook salmon locations were below the compensation depth.

The migrations between the Ice Harbor Dam tailrace and McNary Dam forebay of fish released before 17 May appeared direct, without evidence of "holding" at any time. However, many fish released after 17 May entered shallow-water areas near Wallula Gap where they remained for several days prior to migrating to McNary Dam. This change in behavior reduced the depths of tagged chinook salmon, but not steelhead. The median depth of chinook salmon released before 17 May was 2.6 m, whereas those released afterwards had a median depth of 1.8 m. Tagged juvenile chinook salmon released after 17 May were below the compensation depth in 39% of fish locations, compared to 60% for those released earlier. Median depths of steelhead during these periods were 2.3 m and 3.1 m, respectively.

The travel times of tagged fish released after 17 May were greater than those released earlier. Median travel times increased from 34.4 h for juvenile chinook salmon released before 17 May to 56.2 h for those released afterward. This result was heavily influenced by two

individuals released after 17 May with travel times of 101 h and 174 h. Juvenile steelhead median travel times increased from 34.9 h for fish released before 17 May to 52.6 h for those released after 17 May.

Results from 1997 research indicate tagged juvenile steelhead were below the compensation depth in most instances. The median depth of tagged juvenile chinook salmon released after 17 May was lower than fish released earlier, resulting in a lower proportion of locations below the compensation depth. The combination of decreased depths and increased travel times of juvenile chinook salmon released after 17 May increased their risk of gas bubble disease by increasing the time and severity of exposure to water with high total dissolved gas.

There are limitations in the current data set. The probability of locating tagged fish is inversely proportional to their depth. Tagged fish at depths greater than approximately 12 m are below reasonable limits of detection and do not contribute to the data we collected. In addition, a small number of tagged fish were released. We collected repeated measurements from a relatively small number of individuals rather than a few measurements from a large number of individuals. The strength of this method is in its ability to produce exposure histories of individuals. These limitations should be considered when evaluating these data.

Future planned research will be similar to work in 1997. In 1998 juvenile chinook salmon and steelhead will be tagged and released as in 1997. However, we plan to begin releases earlier in 1998; 1997 work was delayed while waiting for ESA permits. Work may be altered to release fish closer to or above Ice Harbor Dam to collect data from the area of the stilling basin. Differences in projected spring flows between 1997 and 1998 may extend the sampling season in 1998.

Evaluation of Horizontal and Vertical Distribution of Juvenile Salmonids in the Lower Snake and Columbia Rivers In Relation To Total Dissolved Gas

2) Dennis W. Rondorf and Dan H. Feil
USGS- Biological Resources Division
Columbia River Research Laboratory

Summary of 1997 Research

Hydroacoustic surveys were conducted between 7 May and 24 July 1997 at three different sites in McNary Reservoir to assess the horizontal and vertical distribution of juvenile salmonids. Vertical distribution of outmigrating juvenile salmonids is of interest, particularly above the compensation depth (approximately 1 m of depth for every 10% over 100% TDGS saturation), due to the potential for development of gas bubble trauma (GBT). Total dissolved gas supersaturation levels were also monitored at ten sites throughout McNary Reservoir to provide compensation depths for prevailing TDGS levels at particular sites in the reservoir. TDGS levels ranged from 102-129% saturation throughout the season. Preliminary analyses of hydroacoustic data collected 15-17 May 1997 at three points along a cross-sectional transect (opposite shores and center of reservoir) revealed that fish detected during daytime surveys were distributed nearer the surface than fish detected during nighttime surveys. Generally, daytime surveys showed that >20% of the detected total fish abundance was at or above the compensation depth for prevailing TDGS levels (120-127%, 2-2.5m). However, during nighttime surveys, <20% of the detected total fish abundance was at or above the compensation depth for prevailing TDGS levels. Preliminary analyses of mobile hydroacoustic data collected 7-9 May 1997 along

cross-sectional transects also revealed that fish detected during daytime surveys were distributed slightly nearer the surface than fish detected during nighttime surveys. During mobile daytime surveys, 13% of the detected total fish abundance was at or above the compensation depth for prevailing TDGS levels (121%, 2.0m). During mobile nighttime surveys, only 7% of the detected total fish abundance was at or above the compensation depth. Further analyses of hydroacoustic data will provide information critical to assessing the percentage of the smolt population at risk to exposure to supersaturated TDGS levels near the surface of reservoirs.

Summary of 1998 Research

A Final Proposal for 1998 research relating to this project (GAS-P-97-1) has been submitted to the U.S. Army Corps of Engineers. However, at this time, funding for this project in 1998 has been terminated.

Objective 4: Determine the physical characteristics of dissolved gas throughout the hydrosystem under specific spill and flow regimes.

Research for Objective 4:

A. Determine the TDGS distribution downstream from spill.

Rock Peters
U.S. Army Corps of Engineers
Environmental Resources CENWP-PE-E

Summary for 1997 Field Sampling

Water quality field sampling for the Dissolved Gas Abatement Study began in February for the 1997 sampling season and continued until late August. Near –field studies that were directed at evaluating operational and structural alternatives were conducted during February at Bonneville and McNary dams. Whole-pool studies began in April and continued through the fish spill season. The sampling schedule is shown below. This schedule resulted in approximately 375,000 observations of water temperature, total dissolved gas pressure, and dissolved oxygen concentration. Other parameters include depth of sample, specific conductance, and pH.

Sample Set	Sampling Date	Stations
McNary Dam	Feb. 11-13	29
Bonneville Dam	Feb. 18-19	31
Lower Granite Pool	Apr. 2-16	13
Little Goose Pool	Apr. 2-16	20
Lower Monumental Pool	Apr. 2-16	19
Ice Harbor Pool	Apr.23 – May 2	22
NcNary Pool	Apr. 23 – May 2	28
John Day Pool	May 16 – 23	38
Little Goose Pool	June 4-13	17
Lower Monumental Pool	June 4-13	17
The Dalles Pool	June 19-30	18
Bonneville Pool	June 19-30	18
Tidal pool	July 1-30	31
John Day pool	Aug. 6-21	31

Initial data review revealed obvious variations in total dissolved gas (TDGS pressures for the different river reaches as well as time lags between stations that were related to water travel time. In general, the highest concentrations occurred immediately below the dams varying from 130% to 160% saturation in the tailwater areas depending upon project operation. Peak TDGS values resulting from high spill volumes could be traced and the spill hydrographs recorded at stations distributed along the rivers. Degassing and mixing occurred rapidly in the first 1000 feet below the dams resulting in 100% to 142% in the downstream reaches. The downstream pool reaches were generally characterized by relatively slow degassing (approximately 0.1% per mile) and mixing processes. As noted in past years, extreme water quality gradients existed laterally and longitudinally with minimal changes vertically. TDGS dynamics were related to project operation, wind, temperature, and community metabolism. Daily diel fluctuations related to solar cycles were frequently evident as well as operational changes.

Planned sampling for the 1998 season should include three near-field studies and approximately four to six whole pool studies. The near-field work will be conducted at Ice Harbor Dam to describe TDGS dynamics following deflector installation for both high and low flow conditions and at Little Goose Dam to investigate mixing and entrainment effects on TDGS. The additional pool studies will be conducted as needed to finalize data needs for the DGAS numerical modeling effort.

Objective 5. Determine whether the protocol and the examination techniques used in the GBD monitoring program optimize the detection of GBD signs demonstrated to affect fish health and survival, while minimizing impacts to juveniles and populations.

Research for Objective 5:

A. Evaluation of monitoring protocols.

Jerry McCann
Fish Passage Center

The Gas Bubble Expert Panel identified several critical questions/assumptions related to the protocols of the GBT monitoring program. Those questions related to the examination protocol are listed below.

1. Clinical signs do not change upon collection.
2. Sites are representative.
3. Sample size is adequate.
4. The relative significance of signs is known.

Additionally, within the framework of the NMFS research plan, these question were framed as follows:

> Determine whether the protocol and the examination techniques used in the GBT monitoring program optimize the detection of GBT signs demonstrated to affect fish health and survival, while minimizing impacts to juveniles and populations.

Much of the uncertainty related to these questions has been answered by recent research or has been addressed in the design of the sampling protocol.

Fish Examination Protocol

The GBT monitoring protocol was developed cooperatively by members of the GBT technical working group (presently the Dissolved Gas Team (DGT)). The examination protocol was developed based upon research conducted at the USGS-BRD Cook, Washington laboratory where the relationship between external signs of GBT (e.g. bubbles in fins, eyes and lateral lines) and internal signs (gill emboli) and the onset of mortality in the study fish. A summary of research conducted to date regarding the significance of GBT signs used for monitoring are presented as part of this document. Based upon their research, which showed a relationship between the development of fin signs and the onset of mortality, the monitoring program began to emphasize the examination of fish for fin signs in 1995. The relationship between the prevalence of any signs versus the point at which a group of fish would experience mortality was shown to be most clear when fin signs were correlated with the onset of mortality. In the monitoring program, other data has been collected, such as lateral line occlusion and the presence of other external bubbles. However, the NMFS action criteria and, therefore, the reporting of the data have emphasized the fin signs.

The use of gill lamellae bubbles were also considered for use in monitoring. Experimental examinations of gill lamellae were conducted at McNary Dam and Bonneville Dam in 1996 (Montgomery Watson 1996). The researchers examined 477 fish that had been previously examined by regular GBT monitoring personnel. Only two fish showed gill bubbles while 21 showed fin signs and three others showed lateral line signs. This study demonstrated that compared to gill bubbles fin signs were more prevalent in the population and therefore fin exams were more effective as a tool to detect fish with previous exposure to high TDGS. In the words of NMFS' research plan fin signs "optimize the detection of GBD signs". Furthermore, gill examinations are time consuming and lethal and, therefore, do not lend themselves to a monitoring program; especially when more than 50,000 fish have to be examined in the course of the season. Also, gill bubbles are usually the proximate cause of death in the fish and therefore are unlikely to be useful for monitoring because the role of monitoring is to warn managers when

the fish population is at risk to mortality and gill bubbles would form at the point mortality is occurring.

Sampling Site

Sampling occurs at dams in the Lower Columbia and Snake rivers in conjunction with the Smolt Monitoring Program (SMP). These sites and fish collection methods were used because of the existence of an on-going SMP. No other non-lethal method of capture can sample as large a portion of the migrating fish from across the river channel as the collection systems at dams. The use of all the Snake River dams as well as all lower Columbia River dams with collection systems assures adequate coverage of the lower river migrant juvenile salmonids. The greatest concern regarding dam sampling of juvenile salmon was whether the signs in fish would change as the fish passed through the collection facility. Research by NMFS (Dawley 1996) showed that fish did not lose signs as they passed through the bypass at Little Goose Dam and at John Day Dam (Dawley, 1997). In addition, fish sampled in the reservoirs and examined for GBT were compared to those collected at the dams. Fish sampled in the reservoir showed a similar level of signs to those at the dams in 1996, while in 1997 a similar if not higher percentage of fish sampled at the dams showed signs than did those in the reservoir (Backman et al., summarized in this report). These data demonstrate that dam sampling for GBT signs is representative of fish in the river. To minimize the possibility of signs changing fish are captured from the separator at transportation and examined for GBT as soon as possible. This minimizes the chance that signs might change during holding prior to examination.

Sample Size

The target number of fish examined is 100 of each species (usually chinook salmon and steelhead) during each sampling day. This sample size was determined based upon the objective to detect with 95% confidence, the occurrence of GBT in 10% of the population. Since the NMFS action criteria is reached when 15% of the population shows signs, the sample size is more than adequate to detect and accurately depict the presence of signs.

Significance of Signs

Probably the most troubling aspect of monitoring is the relative significance of the signs in terms of the risk experienced by the population prior to being sampled. Laboratory results have been less than consistent regarding the onset of mortality versus the presence of signs. Also, using results from controlled laboratory exposures to monitor fish migrating in-river is risky. However, due to the conservative nature of the NMFS action criteria we believe sufficient flexibility is incorporated into the criteria to account for the uncertainty involved in the monitoring. The laboratory research has shown that at 120% TDGS approximately 60% of the fish will display signs of GBT in the fins before the first mortality occurs. With an action criteria of 15% prevalence of signs we are very confident that the population is not at risk when spill can be managed to maintain TDGS low enough to prevent the occurrence of a greater percentage of signs. Again, the goal is to protect the migrating fish and based upon the intentionally conservative action criteria, it appears that the monitoring program is meeting that goal.

6. Other Research

Environmental Factors and Juvenile Salmonid Survival -- Evidence from PIT-Tagged Migrants in 1997

Steven Smith
NMFS
Coastal Zone and Estuarine Studies

We have performed exploratory data analyses on changes in survival estimates for PIT-tagged juvenile salmonids migrating in the Snake and Columbia Rivers throughout the spring 1997 migration season. We have investigated absolute survival estimates and associated changes in environmental factors that potentially affect survival. The analyses reported here are a continuation of analyses of 1996 data reported in the 1996 NMFS Annual Report to the Environmental Quality Commission and of 1994 through 1996 data in our 1996 Annual Report to Bonneville Power Administration (currently available in draft form). We used the same methods described in those documents to estimate survival, to smooth daily survival estimates to clarify trends, and to calculate indices of environmental exposures for groups of PIT-tagged fish.

Findings

Yearling Chinook Salmon

Data Set/Survival Estimates

Between the detection of the first fish at Lower Granite Dam on 30 March and the last on 2 August, we identified a total of only 8,139 PIT-tagged yearling chinook salmon leaving Lower Granite Dam in 1997 (7,174 hatchery, 965 wild origin). This is less than 10% of the total for 1996, because no fish were tagged at Lower Granite Dam in 1997 and 80% of those tagged above the dam were targeted for transportation from the dam if detected). Release sizes were sufficient to estimate survival to McNary Dam for 24 of the daily release groups leaving Lower Granite Dam between 12 April and 21 May. During these 24 days, 4,886 (60.0% of the 1997 total) PIT-tagged yearling chinook salmon left Lower Granite Dam. Besides the small sizes of the release groups, high spill caused very low detection rates at McNary Dam in 1997, leading to imprecise point estimates and distortions in the smoothed survival estimates (see below) when McNary was the lower dam of the reach. To estimate survival only to Lower Monumental Dam, 24 additional daily release groups were of sufficient size, increasing the range of dates to 6 April through 26 May and the total number of fish to 7,398 (90.3% of the total).

For daily release groups pooled into 1-week intervals, survival estimates between Lower Granite and McNary Dams (all estimates are tailrace-to-tailrace) ranged from 27% to 83%, with an average of 62% (Table 1). Average survival estimates in each reach were 95% between Lower Granite and Little Goose Dams, 97% between Little Goose and Lower Monumental Dams, and 69% between Lower Monumental and McNary Dams (two dams and two reservoirs).

Trends in Survival and Environmental Exposures

The running average survival estimates for LGR-MCN and LMO-MCN were biased downward because small release sizes and low detection rates at McNary Dam led to high correlation's between survival estimates and their corresponding variance estimates (a

consequence of the Cormack-Jolly-Seber Model). Thus, lower survival estimates receive more weight in the algorithm than do higher estimates, resulting in bias. Patterns of increase and decrease in the running averages can be reliably compared to patterns in environmental exposures, but the actual smoothed estimates are not reliable. This bias is also present to a lesser degree for estimates in the upper reaches.

Flow, spill percentage, and total dissolved gas saturation (TDGS) exposures for the daily release groups were strongly correlated, and hence had similar correlations with survival estimates (Table 2). Between Lower Granite and Little Goose Dams, the correlations between the exposure levels and survival estimates were all positive (higher flow, spill, and gas levels corresponded to higher survival). For survival in all other reaches, and overall between Lower Granite and McNary Dams, the correlations were negative (lower survival with higher flow, spill, and gas levels). None of the correlations with unsmoothed estimates were significant. It is not possible to assess significance for the correlations with smoothed estimates.

Steelhead

Data Set/Survival Estimates

PIT-tagged steelhead were detected at Lower Granite from 27 March to 23 August. We identified a total of 33,871 PIT-tagged steelhead leaving Lower Granite Dam (32,106 hatchery, 1,766 wild origin). Release sizes were sufficient to estimate survival to McNary Dam for 37 of the daily release groups leaving Lower Granite Dam between 15 April and 31 May. During these 37 days, 29,588 (87.4% of the 1997 total) PIT-tagged steelhead left Lower Granite Dam.

For daily release groups pooled into 1-week intervals, survival estimates between Lower Granite and McNary Dams ranged from 57% to 100%, with an average of 78% (Table 3). Average survival estimates in the each reach were 96% between Lower Granite and Little Goose Dams, 97% between Little Goose and Lower Monumental Dams, and 85% between Lower Monumental and McNary Dams.

Trends in Survival and Environmental Exposures

Survival estimates, either unsmoothed or smoothed, were generally not strongly correlated with any of the environmental exposures (Table 3). The only strong correlation was between water temperature and smoothed survival between Lower Granite and Little Goose Dams. However, because the range of smoothed survival estimates was between 95% and 98%, this correlation is probably not biologically meaningful.

Table 1. Estimates of survival probabilities for yearling chinook salmon detected or released at Lower Granite Dam, 1997. Daily release groups are pooled by week. Estimates based on Cormack-Jolly-Seber Model. Standard errors in ().

Abbr.: LGR-Lower Granite Dam; LGO-Little Goose Dam; LMO-Lower Monumental Dam; MCN-McNary Dam.

Date @ LGR	LGR to LGO	LGO to LMO	LMO to MCN	LGR to MCN
06 Apr - 12 Apr	0.812	1.000*	0.911	0.742
	(0.061)	(0.161)	(0.554)	(0.439)
13 Apr - 19 Apr	0.973	1.000*	0.513	0.615
	(0.059)	(0.269)	(0.285)	(0.315)
20 Apr - 26 Apr	0.941	0.827	1.000*	0.825
	(0.041)	(0.070)	(0.321)	(0.243)
27 Apr - 03 May	0.954	0.855	0.882	0.719
	(0.033)	(0.068)	(0.306)	(0.244)
04 May - 10 May	1.000*	0.911	0.533	0.502
	(0.055)	(0.132)	(0.225)	(0.201)
11 May - 17 May	0.992	1.000*	0.680	0.678
	(0.061)	(0.185)	(0.308)	(0.283)
18 May - 24 May	0.949	0.996	0.285	0.269
	(0.079)	(0.227)	(0.133)	(0.112)

* Cormack-Jolly-Seber Model survival probability estimate greater than 1.0.

Table 2. R^2-values between exposure indices and estimated probability of survival between Lower Granite and McNary Dams for daily groups of yearling chinook salmon detected or released at Lower Granite Dam in 1997. Except where all exposures are measured at Lower Monumental Dam. Smoothed estimates are weighted by inverse variance. Symbols in parentheses indicate direction of relationship. Abbreviations: LGR-Lower Granite Dam; LGO-Little Dam; IHR- Ice Harbor Dam; LMO-Lower Monumental Dam; MCN-McNary Dam.

		Coefficient of Determination (R^2)	
Exposure	Survival in Reach	Unsmoothed	Smoothed
Flow	LGR-LGO	15.0% (+)	23.2% (+)
	LGO-LMO	4.6% (+)	48.0% (-)
	LMO-MCN	20.2% (-)	18.3% (-)
	LGR-MCN	15.8% (-)	27.6% (-)
Spill%	LGR-LGO	12.3% (+)	16.4% (+)
	LGO-LMO	5.2% (+)	57.4% (-)
	LMO-MCN	23.2% (-)	23.0% (-)
	LGR-MCN	15.7% (-)	39.8% (-)
Temperature	LGR-LGO	0.0% (+)	19.0% (+)
	LGO-LMO	2.1% (-)	35.5% (-)
	LMO-MCN	2.1% (-)	1.5% (-)
	LGR-MCN	4.2% (-)	15.1% (-)
TDGS	LGR-LGO	13.2% (+)	32.0% (+)
	LGO-LMO	1.1% (+)	61.3% (-)
(at IHR)	LMO-MCN	20.9% (-)	28.9% (-)
(at IHR)	LGR-MCN	19.8% (-)	36.4% (-)

Table 3. Estimates of survival probabilities for juvenile steelhead detected or released at Lower Granite Dam, 1997. Daily release groups are pooled by week. Estimates based on Cormack-Jolly-Seber Model. Standard errors in (). Abbr.: LGR-Lower Granite Dam; LGO-Little Goose Dam; LMO-Lower Monumental Dam; MCN-McNary Dam.

Date @ LGR	LGR to LGO	LGO to LMO	LMO to MCN	LGR to MCN
08 Apr - 14 Apr	0.921 (0.063)	1.000* (0.245)	0.695 (0.376)	0.791 (0.398)
15 Apr - 21 Apr	0.988 (0.017)	0.881 (0.041)	0.855 (0.137)	0.745 (0.115)
22 Apr - 28 Apr	0.988 (0.016)	0.927 (0.036)	0.621 (0.071)	0.568 (0.062)
29 Apr - 05 May	0.973 (0.010)	0.886 (0.022)	0.904 (0.100)	0.780 (0.084)
06 May - 12 May	0.948 (0.012)	0.969 (0.036)	0.866 (0.142)	0.795 (0.128)
13 May - 19 May	0.959 (0.020)	0.924 (0.054)	1.000* (0.264)	1.000* (0.227)

* Cormack-Jolly-Seber Model survival probability estimate greater than 1.0.

Summary/Discussion

This document provides a summary of estimates of survival for juvenile salmonids migrating below Lower Granite Dam in spring 1997, and illustrates the difficulties in relating survival to environmental factors with low release numbers of PIT-tagged fish and high spill levels (low detection rates) at McNary Dam. Overall, survival estimates between Lower Granite and Lower Monumental Dams were slightly higher in 1997 than in 1996, for both yearling chinook salmon and steelhead, and for steelhead between Lower Monumental and McNary Dams. For yearling chinook salmon between Lower Monumental and McNary Dams survival was higher in 1997 than in 1996, but lower than in 1995.

Correlations between environmental exposures and survival estimates were largely either nonexistent (steelhead) or contradictory between different reaches (yearling chinook salmon). Overall, survival of yearling chinook salmon between Lower Granite and McNary Dams was negatively correlated (though not significantly) with flow, spill percentage, and TDGS. However, conclusions based on these results must be tentative, as the correlations are not strong, and the release sizes are very small (only about 5,000 fish over 24 days). For steelhead, there were very weak positive correlations between flow, spill, and TDGS and survival estimates from Lower Granite Dam to McNary Dam, and a weak negative correlation between temperature and estimated survival in the same reach

Table 4. R^2-values between exposure indices and estimated probability of survival between Lower Granite and McNary Dams for daily groups of juvenile steelhead detected or released at Lower Granite Dam in 1997. Except where noted, all exposures are measured at Lower Monumental Dam. Smoothed estimates are weighted by inverse variance. Symbols in parentheses indicate direction of relationship. Abbreviations: LGR-Lower Granite Dam; LGO-Little Goose; Dam; IHR- Ice Harbor Dam; LMO-Lower Monumental Dam; MCN-McNary Dam.

		Coefficient of Determination (R^2)	
Exposure	Survival in Reach	Unsmoothed	Smoothed
Flow	LGR-LGO	0.4% (+)	0.4% (-)
	LGO-LMO	10.0% (+)	0.0% (+)
	LMO-MCN	2.0% (+)	3.4% (+)
	LGR-MCN	3.9% (+)	5.9% (+)
Spill%	LGR-LGO	0.1% (-)	4.3% (-)
	LGO-LMO	0.5% (+)	1.1% (-)
	LMO-MCN	3.9% (+)	10.0% (+)
	LGR-MCN	5.6% (+)	1.0% (+)
Temperature	LGR-LGO	0.6% (-)	63.3% (-)
	LGO-LMO	2.6% (-)	2.9% (+)
	LMO-MCN	0.0% (+)	3.6% (-)
	LGR-MCN	0.0% (+)	8.5% (-)
TDGS	LGR-LGO	5.5% (-)	20.6% (-)
	LGO-LMO	1.7% (+)	0.9% (+)
(at IHR)	LMO-MCN	20.0% (+)	6.9% (+)
(at IHR)	LGR-MCN	1.3% (+)	9.9% (+)

7. Evaluation of Spill Effects on Fish Passage Efficiency and Survivorship
Fish Passage Efficiency

Gary Fredricks
National Marine Fisheries Service

Fish passage efficiency (FPE) is defined as the percentage of fish that pass a dam through non-turbine routes that generally provide higher passage survival than turbines. The minimum FPE required by the Federal Columbia River Power System Biological Opinion for the lower Columbia River dams is 80%. FPE for these dams is presented graphically for the 1997 spill season in Figure 1. FPE at each dam primarily relates to the fish guidance efficiency (FGE) of the bypass or sluiceway system and the level of spill. Generally, as the season progresses from spring to summer, FGE drops in response to changing water temperatures and fish species composition. As this occurs, spill levels would be increased (within total dissolved gas limits) to maintain the FPE goals. In the case of the 1997 season, spill was uncontrollable at the lower Columbia River dams through much of the juvenile migration season and the resultant FPE levels were rarely the result of specific spill management efforts.

The estimated FPE level associated with a spill scenario that results in a particular tailrace total dissolved gas (TDG) level at any dam depends on total river flow and powerhouse hydraulic capacity. Once the spill level is capped by a particular TDG level, FPE will decrease with increasing river flow up to the capacity of the powerhouse. Once powerhouse capacity is met, increasing flow must be passed through the spillway and FPE and TDG will increase. The following example (Table 1) illustrates the difference between FPE levels at the four lower Columbia River dams under two river flows. The respective spill levels in thousand cubic feet per second (kcfs) for 110 and 120 percent TDG at these dams for the 1997 spill season are: Bonneville 70, 120; The Dalles 80, 230; John Day 25, 50; and McNary 50, 150 (Corps of Engineers, May 1997 spill cap teletype). The fish to spill flow ratio was assumed to be 1:1.

Table 1. Estimated spring chinook FPE levels at two different river flows with tailrace TDG capped at two different levels for each of the lower Columbia River dams.

River Flow	250 kcfs		300 kcfs	
TDG	110%	120%	110%	120%
Bonneville	55	59	52	56
The Dalles	61	95	58	87
John Day	62	66	62	65
McNary[2]	88	93	90	92

[2]The McNary Dam powerhouse hydraulic capacity of 175 kcfs is too small to allow limiting spill to 110% TDG at these flow levels. FGE and survival are therefore higher in the 110% column than they would be if the dam could reduce spill to the 50 kcfs level necessary to meet 110% TDG.

Smolt Survival. The shortcomings of using a spreadsheet model such as SIMPAS for calculating point survival estimates was well documented in our 1996 annual report to the Oregon Department of Environmental Quality. In that report, we also indicated that relative differences in survival estimates were more meaningful than absolute survival estimates. To illustrate this use we demonstrated the difference in cumulative project survival (all eight mainstem dams) when spill levels were generating 110 and 120 percent TDG. These survival estimates are based on point estimates of passage route survival empirically derived from past studies at the various Columbia River dams. We believe these estimates are useful for predicting changes in survival under conditions similar to those present when the studies were conducted. Using the general passage route survival assumptions we used in SIMPAS, project survival for each dam (except Bonneville) can be simply derived from FPE by assuming that fish passed through non-turbine routes survive at 98% and fish passed through turbines survive at 90%. Therefore, 80% FPE equals 96.4% project survival (0.8*.98+ 0.2*.90). In Table 2, project survival estimates are estimated using the FPE's listed in table 1.

Table 2. Estimated spring chinook project survivals at two different river flows with tailrace TDG capped at two different levels for each of the lower Columbia River dams.

River Flow	250 kcfs		300 kcfs	
TDG	110%	120%	110%	120%
Bonneville	92.9	93.4	92.5	93.0
The Dalles	94.9	97.6	94.7	96.9
John Day	95.0	95.3	94.9	95.2
McNary[3]	96.9	97.4	97.1	97.2

Because spill and total dissolved gas levels in the Columbia River in 1997 were so much higher than those experienced during past survival studies , we do not believe the spreadsheet model method of calculating survival is useful or meaningful for estimating 1997 project passage survivals and have not included them in this report. An example of how static parameter assumptions can mislead modeling efforts was illustrated at The Dalles Dam this year. We normally use a two percent mortality factor for fish passing through a spillway because spillway survival has been measured at 0-2 percent at the majority of spillways tested under normal spill conditions . In 1997, survival tests at The Dalles Dam indicated approximately 7-14% mortality for test fish passing through the spillway under the extremely high spill flow conditions prevalent during much of the spring and summer migration season. It is suspected that the high mortality is, at least in part, due to physical injuries caused by the extremely high level of spill. It is unknown whether all fish passing this spillway or the spillways at other lower Columbia River Dams suffered this mortality. It is, however, safe to assume that using the conventional spillway survivals in a predictive model would be unwise in a flow year like 1997. Survival data collected inseason using PIT tag information is much more realistic and useful. These data are presented elsewhere in this report.

[3] See footnote 1.

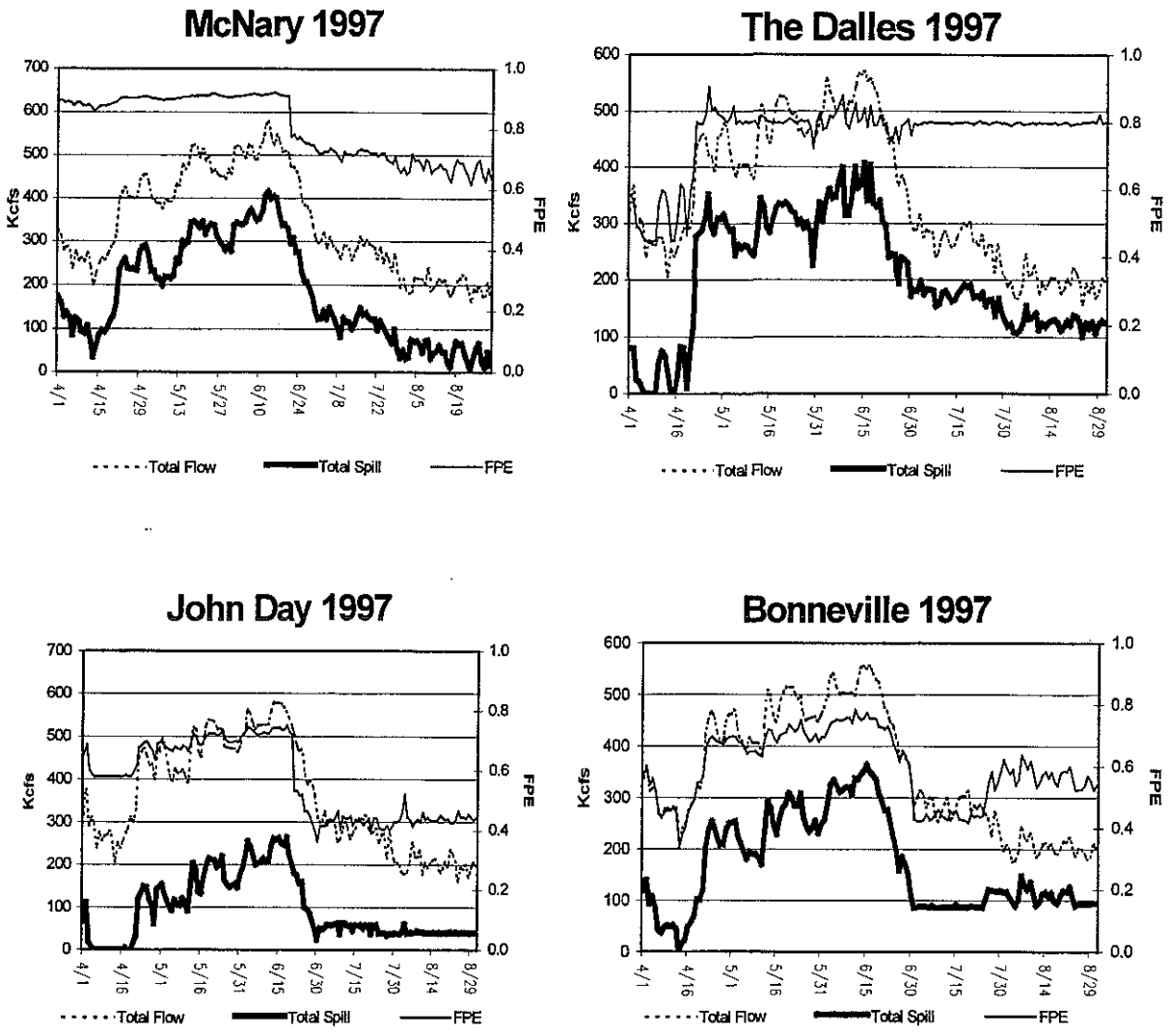


Figure 1 . FPE, flow, and spill for the four Lower Columbia River dams for 1997

8. Update on Ongoing Processes

Dissolved gas monitoring and research does not take place in a vacuum, but relates to other regional processes. There were two significant occurrences over the past year that have affected the dissolved gas program. First, based on a review of the proposed 1998 funding the NPPC put on hold any dissolved gas research proposed for 1998. This action was prompted by a recommendation from the NPPC's ISAB. The NPPC requested that the NMFS Dissolved Gas Team develop a Research Plan for Dissolved Gas. Secondly, the DGT received an assignment from NMFS Implementation Team. The IT requested that the DGT review the information collected relative to dissolved gas over the past four years and report on what has been learned. The IT then requests that the DGT develop a Research Plan. These two processes will enable NMFS to summarize for the DEQ the knowledge gained from the implementation of the Biological Opinion Spill program over the past four years prior to DEQ making a decision on the 1998 Waiver Request.

The NMFS is coordinating and sponsoring a review of the total dissolved gas research scheduled to begin on December 3, 1997. The proceedings of the review will be incorporated in the final report to DEQ.

Appendix 1. Outline for NMFS Annual report to EQC

State of Oregon
Department of Environmental Quality Memorandum

Date: April 18, 1997

To: Environmental Quality Commission

From: Stephanie Hallock, Water Quality Acting Division Administrator

Subject: Outline for the National Marine Fisheries Service's Annual Report to the Environmental Quality Commission on Total Dissolved Gas

Attached is an outline for the National Marine Fisheries Service's (NMFS) 1998 annual report on total dissolved gas (TDG) to the Environmental Quality Commission (EQC). The outline was requested by the EQC at the February 28, 1997 meeting as a requirement for granting the NMFS request for a waiver to the state of Oregon's TDG water quality standard. The waiver request was made by NMFS to allow the U.S. Army Corps of Engineers to voluntarily spill water which would aid salmonid smolt migration past the Columbia River dams.

The Department of Environmental Quality (DEQ) recommends that the EQC grant the TDG waiver request as stated in the February 28, 1997 Staff Report for the Total Dissolved Gas Waiver Request. The DEQ recommends that the outline for the annual report be included as part of the conditions that were in the February 28, 1997 Staff Report under Department Recommendations section (vi) item 3.

Outline for the NMFS 1998 TDG Annual Report to the EQC

Introduction

The National Marine Fisheries Service (NMFS) is required by the Environmental Quality Commission (EQC) to provide a report on Total Dissolved Gas (TDG) in the Columbia River as a condition of the TDG water quality standard waiver. The report will contain information on the physical monitoring of TDG, the factors causing spill, biological monitoring for the incidence of Gas Bubble Disease (GBD) signs, the research being conducted on the effects of TDG on fish, and an evaluation of the real-time biological monitoring. A draft of the report will be peer reviewed prior to the report becoming final. Below is an outline of the information to be contained in the NMFS annual report.

Physical Monitoring of Total Dissolved Gas (TDG)

The results of TDG monitoring in the forebay and tailrace areas of Bonneville, The Dalles, John Day, and McNary Dams will be presented in tabular and graphical format. The tables and graphs will include daily average and 24-hour minimum and maximum TDG levels for the four mainstem dams in Oregon.

The Factors Causing Spill

There will be tabular and graphical presentation of data on the quantities of voluntary and involuntary spill. The tables and graphs will include the following information.

A. The project location which will include all 8 lower Snake and Columbia River dams.
B. The dates of data collection will be from April 10 through August 31, 1997.

C. The data collected will be daily averages and will include:

1) Observed total river flow (kcfs);
2) Project hydraulic capacity (kcfs);
3) Total involuntary spill (kcfs) and caused by:
    a) Lack of hydraulic capacity (kcfs);
    b) Lack of market (kcfs);
4) Voluntary Spill (kcfs) according to the Reasonable and Prudent Alternative #2 spill to reach 80% Fish Passage Efficiency;
5) Total Spill (kcfs);
6) The percentage of total spill that was voluntary.

The tables and graphs to be produced for this section will be similar to the information presented in section 2 of the NMFS report on the 1996 spill season to the EQC (NMFS 1997). The information collected for the 1997 spill season will provide better resolution of the amount of spill due to voluntary and involuntary spill. The report on the 1996 spill season used weekly averages while the 1997 report will use daily averages for calculating voluntary and involuntary spill.

Biological Monitoring for Real-Time Spill Management

This section of the report will contain the results from the juvenile salmonid and adult salmon monitoring program. This program was designed to be used for real-time spill management. Juvenile salmonids will be routinely monitored for signs of GBD by the Fish Passage Center (FPC) as part of the Smolt Monitoring Program. Adult salmon will be collected as they ascend fish ladders and examined for signs of GBD. The adult monitoring will be conducted by NMFS, Columbia River Intertribal Fish Commission (CRITFC), or Washington Department of Fish and Wildlife (WDFW) depending on location. Juvenile salmonid monitoring will be conducted at Lower Granite, Little Goose, Lower Monumental, Ice Harbor, Rock Island, McNary, John Day, and Bonneville dams.

Adult monitoring will be conducted at Lower Granite and Bonneville dams. The report will contain the following biological monitoring information.

A. Juvenile salmonid data on the incidence and severity of GBD signs.

B. Adult salmon data on the incidence and severity of GBD signs.

C. Assessment of the incidence of GBD signs which will include a discussion of the sensitivity of GBD signs monitoring to changes in TDG. A graphic of incidence of GBD signs overlaid by TDG levels will be included in the report.

Update on Gas Bubble Research

This section of the report will discuss the research designed to address the critical uncertainties identified by the NMFS 1996 Gas Expert Panel. The goal of the gas bubble research is to assure that biological monitoring for GBD signs represent in-river fish condition and is suitable for measuring adverse effects from TDG induced GBD signs. The report will contain the responsible party performing the research, the anticipated completion date, and the funding source. The objectives and research designed for achieving the goal are described below.

The research designed to address the objectives should provide information to answer questions such as the relevancy of specific GBD signs (bubbles in the filaments), estimating potential mortality due to TDG, and whether the incidence of GBD signs for fish collected through the smolt monitoring program represents the incidence of GBD signs for in-river fish. The 1997 report will contain information on the objectives, results of completed research, and abstracts of on-going research. Some of the research projects will be multi-year studies. Full reports on the research will be made available when the investigators have completed their reports.

Objective 1: Determine if there is a difference in the incidence and severity of signs of GBD between migratory fish in the reservoir and in the fish sampled through the Smolt Monitoring Program.

Research for Objective 1:

A. Field test juveniles exposed to TDG. Expose juvenile salmonids to TDG, release them upstream of the project, and recapture them in the smolt by-pass system. Evaluate changes in incidence of GBD signs resulting from dam passage.

B. Compare incidence and severity of GBD signs in juvenile salmonids collected from the forebay and the smolt by-pass system.

C. Continue laboratory research on GBD signs, hydrostatic pressure and TDG body burden.

Objective 2: Determine the progression of GBD signs as the result of exposure to TDG and the relation between signs, health, and survival of aquatic species indigenous to the Columbia and Snake Rivers.

Research for Objectives 2:

A. Continue net-pen field research correlating resident fish GBD signs and mortality.

B. Laboratory studies correlating TDG exposure and GBD signs with mortality of juvenile and adult salmonids and sublethal effects.

C. Assess survival of fish exposed to TDG and released to the river.

D. Investigate the cause of headburns.

Objective 3: Describe the migratory distribution of juvenile and adult salmonids, particularly with respect to vertical distribution in the reservoir and relate fish distribution to the distribution of TDG.

Research for Objective 3:

Determine the lateral and vertical distribution of migrants in relation to plume and TDG.

Objective 4: Determine the physical characteristics of dissolved gas throughout the hydrosystem under specific spill and flow regimes.

Research for Objective 4:

Determine the TDG distribution downstream from spill.

Objective 5: Determine whether the protocol and examination techniques used in the GBD monitoring program optimize the detection of GBD signs demonstrated to affect fish health and survival, while minimizing impacts to individuals and populations.

Research for Objective 5:

Evaluation of monitoring protocols.

The net-pen research using juvenile salmonids was discontinued. The researchers and members of the dissolved gas team thought that there were better methods available for answering the questions the juvenile salmonid net-pen research was to address.

Researchers thought that laboratory exposures would be better able to address the dose-response of salmonids to TDG.

Other Research

In addition to the research on GBD signs in the previous section, there will be research conducted to evaluate the effects of ambient conditions and transportation on salmonid survival. PIT tags will be used to estimate salmonid survival through various river reaches. Ambient conditions will be measured, such as river flow, temperature, and TDG. The ambient conditions will be regressed against annual survivorship estimates developed from PIT tag data. This information may help to understand the effects of these variables on salmonid survivorship. Other studies will examine the effect barge transport has on smolt on survivorship to adulthood. PIT tag methodology will be used to estimate annual survivorship. In addition to transport effects on smolt survivorship to adulthood, other in-river variables such as flow and spill will be measured and regressed against annual survivorship.

Evaluation of Spill Effects on Fish Passage Efficiency and Survivorship

The report will contain an evaluation of the effectiveness of spill on increasing fish passage efficiency (FPE) and survivorship of migrating juvenile salmonids. Numerical modeling will be used to perform this evaulation. The NMFS model, SIMPAS, will be used to estimate the FPE and survivorship for the Bonneville, The Dalles, John Day, and McNary dams at the flow and spill volumes observed during the 1997 spill season. Tabular and graphical data for the average weekly FPE, survivorship, river flow (kcfs), voluntary (kcfs), and involuntary (kcfs) spill will be presented. Point estimates of FPE and survivorship will be provided for spill scenarios of 110, 115, and 120 %TDG in the tail race of Bonneville, The Dalles, John Day, and McNary dams.

Peer Review of the Report

The critical uncertainties in the 1996 report by the Gas Expert Panel and the NMFS Research Plan identify the research to be conducted and a system for the annual review of the research results. There will be an annual research review meeting held by NMFS in September to discuss the previous years research results on TDG, spill, and GBD signs. These meetings also discuss whether the designed research program is meeting the goal and objectives identified. The NMFS report will contain a summary of the research review meeting. These meetings are open to the public and are coordinated with the Bonneville Power Authority, U.S. Army Corps of Engineers, Northwest Power Planning Council, state and federal fishery agencies, and state and federal environmental regulatory agencies. Through this process the research results and the research program are peer reviewed.

The draft NMFS report will be available for peer review by the state and federal fisheries agencies, state and federal environmental regulatory agencies, and the interested public. The draft report will be made available for public comment by December 1, 1997. In addition, the ISAB will review the draft report and provide written comments to the NMFS on the results of their review. NMFS will provide to the ODEQ the final report and the written reviews of the draft report by February 1, 1998.

Appendix 2. Daily averaged flows, spill and hydraulic capacities at Snake and Lower Columbia River federal hydroelectric projects.

Definitions

Information Source

Observed hourly data extracted from the Columbia River Operational and Meteorological System (CROHMS) include Total Flow, Turbine Flow, Total Spill, numbers of available and on-line turbines, and total generation. All other columns in the report contain computed values.

Hydraulic Capacity (Also termed Available Turbine Capacity (BPA))

Total potential flow through all available turbines operating at highest generating capacity. This assumes a market for all generation and the highest hourly ratio of turbine flow to power generation during each day. The difference of this value and actual turbine flows estimates the maximum potential reduction in spill that could occur from operating all available turbines (Unused Turbine Capacity). Hydraulic Capacity = (Lack of Market Spill) + (Turbine Flow)+ Unused Turbine Capacity.)

Lack-of-Market Spill (BPA)

Water that could have been passed through the turbines to generate power if a load/market had existed for that additional generation. This is the only category of spill that could have reduced total spill and associated total dissolved gas levels.

Excess Hydraulic Capacity Spill

Water that is spilled because the total flow exceeds the hydraulic capacity of a project. Computationally: Excess Hydraulic Capacity Spill = (Total Flow)–(Hydraulic Capacity).

Involuntary Spill

Spill that occurs because of the physical limitations of the hydraulic capacity and due to the limitation of the market to absorb all energy that can potentially be produced. Computationally: Involuntary Spill = (Lack-of-Market Spill)+(Excess Hydraulic Capacity Spill).

Fish Spill

The federal parties are required under the Biological Opinion to spill at specific projects to achieve an 80% fish passage efficiency; (i.e. 80% of fish pass a project via non-turbine routes). The volume of spill provided is limited by the amount of total dissolved gas that can occur under the water quality waivers granted in 1997. In a high water year, when flows exceed hydraulic capacity and power market the involuntary spill provides most of the spill for fish. In the context of this analysis, Fish Spill is the amount of Total Spill that can be directly attributed to the Fish Spill Program and not to involuntary spill, which would have occurred regardless of fish requirements. Computationally: Fish Spill = (Total Spill)– (Lack of Market Spill)–(Excess Hydraulic Capacity Spill).

% Involuntary Spill

The percent of the total spill that could be attributed to involuntary sources. Those involuntary sources include spill due to the lack of a power market for the energy produced, and due to flows exceeding the hydraulic capacity of a project.

Daily Averaged Flows, Spills and Involuntary Spill at Lower Granite Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	112	116	100	11	0	11	12	0	91.67	8.33
4/2	104	104	95	7	0	7	8	0	87.50	12.50
4/3	98	106	97	0	0	0	0	0	0.00	0.00
4/4	95	98	95	0	0	0	0	0	0.00	0.00
4/5	85	98	85	0	0	0	0	0	0.00	0.00
4/6	77	81	76	0	0	0	0	0	0.00	0.00
4/7	83	98	82	0	0	0	0	0	0.00	0.00
4/8	87	94	87	0	0	0	0	0	0.00	0.00
4/9	83	92	83	0	0	0	0	0	0.00	0.00
4/10	89	93	78	10	0	10	11	1	90.91	9.09
4/11	88	88	66	18	0	18	22	4	81.82	18.18
4/12	82	93	59	19	0	19	23	4	82.61	17.39
4/13	82	96	59	20	0	20	22	2	90.91	9.09
4/14	83	104	59	23	0	23	24	1	95.83	4.17
4/15	88	104	59	26	0	26	28	2	92.86	7.14
4/16	93	106	67	23	0	23	25	2	92.00	8.00
4/17	106	114	77	25	0	25	28	3	89.29	10.
4/18	111	121	82	26	0	26	28	2	92.86	7.14
4/19	123	116	94	20	7	27	28	1	96.43	3.57
4/20	156	120	114	6	36	42	42	0	100.00	0.00
4/21	181	124	124	0	57	57	56	0	100.00	0.00
4/22	178	127	127	0	51	51	51	0	100.00	0.00
4/23	173	126	121	5	47	52	52	0	100.00	0.00
4/24	179	127	127	0	52	52	52	0	100.00	0.00
4/25	171	120	120	0	51	51	50	0	100.00	0.00
4/26	162	104	104	0	58	58	57	0	100.00	0.00
4/27	160	114	112	2	46	48	48	0	100.00	0.00
4/28	173	121	121	0	52	52	51	0	100.00	0.00
4/29	180	121	119	2	59	61	61	0	100.00	0.00
4/30	174	123	123	0	51	51	50	0	100.00	0.00
5/1	169	116	111	4	53	57	57	0	100.00	0.00
5/2	157	116	115	2	41	43	42	0	100.00	0.00
5/3	135	115	99	16	20	36	36	0	100.00	0.00
5/4	136	114	95	19	22	41	41	0	100.00	0.00
5/5	134	120	104	14	14	28	30	2	93.33	6.67
5/6	138	117	110	5	21	26	27	1	96.30	3.70
5/7	154	116	116	0	38	38	37	0	100.00	0.00
5/8	155	115	115	0	40	40	39	0	100.00	0.00
5/9	149	115	111	4	34	38	38	0	100.00	0.00
5/10	159	120	112	8	39	47	47	0	100.00	0.
5/11	168	124	104	21	44	65	64	0	100.00	0.
5/12	174	117	111	6	57	63	63	0	100.00	0.00
5/13	180	114	111	3	66	69	68	0	100.00	0.00
5/14	196	118	109	10	78	88	87	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Lower Granite Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/15	202	124	117	8	78	86	84	0	100.00	0.00
5/16	213	125	125	0	88	88	87	0	100.00	0.00
5/17	225	122	122	0	103	103	102	0	100.00	0.00
5/18	225	124	124	0	101	101	101	0	100.00	0.00
5/19	208	124	124	0	84	84	84	0	100.00	0.00
5/20	191	116	105	10	75	85	85	0	100.00	0.00
5/21	186	118	116	2	68	70	69	0	100.00	0.00
5/22	178	116	111	5	62	67	67	0	100.00	0.00
5/23	174	123	118	5	51	56	55	0	100.00	0.00
5/24	171	119	96	23	52	75	75	0	100.00	0.00
5/25	165	118	102	16	47	63	62	0	100.00	0.00
5/26	153	115	96	18	38	56	56	0	100.00	0.00
5/27	146	116	106	10	30	40	39	0	100.00	0.00
5/28	142	121	111	10	21	31	31	0	100.00	0.00
5/29	145	115	95	20	30	50	49	0	100.00	0.00
5/30	151	115	108	7	36	43	43	0	100.00	0.00
5/31	164	120	106	11	44	55	57	2	96.49	3.51
6/1	180	116	115	1	64	65	64	0	100.00	0.00
6/2	191	119	118	1	72	73	73	0	100.00	0.00
6/3	183	117	111	6	66	72	72	0	100.00	0.00
6/4	178	116	104	12	62	74	73	0	100.00	0.00
6/5	185	120	103	15	65	80	81	1	98.77	1.23
6/6	188	117	105	12	71	83	83	0	100.00	0.00
6/7	178	105	94	10	73	83	83	0	100.00	0.00
6/8	173	106	83	23	67	90	90	0	100.00	0.00
6/9	169	113	92	22	56	78	77	0	100.00	0.00
6/10	174	105	97	8	69	77	76	0	100.00	0.00
6/11	182	118	83	32	64	96	99	3	96.97	3.03
6/12	193	119	103	14	74	88	89	1	98.88	1.12
6/13	188	114	102	12	74	86	85	0	100.00	0.00
6/14	181	112	93	20	69	89	87	0	100.00	0.00
6/15	190	113	88	24	77	101	101	0	100.00	0.00
6/16	187	113	103	10	74	84	84	0	100.00	0.00
6/17	184	107	100	7	77	84	83	0	100.00	0.00
6/18	179	110	103	7	69	76	76	0	100.00	0.00
6/19	178	114	112	2	64	66	66	0	100.00	0.00
6/20	168	112	100	12	56	68	68	0	100.00	0.00
6/21	160	111	101	10	49	59	58	0	100.00	0.00
6/22	148	105	92	13	43	56	55	0	100.00	0.00
6/23	139	109	92	16	30	46	46	0	100.00	0.00
6/24	123	108	100	6	15	21	23	0	91.30	8.70
6/25	109	107	107	0	2	2	2	0	100.00	0.00
6/26	104	130	97	6	0	6	6	0	100.00	0.00
6/27	105	114	102	2	0	2	2	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Lower Granite Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/28	109	107	98	7	2	9	10	0	90.00	10.00
6/29	110	108	105	2	2	4	5	0	80.00	20.00
6/30	102	114	101	0	0	0	0	0	0.00	0.00
7/1	100	109	100	0	0	0	0	0	0.00	0.00
7/2	107	109	101	3	0	3	6	0	50.00	50.00
7/3	95	103	89	5	0	5	6	0	83.33	16.67
7/4	90	100	83	5	0	5	6	0	83.33	16.67
7/5	86	88	79	2	0	2	6	0	33.33	66.67
7/6	82	83	80	1	0	1	2	0	50.00	50.00
7/7	74	90	73	0	0	0	0	0	0.00	0.00
7/8	70	79	67	2	0	2	3	0	66.67	33.33
7/9	68	78	68	0	0	0	0	0	0.00	0.00
7/10	73	84	72	0	0	0	0	0	0.00	0.00
7/11	69	89	65	4	0	4	4	0	100.00	0.00
7/12	58	108	55	2	0	2	2	0	100.00	0.00
7/13	57	108	52	4	0	4	4	0	100.00	0.00
7/14	54	100	52	2	0	2	2	0	100.00	0
7/15	62	101	57	6	0	6	6	0	100.00	0.00
7/16	65	100	57	7	0	7	8	0	87.50	12.50
7/17	64	97	58	6	0	6	6	0	100.00	0.00
7/18	64	95	61	3	0	3	3	0	100.00	0.00
7/19	64	101	64	0	0	0	0	0	0.00	0.00
7/20	68	90	65	3	0	3	3	0	100.00	0.00
7/21	62	93	60	2	0	2	2	0	100.00	0.00
7/22	63	94	58	4	0	4	4	0	100.00	0.00
7/23	63	94	56	6	0	6	6	0	100.00	0.00
7/24	61	82	55	5	0	5	6	0	83.33	16.67
7/25	62	71	59	2	0	2	2	0	100.00	0.00
7/26	59	71	58	0	0	0	0	0	0.00	0.00
7/27	58	106	53	3	0	3	4	0	75.00	25.00
7/28	61	93	54	6	0	6	6	0	100.00	0.00
7/29	59	98	57	1	0	1	1	0	100.00	0.00
7/30	58	95	54	4	0	4	4	0	100.00	0.00
7/31	59	97	53	6	0	6	6	0	100.00	0.00
8/1	56	99	54	2	0	2	2	0	100.00	0.00
8/2	56	101	56	0	0	0	0	0	0.00	0.00
8/3	57	94	57	0	0	0	0	0	0.00	0.00
8/4	56	82	55	0	0	0	0	0	0.00	0.00
8/5	53	89	52	0	0	0	0	0	0.00	0.00
8/6	54	87	54	0	0	0	0	0	0.00	0
8/7	54	84	54	0	0	0	0	0	0.00	0.00
8/8	52	90	44	4	0	4	8	0	50.00	50.00
8/9	52	81	51	0	0	0	0	0	0.00	0.00
8/10	52	79	52	0	0	0	0	0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Lower Granite Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/11	49	81	48	0	0	0	0	0	0.00	0.00
8/12	52	80	51	0	0	0	0	0	0.00	0.00
8/13	50	86	50	0	0	0	0	0	0.00	0.00
8/14	52	100	51	0	0	0	0	0	0.00	0.00
8/15	49	108	49	0	0	0	0	0	0.00	0.00
8/16	46	110	45	0	0	0	0	0	0.00	0.00
8/17	43	102	43	0	0	0	0	0	0.00	0.00
8/18	43	85	42	0	0	0	0	0	0.00	0.00
8/19	42	75	41	0	0	0	0	0	0.00	0.00
8/20	40	83	40	0	0	0	0	0	0.00	0.00
8/21	44	104	43	0	0	0	0	0	0.00	0.00
8/22	41	116	40	0	0	0	0	0	0.00	0.00
8/23	41	117	41	0	0	0	0	0	0.00	0.00
8/24	42	103	42	0	0	0	0	0	0.00	0.00
8/25	43	116	42	0	0	0	0	0	0.00	0.00
8/26	43	121	42	0	0	0	0	0	0.00	0.00
8/27	41	89	40	0	0	0	0	0	0.00	0.00
8/28	35	86	34	0	0	0	0	0	0.00	0.00
8/29	33	85	29	3	0	3	3	0	100.00	0.00
8/30	30	91	29	0	0	0	0	0	0.00	0.00
8/31	30	93	29	0	0	0	0	0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Little Goose Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	113	112	99	8	1	9	13	0	69.23	30.77
4/2	96	94	83	3	2	5	12	0	41.67	58.33
4/3	96	96	94	0	0	0	2	0	0.00	0.00
4/4	96	95	88	6	1	7	8	0	87.50	12.50
4/5	90	95	75	13	0	13	14	0	92.86	7.14
4/6	88	92	87	0	0	0	0	0	0.00	0.00
4/7	87	97	78	5	0	5	8	0	62.50	37.50
4/8	93	90	79	1	3	4	13	9	30.77	69.23
4/9	84	94	77	2	0	2	6	4	33.33	66.67
4/10	89	98	66	16	0	16	23	7	69.57	30.43
4/11	85	96	53	27	0	27	32	5	84.38	15.63
4/12	80	97	43	34	0	34	36	2	94.44	5.56
4/13	78	101	52	23	0	23	25	2	92.00	8.00
4/14	81	94	45	35	0	35	36	1	97.22	2.78
4/15	82	100	54	24	0	24	26	2	92.31	7.69
4/16	90	103	63	26	0	26	26	0	100.00	0.0
4/17	103	101	78	18	2	20	24	4	83.33	16.67
4/18	110	102	86	14	8	22	22	0	100.00	0.00
4/19	122	102	90	12	20	32	32	0	100.00	0.00
4/20	153	115	112	3	38	41	41	0	100.00	0.00
4/21	177	120	120	0	57	57	56	0	100.00	0.00
4/22	177	121	121	0	56	56	55	0	100.00	0.00
4/23	169	117	116	1	52	53	52	0	100.00	0.00
4/24	181	118	116	2	63	65	64	0	100.00	0.00
4/25	164	116	110	5	48	53	53	0	100.00	0.00
4/26	158	98	79	19	60	79	78	0	100.00	0.00
4/27	152	111	99	12	41	53	53	0	100.00	0.00
4/28	170	106	105	1	64	65	64	0	100.00	0.00
4/29	175	104	101	3	71	74	74	0	100.00	0.00
4/30	170	108	102	5	62	67	67	0	100.00	0.00
5/1	164	103	101	1	61	62	62	0	100.00	0.00
5/2	153	103	91	13	50	63	61	0	100.00	0.00
5/3	131	109	86	22	22	44	44	0	100.00	0.00
5/4	132	101	80	21	31	52	52	0	100.00	0.00
5/5	134	102	92	10	32	42	42	0	100.00	0.00
5/6	134	106	98	8	28	36	35	0	100.00	0.00
5/7	145	104	104	0	41	41	40	0	100.00	0.00
5/8	151	112	110	2	39	41	40	0	100.00	0.00
5/9	143	103	103	0	40	40	39	0	100.00	0.0
5/10	150	106	98	8	44	52	51	0	100.00	0.00
5/11	160	110	106	3	50	53	53	0	100.00	0.00
5/12	167	102	93	9	65	74	73	0	100.00	0.00
5/13	169	92	88	4	77	81	80	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Little Goose Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/14	190	105	105	0	85	85	84	0	100.00	0.00
5/15	189	116	116	0	73	73	73	0	100.00	0.00
5/16	208	114	114	0	94	94	93	0	100.00	0.00
5/17	212	113	113	0	99	99	98	0	100.00	0.00
5/18	217	114	114	0	103	103	103	0	100.00	0.00
5/19	197	111	111	0	86	86	86	0	100.00	0.00
5/20	185	109	103	6	76	82	81	0	100.00	0.00
5/21	174	101	85	16	73	89	88	0	100.00	0.00
5/22	174	88	83	4	86	90	90	0	100.00	0.00
5/23	166	98	97	2	68	70	68	0	100.00	0.00
5/24	163	107	86	21	56	77	77	0	100.00	0.00
5/25	156	112	83	26	44	70	72	2	97.22	2.78
5/26	146	106	84	22	40	62	61	0	100.00	0.00
5/27	140	97	87	10	43	53	52	0	100.00	0.00
5/28	137	94	84	10	43	53	53	0	100.00	0.00
5/29	138	91	63	29	47	76	75	0	100.00	0.00
5/30	146	106	101	5	40	45	45	0	100.00	0.00
5/31	162	114	114	0	48	48	48	0	100.00	0.00
6/1	173	114	114	0	59	59	58	0	100.00	0.00
6/2	183	115	115	0	68	68	67	0	100.00	0.00
6/3	175	114	114	0	61	61	60	0	100.00	0.00
6/4	171	110	109	2	61	63	62	0	100.00	0.00
6/5	176	110	109	1	66	67	67	0	100.00	0.00
6/6	182	112	112	0	70	70	70	0	100.00	0.00
6/7	168	113	105	8	55	63	62	0	100.00	0.00
6/8	165	109	91	18	56	74	73	0	100.00	0.00
6/9	164	104	99	5	60	65	64	0	100.00	0.00
6/10	167	107	105	2	60	62	61	0	100.00	0.00
6/11	174	109	107	3	65	68	67	0	100.00	0.00
6/12	186	108	108	0	78	78	78	0	100.00	0.00
6/13	179	114	114	0	65	65	64	0	100.00	0.00
6/14	175	110	110	0	65	65	65	0	100.00	0.00
6/15	183	112	112	0	71	71	71	0	100.00	0.00
6/16	179	106	106	0	73	73	72	0	100.00	0.00
6/17	172	110	80	28	62	90	92	2	97.83	2.17
6/18	170	108	89	19	62	81	80	0	100.00	0.00
6/19	171	107	103	4	64	68	68	0	100.00	0.00
6/20	162	110	87	23	52	75	74	0	100.00	0.00
6/21	150	102	82	20	48	68	68	0	100.00	0.00
6/22	142	104	83	21	38	59	59	0	100.00	0.00
6/23	132	103	84	16	29	45	48	0	93.75	6.25
6/24	122	102	99	3	20	23	21	0	100.00	0.00
6/25	112	114	102	6	0	6	9	0	66.67	33.33

Daily Averaged Flows, Spills and Involuntary Spill at Little Goose Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/26	102	107	101	0	0	0	0	0	0.00	0.00
6/27	105	104	104	0	1	1	0	0	0.00	0.00
6/28	107	110	92	11	0	11	14	0	78.57	21.43
6/29	110	109	103	3	1	4	6	0	66.67	33.33
6/30	101	100	100	0	1	1	0	0	0.00	0.00
7/1	101	100	100	0	1	1	0	0	0.00	0.00
7/2	106	104	103	1	2	3	3	0	100.00	0.00
7/3	93	96	92	0	0	0	0	0	0.00	0.00
7/4	88	100	87	0	0	0	0	0	0.00	0.00
7/5	85	94	84	0	0	0	0	0	0.00	0.00
7/6	80	101	79	0	0	0	0	0	0.00	0.00
7/7	71	98	70	0	0	0	0	0	0.00	0.00
7/8	71	98	70	0	0	0	0	0	0.00	0.00
7/9	68	93	68	0	0	0	0	0	0.00	0.00
7/10	71	98	70	0	0	0	0	0	0.00	0.00
7/11	69	100	68	0	0	0	0	0	0.00	0.00
7/12	57	101	56	0	0	0	0	0	0.00	0.00
7/13	53	94	53	0	0	0	0	0	0.00	0.00
7/14	53	94	52	0	0	0	0	0	0.00	0.00
7/15	62	86	53	7	0	7	8	0	87.50	12.50
7/16	63	82	60	2	0	2	3	0	66.67	33.33
7/17	63	90	63	0	0	0	0	0	0.00	0.00
7/18	63	89	62	0	0	0	0	0	0.00	0.00
7/19	65	93	64	0	0	0	0	0	0.00	0.00
7/20	68	82	68	0	0	0	0	0	0.00	0.00
7/21	60	88	60	0	0	0	0	0	0.00	0.00
7/22	61	89	60	0	0	0	0	0	0.00	0.00
7/23	60	95	59	0	0	0	0	0	0.00	0.00
7/24	61	101	60	0	0	0	0	0	0.00	0.00
7/25	61	102	60	0	0	0	0	0	0.00	0.00
7/26	59	106	58	0	0	0	0	0	0.00	0.00
7/27	58	100	57	0	0	0	0	0	0.00	0.00
7/28	59	97	58	0	0	0	0	0	0.00	0.00
7/29	59	86	58	0	0	0	0	0	0.00	0.00
7/30	56	84	55	0	0	0	0	0	0.00	0.00
7/31	57	85	56	0	0	0	0	0	0.00	0.00
8/1	56	86	55	0	0	0	0	0	0.00	0.00
8/2	56	86	55	0	0	0	0	0	0.00	0.00
8/3	57	84	56	0	0	0	0	0	0.00	0.00
8/4	56	91	55	0	0	0	0	0	0.00	0.00
8/5	53	92	52	0	0	0	0	0	0.00	0.00
8/6	52	94	52	0	0	0	0	0	0.00	0.00
8/7	54	101	54	0	0	0	0	0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Little Goose Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/8	52	97	44	6	0	6	7	0	85.71	14.29
8/9	51	111	50	0	0	0	0	0	0.00	0.00
8/10	53	103	52	0	0	0	0	0	0.00	0.00
8/11	48	97	47	0	0	0	0	0	0.00	0.00
8/12	53	103	52	0	0	0	0	0	0.00	0.00
8/13	48	106	47	0	0	0	0	0	0.00	0.00
8/14	53	113	52	0	0	0	0	0	0.00	0.00
8/15	49	100	48	0	0	0	0	0	0.00	0.00
8/16	45	101	44	0	0	0	0	0	0.00	0.00
8/17	43	101	42	0	0	0	0	0	0.00	0.00
8/18	44	96	43	0	0	0	0	0	0.00	0.00
8/19	44	84	43	0	0	0	0	0	0.00	0.00
8/20	42	91	41	0	0	0	0	0	0.00	0.00
8/21	45	93	44	0	0	0	0	0	0.00	0.00
8/22	40	92	40	0	0	0	0	0	0.00	0.00
8/23	42	96	42	0	0	0	0	0	0.00	0.00
8/24	42	82	41	0	0	0	0	0	0.00	0.00
8/25	42	101	41	0	0	0	0	0	0.00	0.00
8/26	43	90	42	0	0	0	0	0	0.00	0.00
8/27	41	110	40	0	0	0	0	0	0.00	0.00
8/28	33	90	32	0	0	0	0	0	0.00	0.00
8/29	33	95	25	6	0	6	7	0	85.71	14.29
8/30	28	102	28	0	0	0	0	0	0.00	0.00
8/31	30	113	29	0	0	0	0	0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Lower Monumental Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	123	99	99	0	24	24	23	0	100.00	0.00
4/2	105	94	89	4	11	15	15	0	100.00	0.00
4/3	99	98	98	0	1	1	0	0	0.00	0.00
4/4	105	101	101	0	4	4	3	0	100.00	0.00
4/5	94	93	93	0	1	1	0	0	0.00	0.00
4/6	95	94	94	0	1	1	0	0	0.00	0.00
4/7	91	92	90	0	0	0	0	0	0.00	0.00
4/8	102	98	98	0	4	4	3	0	100.00	0.00
4/9	93	94	92	0	0	0	0	0	0.00	0.00
4/10	101	107	90	10	0	10	10	0	100.00	0.00
4/11	90	102	71	18	0	18	19	1	94.74	5.26
4/12	86	94	66	19	0	19	20	1	95.00	5.00
4/13	83	97	62	20	0	20	20	0	100.00	0.00
4/14	86	92	64	17	0	17	22	5	77.27	22.73
4/15	87	101	65	18	0	18	21	3	85.71	14.29
4/16	97	99	75	17	0	17	21	4	80.95	19.0
4/17	112	102	87	12	10	22	24	2	91.67	8.33
4/18	117	106	94	11	11	22	22	0	100.00	0.00
4/19	132	108	104	5	24	29	28	0	100.00	0.00
4/20	164	114	113	1	50	51	50	0	100.00	0.00
4/21	191	120	118	2	71	73	73	0	100.00	0.00
4/22	192	120	120	0	72	72	72	0	100.00	0.00
4/23	180	117	117	0	63	63	62	0	100.00	0.00
4/24	199	117	114	3	82	85	84	0	100.00	0.00
4/25	179	119	119	0	60	60	59	0	100.00	0.00
4/26	173	106	105	1	67	68	67	0	100.00	0.00
4/27	164	111	101	10	53	63	62	0	100.00	0.00
4/28	183	114	113	1	69	70	70	0	100.00	0.00
4/29	193	118	118	0	75	75	75	0	100.00	0.00
4/30	187	118	118	0	69	69	68	0	100.00	0.00
5/1	177	115	115	0	62	62	61	0	100.00	0.00
5/2	167	116	113	2	51	53	53	0	100.00	0.00
5/3	143	107	100	7	36	43	42	0	100.00	0.00
5/4	140	106	98	8	34	42	40	0	100.00	0.00
5/5	142	114	104	9	28	37	38	1	97.37	2.63
5/6	144	110	106	4	34	38	37	0	100.00	0.00
5/7	154	114	114	0	40	40	39	0	100.00	0.00
5/8	159	117	117	0	42	42	41	0	100.00	0.00
5/9	154	114	113	1	40	41	40	0	100.00	0.0
5/10	159	114	111	3	45	48	47	0	100.00	0.00
5/11	170	113	113	0	57	57	56	0	100.00	0.00
5/12	179	116	114	2	63	65	64	0	100.00	0.00
5/13	183	116	116	0	67	67	66	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Lower Monumental Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/14	205	115	113	2	90	92	91	0	100.00	0.00
5/15	205	117	117	0	88	88	87	0	100.00	0.00
5/16	223	118	118	0	105	105	104	0	100.00	0.00
5/17	231	115	115	0	116	116	115	0	100.00	0.00
5/18	236	114	114	0	122	122	121	0	100.00	0.00
5/19	214	112	112	0	102	102	101	0	100.00	0.00
5/20	197	112	112	0	85	85	84	0	100.00	0.00
5/21	189	114	111	3	75	78	77	0	100.00	0.00
5/22	187	116	114	2	71	73	72	0	100.00	0.00
5/23	174	111	107	4	63	67	65	0	100.00	0.00
5/24	173	105	100	4	68	72	72	0	100.00	0.00
5/25	172	106	102	4	66	70	68	0	100.00	0.00
5/26	154	104	96	7	50	57	56	0	100.00	0.00
5/27	146	107	104	3	39	42	42	0	100.00	0.00
5/28	145	109	103	6	36	42	41	0	100.00	0.00
5/29	148	102	96	6	46	52	52	0	100.00	0.00
5/30	152	110	108	2	42	44	43	0	100.00	0.00
5/31	172	110	104	4	62	66	66	0	100.00	0.00
6/1	183	110	109	1	73	74	73	0	100.00	0.00
6/2	196	120	120	0	76	76	75	0	100.00	0.00
6/3	185	113	112	1	72	73	72	0	100.00	0.00
6/4	183	112	109	2	71	73	73	0	100.00	0.00
6/5	189	114	107	7	75	82	82	0	100.00	0.00
6/6	194	113	104	9	81	90	90	0	100.00	0.00
6/7	184	117	95	20	67	87	89	2	97.75	2.25
6/8	176	100	82	18	76	94	93	0	100.00	0.00
6/9	175	108	88	20	67	87	86	0	100.00	0.00
6/10	175	112	94	15	63	78	81	3	96.30	3.70
6/11	187	109	81	25	78	103	104	1	99.04	0.96
6/12	200	111	103	8	89	97	97	0	100.00	0.00
6/13	192	107	97	10	85	95	94	0	100.00	0.00
6/14	186	108	92	16	78	94	94	0	100.00	0.00
6/15	194	102	86	16	92	108	107	0	100.00	0.00
6/16	192	108	94	14	84	98	98	0	100.00	0.00
6/17	185	104	96	8	81	89	88	0	100.00	0.00
6/18	183	109	101	8	74	82	81	0	100.00	0.00
6/19	185	113	113	0	72	72	71	0	100.00	0.00
6/20	171	105	98	7	66	73	72	0	100.00	0.00
6/21	158	109	101	8	49	57	56	0	100.00	0.00
6/22	154	109	99	10	45	55	53	0	100.00	0.00
6/23	141	111	91	15	30	45	49	0	91.84	8.16
6/24	126	112	106	6	14	20	19	0	100.00	0.00
6/25	121	116	112	3	5	8	9	0	88.89	11.11

Daily Averaged Flows, Spills and Involuntary Spill at Lower Monumental Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/26	107	110	104	1	0	1	2	0	50.00	50.00
6/27	115	114	114	0	1	1	0	0	0.00	0.00
6/28	113	109	102	5	4	9	10	0	90.00	10.00
6/29	119	115	114	1	4	5	4	0	100.00	0.00
6/30	110	109	109	0	1	1	0	0	0.00	0.00
7/1	107	101	93	5	6	11	14	0	78.57	21.43
7/2	112	90	88	1	22	23	23	0	100.00	0.00
7/3	101	97	97	0	4	4	3	0	100.00	0.00
7/4	94	90	90	0	4	4	2	0	100.00	0.00
7/5	92	92	92	0	0	0	0	0	0.00	0.00
7/6	85	84	84	0	1	1	0	0	0.00	0.00
7/7	78	85	77	0	0	0	0	0	0.00	0.00
7/8	75	85	74	0	0	0	0	0	0.00	0.00
7/9	74	79	74	0	0	0	0	0	0.00	0.00
7/10	78	86	77	0	0	0	0	0	0.00	0.00
7/11	75	88	74	0	0	0	0	0	0.00	0.0
7/12	62	83	62	0	0	0	0	0	0.00	0.00
7/13	58	80	57	0	0	0	0	0	0.00	0.00
7/14	58	85	57	0	0	0	0	0	0.00	0.00
7/15	66	85	57	8	0	8	8	0	100.00	0.00
7/16	66	87	59	6	0	6	6	0	100.00	0.00
7/17	69	94	68	0	0	0	0	0	0.00	0.00
7/18	66	92	66	0	0	0	0	0	0.00	0.00
7/19	70	100	69	0	0	0	0	0	0.00	0.00
7/20	74	103	74	0	0	0	0	0	0.00	0.00
7/21	65	97	64	0	0	0	0	0	0.00	0.00
7/22	67	90	66	0	0	0	0	0	0.00	0.00
7/23	63	89	62	0	0	0	0	0	0.00	0.00
7/24	66	86	65	0	0	0	0	0	0.00	0.00
7/25	66	86	65	0	0	0	0	0	0.00	0.00
7/26	64	85	64	0	0	0	0	0	0.00	0.00
7/27	61	91	60	0	0	0	0	0	0.00	0.00
7/28	64	83	63	0	0	0	0	0	0.00	0.00
7/29	64	82	63	0	0	0	0	0	0.00	0.00
7/30	61	82	60	0	0	0	0	0	0.00	0.00
7/31	63	86	62	0	0	0	0	0	0.00	0.00
8/1	60	90	59	0	0	0	0	0	0.00	0.00
8/2	59	83	58	0	0	0	0	0	0.00	0.00
8/3	61	80	60	0	0	0	0	0	0.00	0.0
8/4	61	84	60	0	0	0	0	0	0.00	0.00
8/5	56	87	55	0	0	0	0	0	0.00	0.00
8/6	58	89	57	0	0	0	0	0	0.00	0.00
8/7	57	85	56	0	0	0	0	0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Lower Monumental Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/8	55	87	46	8	0	8	9	0	88.89	11.11
8/9	54	94	53	0	0	0	0	0	0.00	0.00
8/10	56	85	55	0	0	0	0	0	0.00	0.00
8/11	51	84	50	0	0	0	0	0	0.00	0.00
8/12	57	75	56	0	0	0	0	0	0.00	0.00
8/13	50	85	49	0	0	0	0	0	0.00	0.00
8/14	59	92	58	0	0	0	0	0	0.00	0.00
8/15	53	83	52	0	0	0	0	0	0.00	0.00
8/16	48	90	48	0	0	0	0	0	0.00	0.00
8/17	46	83	45	0	0	0	0	0	0.00	0.00
8/18	47	90	47	0	0	0	0	0	0.00	0.00
8/19	46	86	45	0	0	0	0	0	0.00	0.00
8/20	44	86	43	0	0	0	0	0	0.00	0.00
8/21	47	90	46	0	0	0	0	0	0.00	0.00
8/22	43	85	42	0	0	0	0	0	0.00	0.00
8/23	48	88	47	0	0	0	0	0	0.00	0.00
8/24	46	90	45	0	0	0	0	0	0.00	0.00
8/25	44	91	43	0	0	0	0	0	0.00	0.00
8/26	43	88	42	0	0	0	0	0	0.00	0.00
8/27	46	107	45	0	0	0	0	0	0.00	0.00
8/28	33	87	32	0	0	0	0	0	0.00	0.00
8/29	35	100	26	8	0	8	8	0	100.00	0.00
8/30	29	100	29	0	0	0	0	0	0.00	0.00
8/31	33	95	32	0	0	0	0	0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Ice Harbor Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	121	65	65	0	56	56	56	0	100.00	0.00
4/2	106	70	69	1	36	37	36	0	100.00	0.00
4/3	99	73	73	0	26	26	25	0	100.00	0.00
4/4	104	74	74	0	30	30	30	0	100.00	0.00
4/5	96	73	73	0	23	23	22	0	100.00	0.00
4/6	94	72	72	0	22	22	22	0	100.00	0.00
4/7	90	70	70	0	20	20	19	0	100.00	0.00
4/8	102	73	73	0	29	29	28	0	100.00	0.00
4/9	94	72	72	0	22	22	22	0	100.00	0.00
4/10	100	71	71	0	29	29	28	0	100.00	0.00
4/11	89	63	63	0	26	26	25	0	100.00	0.00
4/12	87	63	63	0	24	24	23	0	100.00	0.00
4/13	82	58	58	0	24	24	22	0	100.00	0.00
4/14	86	62	62	0	24	24	23	0	100.00	0.00
4/15	89	64	64	0	25	25	24	0	100.00	0.00
4/16	96	69	69	0	27	27	26	0	100.00	0.0
4/17	112	74	74	0	38	38	38	0	100.00	0.0
4/18	117	73	73	0	44	44	44	0	100.00	0.00
4/19	127	72	72	0	55	55	54	0	100.00	0.00
4/20	157	72	72	0	85	85	84	0	100.00	0.00
4/21	182	70	70	0	112	112	111	0	100.00	0.00
4/22	181	72	72	0	109	109	108	0	100.00	0.00
4/23	169	69	69	0	100	100	99	0	100.00	0.00
4/24	187	68	68	0	119	119	118	0	100.00	0.00
4/25	172	66	66	0	106	106	106	0	100.00	0.00
4/26	163	67	67	0	96	96	95	0	100.00	0.00
4/27	157	69	69	0	88	88	87	0	100.00	0.00
4/28	174	70	70	0	104	104	102	0	100.00	0.00
4/29	180	65	65	0	115	115	114	0	100.00	0.00
4/30	176	66	66	0	110	110	108	0	100.00	0.00
5/1	168	70	70	0	98	98	97	0	100.00	0.00
5/2	162	72	72	0	90	90	89	0	100.00	0.00
5/3	137	72	72	0	65	65	64	0	100.00	0.00
5/4	138	72	72	0	66	66	65	0	100.00	0.00
5/5	138	73	73	0	65	65	64	0	100.00	0.00
5/6	139	71	71	0	68	68	66	0	100.00	0.00
5/7	151	73	73	0	78	78	77	0	100.00	0.00
5/8	148	73	73	0	75	75	74	0	100.00	0.00
5/9	154	73	73	0	81	81	80	0	100.00	0.00
5/10	153	73	73	0	80	80	79	0	100.00	0.0
5/11	164	74	74	0	90	90	90	0	100.00	0.00
5/12	170	74	74	0	96	96	95	0	100.00	0.00
5/13	173	74	74	0	99	99	98	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Ice Harbor Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/14	191	73	73	0	118	118	117	0	100.00	0.00
5/15	194	74	74	0	120	120	119	0	100.00	0.00
5/16	205	74	74	0	131	131	129	0	100.00	0.00
5/17	214	74	74	0	140	140	140	0	100.00	0.00
5/18	217	74	74	0	143	143	143	0	100.00	0.00
5/19	199	73	73	0	126	126	125	0	100.00	0.00
5/20	185	69	68	0	116	116	116	0	100.00	0.00
5/21	176	67	64	3	109	112	111	0	100.00	0.00
5/22	179	74	73	1	105	106	105	0	100.00	0.00
5/23	164	70	66	4	94	98	97	0	100.00	0.00
5/24	163	67	58	9	96	105	104	0	100.00	0.00
5/25	165	71	66	5	94	99	98	0	100.00	0.00
5/26	146	65	61	4	81	85	84	0	100.00	0.00
5/27	142	72	71	1	70	71	70	0	100.00	0.00
5/28	140	72	72	0	68	68	68	0	100.00	0.00
5/29	144	71	71	0	73	73	73	0	100.00	0.00
5/30	146	72	72	0	74	74	73	0	100.00	0.00
5/31	165	77	70	4	88	92	94	2	97.87	2.13
6/1	171	70	69	1	101	102	101	0	100.00	0.00
6/2	185	71	71	0	114	114	113	0	100.00	0.00
6/3	176	71	68	3	105	108	108	0	100.00	0.00
6/4	177	73	72	1	104	105	105	0	100.00	0.00
6/5	185	71	69	2	114	116	115	0	100.00	0.00
6/6	190	71	71	0	119	119	117	0	100.00	0.00
6/7	178	64	59	5	114	119	119	0	100.00	0.00
6/8	171	62	50	12	109	121	120	0	100.00	0.00
6/9	170	68	58	10	102	112	112	0	100.00	0.00
6/10	175	70	64	6	105	111	110	0	100.00	0.00
6/11	184	67	62	5	117	122	121	0	100.00	0.00
6/12	198	66	60	6	132	138	138	0	100.00	0.00
6/13	191	74	69	5	117	122	122	0	100.00	0.00
6/14	183	68	61	7	115	122	122	0	100.00	0.00
6/15	191	61	57	4	130	134	133	0	100.00	0.00
6/16	191	64	64	0	127	127	127	0	100.00	0.00
6/17	183	66	63	3	117	120	119	0	100.00	0.00
6/18	180	66	57	9	114	123	122	0	100.00	0.00
6/19	184	68	68	0	116	116	116	0	100.00	0.00
6/20	171	66	66	0	105	105	105	0	100.00	0.00
6/21	159	63	63	0	96	96	95	0	100.00	0.00
6/22	154	65	57	8	89	97	96	0	100.00	0.00
6/23	143	66	61	5	77	82	81	0	100.00	0.00
6/24	128	68	68	0	60	60	59	0	100.00	0.00
6/25	127	70	70	0	57	57	56	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Ice Harbor Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/26	108	61	58	3	47	50	49	0	100.00	0.00
6/27	117	72	72	0	45	45	44	0	100.00	0.00
6/28	114	68	68	0	46	46	44	0	100.00	0.00
6/29	120	72	72	0	48	48	48	0	100.00	0.00
6/30	111	69	68	1	42	43	43	0	100.00	0.00
7/1	110	67	66	1	43	44	43	0	100.00	0.00
7/2	114	72	72	0	42	42	41	0	100.00	0.00
7/3	104	63	61	1	41	42	42	0	100.00	0.00
7/4	96	61	55	6	35	41	40	0	100.00	0.00
7/5	95	60	54	6	35	41	40	0	100.00	0.00
7/6	87	60	46	14	27	41	40	0	100.00	0.00
7/7	78	50	38	13	28	41	40	0	100.00	0.00
7/8	76	57	36	21	19	40	40	0	100.00	0.00
7/9	77	53	36	17	24	41	40	0	100.00	0.00
7/10	78	59	37	20	19	39	40	1	97.50	2.50
7/11	78	59	38	22	19	41	40	0	100.00	0.00
7/12	65	49	24	25	16	41	40	0	100.00	0.0
7/13	60	56	23	25	4	29	36	7	80.56	19.44
7/14	61	52	28	14	9	23	31	8	74.19	25.81
7/15	65	54	35	5	11	16	29	13	55.17	44.83
7/16	70	51	31	18	19	37	38	1	97.37	2.63
7/17	72	46	32	13	26	39	39	0	100.00	0.00
7/18	70	43	30	12	27	39	39	0	100.00	0.00
7/19	72	44	32	12	28	40	39	0	100.00	0.00
7/20	77	53	36	16	24	40	40	0	100.00	0.00
7/21	67	47	30	15	20	35	36	1	97.22	2.78
7/22	68	43	31	11	25	36	36	0	100.00	0.00
7/23	66	47	29	15	19	34	36	2	94.44	5.56
7/24	68	46	31	13	22	35	36	1	97.22	2.78
7/25	66	45	28	16	21	37	37	0	100.00	0.00
7/26	67	48	26	19	19	38	40	2	95.00	5.00
7/27	63	42	25	14	21	35	36	1	97.22	2.78
7/28	65	47	28	17	18	35	36	1	97.22	2.78
7/29	68	49	30	14	19	33	36	3	91.67	8.33
7/30	64	51	27	16	13	29	36	7	80.56	19.44
7/31	65	50	29	13	15	28	35	7	80.00	20.00
8/1	60	57	26	16	3	19	33	14	57.58	42.42
8/2	60	55	24	24	5	29	36	7	80.56	19.44
8/3	64	47	24	22	17	39	39	0	100.00	0.00
8/4	64	50	25	19	14	33	39	6	84.62	15.3
8/5	58	47	19	21	11	32	39	7	82.05	17.95
8/6	58	48	19	19	10	29	38	9	76.32	23.68
8/7	60	50	17	28	10	38	42	4	90.48	9.52

Daily Averaged Flows, Spills and Involuntary Spill at Ice Harbor Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/8	59	58	17	28	1	29	41	12	70.73	29.27
8/9	55	48	18	18	7	25	36	11	69.44	30.56
8/10	59	48	18	22	11	33	40	7	82.50	17.50
8/11	52	39	12	23	13	36	39	3	92.31	7.69
8/12	60	48	20	22	12	34	40	6	85.00	15.00
8/13	51	38	11	23	13	36	39	3	92.31	7.69
8/14	61	40	15	24	21	45	45	0	100.00	0.00
8/15	55	48	18	20	7	27	36	9	75.00	25.00
8/16	51	43	12	26	8	34	38	4	89.47	10.53
8/17	49	37	10	23	12	35	38	3	92.11	7.89
8/18	49	39	14	18	10	28	35	7	80.00	20.00
8/19	49	25	10	14	24	38	38	0	100.00	0.00
8/20	45	19	9	9	26	35	35	0	100.00	0.00
8/21	49	30	12	14	19	33	36	3	91.67	8.33
8/22	46	47	10	31	0	31	34	3	91.18	8.82
8/23	52	44	12	28	8	36	40	4	90.00	10.00
8/24	48	47	13	20	1	21	34	13	61.76	38.24
8/25	46	57	12	26	0	26	32	6	81.25	18.75
8/26	44	40	9	22	4	26	34	8	76.47	23.53
8/27	53	45	14	24	8	32	39	7	82.05	17.95
8/28	32	48	5	26	0	26	27	1	96.30	3.70
8/29	39	44	6	32	0	32	33	1	96.97	3.03
8/30					0	0		0	0.00	0.00
8/31					0	0		0	0.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at McNary Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	326	150	150	0	176	176	173	0	100.00	0.00
4/2	312	150	150	0	162	162	159	0	100.00	0.00
4/3	281	148	148	0	133	133	129	0	100.00	0.00
4/4	288	148	148	0	140	140	138	0	100.00	0.00
4/5	278	149	149	0	129	129	125	0	100.00	0.00
4/6	240	150	150	0	90	90	86	0	100.00	0.00
4/7	275	147	147	0	128	128	125	0	100.00	0.00
4/8	256	135	135	0	121	121	118	0	100.00	0.00
4/9	261	162	162	0	99	99	95	0	100.00	0.00
4/10	255	161	161	0	94	94	89	0	100.00	0.00
4/11	273	162	162	0	111	111	107	0	100.00	0.00
4/12	242	162	162	0	80	80	75	0	100.00	0.00
4/13	201	162	162	0	39	39	35	0	100.00	0.00
4/14	228	162	162	0	66	66	62	0	100.00	0.00
4/15	248	159	159	0	89	89	84	0	100.00	0.00
4/16	261	161	161	0	100	100	96	0	100.00	0.
4/17	257	161	161	0	96	96	92	0	100.00	0.00
4/18	268	162	162	0	106	106	102	0	100.00	0.00
4/19	287	163	163	0	124	124	120	0	100.00	0.00
4/20	295	162	162	0	133	133	129	0	100.00	0.00
4/21	321	162	162	0	159	159	155	0	100.00	0.00
4/22	399	161	161	0	238	238	234	0	100.00	0.00
4/23	414	160	160	0	254	254	249	0	100.00	0.00
4/24	424	161	161	0	263	263	259	0	100.00	0.00
4/25	404	160	160	0	244	244	240	0	100.00	0.00
4/26	403	160	160	0	243	243	236	0	100.00	0.00
4/27	401	159	159	0	242	242	237	0	100.00	0.00
4/28	401	163	163	0	238	238	234	0	100.00	0.00
4/29	442	161	161	0	281	281	276	0	100.00	0.00
4/30	452	160	160	0	292	292	287	0	100.00	0.00
5/1	456	161	161	0	295	295	291	0	100.00	0.00
5/2	436	161	161	0	275	275	271	0	100.00	0.00
5/3	402	166	166	0	236	236	232	0	100.00	0.00
5/4	395	159	159	0	236	236	232	0	100.00	0.00
5/5	390	169	169	0	221	221	216	0	100.00	0.00
5/6	388	170	170	0	218	218	214	0	100.00	0.00
5/7	378	174	174	0	204	204	200	0	100.00	0.00
5/8	397	175	175	0	222	222	218	0	100.00	0.00
5/9	394	172	172	0	222	222	218	0	100.00	0
5/10	392	173	173	0	219	219	216	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at McNary Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/11	400	174	174	0	226	226	221	0	100.00	0.00
5/12	433	170	170	0	263	263	259	0	100.00	0.00
5/13	429	173	173	0	256	256	251	0	100.00	0.00
5/14	478	174	174	0	304	304	300	0	100.00	0.00
5/15	468	172	172	0	296	296	292	0	100.00	0.00
5/16	478	176	176	0	302	302	299	0	100.00	0.00
5/17	519	171	171	0	348	348	344	0	100.00	0.00
5/18	524	174	174	0	350	350	346	0	100.00	0.00
5/19	518	172	172	0	346	346	342	0	100.00	0.00
5/20	496	159	159	0	337	337	332	0	100.00	0.00
5/21	514	165	164	1	349	350	345	0	100.00	0.00
5/22	488	166	166	0	322	322	317	0	100.00	0.00
5/23	496	158	158	0	338	338	333	0	100.00	0.00
5/24	460	134	117	17	326	343	339	0	100.00	0.00
5/25	465	144	124	20	321	341	337	0	100.00	0.00
5/26	457	143	141	2	314	316	312	0	100.00	0.00
5/27	452	148	147	1	304	305	301	0	100.00	0.00
5/28	452	159	158	1	293	294	290	0	100.00	0.00
5/29	446	165	162	3	281	284	280	0	100.00	0.00
5/30	467	173	173	0	294	294	290	0	100.00	0.00
5/31	457	175	175	0	282	282	278	0	100.00	0.00
6/1	515	174	174	0	341	341	337	0	100.00	0.00
6/2	522	175	175	0	347	347	343	0	100.00	0.00
6/3	517	172	172	0	345	345	341	0	100.00	0.00
6/4	508	165	165	0	343	343	340	0	100.00	0.00
6/5	494	161	145	15	333	348	344	0	100.00	0.00
6/6	523	156	156	0	367	367	363	0	100.00	0.00
6/7	520	152	143	10	368	378	374	0	100.00	0.00
6/8	494	145	130	15	349	364	360	0	100.00	0.00
6/9	490	154	137	17	336	353	349	0	100.00	0.00
6/10	518	162	160	2	356	358	354	0	100.00	0.00
6/11	533	160	157	3	373	376	372	0	100.00	0.00
6/12	570	160	160	0	410	410	406	0	100.00	0.00
6/13	577	158	158	0	419	419	415	0	100.00	0.00
6/14	543	140	140	0	403	403	399	0	100.00	0.00
6/15	525	131	115	16	394	410	405	0	100.00	0.00
6/16	549	148	145	4	401	405	400	0	100.00	0.00
6/17	530	168	161	6	362	368	365	0	100.00	0.00
6/18	509	170	167	3	339	342	338	0	100.00	0.00
6/19	510	168	167	1	342	343	339	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at McNary Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/20	506	173	173	0	333	333	329	0	100.00	0.00
6/21	472	172	172	0	300	300	296	0	100.00	0.00
6/22	470	174	158	16	296	312	308	0	100.00	0.00
6/23	461	193	182	11	268	279	276	0	100.00	0.00
6/24	441	161	161	0	280	280	276	0	100.00	0.00
6/25	394	160	160	0	234	234	229	0	100.00	0.00
6/26	383	168	168	0	215	215	210	0	100.00	0.00
6/27	378	168	168	0	210	210	206	0	100.00	0.00
6/28	369	173	173	0	196	196	192	0	100.00	0.00
6/29	335	158	158	1	177	178	173	0	100.00	0.00
6/30	308	165	161	4	143	147	143	0	100.00	0.00
7/1	297	171	169	2	126	128	123	0	100.00	0.00
7/2	303	173	173	0	130	130	126	0	100.00	0.00
7/3	317	172	172	0	145	145	141	0	100.00	0.00
7/4	286	159	159	0	127	127	123	0	100.00	0.00
7/5	310	158	158	0	152	152	148	0	100.00	0.
7/6	292	156	156	0	136	136	133	0	100.00	0.00
7/7	281	157	157	0	124	124	120	0	100.00	0.00
7/8	276	170	170	0	106	106	102	0	100.00	0.00
7/9	259	173	173	0	86	86	82	0	100.00	0.00
7/10	287	157	157	0	130	130	126	0	100.00	0.00
7/11	289	167	167	0	122	122	118	0	100.00	0.00
7/12	281	162	162	0	119	119	115	0	100.00	0.00
7/13	255	150	150	0	105	105	100	0	100.00	0.00
7/14	276	160	160	0	116	116	112	0	100.00	0.00
7/15	285	165	150	14	120	134	130	0	100.00	0.00
7/16	311	160	160	0	151	151	148	0	100.00	0.00
7/17	291	156	154	2	135	137	133	0	100.00	0.00
7/18	302	161	161	0	141	141	137	0	100.00	0.00
7/19	295	164	164	0	131	131	126	0	100.00	0.00
7/20	290	164	164	0	126	126	122	0	100.00	0.00
7/21	285	160	160	0	125	125	122	0	100.00	0.00
7/22	258	156	156	0	102	102	98	0	100.00	0.00
7/23	284	161	161	0	123	123	118	0	100.00	0.00
7/24	249	149	141	6	100	106	104	0	100.00	0.00
7/25	270	173	173	0	97	97	92	0	100.00	0.00
7/26	253	168	168	0	85	85	80	0	100.00	0.00
7/27	231	158	158	0	73	73	68	0	100.00	0.00
7/28	268	165	165	0	103	103	99	0	100.00	0
7/29	231	171	171	0	60	60	56	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at McNary Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
7/30	196	157	157	0	39	39	34	0	100.00	0.00
7/31	210	156	156	0	54	54	51	0	100.00	0.00
8/1	193	157	157	0	36	36	32	0	100.00	0.00
8/2	181	142	142	0	39	39	35	0	100.00	0.00
8/3	183	121	104	17	62	79	75	0	100.00	0.00
8/4	216	142	142	0	74	74	70	0	100.00	0.00
8/5	216	140	140	0	76	76	72	0	100.00	0.00
8/6	215	147	147	0	68	68	64	0	100.00	0.00
8/7	213	163	162	1	50	51	47	0	100.00	0.00
8/8	204	160	129	31	44	75	71	0	100.00	0.00
8/9	238	159	159	0	79	79	75	0	100.00	0.00
8/10	188	150	150	0	38	38	33	0	100.00	0.00
8/11	196	149	149	0	47	47	43	0	100.00	0.00
8/12	205	151	151	0	54	54	50	0	100.00	0.00
8/13	214	148	148	0	66	66	62	0	100.00	0.00
8/14	208	157	157	0	51	51	48	0	100.00	0.00
8/15	211	160	160	0	51	51	47	0	100.00	0.00
8/16	190	162	162	0	28	28	24	0	100.00	0.00
8/17	177	160	160	0	17	17	13	0	100.00	0.00
8/18	189	136	136	0	53	53	49	0	100.00	0.00
8/19	207	132	132	0	75	75	71	0	100.00	0.00
8/20	212	144	144	0	68	68	64	0	100.00	0.00
8/21	222	152	152	0	70	70	66	0	100.00	0.00
8/22	216	166	166	0	50	50	45	0	100.00	0.00
8/23	196	164	164	0	32	32	27	0	100.00	0.00
8/24	162	154	154	0	8	8	5	0	100.00	0.00
8/25	188	153	153	0	35	35	31	0	100.00	0.00
8/26	184	128	126	2	56	58	55	0	100.00	0.00
8/27	199	131	128	3	68	71	66	0	100.00	0.00
8/28	173	144	144	0	29	29	25	0	100.00	0.00
8/29	174	158	158	0	16	16	12	0	100.00	0.00
8/30	206	155	155	0	51	51	47	0	100.00	0.00
8/31	174	152	152	0	22	22	18	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at John Day Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	317	250	249	0	67	67	66	0	100.00	0.00
4/2	376	264	263	1	112	113	111	0	100.00	0.00
4/3	293	273	272	0	20	20	20	0	100.00	0.00
4/4	311	302	301	0	9	9	9	0	100.00	0.00
4/5	296	294	294	0	2	2	0	0	0.00	0.00
4/6	244	242	242	0	2	2	0	0	0.00	0.00
4/7	277	275	275	0	2	2	0	0	0.00	0.00
4/8	259	258	258	0	1	1	0	0	0.00	0.00
4/9	269	267	267	0	2	2	0	0	0.00	0.00
4/10	273	272	271	0	1	1	0	0	0.00	0.00
4/11	281	280	280	0	1	1	0	0	0.00	0.00
4/12	255	254	254	0	1	1	0	0	0.00	0.00
4/13	206	206	204	0	0	0	0	0	0.00	0.00
4/14	252	253	251	0	0	0	0	0	0.00	0.00
4/15	242	243	240	0	0	0	0	0	0.00	0.00
4/16	259	257	257	0	2	2	0	0	0.00	0.00
4/17	276	272	271	0	4	4	4	0	100.00	0.0
4/18	288	287	287	0	1	1	0	0	0.00	0.00
4/19	314	312	312	0	2	2	0	0	0.00	0.00
4/20	300	286	286	0	14	14	13	0	100.00	0.00
4/21	342	309	309	0	33	33	32	0	100.00	0.00
4/22	449	328	328	0	121	121	120	0	100.00	0.00
4/23	465	331	331	0	134	134	133	0	100.00	0.00
4/24	472	322	322	0	150	150	149	0	100.00	0.00
4/25	456	307	307	0	149	149	147	0	100.00	0.00
4/26	435	316	316	0	119	119	118	0	100.00	0.00
4/27	438	330	329	1	108	109	107	0	100.00	0.00
4/28	400	337	337	0	63	63	61	0	100.00	0.00
4/29	471	328	328	0	143	143	141	0	100.00	0.00
4/30	464	317	316	1	147	148	147	0	100.00	0.00
5/1	494	339	339	0	155	155	154	0	100.00	0.00
5/2	476	343	343	0	133	133	133	0	100.00	0.00
5/3	442	326	326	0	116	116	115	0	100.00	0.00
5/4	411	309	309	0	102	102	102	0	100.00	0.00
5/5	396	303	303	0	93	93	92	0	100.00	0.00
5/6	424	307	307	0	117	117	116	0	100.00	0.00
5/7	415	306	306	0	109	109	107	0	100.00	0.00
5/8	416	312	311	1	104	105	104	0	100.00	0.00
5/9	422	301	301	0	121	121	120	0	100.00	0.00
5/10	405	295	295	0	110	110	109	0	100.00	0.0
5/11	394	301	301	0	93	93	91	0	100.00	0.0
5/12	477	326	326	0	151	151	150	0	100.00	0.00
5/13	520	317	316	2	203	205	204	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at John Day Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/14	514	323	323	0	191	191	189	0	100.00	0.00
5/15	466	327	326	1	139	140	138	0	100.00	0.00
5/16	455	321	321	0	134	134	132	0	100.00	0.00
5/17	503	329	329	0	174	174	173	0	100.00	0.00
5/18	528	327	327	0	201	201	200	0	100.00	0.00
5/19	540	323	323	0	217	217	215	0	100.00	0.00
5/20	540	326	326	0	214	214	212	0	100.00	0.00
5/21	537	324	324	0	213	213	211	0	100.00	0.00
5/22	517	322	321	1	195	196	195	0	100.00	0.00
5/23	519	316	315	1	203	204	202	0	100.00	0.00
5/24	508	288	287	1	220	221	220	0	100.00	0.00
5/25	480	314	314	0	166	166	164	0	100.00	0.00
5/26	477	323	323	0	154	154	153	0	100.00	0.00
5/27	475	326	326	0	149	149	148	0	100.00	0.00
5/28	474	322	322	0	152	152	150	0	100.00	0.00
5/29	474	318	318	0	156	156	156	0	100.00	0.00
5/30	464	317	317	0	147	147	146	0	100.00	0.00
5/31	484	307	307	0	177	177	176	0	100.00	0.00
6/1	503	309	309	0	194	194	193	0	100.00	0.00
6/2	521	304	304	0	217	217	216	0	100.00	0.00
6/3	563	310	308	2	253	255	254	0	100.00	0.00
6/4	556	313	311	2	243	245	243	0	100.00	0.00
6/5	534	310	310	0	224	224	222	0	100.00	0.00
6/6	520	318	318	0	202	202	200	0	100.00	0.00
6/7	528	324	324	0	204	204	202	0	100.00	0.00
6/8	529	319	319	0	210	210	208	0	100.00	0.00
6/9	530	312	312	0	218	218	216	0	100.00	0.00
6/10	529	319	319	0	210	210	209	0	100.00	0.00
6/11	530	322	319	3	208	211	209	0	100.00	0.00
6/12	560	314	314	0	246	246	245	0	100.00	0.00
6/13	581	318	318	0	263	263	261	0	100.00	0.00
6/14	580	320	320	0	260	260	259	0	100.00	0.00
6/15	580	316	316	0	264	264	262	0	100.00	0.00
6/16	579	329	327	2	250	252	250	0	100.00	0.00
6/17	568	323	320	3	245	248	247	0	100.00	0.00
6/18	560	295	295	0	265	265	263	0	100.00	0.00
6/19	544	322	322	1	222	223	222	0	100.00	0.00
6/20	522	320	319	1	202	203	202	0	100.00	0.00
6/21	504	322	320	2	182	184	182	0	100.00	0.00
6/22	483	306	306	0	177	177	175	0	100.00	0.00
6/23	468	311	311	0	157	157	156	0	100.00	0.00
6/24	470	310	310	0	160	160	159	0	100.00	0.00
6/25	412	310	310	0	102	102	101	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at John Day Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/26	390	295	292	3	95	98	96	0	100.00	0.00
6/27	396	310	310	0	86	86	87	1	98.85	1.15
6/28	387	317	317	0	70	70	69	0	100.00	0.00
6/29	362	311	311	0	51	51	50	0	100.00	0.00
6/30	313	288	288	0	25	25	24	0	100.00	0.00
7/1	300	249	249	0	51	51	50	0	100.00	0.00
7/2	303	262	252	10	41	51	49	0	100.00	0.00
7/3	324	270	270	0	54	54	53	0	100.00	0.00
7/4	293	253	231	19	40	59	58	0	100.00	0.00
7/5	306	252	247	5	54	59	57	0	100.00	0.00
7/6	304	245	245	0	59	59	57	0	100.00	0.00
7/7	292	234	231	3	58	61	60	0	100.00	0.00
7/8	254	223	191	30	31	61	62	1	98.39	1.61
7/9	261	245	222	17	16	33	37	4	89.19	10.81
7/10	286	250	222	25	36	61	62	1	98.39	1.61
7/11	301	241	237	4	60	64	62	0	100.00	0.00
7/12	285	238	226	12	47	59	57	0	100.00	0.0
7/13	261	232	203	29	29	58	57	0	100.00	0.00
7/14	275	246	228	17	29	46	45	0	100.00	0.00
7/15	286	250	227	20	36	56	57	1	98.25	1.75
7/16	306	254	247	7	52	59	57	0	100.00	0.00
7/17	308	249	249	0	59	59	58	0	100.00	0.00
7/18	306	254	254	0	52	52	50	0	100.00	0.00
7/19	316	258	257	2	58	60	58	0	100.00	0.00
7/20	285	238	226	12	47	59	58	0	100.00	0.00
7/21	276	240	236	4	36	40	38	0	100.00	0.00
7/22	277	229	218	11	48	59	58	0	100.00	0.00
7/23	284	235	224	11	49	60	59	0	100.00	0.00
7/24	252	234	212	18	18	36	39	3	92.31	7.69
7/25	270	244	230	14	26	40	38	0	100.00	0.00
7/26	272	241	232	8	31	39	38	0	100.00	0.00
7/27	216	232	180	32	0	32	35	3	91.43	8.57
7/28	278	256	239	17	22	39	38	0	100.00	0.00
7/29	233	229	194	23	4	27	38	11	71.05	28.95
7/30	208	209	168	31	0	31	39	8	79.49	20.51
7/31	205	223	166	30	0	30	38	8	78.95	21.05
8/1	197	223	157	36	0	36	38	2	94.74	5.26
8/2	181	239	136	45	0	45	43	0	100.00	0.00
8/3	178	225	116	59	0	59	60	1	98.33	1.67
8/4	183	209	142	34	0	34	39	5	87.18	12.82
8/5	207	213	164	30	0	30	41	11	73.17	26.8
8/6	251	234	209	23	17	40	40	0	100.00	0.00
8/7	219	225	177	36	0	36	41	5	87.80	12.20

Daily Averaged Flows, Spills and Involuntary Spill at John Day Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/8	218	222	173	31	0	31	44	13	70.45	29.55
8/9	232	237	188	26	0	26	43	17	60.47	39.53
8/10	178	224	135	39	0	39	42	3	92.86	7.14
8/11	205	205	163	28	0	28	40	12	70.00	30.00
8/12	193	194	151	26	0	26	40	14	65.00	35.00
8/13	203	195	162	24	8	32	40	8	80.00	20.00
8/14	211	207	169	30	4	34	40	6	85.00	15.00
8/15	214	220	171	24	0	24	41	17	58.54	41.46
8/16	201	204	160	26	0	26	40	14	65.00	35.00
8/17	183	194	141	34	0	34	41	7	82.93	17.07
8/18	192	196	151	26	0	26	40	14	65.00	35.00
8/19	206	196	164	25	10	35	41	6	85.37	14.63
8/20	195	207	154	33	0	33	40	7	82.50	17.50
8/21	234	213	190	18	21	39	42	3	92.86	7.14
8/22	222	209	180	24	13	37	40	3	92.50	7.50
8/23	209	200	166	23	9	32	41	9	78.05	21.95
8/24	160	198	119	36	0	36	40	4	90.00	10.00
8/25	194	185	152	23	9	32	41	9	78.05	21.95
8/26	190	193	148	32	0	32	40	8	80.00	20.00
8/27	200	187	157	20	13	33	41	8	80.49	19.51
8/28	172	176	131	25	0	25	40	15	62.50	37.50
8/29	191	192	150	40	0	40	40	0	100.00	0.00
8/30	206	204	164	36	2	38	40	2	95.00	5.00
8/31	194	192	152	31	2	33	40	7	82.50	17.50

Daily Averaged Flows, Spills and Involuntary Spill at The Dalles Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	323	252	237	15	71	86	81	0	100.00	0.00
4/2	366	281	281	0	85	85	80	0	100.00	0.00
4/3	293	263	263	0	30	30	25	0	100.00	0.00
4/4	307	282	282	0	25	25	20	0	100.00	0.00
4/5	297	285	285	0	12	12	6	0	100.00	0.00
4/6	242	244	237	0	0	0	0	0	0.00	0.00
4/7	267	262	262	0	5	5	0	0	0.00	0.00
4/8	264	259	259	0	5	5	0	0	0.00	0.00
4/9	261	257	257	0	4	4	0	0	0.00	0.00
4/10	274	256	215	39	18	57	55	0	100.00	0.00
4/11	274	256	195	58	18	76	74	0	100.00	0.00
4/12	254	252	184	57	2	59	66	0	89.39	10.61
4/13	205	232	165	34	0	34	36	0	94.44	5.56
4/14	253	256	248	0	0	0	0	0	0.00	0.00
4/15	241	251	236	0	0	0	0	0	0.00	0.00
4/16	255	254	220	27	1	28	30	0	93.33	6.67
4/17	271	246	184	62	25	87	83	0	100.00	0.0
4/18	289	251	204	45	38	83	81	0	100.00	0.00
4/19	306	290	290	0	16	16	11	0	100.00	0.00
4/20	291	250	210	40	41	81	75	0	100.00	0.00
4/21	335	248	211	37	87	124	118	0	100.00	0.00
4/22	432	240	150	90	192	282	276	0	100.00	0.00
4/23	450	246	162	84	204	288	282	0	100.00	0.00
4/24	459	236	165	72	223	295	288	0	100.00	0.00
4/25	452	255	139	116	197	313	309	0	100.00	0.00
4/26	423	241	65	176	182	358	351	0	100.00	0.00
4/27	419	254	119	136	165	301	294	0	100.00	0.00
4/28	394	244	105	139	150	289	283	0	100.00	0.00
4/29	452	236	137	98	216	314	309	0	100.00	0.00
4/30	457	233	143	90	224	314	308	0	100.00	0.00
5/1	478	223	157	66	255	321	315	0	100.00	0.00
5/2	468	251	162	88	217	305	300	0	100.00	0.00
5/3	428	252	135	118	176	294	287	0	100.00	0.00
5/4	400	241	104	137	159	296	290	0	100.00	0.00
5/5	384	232	134	97	152	249	244	0	100.00	0.00
5/6	404	221	136	85	183	268	262	0	100.00	0.00
5/7	404	233	142	91	171	262	256	0	100.00	0.00
5/8	404	231	138	93	173	266	260	0	100.00	0.00
5/9	404	223	141	82	181	263	258	0	100.00	0.00
5/10	387	214	132	82	173	255	249	0	100.00	0.00
5/11	379	212	130	82	167	249	244	0	100.00	0.00
5/12	453	215	167	48	238	286	280	0	100.00	0.00
5/13	510	227	160	67	283	350	344	0	100.00	0.00
5/14	497	238	160	77	259	336	330	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at The Dalles Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/15	455	236	156	80	219	299	293	0	100.00	0.00
5/16	443	249	153	96	194	290	284	0	100.00	0.00
5/17	482	247	169	78	235	313	307	0	100.00	0.00
5/18	516	251	183	68	265	333	327	0	100.00	0.00
5/19	527	245	186	60	282	342	335	0	100.00	0.00
5/20	526	238	188	50	288	338	333	0	100.00	0.00
5/21	523	235	181	55	288	343	336	0	100.00	0.00
5/22	503	246	166	80	257	337	331	0	100.00	0.00
5/23	494	245	169	76	249	325	322	0	100.00	0.00
5/24	498	275	175	100	223	323	317	0	100.00	0.00
5/25	465	254	160	94	211	305	299	0	100.00	0.00
5/26	468	241	157	85	227	312	305	0	100.00	0.00
5/27	455	256	157	99	199	298	292	0	100.00	0.00
5/28	464	252	157	95	212	307	301	0	100.00	0.00
5/29	468	262	176	86	206	292	286	0	100.00	0.00
5/30	450	249	218	31	201	232	226	0	100.00	0.00
5/31	461	266	158	98	195	293	299	6	97.99	2.01
6/1	484	262	142	120	222	342	336	0	100.00	0.00
6/2	506	262	197	64	244	308	303	0	100.00	0.00
6/3	557	265	212	54	292	346	339	0	100.00	0.00
6/4	535	252	168	84	283	367	361	0	100.00	0.00
6/5	520	248	170	78	272	350	345	0	100.00	0.00
6/6	501	250	148	101	251	352	347	0	100.00	0.00
6/7	512	257	127	130	255	385	377	0	100.00	0.00
6/8	512	272	106	166	240	406	400	0	100.00	0.00
6/9	496	283	177	106	213	319	314	0	100.00	0.00
6/10	517	284	197	87	233	320	314	0	100.00	0.00
6/11	517	258	165	92	259	351	346	0	100.00	0.00
6/12	541	257	135	122	284	406	400	0	100.00	0.00
6/13	566	273	200	74	293	367	363	0	100.00	0.00
6/14	564	282	189	94	282	376	370	0	100.00	0.00
6/15	570	280	158	122	290	412	407	0	100.00	0.00
6/16	554	257	208	50	297	347	341	0	100.00	0.00
6/17	557	261	147	114	296	410	404	0	100.00	0.00
6/18	543	255	199	56	288	344	337	0	100.00	0.00
6/19	529	247	193	54	282	336	330	0	100.00	0.00
6/20	503	255	156	99	248	347	341	0	100.00	0.00
6/21	487	269	178	91	218	309	304	0	100.00	0.00
6/22	464	271	164	107	193	300	296	0	100.00	0.00
6/23	442	250	196	55	192	247	240	0	100.00	0.00
6/24	453	234	203	31	219	250	245	0	100.00	0.00
6/25	401	232	151	81	169	250	244	0	100.00	0.00
6/26	369	234	168	65	135	200	194	0	100.00	0.00
6/27	385	220	141	79	165	244	239	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at The Dalles Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/28	372	220	131	90	152	242	236	0	100.00	0.00
6/29	351	225	115	110	126	236	230	0	100.00	0.00
6/30	303	214	125	88	89	177	173	0	100.00	0.00
7/1	289	200	100	100	89	189	182	0	100.00	0.00
7/2	289	218	103	115	71	186	181	0	100.00	0.00
7/3	315	208	111	96	107	203	198	0	100.00	0.00
7/4	275	204	95	109	71	180	176	0	100.00	0.00
7/5	288	196	100	97	92	189	183	0	100.00	0.00
7/6	285	212	96	116	73	189	183	0	100.00	0.00
7/7	283	198	97	101	85	186	181	0	100.00	0.00
7/8	242	204	82	116	38	154	154	0	100.00	0.00
7/9	249	219	85	121	30	151	158	7	95.57	4.43
7/10	276	211	94	117	65	182	177	0	100.00	0.00
7/11	285	238	99	139	47	186	181	0	100.00	0.00
7/12	270	221	93	128	49	177	172	0	100.00	0.00
7/13	258	212	88	121	46	167	163	0	100.00	0.00
7/14	261	193	90	98	68	166	166	0	100.00	0.0
7/15	277	202	95	108	75	183	176	0	100.00	0.00
7/16	290	212	100	112	78	190	184	0	100.00	0.00
7/17	300	213	103	110	87	197	192	0	100.00	0.00
7/18	295	230	101	129	65	194	188	0	100.00	0.00
7/19	302	222	105	117	80	197	192	0	100.00	0.00
7/20	270	221	94	126	49	175	170	0	100.00	0.00
7/21	268	227	91	133	41	174	171	0	100.00	0.00
7/22	261	217	86	129	44	173	170	0	100.00	0.00
7/23	279	221	96	125	58	183	178	0	100.00	0.00
7/24	244	205	83	113	39	152	155	3	98.06	1.94
7/25	261	212	91	120	49	169	164	0	100.00	0.00
7/26	260	224	89	135	36	171	166	0	100.00	0.00
7/27	213	224	71	131	0	131	137	6	95.62	4.38
7/28	261	204	88	106	57	163	168	5	97.02	2.98
7/29	228	202	78	115	26	141	144	3	97.92	2.08
7/30	206	196	69	113	10	123	132	9	93.18	6.82
7/31	189	196	64	111	0	111	119	8	93.28	6.72
8/1	197	207	69	121	0	121	122	1	99.18	0.82
8/2	173	209	58	109	0	109	109	0	100.00	0.00
8/3	168	195	55	106	0	106	107	1	99.07	0.93
8/4	177	196	58	113	0	113	113	0	100.00	0.00
8/5	199	191	68	112	8	120	125	5	96.00	4.00
8/6	245	202	84	116	43	159	155	0	100.00	0.0
8/7	209	205	71	113	4	117	132	15	88.64	11.3
8/8	212	188	70	107	24	131	136	5	96.32	3.68
8/9	224	221	77	123	3	126	142	16	88.73	11.27
8/10	177	213	58	112	0	112	113	1	99.12	0.88

Daily Averaged Flows, Spills and Involuntary Spill at The Dalles Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/11	196	218	65	121	0	121	125	4	96.80	3.20
8/12	185	215	61	115	0	115	118	3	97.46	2.54
8/13	196	218	65	122	0	122	124	2	98.39	1.61
8/14	204	217	68	129	0	129	129	0	100.00	0.00
8/15	204	212	68	120	0	120	130	10	92.31	7.69
8/16	198	211	67	117	0	117	125	8	93.60	6.40
8/17	177	223	59	111	0	111	112	1	99.11	0.89
8/18	187	244	61	118	0	118	120	2	98.33	1.67
8/19	202	202	67	113	0	113	129	16	87.60	12.40
8/20	193	200	66	109	0	109	121	12	90.08	9.92
8/21	220	213	76	122	7	129	139	10	92.81	7.19
8/22	215	240	73	136	0	136	136	0	100.00	0.00
8/23	199	227	67	121	0	121	126	5	96.03	3.97
8/24	158	234	51	101	0	101	101	0	100.00	0.00
8/25	194	210	64	115	0	115	124	9	92.74	7.26
8/26	179	216	58	114	0	114	115	1	99.13	0.87
8/27	195	218	63	120	0	120	126	6	95.24	4.76
8/28	169	231	55	107	0	107	108	1	99.07	0.93
8/29	180	222	52	123	0	123	123	0	100.00	0.00
8/30	203	234	68	128	0	128	129	1	99.22	0.78
8/31	196	221	64	120	0	120	126	6	95.24	4.76

Daily Averaged Flows, Spills and Involuntary Spill at Bonneville Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
4/1	337	208	208	0	129	129	120	0	100.00	0.00
4/2	360	243	212	26	117	143	139	0	100.00	0.00
4/3	314	211	211	0	103	103	94	0	100.00	0.00
4/4	319	203	203	0	116	116	107	0	100.00	0.00
4/5	311	217	216	1	94	95	86	0	100.00	0.00
4/6	278	224	224	0	54	54	45	0	100.00	0.00
4/7	263	217	217	0	46	46	37	0	100.00	0.00
4/8	278	222	222	0	56	56	46	0	100.00	0.00
4/9	274	214	214	0	60	60	50	0	100.00	0.00
4/10	275	216	216	0	59	59	50	0	100.00	0.00
4/11	282	222	222	0	60	60	51	0	100.00	0.00
4/12	279	226	226	0	53	53	44	0	100.00	0.00
4/13	216	207	207	0	9	9	0	0	0.00	0.00
4/14	240	214	214	0	26	26	15	0	100.00	0.00
4/15	251	218	218	0	33	33	24	0	100.00	0.00
4/16	275	219	219	0	56	56	47	0	100.00	0.00
4/17	287	221	221	0	66	66	56	0	100.00	0.0
4/18	299	220	220	0	79	79	69	0	100.00	0.0
4/19	322	212	212	0	110	110	101	0	100.00	0.00
4/20	318	208	208	0	110	110	102	0	100.00	0.00
4/21	346	216	216	0	130	130	121	0	100.00	0.00
4/22	422	209	209	0	213	213	204	0	100.00	0.00
4/23	451	204	204	0	247	247	237	0	100.00	0.00
4/24	468	206	206	0	262	262	253	0	100.00	0.00
4/25	457	208	208	0	249	249	240	0	100.00	0.00
4/26	429	204	199	4	225	229	221	0	100.00	0.00
4/27	407	198	190	8	209	217	208	0	100.00	0.00
4/28	414	201	196	5	213	218	209	0	100.00	0.00
4/29	448	204	201	3	244	247	238	0	100.00	0.00
4/30	463	204	204	0	259	259	250	0	100.00	0.00
5/1	464	203	203	0	261	261	252	0	100.00	0.00
5/2	472	208	208	0	264	264	254	0	100.00	0.00
5/3	436	205	201	3	231	234	225	0	100.00	0.00
5/4	411	199	192	7	212	219	210	0	100.00	0.00
5/5	397	201	194	7	196	203	194	0	100.00	0.00
5/6	398	207	207	0	191	191	181	0	100.00	0.00
5/7	416	212	212	0	204	204	194	0	100.00	0.00
5/8	407	207	207	0	200	200	191	0	100.00	0.00
5/9	406	208	207	1	198	199	190	0	100.00	0.00
5/10	406	214	214	0	192	192	183	0	100.00	0.0
5/11	384	208	204	4	176	180	170	0	100.00	0.0
5/12	439	200	194	6	239	245	236	0	100.00	0.00
5/13	508	207	207	1	301	302	292	0	100.00	0.00
5/14	491	201	201	0	290	290	280	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Bonneville Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
5/15	464	205	205	0	259	259	249	0	100.00	0.00
5/16	447	209	209	0	238	238	229	0	100.00	0.00
5/17	474	205	205	0	269	269	260	0	100.00	0.00
5/18	503	215	215	0	288	288	279	0	100.00	0.00
5/19	515	219	217	1	296	297	288	0	100.00	0.00
5/20	514	205	196	8	309	317	308	0	100.00	0.00
5/21	515	205	205	0	310	310	301	0	100.00	0.00
5/22	502	208	208	0	294	294	285	0	100.00	0.00
5/23	492	198	198	0	294	294	285	0	100.00	0.00
5/24	496	182	180	2	314	316	308	0	100.00	0.00
5/25	465	193	192	1	272	273	263	0	100.00	0.00
5/26	450	204	197	7	246	253	244	0	100.00	0.00
5/27	453	209	209	0	244	244	235	0	100.00	0.00
5/28	456	204	204	0	252	252	242	0	100.00	0.00
5/29	457	199	194	5	258	263	254	0	100.00	0.00
5/30	448	208	208	0	240	240	231	0	100.00	0.00
5/31	461	209	204	4	252	256	247	0	100.00	0.00
6/1	474	208	208	0	266	266	257	0	100.00	0.00
6/2	497	207	203	5	290	295	285	0	100.00	0.00
6/3	534	200	200	1	334	335	325	0	100.00	0.00
6/4	540	197	197	0	343	343	334	0	100.00	0.00
6/5	516	191	184	6	325	331	323	0	100.00	0.00
6/6	501	188	180	8	313	321	312	0	100.00	0.00
6/7	505	190	180	10	315	325	316	0	100.00	0.00
6/8	503	190	174	16	313	329	319	0	100.00	0.00
6/9	504	187	174	13	317	330	320	0	100.00	0.00
6/10	503	193	186	7	310	317	307	0	100.00	0.00
6/11	499	182	152	30	317	347	337	0	100.00	0.00
6/12	526	195	181	14	331	345	336	0	100.00	0.00
6/13	552	202	198	4	350	354	345	0	100.00	0.00
6/14	556	203	194	9	353	362	352	0	100.00	0.00
6/15	552	194	179	16	358	374	364	0	100.00	0.00
6/16	557	210	197	13	347	360	351	0	100.00	0.00
6/17	543	198	190	8	345	353	344	0	100.00	0.00
6/18	531	198	188	10	333	343	334	0	100.00	0.00
6/19	525	207	207	0	318	318	309	0	100.00	0.00
6/20	501	197	197	0	304	304	294	0	100.00	0.00
6/21	477	201	191	10	276	286	276	0	100.00	0.00
6/22	466	202	181	21	264	285	276	0	100.00	0.00
6/23	447	194	188	5	253	258	250	0	100.00	0.00
6/24	440	210	210	0	230	230	220	0	100.00	0.00
6/25	419	212	212	0	207	207	197	0	100.00	0.00
6/26	378	212	210	1	166	167	158	0	100.00	0.00
6/27	391	201	197	4	190	194	185	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Bonneville Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
6/28	375	197	197	0	178	178	169	0	100.00	0.00
6/29	367	212	209	3	155	158	149	0	100.00	0.00
6/30	323	209	209	0	114	114	104	0	100.00	0.00
7/1	287	194	192	1	93	94	86	0	100.00	0.00
7/2	301	205	205	0	96	96	86	0	100.00	0.00
7/3	314	216	216	0	98	98	89	0	100.00	0.00
7/4	303	205	205	0	98	98	89	0	100.00	0.00
7/5	281	187	184	3	94	97	88	0	100.00	0.00
7/6	300	203	203	0	97	97	87	0	100.00	0.00
7/7	299	201	201	0	98	98	90	0	100.00	0.00
7/8	266	187	171	16	79	95	86	0	100.00	0.00
7/9	254	189	159	30	65	95	86	0	100.00	0.00
7/10	273	196	177	19	77	96	86	0	100.00	0.00
7/11	289	192	192	0	97	97	88	0	100.00	0.00
7/12	299	209	202	6	90	96	87	0	100.00	0.00
7/13	256	188	160	27	68	95	87	0	100.00	0.00
7/14	269	188	173	15	81	96	87	0	100.00	0.0
7/15	284	196	183	13	88	101	93	0	100.00	0.0
7/16	300	206	204	3	94	97	87	0	100.00	0.00
7/17	303	207	207	0	96	96	87	0	100.00	0.00
7/18	302	206	206	0	96	96	87	0	100.00	0.00
7/19	313	218	218	0	95	95	86	0	100.00	0.00
7/20	274	189	177	12	85	97	88	0	100.00	0.00
7/21	286	195	190	5	91	96	87	0	100.00	0.00
7/22	279	193	183	10	86	96	87	0	100.00	0.00
7/23	287	196	190	5	91	96	87	0	100.00	0.00
7/24	276	184	180	4	92	96	87	0	100.00	0.00
7/25	269	183	156	27	86	113	104	0	100.00	0.00
7/26	258	178	128	50	80	130	121	0	100.00	0.00
7/27	227	166	98	68	61	129	120	0	100.00	0.00
7/28	272	189	145	45	83	128	118	0	100.00	0.00
7/29	250	169	122	47	81	128	118	0	100.00	0.00
7/30	222	161	94	67	61	128	118	0	100.00	0.00
7/31	197	147	71	75	50	125	116	0	100.00	0.00
8/1	208	156	82	74	52	126	117	0	100.00	0.00
8/2	196	154	81	73	42	115	106	0	100.00	0.00
8/3	176	135	69	66	41	107	98	0	100.00	0.00
8/4	179	152	80	71	27	98	89	0	100.00	0.00
8/5	197	168	86	79	29	108	102	0	100.00	0.00
8/6	242	129	86	43	113	156	147	0	100.00	0.0
8/7	224	122	84	38	102	140	131	0	100.00	0.0
8/8	218	129	87	42	89	131	121	0	100.00	0.00
8/9	232	131	87	44	101	145	135	0	100.00	0.00
8/10	209	126	87	40	83	123	113	0	100.00	0.00

Daily Averaged Flows, Spills and Involuntary Spill at Bonneville Dam

Date	Total Flow (kcfs) (a)	Hydraulic Capacity (kcfs) (b)	Turbine Flow (kcfs) (c)	Lack of Market Spill (kcfs) (d)	Excess Hydraulic Capacity Spill (kcfs) (e)	Involuntary Spill (d+e) (kcfs) (f)	Total Spill (kcfs) (g)	Fish Specific Portion of Total Spill (kcfs) (h)	% Involuntary Spill (i)	% Voluntary Spill (j)
8/11	185	127	85	42	58	100	91	0	100.00	0.00
8/12	192	152	86	63	40	103	97	0	100.00	0.00
8/13	208	138	87	51	70	121	111	0	100.00	0.00
8/14	213	130	86	43	83	126	116	0	100.00	0.00
8/15	204	132	88	44	72	116	107	0	100.00	0.00
8/16	210	130	87	43	80	123	114	0	100.00	0.00
8/17	195	132	86	45	63	108	100	0	100.00	0.00
8/18	191	151	87	62	40	102	95	0	100.00	0.00
8/19	202	160	84	76	42	118	109	0	100.00	0.00
8/20	215	176	88	88	39	127	118	0	100.00	0.00
8/21	215	177	88	88	38	126	117	0	100.00	0.00
8/22	224	177	88	88	47	135	126	0	100.00	0.00
8/23	204	177	88	84	27	111	107	0	100.00	0.00
8/24	187	176	88	81	11	92	90	0	100.00	0.00
8/25	201	155	100	55	46	101	92	0	100.00	0.00
8/26	200	154	99	55	46	101	92	0	100.00	0.00
8/27	192	151	90	59	41	100	92	0	100.00	0.00
8/28	181	148	78	69	33	102	94	0	100.00	0.00
8/29	184	157	81	73	27	100	94	0	100.00	0.00
8/30	210	174	106	68	36	104	94	0	100.00	0.00
8/31	197	166	93	71	31	102	94	0	100.00	0.00

Appendix 3. COE final database for total dissolved gas measurements presented as the mean of the 12 highest hourly readings and the 24-hour minimum and maximum.

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Wauna Mill	4/1/97	112.0991	112.4508	112.6615	111.1253	24
Wauna Mill	4/2/97	111.6132	112.1462	112.8073	110.6684	24
Wauna Mill	4/3/97	112.0551	112.5162	112.8405	111.0677	24
Wauna Mill	4/4/97	112.759	113.9948	114.4531	110.8214	24
Wauna Mill	4/5/97	113.4035	114.0436	114.6405	111.9636	24
Wauna Mill	4/6/97	113.4073	113.8206	114.2112	112.6467	24
Wauna Mill	4/7/97	110.8668	111.4891	112.5163	109.6354	24
Wauna Mill	4/8/97	109.0538	109.3456	109.9217	108.4416	24
Wauna Mill	4/9/97	107.7425	108.0352	108.4525	107.1151	24
Wauna Mill	4/10/97	107.4772	107.7921	108.0519	106.8387	23
Wauna Mill	4/11/97	107.5382	107.9557	108.3442	106.7183	24
Wauna Mill	4/12/97	107.9852	108.3173	108.7927	107.4316	24
Wauna Mill	4/13/97	107.7087	107.9965	108.2786	106.9463	24
Wauna Mill	4/14/97	107.1869	107.4535	108.2786	106.5359	24
Wauna Mill	4/15/97	107.3482	107.7099	107.9948	106.658	24
Wauna Mill	4/16/97	107.1178	107.3854	107.7024	106.4136	24
Wauna Mill	4/17/97	107.6703	108.1979	108.8542	106.5019	24
Wauna Mill	4/18/97	108.2335	108.5081	108.8507	107.2178	24
Wauna Mill	4/19/97	109.0653	109.491	110.1064	108.3223	24
Wauna Mill	4/20/97	107.3581	108.0866	109.9602	105.9818	24
Wauna Mill	4/21/97	108.8487	109.6074	110.2228	107.2917	24
Wauna Mill	4/22/97	108.3881	108.7848	109.1743	107.4901	24
Wauna Mill	4/23/97	109.5034	110.3932	110.8639	108.1472	24
Wauna Mill	4/24/97	113.4883	115.0069	115.7552	111.3281	24
Wauna Mill	4/25/97	117.932	118.9624	119.7386	116.1458	24
Wauna Mill	4/26/97	119.04	119.6659	120.3679	116.558	24
Wauna Mill	4/27/97	117.1575	117.6151	118.1699	116.083	24
Wauna Mill	4/28/97	118.0829	118.5354	118.9474	116.9069	24
Wauna Mill	4/29/97	117.0528	117.6995	118.3727	115.6863	24
Wauna Mill	4/30/97	116.6424	117.9451	118.7583	114.5833	24
Wauna Mill	5/1/97	116.91	117.364	117.6394	115.1042	24
Wauna Mill	5/2/97	117.8705	118.4105	119.4737	116.9514	24
Wauna Mill	5/3/97	118.1786	118.6425	119.7368	117.1018	24
Wauna Mill	5/4/97	117.5953	118.1986	118.7744	115.7552	24
Wauna Mill	5/5/97	118.0165	118.426	119.0352	116.9492	23
Wauna Mill	5/6/97	117.1545	117.9085	119.1656	116.0414	24
Wauna Mill	5/7/97	117.1452	117.7009	118.2292	116.0622	24
Wauna Mill	5/8/97	116.3427	116.9451	117.4026	114.8631	24
Wauna Mill	5/9/97	115.6047	116.1621	116.6667	114.0827	24
Wauna Mill	5/10/97	117.1407	118.3518	119.1906	115.4145	24
Wauna Mill	5/11/97	118.4598	119.0372	119.7903	117.4479	24
Wauna Mill	5/12/97	117.4489	118.0555	118.8482	115.5556	24
Wauna Mill	5/13/97	117.7919	119.4496	121.1564	115.6863	24
Wauna Mill	5/14/97	120.7127	121.615	122.6144	119.2661	24
Wauna Mill	5/15/97	121.9841	122.3392	123.0469	121.4286	24
Wauna Mill	5/16/97	121.327	121.7603	122.9465	120.4427	24
Wauna Mill	5/17/97	119.2397	119.7227	120.4161	118.2879	24
Wauna Mill	5/18/97	119.4867	120.396	121.3351	117.7314	24
Wauna Mill	5/19/97	119.3436	119.9344	120.4724	118.3246	24
Wauna Mill	5/20/97	119.693	120.6156	121.1009	117.8478	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Wauna Mill	5/21/97	120.6398	121.2798	122.1204	119.2661	24
Wauna Mill	5/22/97	120.7624	121.3765	121.8873	119.3464	24
Wauna Mill	5/23/97	121.2511	121.7979	122.3822	120.3146	24
Wauna Mill	5/24/97	120.7071	121.4557	122.1932	119.4263	24
Wauna Mill	5/25/97	120.456	121.0532	121.7448	119.2708	24
Wauna Mill	5/26/97	122.9132	123.4032	123.9896	121.382	24
Wauna Mill	5/27/97	120.9522	121.7809	122.5849	119.2458	24
Wauna Mill	5/28/97	120.569	121.0295	121.382	119.6592	24
Wauna Mill	5/29/97	120.8579	121.2873	121.9895	119.9739	24
Wauna Mill	5/30/97	122.056	122.653	123.8845	121.232	24
Wauna Mill	5/31/97	120.8447	121.9265	123.6531	119.2157	24
Wauna Mill	6/1/97	119.2559	119.5655	120.2086	118.7744	24
Wauna Mill	6/2/97	120.482	122.0885	122.5	117.9085	24
Wauna Mill	6/3/97	121.9478	122.5622	122.9358	120.5805	24
Wauna Mill	6/4/97	121.6131	122.4251	123.7288	119.5282	24
Wauna Mill	6/5/97	122.9848	123.3335	124.5111	121.4844	15
Wauna Mill	6/6/97	125.1066	125.8217	126.5013	123.2073	23
Wauna Mill	6/7/97	123.3336	124.3074	125.3595	121.8016	24
Wauna Mill	6/8/97	122.4704	123.3199	124.1199	120.5462	24
Wauna Mill	6/9/97	121.6235	122.7895	123.3987	119.1656	24
Wauna Mill	6/10/97	123.0979	124.1494	125.5875	121.4379	24
Wauna Mill	6/11/97	123.9214	124.4575	124.8691	122.644	23
Wauna Mill	6/12/97	123.651	124.4623	125.3906	122.1204	24
Wauna Mill	6/13/97	123.4598	124.2205	125.0326	122.2947	24
Wauna Mill	6/14/97	123.5589	124.6111	125.0653	121.6993	24
Wauna Mill	6/15/97	123.8845	124.6903	125.0653	122.425	24
Wauna Mill	6/16/97	125.0027	126.2591	127.3919	123.1071	24
Wauna Mill	6/17/97	125.7408	126.3258	127.5229	124.5431	24
Wauna Mill	6/18/97	123.8018	124.3332	125.163	122.3958	24
Wauna Mill	6/19/97	122.9823	123.6534	124.7718	121.5584	24
Wauna Mill	6/20/97	123.0883	123.5995	124.2503	122.0339	24
Wauna Mill	6/21/97	122.3846	122.9003	123.6148	121.4474	24
Wauna Mill	6/22/97	120.7368	121.4172	122.4409	119.6078	24
Wauna Mill	6/23/97	118.2619	119.036	119.9219	116.7098	24
Wauna Mill	6/24/97	119.5026	120.1718	120.8333	118.0519	24
Wauna Mill	6/25/97	119.1785	119.7211	120.3922	117.8618	24
Wauna Mill	6/26/97	117.4461	117.7328	118.0157	116.6884	24
Wauna Mill	6/27/97	115.9303	116.3654	117.7314	114.6024	24
Wauna Mill	6/28/97	114.6914	115.2046	115.8377	113.7255	24
Wauna Mill	6/29/97	115.0044	115.5283	116.2516	114.0052	24
Wauna Mill	6/30/97	114.3854	115.1834	116.273	111.8644	24
Wauna Mill	7/1/97	112.4872	113.0929	113.7841	111.039	24
Wauna Mill	7/2/97	112.3493	112.9197	113.394	110.9091	24
Wauna Mill	7/3/97	111.5397	112.1129	113.1854	110.2731	24
Wauna Mill	7/4/97	111.7458	112.2557	113.089	110.0917	24
Wauna Mill	7/5/97	110.7292	111.2668	111.734	109.2689	24
Wauna Mill	7/6/97	110.4464	111.0722	111.849	108.8657	24
Wauna Mill	7/7/97	110.3667	110.9747	111.4583	108.3442	24
Wauna Mill	7/8/97	109.9176	110.4837	110.9375	108.2245	24
Wauna Mill	7/9/97	109.138	109.5896	110.0654	107.7225	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Wauna Mill	7/10/97	109.1106	110.1761	110.719	106.0209	24
Wauna Mill	7/11/97	109.2686	109.4514	109.6606	108.8657	24
Wauna Mill	7/12/97	108.6077	108.8958	109.1027	107.6723	24
Wauna Mill	7/13/97	109.6674	110.3632	110.705	108.3225	24
Wauna Mill	7/14/97	109.3681	109.824	110.1828	108.3442	24
Wauna Mill	7/15/97	108.4718	109.1649	109.5176	106.3719	24
Wauna Mill	7/16/97	109.4193	110.4044	111.1257	107.5619	24
Wauna Mill	7/17/97	109.0202	109.6666	110.616	107.8329	24
Wauna Mill	7/18/97	108.7883	109.6367	110.2731	107.5423	24
Wauna Mill	7/19/97	110.1816	111.0449	111.911	108.4746	24
Wauna Mill	7/20/97	109.4788	109.8943	110.616	108.7582	24
Wauna Mill	7/21/97	108.5894	109.4713	110.3133	104.8429	24
Wauna Mill	7/22/97	109.5657	110.4636	111.5735	107.0496	24
Wauna Mill	7/23/97	109.2642	109.8331	110.2731	107.4219	24
Wauna Mill	7/24/97	108.0178	108.6947	109.1146	105.3385	24
Wauna Mill	7/25/97	107.8109	108.7055	109.2448	104.8114	24
Wauna Mill	7/26/97	107.8447	108.7469	109.5425	105.2151	24
Wauna Mill	7/27/97	107.5131	108.2463	108.7467	105.3595	24
Wauna Mill	7/28/97	106.9442	107.6471	107.9634	105.6063	24
Wauna Mill	7/29/97	107.1326	108.2528	108.7467	105.2151	24
Wauna Mill	7/30/97	108.5576	109.4473	110.1695	106.6493	24
Wauna Mill	7/31/97	108.3115	108.9342	109.8958	106.7708	24
Wauna Mill	8/1/97	108.1078	108.9789	109.9087	106.5019	24
Wauna Mill	8/2/97	108.5272	109.4146	110.4303	106.8921	24
Wauna Mill	8/3/97	109.1261	109.6097	110.3133	107.9427	24
Wauna Mill	8/4/97	108.285	108.7688	109.3385	107.1429	24
Wauna Mill	8/5/97	107.975	109.0115	110	105.304	24
Wauna Mill	8/6/97	108.1002	108.4454	109.1265	107.0039	24
Wauna Mill	8/7/97	105.9913	106.5149	106.7708	103.251	24
Wauna Mill	8/8/97	106.7511	107.9957	108.9005	102.7379	24
Wauna Mill	8/9/97	108.6	109.6205	110.6021	105.3806	24
Wauna Mill	8/10/97	108.7155	109.1157	110.3675	107.9739	24
Wauna Mill	8/11/97	107.0373	107.5277	108.366	106.1358	24
Wauna Mill	8/12/97	106.6864	107.2214	107.4413	104.9544	24
Wauna Mill	8/13/97	106.9877	107.3586	107.7024	106.1278	24
Wauna Mill	8/14/97	107.2612	108.0324	109.0314	105.8747	24
Wauna Mill	8/15/97	106.9641	108.2798	109.4488	104.3194	24
Wauna Mill	8/16/97	108.7543	109.9224	110.7753	105.6283	24
Wauna Mill	8/17/97	108.2883	109.161	109.9738	105.483	24
Wauna Mill	8/18/97	105.7289	106.4459	106.9191	103.7859	24
Wauna Mill	8/19/97	106.4425	107.2791	108.1152	103.9113	24
Wauna Mill	8/20/97	106.4178	107.15	108.1579	104.712	24
Wauna Mill	8/21/97	105.315	106.0188	106.6406	103.125	24
Wauna Mill	8/22/97	106.626	107.1809	107.7024	104.824	24
Wauna Mill	8/23/97	106.4542	107.2615	108.1258	104.1721	24
Wauna Mill	8/24/97	107.3522	107.9133	108.366	105.3665	24
Wauna Mill	8/25/97	107.4013	108.0064	108.6387	105.7592	24
Wauna Mill	8/26/97	106.8211	107.667	108.1472	103.9216	24
Wauna Mill	8/27/97	105.3869	106.1548	106.5445	104.047	24
Wauna Mill	8/28/97	105.5119	105.8778	106.1518	104.3194	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Wauna Mill	8/29/97	106.4359	107.6463	109.7911	103.9165	24
Wauna Mill	8/30/97	108.5833	109.1726	109.724	107.5916	24
Wauna Mill	8/31/97	109.2189	109.8556	110.7471	108.1258	24
Kalama	4/1/97	113.8841	114.0856	114.5619	113.3333	24
Kalama	4/2/97	113.9678	114.4228	114.7477	113.1714	24
Kalama	4/3/97	115.4523	116.3128	117.0795	114.2119	24
Kalama	4/4/97	115.4968	116.1268	117.3629	114.4531	24
Kalama	4/5/97	115.1851	116.0514	116.6013	113.6187	24
Kalama	4/6/97	113.295	114.1533	115.4047	111.1979	24
Kalama	4/7/97	110.0015	110.324	110.7932	109.4682	24
Kalama	4/8/97	109.2407	109.4308	109.7656	108.7013	24
Kalama	4/9/97	109.0303	109.2177	109.4805	108.6563	24
Kalama	4/10/97	108.1877	108.4648	108.9494	107.6326	24
Kalama	4/11/97	107.5684	108.0967	108.4635	106.7097	24
Kalama	4/12/97	108.1878	108.6346	109.1984	107.4219	24
Kalama	4/13/97	108.5855	109.4795	110.0132	106.8063	24
Kalama	4/14/97	108.1336	108.6684	109.1864	106.7797	24
Kalama	4/15/97	107.3737	108.4437	109.0909	105.8824	24
Kalama	4/16/97	108.87	109.2616	109.9346	107.7124	24
Kalama	4/17/97	108.1118	108.5031	109.4488	106.7708	24
Kalama	4/18/97	109.8371	110.3129	110.8466	109.067	24
Kalama	4/19/97	110.4147	111.1129	112.4832	109.3298	24
Kalama	4/20/97	110.4877	110.8926	112.1172	109.0206	24
Kalama	4/21/97	109.317	109.5807	110.105	108.399	24
Kalama	4/22/97	111.3417	112.5714	113.5458	108.9005	24
Kalama	4/23/97	115.991	117.3558	118.2895	112.3847	24
Kalama	4/24/97	120.3778	121.4113	123.1675	117.3403	24
Kalama	4/25/97	123.4138	124.0901	125.1316	121.7562	24
Kalama	4/26/97	123.9399	124.5521	124.9671	121.7966	24
Kalama	4/27/97	121.4284	121.8551	122.7451	120.5229	24
Kalama	4/28/97	121.9094	122.9829	124.3065	119.5795	24
Kalama	4/29/97	121.2192	121.9456	122.8346	119.5795	24
Kalama	4/30/97	122.1748	123.052	123.7533	120.3922	24
Kalama	5/1/97	120.6061	121.0302	121.2516	119.4805	23
Kalama	5/2/97	122.7649	123.9694	124.8677	120.8605	24
Kalama	5/3/97	121.8972	122.2391	122.7451	121.1488	24
Kalama	5/4/97	121.7632	122.2198	122.526	120.8605	24
Kalama	5/5/97	122.2914	123.0352	123.4987	120.7301	24
Kalama	5/6/97	121.7293	122.7799	123.4375	119.0415	24
Kalama	5/7/97	119.1003	119.8812	120.5497	117.8525	24
Kalama	5/8/97	119.8708	120.1547	120.6806	119.1157	24
Kalama	5/9/97	119.7694	120.7743	121.382	118.3117	24
Kalama	5/10/97	120.7511	121.4998	122.0183	119.4805	24
Kalama	5/11/97	121.6014	122.2666	123.1884	120.7843	24
Kalama	5/12/97	120.4795	120.924	121.8421	119.5538	24
Kalama	5/13/97	123.9427	125.2475	125.7596	120.3146	24
Kalama	5/14/97	126.728	127.5573	128.3837	125.3927	24
Kalama	5/15/97	126.005	126.4649	126.7016	124.2188	24
Kalama	5/16/97	123.7767	124.2308	124.7059	122.5554	24
Kalama	5/17/97	122.1133	122.4171	122.8758	121.4844	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Kalama	5/18/97	122.5337	123.4173	124.0473	121.2794	24
Kalama	5/19/97	123.9465	124.4522	125.1979	122.644	23
Kalama	5/20/97	124.6192	124.9754	125.2949	123.8845	24
Kalama	5/21/97	125.0614	125.461	126.3089	124.2147	24
Kalama	5/22/97	125.6957	126.3096	126.9634	124.6073	24
Kalama	5/23/97	124.9635	125.3193	125.9843	124.3137	24
Kalama	5/24/97	125.4954	126.0283	126.6319	123.9272	24
Kalama	5/25/97	126.4729	127.4004	127.9373	124.0885	24
Kalama	5/26/97	124.9649	126.0169	126.6319	122.8758	24
Kalama	5/27/97	123.7855	124.2753	124.9022	122.526	24
Kalama	5/28/97	123.943	124.4471	124.8691	122.8162	24
Kalama	5/29/97	124.5689	125.5019	125.9502	122.9465	24
Kalama	5/30/97	126.4818	127.2181	128.084	124.9017	24
Kalama	5/31/97	123.7137	124.3268	124.9344	122.5554	24
Kalama	6/1/97	122.6999	123.0436	123.8903	122.1354	24
Kalama	6/2/97	124.2903	125.3301	125.7596	122.7865	24
Kalama	6/3/97	126.1297	126.7078	127.668	125.1969	24
Kalama	6/4/97	128.2685	128.846	129.5276	126.0184	24
Kalama	6/5/97	129.2636	130.1419	130.5882	127.8646	24
Kalama	6/6/97	129.5039	130.1373	130.9305	126.8325	16
Kalama	6/7/97	127.4868	128.7798	129.1503	124.2503	24
Kalama	6/8/97	125.3199	126.7732	127.9009	122.6144	24
Kalama	6/9/97	125.8341	126.3835	126.9281	123.1675	24
Kalama	6/10/97	129.5448	130.5228	130.8399	127.0341	24
Kalama	6/11/97	128.3983	129.3496	129.9738	126.378	23
Kalama	6/12/97	128.8893	129.1418	131.1024	127.2966	14
Kalama	6/13/97	129.7289	129.9313	130.6283	129.1885	21
Kalama	6/14/97	130.0337	130.4699	131.0526	129.0196	24
Kalama	6/15/97	130.1857	130.4609	130.9305	129.4503	24
Kalama	6/16/97	130.6607	130.6607	131.1842	130.1442	6
Kalama	6/17/97	131.0583	131.0583	131.3158	130.7995	5
Kalama	6/18/97	129.0243	129.1584	130.7995	127.4151	13
Kalama	6/19/97	128.8459	129.6424	130.0654	127.2846	24
Kalama	6/20/97	127.2812	127.78	128.2523	126.3364	24
Kalama	6/21/97	126.2762	127.3543	127.7411	123.9843	24
Kalama	6/22/97	123.7836	125.0657	125.9502	121.5405	24
Kalama	6/23/97	123.9896	125.3524	126.6927	121.3542	24
Kalama	6/24/97	123.0737	123.5679	123.9843	121.6883	24
Kalama	6/25/97	122.5974	123.0878	123.2283	120.8115	23
Kalama	6/26/97	120.4939	120.7894	121.1009	119.8693	24
Kalama	6/27/97	119.2001	119.6329	119.9475	118.1699	24
Kalama	6/28/97	119.3618	119.8623	120.2632	118.4555	24
Kalama	6/29/97	119.8038	120.3906	120.9486	118.8729	24
Kalama	6/30/97	118.3819	118.861	119.1041	117.3856	24
Kalama	7/1/97	116.5518	116.8208	117.2324	115.7963	24
Kalama	7/2/97	114.2889	114.7489	115.6863	113.1682	24
Kalama	7/3/97	114.8278	115.8336	116.2055	113.4641	24
Kalama	7/4/97	116.0932	116.8962	117.7249	114.8684	24
Kalama	7/5/97	115.748	116.7728	117.477	114.0236	24
Kalama	7/6/97	115.9908	116.445	116.732	114.902	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Kalama	7/7/97	113.7523	114.1176	114.5098	112.9243	24
Kalama	7/8/97	114.7019	115.2458	115.5059	113.6304	24
Kalama	7/9/97	113.8482	114.1968	114.7563	112.9921	24
Kalama	7/10/97	112.1819	112.4373	112.713	111.634	23
Kalama	7/11/97	111.2044	111.5604	112.0577	110.705	24
Kalama	7/12/97	111.5917	112.4457	112.8105	110.0391	24
Kalama	7/13/97	112.2327	112.9133	113.2895	110.9661	24
Kalama	7/14/97	112.1707	112.8348	113.4034	110.8639	24
Kalama	7/15/97	111.9051	112.4743	112.9243	110.8355	24
Kalama	7/16/97	111.9212	112.5937	113.0607	110.705	24
Kalama	7/17/97	112.4707	113.2565	113.6304	111.3009	24
Kalama	7/18/97	111.9514	112.7373	113.3333	110.691	24
Kalama	7/19/97	111.8255	112.6086	113.21	110.4712	24
Kalama	7/20/97	112.619	113.697	114.361	111.0381	24
Kalama	7/21/97	113.5434	114.804	115.2231	111.6645	24
Kalama	7/22/97	113.2198	113.6469	114.1361	112.4346	24
Kalama	7/23/97	111.5439	112.0806	112.4509	110.5744	24
Kalama	7/24/97	111.3449	112.1748	112.713	109.9087	24
Kalama	7/25/97	111.1818	111.8467	112.1569	109.7656	24
Kalama	7/26/97	110.6364	111.107	114.4737	109.4118	18
Kalama	7/27/97					
Kalama	7/28/97	112.3405	112.3405	112.9581	111.3726	12
Kalama	7/29/97	112.3684	112.846	113.2199	111.4882	24
Kalama	7/30/97	111.5044	111.9532	112.3037	110.5606	24
Kalama	7/31/97	110.9409	111.6026	112.0104	109.7656	24
Kalama	8/1/97	111.5513	112.1916	112.6963	110.1563	24
Kalama	8/2/97	112.842	113.6711	114.267	111.3281	24
Kalama	8/3/97	112.8286	113.2591	113.7255	111.9948	24
Kalama	8/4/97	112.0789	112.7499	113.4289	110.9091	24
Kalama	8/5/97	110.9789	111.5477	112.0623	109.5979	24
Kalama	8/6/97	110.1751	110.7795	111.5033	108.9961	24
Kalama	8/7/97	111.4792	112.715	113.3159	109.6354	24
Kalama	8/8/97	112.626	113.2066	113.5171	111.6798	24
Kalama	8/9/97	112.0529	112.7785	113.4387	110.8781	24
Kalama	8/10/97	112.0104	112.3401	112.9117	110.7471	24
Kalama	8/11/97	112.2922	113.3182	113.9108	110.691	24
Kalama	8/12/97	112.2079	112.7721	113.272	111.3577	24
Kalama	8/13/97	112.1875	113.2888	113.9108	110.5606	24
Kalama	8/14/97	112.7006	114.3003	115.2632	109.9217	24
Kalama	8/15/97	113.539	114.0874	114.888	112.5984	24
Kalama	8/16/97	112.1707	112.7326	113.5171	110.9948	24
Kalama	8/17/97	111.614	112.406	113.2895	109.9607	24
Kalama	8/18/97	111.2193	111.7745	112.2876	109.7784	24
Kalama	8/19/97	111.7458	112.858	113.7795	109.8168	24
Kalama	8/20/97	111.5078	112.3808	113.5526	109.7784	24
Kalama	8/21/97	111.6061	112.3629	113.1854	109.6354	24
Kalama	8/22/97	112.8461	113.8679	114.6789	111.3429	24
Kalama	8/23/97	113.8099	114.983	116.3158	111.9948	24
Kalama	8/24/97	113.2154	113.541	113.9869	112.6963	24
Kalama	8/25/97	112.1258	112.515	112.9581	111.3874	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Kalama	8/26/97	111.5847	112.1143	112.7297	110.6439	24
Kalama	8/27/97	110.5986	111.3474	112.0419	109.2811	24
Kalama	8/28/97	110.8963	111.7925	112.5819	109.4118	24
Kalama	8/29/97	111.4704	112.4374	113.1062	109.6732	24
Kalama	8/30/97	112.9414	113.9798	114.7175	110.9948	24
Kalama	8/31/97	113.8342	114.6019	115.1316	112.0735	24
Camas/Washougal	4/1/97	117.1504	117.5264	118.1001	115.8974	24
Camas/Washougal	4/2/97	115.1565	115.5765	115.9948	114.4872	23
Camas/Washougal	4/3/97	116.3547	116.5507	116.7539	115.8442	24
Camas/Washougal	4/4/97	117.5377	118.4252	118.9048	116.4491	24
Camas/Washougal	4/5/97	114.7844	115.9146	118.2176	112.7297	24
Camas/Washougal	4/6/97	111.0491	112.2347	112.844	108.7696	24
Camas/Washougal	4/7/97	109.8428	110.4062	111.7801	108.7126	24
Camas/Washougal	4/8/97	110.4627	110.744	111.1111	109.4929	24
Camas/Washougal	4/9/97	109.0126	109.3789	109.8958	108.3009	24
Camas/Washougal	4/10/97	107.9989	108.2721	108.7126	107.5227	24
Camas/Washougal	4/11/97	107.8539	108.254	108.4525	106.8653	24
Camas/Washougal	4/12/97	109.3528	110.052	110.733	108.2569	24
Camas/Washougal	4/13/97	110.1723	111.4477	112.2047	107.8637	24
Camas/Washougal	4/14/97	107.5197	108.7247	109.555	105.483	24
Camas/Washougal	4/15/97	109.872	111.2308	112.6963	107.8329	24
Camas/Washougal	4/16/97	109.0743	110.4555	111.0966	106.5617	23
Camas/Washougal	4/17/97	110.2974	111.3392	112.0104	108.9378	24
Camas/Washougal	4/18/97	111.679	112.0483	112.7632	110.9067	24
Camas/Washougal	4/19/97	114.1893	115.0698	115.415	112.2691	24
Camas/Washougal	4/20/97	111.5425	112.46	113.7931	109.4929	23
Camas/Washougal	4/21/97	111.9045	113.4178	114.9215	109.2328	24
Camas/Washougal	4/22/97	117.4707	119.5621	120.8936	113.9869	24
Camas/Washougal	4/23/97	123.4245	124.427	126.0756	121.4192	24
Camas/Washougal	4/24/97	126.9933	127.6018	128.0884	126.1039	24
Camas/Washougal	4/25/97	127.8814	128.7391	129.4889	126.1997	24
Camas/Washougal	4/26/97	127.4583	128.8901	131.0118	124.8042	24
Camas/Washougal	4/27/97	125.9588	127.1451	130.1173	123.9272	21
Camas/Washougal	4/28/97	126.1716	128.1915	130.092	123.1675	24
Camas/Washougal	4/29/97	126.3657	128.2199	128.6832	123.0366	24
Camas/Washougal	4/30/97	125.5976	126.5536	127.0341	123.9583	24
Camas/Washougal	5/1/97	125.5569	126.8421	128.292	123.8961	24
Camas/Washougal	5/2/97	126.6656	127.3327	128.0263	125.7218	24
Camas/Washougal	5/3/97	127.481	128.1458	129.281	125.7813	24
Camas/Washougal	5/4/97	126.0285	127.2509	129.2969	123.9637	22
Camas/Washougal	5/5/97	125.4399	126.0646	128.3485	124.3807	20
Camas/Washougal	5/6/97	122.5662	123.1629	124.4444	120.9091	24
Camas/Washougal	5/7/97	122.1981	122.6288	123.4681	121.1414	24
Camas/Washougal	5/8/97	122.8416	123.9966	124.7706	120.9635	24
Camas/Washougal	5/9/97	125.2295	125.9812	127.0833	124.1514	24
Camas/Washougal	5/10/97	124.5093	125.1578	125.9502	123.5984	24
Camas/Washougal	5/11/97	122.4917	123.1124	124.0157	120.8877	24
Camas/Washougal	5/12/97	125.2918	127.7589	129.6199	121.6535	24
Camas/Washougal	5/13/97	127.7561	128.8882	131.357	125.1638	18
Camas/Washougal	5/14/97	130.1733	130.2776	131.0026	129.3578	14

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Camas/Washougal	5/15/97	127.9692	128.5691	129.8292	126.6927	24
Camas/Washougal	5/16/97	125.9443	126.4535	126.8676	125.163	24
Camas/Washougal	5/17/97	125.723	126.1469	126.4744	124.9347	24
Camas/Washougal	5/18/97	126.5148	127.0696	128.1209	125.6209	24
Camas/Washougal	5/19/97	129.3685	130.3613	131.4815	127.7267	24
Camas/Washougal	5/20/97	128.3713	129.0569	131.0526	127.1053	20
Camas/Washougal	5/21/97	128.9217	129.6804	131.2746	127.1654	18
Camas/Washougal	5/22/97	129.4292	130.0057	130.3947	128.6089	24
Camas/Washougal	5/23/97	129.5184	129.9772	131.0118	128.0472	19
Camas/Washougal	5/24/97	128.1612	128.2174	130.3665	127.4869	13
Camas/Washougal	5/25/97	128.1959	128.4104	130.5882	125.6209	13
Camas/Washougal	5/26/97	126.8276	127.8731	130.7592	125.098	22
Camas/Washougal	5/27/97	125.9578	126.9152	128.0105	124.4792	24
Camas/Washougal	5/28/97	127.0452	127.6363	128.3465	126.0471	24
Camas/Washougal	5/29/97	128.5342	129.1003	130.6684	127.2251	19
Camas/Washougal	5/30/97	127.233	127.6964	128.7402	126.5092	24
Camas/Washougal	5/31/97	126.1662	126.6935	127.141	125.098	24
Camas/Washougal	6/1/97	126.2011	126.682	127.1895	125.163	24
Camas/Washougal	6/2/97	128.0907	129.2479	131.2665	126.1097	21
Camas/Washougal	6/3/97	129.3789	129.3789	132.0106	128.0632	10
Camas/Washougal	6/4/97					
Camas/Washougal	6/5/97					
Camas/Washougal	6/6/97	130.1231	130.1231	130.3665	129.8039	5
Camas/Washougal	6/7/97	129.0347	129.134	130.7592	127.8431	13
Camas/Washougal	6/8/97	127.6165	127.7123	130.2356	126.4668	13
Camas/Washougal	6/9/97	129.7543	129.7543	130.5882	128.7958	8
Camas/Washougal	6/10/97	130.4968	130.4968	130.8804	130.0131	6
Camas/Washougal	6/11/97	129.5544	129.5544	130.9305	128.534	8
Camas/Washougal	6/12/97	129.4032	129.4032	130.9711	128.5714	5
Camas/Washougal	6/13/97					
Camas/Washougal	6/14/97					
Camas/Washougal	6/15/97					
Camas/Washougal	6/16/97					
Camas/Washougal	6/17/97					
Camas/Washougal	6/18/97					
Camas/Washougal	6/19/97	129.8114	129.8114	130.4575	129.2969	10
Camas/Washougal	6/20/97	129.3692	129.9814	130.9711	128.292	21
Camas/Washougal	6/21/97	128.3631	129.5158	131.1432	124.5752	23
Camas/Washougal	6/22/97	126.2986	127.1816	130.2356	124.6396	19
Camas/Washougal	6/23/97	126.0588	127.0966	129.6104	124.2228	23
Camas/Washougal	6/24/97	124.634	125.0596	125.651	123.822	24
Camas/Washougal	6/25/97	123.5193	124.2903	125.0986	119.8163	24
Camas/Washougal	6/26/97	121.2397	121.7202	122.6737	120.4188	24
Camas/Washougal	6/27/97	121.0339	122.1484	123.5217	119.3717	24
Camas/Washougal	6/28/97	120.6789	121.3642	122.7034	119.8163	24
Camas/Washougal	6/29/97	120.3024	121.2371	122.5296	118.8729	24
Camas/Washougal	6/30/97	119.0797	119.6075	120.1316	116.9713	24
Camas/Washougal	7/1/97	114.6781	115.3409	116.7102	113.0719	24
Camas/Washougal	7/2/97	114.3821	116.0399	116.9935	112.1252	24
Camas/Washougal	7/3/97	115.7113	117.449	118.9974	113.2026	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Camas/Washougal	7/4/97	116.2166	117.8827	119.3931	113.7976	24
Camas/Washougal	7/5/97	116.6579	118.0236	119.685	114.6982	24
Camas/Washougal	7/6/97	113.9317	115.0475	116.1206	112.0104	24
Camas/Washougal	7/7/97	114.1329	116.3099	117.6471	111.0821	24
Camas/Washougal	7/8/97	114.5312	115.295	116.6667	113.3508	24
Camas/Washougal	7/9/97	113.5707	114.7087	116.0995	111.5334	22
Camas/Washougal	7/10/97	113.2565	114.1423	115.5556	111.9948	24
Camas/Washougal	7/11/97	113.8717	115.669	117.3403	111.4733	24
Camas/Washougal	7/12/97	113.9947	115.7576	117.3403	111.5885	24
Camas/Washougal	7/13/97	114.1059	115.7905	117.5393	111.7035	24
Camas/Washougal	7/14/97	114.5488	116.3441	118.2768	112.1252	24
Camas/Washougal	7/15/97	113.6564	114.9426	116.645	111.3134	24
Camas/Washougal	7/16/97	114.4845	116.5254	117.8712	111.1979	24
Camas/Washougal	7/17/97	114.4698	116.0933	117.4084	112.1569	24
Camas/Washougal	7/18/97	113.4024	114.9439	116.732	111.1688	24
Camas/Washougal	7/19/97	114.4222	116.6836	117.8478	111.2125	24
Camas/Washougal	7/20/97	116.9178	119.0117	120.9211	114.1361	24
Camas/Washougal	7/21/97	115.4289	116.1583	117.0157	113.9687	24
Camas/Washougal	7/22/97	113.6714	115.0968	116.9492	111.6037	24
Camas/Washougal	7/23/97	113.7203	115.5495	117.0795	111.1979	24
Camas/Washougal	7/24/97	112.1961	112.4252	112.8906	111.5735	24
Camas/Washougal	7/25/97	113.2493	114.4243	116.188	111.9636	24
Camas/Washougal	7/26/97	114.2423	115.8396	116.3613	110.9375	24
Camas/Washougal	7/27/97	116.446	117.5157	118.2176	114.9215	24
Camas/Washougal	7/28/97	117.4504	118.2157	119.0039	116.0574	24
Camas/Washougal	7/29/97	115.1215	115.7083	116.0995	113.9687	24
Camas/Washougal	7/30/97	114.5981	115.4138	116.188	113.5593	24
Camas/Washougal	7/31/97	115.5422	116.7084	117.7314	113.8021	24
Camas/Washougal	8/1/97	116.7943	117.9784	118.9543	115.3646	24
Camas/Washougal	8/2/97	116.4579	117.2547	118.0628	115.2146	24
Camas/Washougal	8/3/97	117.2842	118.2795	119.4517	115.9269	24
Camas/Washougal	8/4/97	115.2642	116.4719	117.6853	113.3766	24
Camas/Washougal	8/5/97	113.8963	115.6477	117.2099	111.2694	24
Camas/Washougal	8/6/97	116.1887	118.3144	119.8175	112.5163	24
Camas/Washougal	8/7/97	116.635	117.6794	118.6684	114.4531	24
Camas/Washougal	8/8/97	116.0587	117.9182	118.9791	113.4115	24
Camas/Washougal	8/9/97	115.6917	115.9877	116.5354	115.2031	24
Camas/Washougal	8/10/97	117.6088	119.0949	120.2365	115.0721	24
Camas/Washougal	8/11/97	116.792	117.7513	118.7418	115.0524	24
Camas/Washougal	8/12/97	116.4046	118.1849	119.6592	113.7076	23
Camas/Washougal	8/13/97	116.4721	118.6661	119.7644	113.0548	24
Camas/Washougal	8/14/97	117.1703	118.2284	119.5538	115.5352	24
Camas/Washougal	8/15/97	114.8123	115.6514	116.5572	113.3683	24
Camas/Washougal	8/16/97	115.0009	117.1785	118.4697	111.8265	24
Camas/Washougal	8/17/97	115.8594	117.7203	119.2661	113.2199	24
Camas/Washougal	8/18/97	114.9706	116.9062	118.3007	112.2715	24
Camas/Washougal	8/19/97	115.1793	117.6469	119.4481	111.911	24
Camas/Washougal	8/20/97	115.8812	115.8812	116.0105	115.6992	4
Camas/Washougal	8/21/97	119.6335	119.6335	120.1571	119.3464	6
Camas/Washougal	8/22/97	118.7828	119.2062	121.1009	115.9477	22

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Camas/Washougal	8/23/97	117.6232	119.6853	120.8661	115.0327	24
Camas/Washougal	8/24/97	115.0867	115.0867	116.6667	113.5171	4
Camas/Washougal	8/25/97					
Camas/Washougal	8/26/97					
Camas/Washougal	8/27/97	115.4462	116.0425	117.8478	111.4173	14
Camas/Washougal	8/28/97	114.7497	115.9233	116.7979	113.1234	24
Camas/Washougal	8/29/97	115.8724	117.6264	118.8976	113.3508	23
Camas/Washougal	8/30/97	116.2462	118.2523	119.8684	113.3858	24
Camas/Washougal	8/31/97	115.4198	116.7746	121.4474	112.8947	19
Skamania	4/1/97	116.3292	117.1962	118.4754	114.653	24
Skamania	4/2/97	117.4858	119.5693	120.4427	114.3774	23
Skamania	4/3/97	120.8101	120.9679	121.232	120.4427	24
Skamania	4/4/97	119.2766	120.9288	121.232	115.8584	24
Skamania	4/5/97	112.7054	114.0596	114.941	110.719	24
Skamania	4/6/97	111.3568	112.2491	112.7297	109.4118	24
Skamania	4/7/97	110.304	110.9943	111.5033	109.0078	24
Skamania	4/8/97	110.2149	110.5178	110.9518	109.2568	24
Skamania	4/9/97	108.4539	108.6919	108.8542	107.8023	24
Skamania	4/10/97	107.719	108.1014	108.69	106.8831	24
Skamania	4/11/97	109.4706	111.2292	114.0625	107.3834	24
Skamania	4/12/97	110.3381	111.9742	113.272	108.2138	24
Skamania	4/13/97	108.7702	110.6511	112.6316	106.2992	24
Skamania	4/14/97	108.3122	108.7119	109.5425	106.9554	24
Skamania	4/15/97	108.9745	110.3809	112.0261	107.2178	24
Skamania	4/16/97	109.3566	109.6563	110.0522	108.2245	23
Skamania	4/17/97	110.3797	111.7464	113.3508	108.3225	24
Skamania	4/18/97	112.4654	114.199	116.095	110.105	24
Skamania	4/19/97	114.0106	115.468	116.8212	111.0526	24
Skamania	4/20/97	109.8954	112.0152	114.8541	106.4935	24
Skamania	4/21/97	113.3128	114.5596	115.6454	110.2999	24
Skamania	4/22/97	120.5873	122.447	123.9474	117.0157	24
Skamania	4/23/97	124.4088	126.5542	128.8512	121.3072	24
Skamania	4/24/97	125.9879	126.7592	127.7922	124.349	24
Skamania	4/25/97	126.8632	127.4002	128.0679	124.8366	24
Skamania	4/26/97	126.8681	128.4923	130.3268	123.4293	23
Skamania	4/27/97	124.4427	125.7274	130.1173	122.3822	21
Skamania	4/28/97	125.4701	127.2044	130.092	122.8758	24
Skamania	4/29/97	126.7976	127.5537	129.5664	125.2618	24
Skamania	4/30/97	126.3642	127.5643	128.628	123.8532	24
Skamania	5/1/97	124.9457	126.3596	127.9584	121.7165	24
Skamania	5/2/97	127.5557	128.6325	129.3421	124.147	24
Skamania	5/3/97	125.9271	127.505	130.5374	122.4115	24
Skamania	5/4/97	125.111	126.9336	129.7789	122.0779	24
Skamania	5/5/97	124.8975	126.0398	130.1173	122.0052	21
Skamania	5/6/97	122.3765	123.0369	123.6364	118.5233	24
Skamania	5/7/97	122.9511	124.2562	125.163	119.171	24
Skamania	5/8/97	124.491	124.9977	125.6209	123.5984	24
Skamania	5/9/97	124.9895	125.5809	125.8824	123.5065	24
Skamania	5/10/97	124.2604	124.4699	124.7706	123.7354	24
Skamania	5/11/97	123.9462	124.5716	125.853	122.7154	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Skamania	5/12/97	127.0776	127.9787	129.882	125.1969	24
Skamania	5/13/97	129.8049	130.3125	131.4888	128.3093	17
Skamania	5/14/97	129.3256	129.4788	131.0526	127.4869	13
Skamania	5/15/97	127.4958	128.1314	129.1123	125.5541	24
Skamania	5/16/97	126.0816	126.4549	126.8929	125.163	24
Skamania	5/17/97	126.7534	127.3471	127.9739	125.2276	24
Skamania	5/18/97	128.282	129.0822	130.3548	126.9531	24
Skamania	5/19/97	130.3004	130.9455	131.3158	127.5953	22
Skamania	5/20/97	128.7902	129.2536	131.3158	127.7487	19
Skamania	5/21/97	130.2099	130.4801	131.3158	129.4889	17
Skamania	5/22/97	130.134	130.4843	131.2746	128.9646	19
Skamania	5/23/97	129.8517	130.2077	131.0118	128.3093	18
Skamania	5/24/97	128.7308	128.7308	129.5276	127.9528	4
Skamania	5/25/97	126.5419	127.0836	129.5812	124.8042	17
Skamania	5/26/97	126.3629	126.7006	127.5098	125.5875	19
Skamania	5/27/97	127.3409	127.7929	128.4224	126.1097	24
Skamania	5/28/97	128.5309	129.5169	130.1047	126.7624	24
Skamania	5/29/97	129.0862	129.5245	130.3665	127.8796	20
Skamania	5/30/97	128.4114	128.7652	129.0026	126.8068	24
Skamania	5/31/97	128.1199	128.9702	130.6684	126.5013	24
Skamania	6/1/97	127.4855	128.0026	128.9817	126.6319	24
Skamania	6/2/97	130.0846	130.2509	130.9618	129.3036	15
Skamania	6/3/97					
Skamania	6/4/97					
Skamania	6/5/97					
Skamania	6/6/97	130.0308	130.0308	130.7592	128.6649	3
Skamania	6/7/97	129.2516	129.3829	130.1047	127.6762	13
Skamania	6/8/97	129.1395	129.1395	130.7592	127.2251	8
Skamania	6/9/97	129.882	129.882	129.882	129.882	1
Skamania	6/10/97	130.5774	130.5774	130.5774	130.5774	1
Skamania	6/11/97	130.2011	130.2011	130.9711	129.6588	6
Skamania	6/12/97					
Skamania	6/13/97					
Skamania	6/14/97					
Skamania	6/15/97					
Skamania	6/16/97					
Skamania	6/17/97					
Skamania	6/18/97					
Skamania	6/19/97	129.0558	129.0558	129.7262	128.3854	2
Skamania	6/20/97	130.2268	130.2268	130.8399	129.2651	10
Skamania	6/21/97	127.842	128.7032	130.7895	125	18
Skamania	6/22/97	127.367	127.8355	130.0261	125.9791	17
Skamania	6/23/97	126.3429	127.1944	129.572	125	22
Skamania	6/24/97	124.3215	124.8907	125.9403	122.3667	24
Skamania	6/25/97	123.9072	125.0111	125.4259	117.2324	24
Skamania	6/26/97	120.6902	122.1095	123.4987	114.1176	24
Skamania	6/27/97	122.3729	123.2079	124.0838	121.0733	24
Skamania	6/28/97	121.8829	122.7794	123.7533	120.235	24
Skamania	6/29/97	121.4676	122.0571	123.8845	120.0262	24
Skamania	6/30/97	119.7257	120.9065	121.7848	116.2973	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Skamania	7/1/97	114.6965	115.1553	116.0365	113.0039	24
Skamania	7/2/97	115.878	116.3016	116.7102	114.6024	24
Skamania	7/3/97	117.2647	117.592	118.3833	116.4922	24
Skamania	7/4/97	119.0997	119.5729	120.7349	118.0628	24
Skamania	7/5/97	118.098	119.4225	120.4456	114.752	23
Skamania	7/6/97	115.1095	115.7825	116.7102	114.0442	24
Skamania	7/7/97	116.6471	117.2319	118.0157	115.625	24
Skamania	7/8/97	116.5009	116.8283	117.2775	115.3543	24
Skamania	7/9/97	115.5523	116.4102	117.6933	113.8381	24
Skamania	7/10/97	114.2431	115.4762	116.4706	111.8644	24
Skamania	7/11/97	115.2118	116.4091	117.601	113.7841	24
Skamania	7/12/97	114.8278	115.8765	117.0573	113.264	24
Skamania	7/13/97	114.484	114.8051	115.1436	113.7255	24
Skamania	7/14/97	115.5755	116.4785	117.801	113.8743	24
Skamania	7/15/97	114.7789	115.8293	117.8618	113.264	24
Skamania	7/16/97	115.2316	116.0437	117.1018	114.1361	24
Skamania	7/17/97	115.568	116.7331	118.0628	113.264	24
Skamania	7/18/97	113.639	114.4523	115.7347	112.6138	24
Skamania	7/19/97	115.8132	116.4029	117.038	114.0808	24
Skamania	7/20/97	118.3656	118.9442	119.8163	117.1466	24
Skamania	7/21/97	115.7759	117.5031	118.8976	113.3508	23
Skamania	7/22/97	113.5828	114.3389	115.4047	110.8214	24
Skamania	7/23/97	114.4753	114.9539	115.6454	113.2986	24
Skamania	7/24/97	114.4227	115.2367	116.7102	112.7771	24
Skamania	7/25/97	114.4224	115.6453	116.4491	110.8214	24
Skamania	7/26/97	116.4493	117.9974	118.8482	112.6797	24
Skamania	7/27/97	118.2683	120.5006	121.5223	113.7795	24
Skamania	7/28/97	118.8045	119.4849	120.0262	116.6013	24
Skamania	7/29/97	116.869	117.7601	118.6108	115.0721	24
Skamania	7/30/97	116.7167	118.7763	120	112.549	24
Skamania	7/31/97	118.2274	119.7739	120.235	114.6214	24
Skamania	8/1/97	119.8571	120.5288	121.0183	117.4707	24
Skamania	8/2/97	119.2148	120.0827	120.3655	116.1458	24
Skamania	8/3/97	118.386	119.3463	119.8953	115.7068	24
Skamania	8/4/97	116.2438	117.364	119.7128	114.1927	24
Skamania	8/5/97	117.2108	118.9468	120.339	114.8052	24
Skamania	8/6/97	121.9111	122.4115	123.0469	120.9909	24
Skamania	8/7/97	119.9808	120.7649	122.1354	117.601	24
Skamania	8/8/97	118.9666	120.6899	121.8016	113.7435	24
Skamania	8/9/97	121.3546	122.243	123.2589	119.2913	24
Skamania	8/10/97	121.0701	122.3166	123.1579	118.3486	24
Skamania	8/11/97	117.8028	119.3184	121.1009	114.3603	24
Skamania	8/12/97	118.4973	119.8972	121.363	116.732	24
Skamania	8/13/97	120.2911	121.2279	122.5426	117.9554	24
Skamania	8/14/97	120.0272	120.4739	121.3351	118.8976	24
Skamania	8/15/97	116.1968	118.9737	120.9211	110.9067	24
Skamania	8/16/97	119.6646	120.8035	122.4704	117.8478	24
Skamania	8/17/97	117.5038	119.6188	122.8647	113.4034	24
Skamania	8/18/97	116.6549	119.2198	122.5131	111.8954	24
Skamania	8/19/97	119.3443	120.2168	121.5506	116.8628	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Skamania	8/20/97	119.1365	121.5788	122.9765	113.4817	24
Skamania	8/21/97	120.1257	121.376	123.3681	115.6658	24
Skamania	8/22/97	121.1069	122.0071	123.46	118.9295	24
Skamania	8/23/97	119.4741	121.394	123.3681	117.0157	24
Skamania	8/24/97	115.6052	117.6673	120.0262	111.1402	24
Skamania	8/25/97	117.1158	119.4555	122.1494	114.0236	23
Skamania	8/26/97	121.3972	121.3972	121.504	121.2121	3
Skamania	8/27/97	116.8654	116.8654	119.6592	115.5759	12
Skamania	8/28/97	119.0752	120.2515	121.7848	117.2775	24
Skamania	8/29/97	119.5636	121.1143	122.4115	117.1916	24
Skamania	8/30/97	118.971	121.0514	122.1053	115.9001	24
Skamania	8/31/97	118.7747	120.5009	121.6359	116.0738	24
Warrendale	4/1/97	118.078	118.8759	119.6911	116.2197	24
Warrendale	4/2/97	119.7186	121.9996	122.6098	116.3683	24
Warrendale	4/3/97	119.9285	120.5542	121.0663	118.677	24
Warrendale	4/4/97	118.8032	119.5673	119.9219	116.6018	24
Warrendale	4/5/97	114.7195	115.8953	116.515	112.3377	24
Warrendale	4/6/97	112.5025	113.6631	114.0992	110.1167	24
Warrendale	4/7/97	111.6199	112.6702	113.264	110.2332	24
Warrendale	4/8/97	111.899	112.2224	112.7604	110.7513	24
Warrendale	4/9/97	110.5512	110.8389	111.039	109.4437	24
Warrendale	4/10/97	110.0023	110.4618	111.1255	109.3023	24
Warrendale	4/11/97	111.6015	113.2505	115.5642	109.6774	24
Warrendale	4/12/97	112.3445	114.0366	115.5556	110	24
Warrendale	4/13/97	110.2837	112.3083	114.4168	107.4316	24
Warrendale	4/14/97	110.5221	111.046	111.5584	108.8889	24
Warrendale	4/15/97	110.6806	112.7373	114.4343	108.0834	24
Warrendale	4/16/97	111.4883	111.8303	112.1569	110.7513	24
Warrendale	4/17/97	112.645	113.8861	115.1239	110.8949	24
Warrendale	4/18/97	114.5103	116.1251	117.6548	112.549	24
Warrendale	4/19/97	115.9352	117.2182	118.3619	112.9581	24
Warrendale	4/20/97	112.4008	113.787	116.2483	110.1036	24
Warrendale	4/21/97	115.7241	116.9074	120.0521	113.2296	23
Warrendale	4/22/97	123.0945	124.6827	125.7218	120.8062	24
Warrendale	4/23/97	127.3306	128.6771	130.2477	124.8366	20
Warrendale	4/24/97	128.6321	128.7426	129.6104	127.9221	14
Warrendale	4/25/97	129.3624	129.3624	129.8177	129.0909	8
Warrendale	4/26/97	128.1597	128.3725	129.6875	127.013	15
Warrendale	4/27/97	125.6356	126.1437	129.6104	123.8651	17
Warrendale	4/28/97	126.4462	126.7825	129.5039	125.1302	17
Warrendale	4/29/97	128.4626	128.539	129.4805	127.5457	13
Warrendale	4/30/97	128.9611	129.2316	130.7592	127.2727	14
Warrendale	5/1/97	127.583	128.1703	129.2047	125.9403	17
Warrendale	5/2/97	129.6524	129.716	131.1024	128.8889	13
Warrendale	5/3/97	127.789	128.5262	129.8956	126.1039	18
Warrendale	5/4/97	126.0688	126.3283	129.9479	125.1289	17
Warrendale	5/5/97	126.363	127.4448	128.4416	123.8961	19
Warrendale	5/6/97	124.7576	125.5302	126.2679	122.8093	23
Warrendale	5/7/97	125.0878	126.0546	126.8734	123.4536	24
Warrendale	5/8/97	125.6995	126.1562	126.5888	124.7089	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Warrendale	5/9/97	126.7253	127.5375	128.2581	124.8062	23
Warrendale	5/10/97	125.6815	125.9638	126.4249	125.1621	24
Warrendale	5/11/97	125.1579	125.8289	126.5625	123.9327	24
Warrendale	5/12/97	127.5201	128.3588	128.9439	126.1378	24
Warrendale	5/13/97	129.5408	129.5408	129.7789	129.3888	7
Warrendale	5/14/97	129.2182	129.2182	129.5189	128.961	6
Warrendale	5/15/97	128.6892	129.279	129.572	127.2021	24
Warrendale	5/16/97	127.5484	127.829	128.4785	127.1077	24
Warrendale	5/17/97	128.0589	128.5715	129.4041	126.943	24
Warrendale	5/18/97	129.1646	129.1646	130.0781	128.6822	10
Warrendale	5/19/97	130.219	130.219	130.5882	129.765	4
Warrendale	5/20/97	129.7658	130.0253	130.4575	129.0365	19
Warrendale	5/21/97					
Warrendale	5/22/97					
Warrendale	5/23/97					
Warrendale	5/24/97	129.3126	129.3126	129.3126	129.3126	3
Warrendale	5/25/97	127.3519	127.4956	128.886	126.8734	17
Warrendale	5/26/97	127.6374	127.7773	127.9948	127.2021	20
Warrendale	5/27/97	128.6801	128.9945	129.4423	128.125	24
Warrendale	5/28/97	129.4383	130.0116	130.6283	128.3117	20
Warrendale	5/29/97	130.1985	130.452	130.9305	129.6199	20
Warrendale	5/30/97	130.012	130.3459	130.6176	129.3036	24
Warrendale	5/31/97	129.6685	130.3773	131.2253	128.4967	23
Warrendale	6/1/97	129.0595	129.4851	130.7592	128.1046	23
Warrendale	6/2/97	131.4789	131.4789	131.7942	131.0118	8
Warrendale	6/3/97					
Warrendale	6/4/97					
Warrendale	6/5/97					
Warrendale	6/6/97					
Warrendale	6/7/97	130.472	130.472	130.9305	129.8429	9
Warrendale	6/8/97	130.6284	130.6284	130.7592	130.4575	3
Warrendale	6/9/97					
Warrendale	6/10/97					
Warrendale	6/11/97	131.0165	131.0165	131.1024	130.9305	2
Warrendale	6/12/97					
Warrendale	6/13/97					
Warrendale	6/14/97					
Warrendale	6/15/97					
Warrendale	6/16/97					
Warrendale	6/17/97					
Warrendale	6/18/97					
Warrendale	6/19/97					
Warrendale	6/20/97	130.6551	130.6551	130.9305	130.4974	3
Warrendale	6/21/97	129.0979	129.5167	130.9305	127.8068	18
Warrendale	6/22/97	128.1923	128.3202	128.9817	127.6983	16
Warrendale	6/23/97	126.9222	127.3593	129.6489	126.0363	21
Warrendale	6/24/97	125.6076	125.9632	126.5544	125.0649	24
Warrendale	6/25/97	126.084	126.4901	126.7016	124.9022	24
Warrendale	6/26/97	122.517	123.0351	123.5984	121.0938	24
Warrendale	6/27/97	123.3791	123.7396	124.0838	122.1643	23

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Warrendale	6/28/97	123.4553	124.3296	125.1638	121.8586	24
Warrendale	6/29/97	122.5878	122.9883	123.8845	121.8586	24
Warrendale	6/30/97	121.0149	122.1883	122.8947	117.4707	24
Warrendale	7/1/97	116.2637	116.6905	117.3629	115.3446	24
Warrendale	7/2/97	117.307	117.7066	118.1462	116.5365	24
Warrendale	7/3/97	118.6274	119.0362	119.8693	117.9319	24
Warrendale	7/4/97	120.1103	120.571	121.4192	119.4481	24
Warrendale	7/5/97	118.6218	120.2495	121.1286	115.3846	24
Warrendale	7/6/97	115.9041	116.5432	117.2549	114.6024	24
Warrendale	7/7/97	117.2494	117.7903	118.5621	116.0156	24
Warrendale	7/8/97	117.3108	117.6659	118.1699	116.5138	24
Warrendale	7/9/97	116.6944	117.7703	118.7911	114.902	24
Warrendale	7/10/97	115.3981	116.3889	117.6933	114.0992	24
Warrendale	7/11/97	116.2135	116.9082	117.801	114.9935	24
Warrendale	7/12/97	115.9085	116.8277	118.0392	114.3229	24
Warrendale	7/13/97	115.6381	116.2661	117.2549	114.3603	24
Warrendale	7/14/97	116.2738	116.7431	117.5393	115.2542	24
Warrendale	7/15/97	115.9715	117.0786	118.0392	114.6024	24
Warrendale	7/16/97	115.8601	116.4402	117.1242	114.81	24
Warrendale	7/17/97	116.6499	117.5697	118.6352	114.752	23
Warrendale	7/18/97	114.9573	115.7983	116.9713	113.8381	24
Warrendale	7/19/97	117.0277	117.5761	118.4797	116.0995	24
Warrendale	7/20/97	119.2778	119.9099	120.8936	118.0865	24
Warrendale	7/21/97	116.7311	118.2728	119.6592	114.0992	24
Warrendale	7/22/97	115.2663	116.0181	116.8848	113.8201	24
Warrendale	7/23/97	115.9528	116.5067	117.5163	114.7327	24
Warrendale	7/24/97	115.8621	116.8164	117.9085	114.3416	24
Warrendale	7/25/97	115.5859	116.1882	116.623	114.472	24
Warrendale	7/26/97	116.2629	116.6851	117.0828	115.0131	24
Warrendale	7/27/97	117.7082	118.4134	119.0539	115.9895	24
Warrendale	7/28/97	118.0987	118.5488	119.1853	116.9713	24
Warrendale	7/29/97	116.5549	116.9867	117.3001	115.7963	24
Warrendale	7/30/97	115.3256	115.6823	115.8377	114.2484	24
Warrendale	7/31/97	115.9541	116.5381	117.0157	114.6944	24
Warrendale	8/1/97	115.7195	116.1079	116.6448	115.1042	24
Warrendale	8/2/97	115.2773	115.7092	115.9895	114.4531	24
Warrendale	8/3/97	115.5323	116.3885	116.9069	114.0052	24
Warrendale	8/4/97	113.5429	114.8593	115.9269	111.6883	24
Warrendale	8/5/97	113.0481	114.2413	115.5352	111.1979	24
Warrendale	8/6/97	116.806	117.1611	118.1226	116.0574	24
Warrendale	8/7/97	115.3948	115.8089	117.0795	114.3416	24
Warrendale	8/8/97	114.5069	115.1707	116.0784	113.3333	24
Warrendale	8/9/97	115.5508	116.5917	117.6084	113.8925	24
Warrendale	8/10/97	117.2386	117.9449	118.9474	115.5963	24
Warrendale	8/11/97	116.3925	116.8322	117.6702	115.4653	24
Warrendale	8/12/97	115.8604	117.0468	118.2176	114.3979	24
Warrendale	8/13/97	116.7795	117.487	118.4797	115.6863	24
Warrendale	8/14/97	115.8614	116.3841	116.9069	113.4034	24
Warrendale	8/15/97	112.7937	114.0502	115.1316	111.1695	24
Warrendale	8/16/97	113.8808	115.0381	116.1629	112.2208	24

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Warrendale	8/17/97	115.1843	116.1001	117.0828	113.7615	24
Warrendale	8/18/97	114.1376	116.0858	118.5864	111.7647	24
Warrendale	8/19/97	114.1757	114.9066	116.2943	112.5819	24
Warrendale	8/20/97	115.7787	116.7275	118.0157	114.2298	24
Warrendale	8/21/97	115.5359	116.5291	118.2768	113.9505	24
Warrendale	8/22/97	116.7647	117.4713	118.0628	115.5556	24
Warrendale	8/23/97	115.9756	117.314	118.1937	114.267	24
Warrendale	8/24/97	113.2553	114.1129	115.3141	111.911	24
Warrendale	8/25/97	114.7658	115.8426	116.5572	113.2546	24
Warrendale	8/26/97	115.6037	116.9527	117.7866	113.7615	24
Warrendale	8/27/97	115.0521	115.9915	116.6448	114.0052	24
Warrendale	8/28/97	115.4474	116.3956	117.1691	113.7435	23
Warrendale	8/29/97	116.4327	117.6252	118.9791	114.7906	24
Warrendale	8/30/97	116.3803	117.3567	118.1102	115.2231	24
Warrendale	8/31/97	116.6334	117.5624	118.134	115.2031	24
Bonneville	4/1/97	114.0958	115.3638	116.8394	111.5385	24
Bonneville	4/2/97	116.183	118.3792	119.5343	111.9231	24
Bonneville	4/3/97	118.5259	119.4438	119.8693	116.2338	23
Bonneville	4/4/97	116.026	117.249	117.5853	113.1062	24
Bonneville	4/5/97	110.7296	111.7374	113.1234	109.1384	24
Bonneville	4/6/97	110.9093	111.369	111.9737	110.0522	24
Bonneville	4/7/97	110.3171	110.5224	110.733	109.7784	24
Bonneville	4/8/97	109.0307	109.5774	109.8296	107.8329	24
Bonneville	4/9/97	107.0062	107.4535	107.8431	106.3802	24
Bonneville	4/10/97	106.5863	106.8336	107.199	105.9663	24
Bonneville	4/11/97	108.8685	111.3031	113.9323	105.9585	24
Bonneville	4/12/97	110.1095	112.604	115.5468	106.7974	24
Bonneville	4/13/97	110.7198	112.4689	115.1515	108.1472	24
Bonneville	4/14/97	110.4369	111.8547	112.5984	108.1152	24
Bonneville	4/15/97	108.652	109.4198	111.5183	107.7225	24
Bonneville	4/16/97	107.8486	108.0787	108.3113	107.3298	24
Bonneville	4/17/97	109.3726	111.2353	112.8609	106.91	24
Bonneville	4/18/97	111.7468	114.3912	115.9151	108.4321	24
Bonneville	4/19/97	112.0613	113.7401	114.8541	108.7186	24
Bonneville	4/20/97	107.2328	108.1503	110.1333	105.867	24
Bonneville	4/21/97	110.3594	112.0382	113.6126	107.0404	24
Bonneville	4/22/97	115.0606	117.8637	120.2381	111.5183	24
Bonneville	4/23/97	120.8844	121.2811	122.0762	119.8946	24
Bonneville	4/24/97	120.2221	120.8313	121.3072	118.9048	24
Bonneville	4/25/97	123.2142	125.0142	126.2467	120.7031	24
Bonneville	4/26/97	125.0116	125.7179	126.4126	123.46	24
Bonneville	4/27/97	121.8888	123.2756	125.7256	119.8433	24
Bonneville	4/28/97	122.6881	123.2946	125	121.4379	24
Bonneville	4/29/97	123.0374	124.3211	125.2645	120.5767	24
Bonneville	4/30/97	121.2211	122.0466	123.6702	119.085	23
Bonneville	5/1/97	119.7018	120.3181	121.6074	118.5379	24
Bonneville	5/2/97	122.9776	123.9684	124.967	121.1286	24
Bonneville	5/3/97	123.4109	124.2113	124.934	122.2513	24
Bonneville	5/4/97	122.0951	123.1554	124.5085	120.3125	24
Bonneville	5/5/97	123.3314	123.6997	124.1787	122.6144	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Bonneville	5/6/97	121.1304	122.1299	123.1275	119.3211	24
Bonneville	5/7/97	120.8612	122.1293	123.0971	118.8312	24
Bonneville	5/8/97	122.743	123.5385	124.3775	121.2794	24
Bonneville	5/9/97	122.877	123.7578	125.1316	120.7301	24
Bonneville	5/10/97	122.625	123.2645	124.0473	121.382	24
Bonneville	5/11/97	123.0364	123.7141	124.2424	121.916	24
Bonneville	5/12/97	123.3426	123.66	124.0106	122.4704	24
Bonneville	5/13/97	124.7628	126.3465	127.8146	122.7332	24
Bonneville	5/14/97	126.8013	127.4897	128.2695	125.3614	23
Bonneville	5/15/97	125.5166	126.3121	126.9382	123.9216	24
Bonneville	5/16/97	124.5566	124.8634	125.3281	123.9216	24
Bonneville	5/17/97	122.9525	123.2803	123.5911	122.4115	24
Bonneville	5/18/97	124.9697	126.5377	128.0263	122.5426	24
Bonneville	5/19/97	127.5414	128.3269	128.9509	124.7028	24
Bonneville	5/20/97	123.6853	124.1523	124.5707	122.5	24
Bonneville	5/21/97	126.5514	126.6316	127.0449	125.921	24
Bonneville	5/22/97	127.2903	127.6425	128.4016	126.7105	24
Bonneville	5/23/97	126.2795	126.5627	127.2127	125.0986	24
Bonneville	5/24/97	125.0181	125.3882	126.0927	123.9843	24
Bonneville	5/25/97	122.8173	123.2554	124.4737	121.6993	24
Bonneville	5/26/97	123.1331	124.042	124.8021	121.1564	24
Bonneville	5/27/97	125.5345	125.8073	127.1053	124.1153	24
Bonneville	5/28/97	127.1027	127.1027	127.609	126.2467	24
Bonneville	5/29/97	127.0693	127.256	127.7045	126.5092	23
Bonneville	5/30/97	127.3516	127.8357	128.1579	126.6404	24
Bonneville	5/31/97	126.0586	127.1112	127.8364	123.9529	24
Bonneville	6/1/97	124.5421	125.2427	125.8191	123.5294	24
Bonneville	6/2/97	126.9916	127.9203	128.5337	125.4902	24
Bonneville	6/3/97	128.4652	128.8769	129.2715	127.7632	24
Bonneville	6/4/97	128.8016	129.4793	130.0525	127.2251	24
Bonneville	6/5/97	127.126	127.4938	127.7851	125.8824	24
Bonneville	6/6/97	127.0765	127.6308	127.8581	125.853	24
Bonneville	6/7/97	124.1197	124.8011	125.887	122.9358	24
Bonneville	6/8/97	123.8865	124.8311	126.2123	122.4837	24
Bonneville	6/9/97	128.0146	128.8315	129.1173	126.4744	24
Bonneville	6/10/97	128.9179	130.1613	130.5665	126.2467	24
Bonneville	6/11/97	126.7688	127.9414	128.3837	124.5729	24
Bonneville	6/12/97	124.7037	125.3884	125.6881	123.0668	23
Bonneville	6/13/97	123.4357	123.6413	123.7845	122.644	24
Bonneville	6/14/97	123.3866	123.7543	124.8684	122.6737	24
Bonneville	6/15/97	125.4691	125.93	126.4126	124.5729	24
Bonneville	6/16/97	126.3084	126.9503	128.4211	125.3281	24
Bonneville	6/17/97	128.5278	129.4267	129.9078	125.5236	24
Bonneville	6/18/97	125.5894	126.1705	126.9281	124.6415	24
Bonneville	6/19/97	125.3238	125.9497	126.2402	123.8903	24
Bonneville	6/20/97	124.6949	124.9873	125.6917	124.147	24
Bonneville	6/21/97	124.527	125.3819	125.6275	122.5722	24
Bonneville	6/22/97	123.5682	124.144	124.4764	122.4115	24
Bonneville	6/23/97	122.051	122.4171	123.3681	121.3542	24
Bonneville	6/24/97	121.1928	121.6562	122.3097	120.3125	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Bonneville	6/25/97	122.8911	123.4176	123.7533	121.0733	24
Bonneville	6/26/97	119.5544	119.9128	120.5497	118.6928	24
Bonneville	6/27/97	118.2772	118.8632	119.3421	117.1466	23
Bonneville	6/28/97	119.0403	119.3613	119.657	118.2654	24
Bonneville	6/29/97	118.8159	119.4619	120.2114	117.8947	24
Bonneville	6/30/97	117.7989	119.1452	119.9208	115.5963	24
Bonneville	7/1/97	113.5773	114.6096	115.445	112.3859	24
Bonneville	7/2/97	115.3237	115.7271	116.2516	113.4817	24
Bonneville	7/3/97	117.1379	117.7565	119.6311	116.2091	24
Bonneville	7/4/97	119.0789	119.4086	119.7889	118.4697	24
Bonneville	7/5/97	116.7752	118.1269	118.7335	113.5171	24
Bonneville	7/6/97	113.5579	114.111	115.3543	112.8105	24
Bonneville	7/7/97	115.1926	115.3906	115.8584	114.902	24
Bonneville	7/8/97	115.736	116.1226	116.6227	114.81	24
Bonneville	7/9/97	114.7869	115.6902	116.3805	113.3858	24
Bonneville	7/10/97	112.7053	112.9147	113.4034	112.3198	24
Bonneville	7/11/97	112.9833	113.2932	113.8925	112.4346	24
Bonneville	7/12/97	113.3068	113.8218	114.4168	112.5326	24
Bonneville	7/13/97	113.5112	113.8885	114.1919	112.8272	24
Bonneville	7/14/97	114.567	114.9873	115.2231	113.7795	24
Bonneville	7/15/97	113.2221	113.7465	114.3045	112.4183	24
Bonneville	7/16/97	113.7983	114.3207	115.4354	112.9751	24
Bonneville	7/17/97	114.4653	115.8252	116.6008	112.3198	23
Bonneville	7/18/97	111.6577	112.0564	112.4672	110.8497	24
Bonneville	7/19/97	115.0708	116.4275	118.0501	112.713	24
Bonneville	7/20/97	118.2914	118.5596	118.7335	117.5231	24
Bonneville	7/21/97	114.2038	115.9337	117.4142	111.9423	24
Bonneville	7/22/97	112.5732	112.7706	113.1234	112.1728	24
Bonneville	7/23/97	113.7213	114.0188	114.1732	113.1062	24
Bonneville	7/24/97	113.6315	114.2358	114.8294	112.5819	24
Bonneville	7/25/97	112.1599	112.5615	112.844	111.5334	24
Bonneville	7/26/97	112.7354	113.1252	113.4387	111.7955	24
Bonneville	7/27/97	115.2751	115.8716	116.3588	113.421	24
Bonneville	7/28/97	115.4278	116	116.3158	114.079	24
Bonneville	7/29/97	112.3829	113.2749	113.9474	110.5125	24
Bonneville	7/30/97	110.9472	111.3652	111.8265	110.3539	24
Bonneville	7/31/97	111.3418	111.8407	112.336	110.616	24
Bonneville	8/1/97	111.3943	111.9297	112.5	110.5882	24
Bonneville	8/2/97	111.4309	111.8441	112.4836	110.8639	24
Bonneville	8/3/97	111.5102	111.9894	112.3684	110.7612	24
Bonneville	8/4/97	110.5654	111.012	111.9266	109.7784	24
Bonneville	8/5/97	109.5061	110.2189	110.8781	108.3551	24
Bonneville	8/6/97	111.608	112.2324	112.5819	110.6021	24
Bonneville	8/7/97	110.5339	111.0856	111.4024	108.7927	24
Bonneville	8/8/97	108.9768	109.3715	109.7625	108.2569	24
Bonneville	8/9/97	110.5729	111.6393	112.1532	108.971	24
Bonneville	8/10/97	114.5198	115.5565	115.9842	112.4174	24
Bonneville	8/11/97	115.9993	116.8098	117.2823	114.7368	24
Bonneville	8/12/97	113.8129	114.2858	115.9211	112.9921	24
Bonneville	8/13/97	113.4247	113.744	114.079	112.8778	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
Bonneville	8/14/97	111.8273	112.3183	113.0263	110.3038	24
Bonneville	8/15/97	108.5402	108.9449	109.7625	107.7836	24
Bonneville	8/16/97	109.0216	110.1082	110.9643	107.6316	24
Bonneville	8/17/97	113.2013	114.5904	115.3034	110.8322	24
Bonneville	8/18/97	111.1185	111.687	113.2895	110.0917	24
Bonneville	8/19/97	110.0103	110.9275	111.6248	108.2895	24
Bonneville	8/20/97	112.05	112.5684	113.0092	111.2137	24
Bonneville	8/21/97	111.033	111.6728	112.3198	109.9476	24
Bonneville	8/22/97	112.5599	113.4136	114.0604	110.7471	24
Bonneville	8/23/97	112.3622	112.9198	113.3245	111.5486	24
Bonneville	8/24/97	111.0589	111.6389	112.2208	110.1183	24
Bonneville	8/25/97	112.2471	113.4061	115.0594	110.6579	24
Bonneville	8/26/97	113.8842	114.3018	115.2116	113.0607	24
Bonneville	8/27/97	112.7441	113.2355	113.6842	111.9423	24
Bonneville	8/28/97	113.0373	113.7143	114.5861	112.0894	24
Bonneville	8/29/97	113.6941	114.3817	115.1515	112.5819	24
Bonneville	8/30/97	114.3523	115.013	115.5673	113.1579	24
Bonneville	8/31/97	114.2261	114.7243	115.4557	113.3245	24
The Dalles DNSTRM	4/1/97	116.1058	117.9467	118.863	110.8073	24
The Dalles DNSTRM	4/2/97	119.5555	122.8974	123.7598	111.2258	24
The Dalles DNSTRM	4/3/97	117.131	121.2667	123.2376	110.1316	24
The Dalles DNSTRM	4/4/97	108.2543	109.3486	110.3675	106.2992	24
The Dalles DNSTRM	4/5/97	108.6708	109.0455	110.3675	107.9739	24
The Dalles DNSTRM	4/6/97	108.9524	109.1159	109.3544	108.519	24
The Dalles DNSTRM	4/7/97	107.3584	107.917	108.5302	106.5531	24
The Dalles DNSTRM	4/8/97	106.3794	106.5218	106.8241	106.1438	24
The Dalles DNSTRM	4/9/97	106.9662	107.8141	108.1258	105.6356	24
The Dalles DNSTRM	4/10/97	110.1662	113.1249	117.4479	106.7708	24
The Dalles DNSTRM	4/11/97	111.3292	115.5005	117.1875	106.7532	24
The Dalles DNSTRM	4/12/97	111.7958	115.8702	117.5231	107.3107	24
The Dalles DNSTRM	4/13/97	111.0708	113.3824	116.2269	107.8947	24
The Dalles DNSTRM	4/14/97	107.2805	107.5045	107.7734	106.6667	24
The Dalles DNSTRM	4/15/97	107.1763	107.5897	108.0263	106.5359	24
The Dalles DNSTRM	4/16/97	110.2682	112.293	116.8421	107.7124	24
The Dalles DNSTRM	4/17/97	112.1039	115.6462	116.1842	107.3203	24
The Dalles DNSTRM	4/18/97	111.47	114.9818	116.2914	107.1146	24
The Dalles DNSTRM	4/19/97	108.9455	109.408	110.3723	108.1902	24
The Dalles DNSTRM	4/20/97	111.6563	115.2829	117.4834	107.1895	24
The Dalles DNSTRM	4/21/97	113.8481	116.4898	119.6592	110.0917	24
The Dalles DNSTRM	4/22/97	121.6993	123.1085	124.3065	119.135	23
The Dalles DNSTRM	4/23/97	122.204	122.6052	123.8786	121.0458	24
The Dalles DNSTRM	4/24/97	122.8433	123.4958	124.8698	121.8586	24
The Dalles DNSTRM	4/25/97	125.0764	125.5764	126.9883	124.2188	24
The Dalles DNSTRM	4/26/97	125.0315	125.3388	125.853	123.9159	24
The Dalles DNSTRM	4/27/97	123.0698	123.4799	124.1787	122.2222	20
The Dalles DNSTRM	4/28/97					
The Dalles DNSTRM	4/29/97	120.9575	120.9575	122.339	118.8729	11
The Dalles DNSTRM	4/30/97	122.1862	123.0374	123.6148	119.8953	24
The Dalles DNSTRM	5/1/97	121.173	121.9494	122.2805	119.5026	24
The Dalles DNSTRM	5/2/97	122.6975	123.4102	124.1425	121.1009	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
The Dalles DNSTRM	5/3/97	121.0397	121.6508	122.0762	119.7903	24
The Dalles DNSTRM	5/4/97	121.6114	121.9744	122.3529	120.4694	24
The Dalles DNSTRM	5/5/97	122.0507	122.6934	123.0366	120.288	24
The Dalles DNSTRM	5/6/97	120.2999	121.0876	121.6428	118.5379	24
The Dalles DNSTRM	5/7/97	121.8719	122.3238	122.6858	120.6762	24
The Dalles DNSTRM	5/8/97	122.2938	122.5106	123.0366	121.9608	23
The Dalles DNSTRM	5/9/97	122.6507	122.878	123.1979	122.2513	24
The Dalles DNSTRM	5/10/97	123.2254	123.5012	123.822	122.3238	24
The Dalles DNSTRM	5/11/97	122.7769	123.0308	123.5217	121.8016	24
The Dalles DNSTRM	5/12/97	124.1031	124.9473	126.0526	122.6737	24
The Dalles DNSTRM	5/13/97	127.8444	128.6765	129.3808	126.3158	24
The Dalles DNSTRM	5/14/97	128.0302	128.8978	129.4584	126.0526	24
The Dalles DNSTRM	5/15/97	125.878	126.234	126.6754	124.6073	24
The Dalles DNSTRM	5/16/97	124.4952	124.7624	125.0986	123.822	24
The Dalles DNSTRM	5/17/97	124.9174	125.1942	126.0813	124.3775	24
The Dalles DNSTRM	5/18/97	127.1636	127.825	128.3837	125.8191	24
The Dalles DNSTRM	5/19/97	128.7791	129.0698	129.443	127.7632	24
The Dalles DNSTRM	5/20/97	127.4936	127.8103	128.1374	126.8775	24
The Dalles DNSTRM	5/21/97	128.1569	128.4726	128.8538	127.3684	23
The Dalles DNSTRM	5/22/97	127.7536	128.1954	128.5151	126.7105	24
The Dalles DNSTRM	5/23/97	126.805	127.3436	127.7045	125.5263	24
The Dalles DNSTRM	5/24/97	127.2495	127.6512	127.8947	126.2812	24
The Dalles DNSTRM	5/25/97	124.6365	125.8261	126.9029	122.3097	24
The Dalles DNSTRM	5/26/97	124.2264	125.0707	125.9162	122.3097	24
The Dalles DNSTRM	5/27/97	124.8137	125.2941	126.2745	123.8592	24
The Dalles DNSTRM	5/28/97	126.705	127.1057	127.5953	125.7853	24
The Dalles DNSTRM	5/29/97	126.4962	126.9782	127.7267	125.5906	24
The Dalles DNSTRM	5/30/97	126.9553	127.3812	127.6316	125.887	24
The Dalles DNSTRM	5/31/97	126.1858	126.5848	126.7717	125.4282	24
The Dalles DNSTRM	6/1/97	126.4693	126.8961	127.4278	125.6544	24
The Dalles DNSTRM	6/2/97	127.9826	129.2159	129.7619	125.5236	24
The Dalles DNSTRM	6/3/97	129.9887	131.3699	131.8783	127.5132	24
The Dalles DNSTRM	6/4/97	129.6868	130.3162	131.2665	127.8215	24
The Dalles DNSTRM	6/5/97	128.1716	128.8514	129.5276	126.5092	24
The Dalles DNSTRM	6/6/97	127.2933	127.6918	128.1003	126.614	24
The Dalles DNSTRM	6/7/97	126.8362	127.5067	128.496	125.921	24
The Dalles DNSTRM	6/8/97	127.0797	128.0678	128.496	125.3281	24
The Dalles DNSTRM	6/9/97	129.2058	130.6974	131.6623	126.8068	21
The Dalles DNSTRM	6/10/97	129.1977	130.0307	131.9683	126.7105	17
The Dalles DNSTRM	6/11/97	128.7527	130.2037	131.3984	126.579	24
The Dalles DNSTRM	6/12/97	127.23	127.6748	128.3641	126.1842	24
The Dalles DNSTRM	6/13/97	128.7558	129.4921	130.303	127.3087	24
The Dalles DNSTRM	6/14/97	129.3516	130.5129	131.7942	127.3684	20
The Dalles DNSTRM	6/15/97	129.2665	129.927	131.4888	128.3837	24
The Dalles DNSTRM	6/16/97	129.0073	129.9432	131.1842	127.4045	23
The Dalles DNSTRM	6/17/97	127.6272	128.2678	130.8707	126.3158	24
The Dalles DNSTRM	6/18/97	127.1322	127.8113	128.3465	125.7218	24
The Dalles DNSTRM	6/19/97	125.5377	126.3021	126.6754	122.9358	24
The Dalles DNSTRM	6/20/97	125.5072	126.945	127.9315	122.4409	24
The Dalles DNSTRM	6/21/97	126.059	126.5153	127.141	124.8684	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
The Dalles DNSTRM	6/22/97	125.723	126.1857	127.2608	124.8357	24
The Dalles DNSTRM	6/23/97	122.9887	124.205	125.2618	120.3125	24
The Dalles DNSTRM	6/24/97	123.1036	124.3507	125.1638	119.7659	24
The Dalles DNSTRM	6/25/97	123.7951	124.2075	125.23	122.2076	24
The Dalles DNSTRM	6/26/97	119.8746	121.0702	121.9448	117.5623	24
The Dalles DNSTRM	6/27/97	121.9777	122.4644	122.8647	120.7622	24
The Dalles DNSTRM	6/28/97	121.2124	121.4646	121.8421	120.5263	24
The Dalles DNSTRM	6/29/97	120.757	121.1471	121.8134	120.1316	24
The Dalles DNSTRM	6/30/97	119.1302	120.3163	121.5324	116.3805	24
The Dalles DNSTRM	7/1/97	118.3877	118.6231	119.085	117.7546	24
The Dalles DNSTRM	7/2/97	118.503	119.0483	119.8693	117.5393	24
The Dalles DNSTRM	7/3/97	119.6569	119.9648	120.4456	118.9791	24
The Dalles DNSTRM	7/4/97	119.4428	119.7912	120.6037	118.7911	24
The Dalles DNSTRM	7/5/97	118.7009	119.1861	119.9472	117.7632	24
The Dalles DNSTRM	7/6/97	118.7587	119.0253	119.4226	118.3246	23
The Dalles DNSTRM	7/7/97	118.7161	119.0074	119.2661	117.9554	23
The Dalles DNSTRM	7/8/97	117.5685	117.7748	118.2415	116.9291	24
The Dalles DNSTRM	7/9/97	117.025	117.43	117.9657	116.095	22
The Dalles DNSTRM	7/10/97	117.2394	117.8808	119.0539	115.6373	23
The Dalles DNSTRM	7/11/97	118.2298	118.5801	118.8158	117.3228	24
The Dalles DNSTRM	7/12/97	117.6535	118.2227	119.2105	116.6448	24
The Dalles DNSTRM	7/13/97	117.5833	118.0474	118.5771	116.5354	24
The Dalles DNSTRM	7/14/97	117.6035	117.9845	118.5526	117.0828	24
The Dalles DNSTRM	7/15/97	117.6037	118.3003	119.0539	116.1629	24
The Dalles DNSTRM	7/16/97	119.158	119.6768	120.6622	118.1579	23
The Dalles DNSTRM	7/17/97	119.0321	119.6085	120.6349	117.942	24
The Dalles DNSTRM	7/18/97	118.3763	118.9687	119.4993	117.4541	24
The Dalles DNSTRM	7/19/97	119.0372	119.5488	120.4486	118.0026	24
The Dalles DNSTRM	7/20/97	119.3671	120.0174	121.164	118.0739	24
The Dalles DNSTRM	7/21/97	119.1465	119.82	121.0596	118.2058	24
The Dalles DNSTRM	7/22/97	118.5155	118.9031	119.6311	117.6316	24
The Dalles DNSTRM	7/23/97	118.9147	119.2259	119.6311	118.3727	24
The Dalles DNSTRM	7/24/97	117.7464	118.1915	119.0789	116.6886	24
The Dalles DNSTRM	7/25/97	117.1981	117.7018	118.0263	116.0315	24
The Dalles DNSTRM	7/26/97	117.8729	118.4829	119.2612	116.82	24
The Dalles DNSTRM	7/27/97	118.2472	118.7109	119.1293	117.2368	24
The Dalles DNSTRM	7/28/97	118.6384	119.1337	120.3704	117.3913	24
The Dalles DNSTRM	7/29/97	117.6293	118.1038	119.3931	116.7325	24
The Dalles DNSTRM	7/30/97	116.5269	116.7691	117.5231	115.7687	24
The Dalles DNSTRM	7/31/97	116.1847	116.652	117.0604	115.1316	24
The Dalles DNSTRM	8/1/97	116.455	116.9185	117.3228	115.6168	23
The Dalles DNSTRM	8/2/97	115.5047	115.9961	117.1053	114.5478	23
The Dalles DNSTRM	8/3/97	115.5499	115.8627	116.1162	114.8294	24
The Dalles DNSTRM	8/4/97	116.0436	116.5084	117.0604	115.0721	24
The Dalles DNSTRM	8/5/97	116.3354	116.8474	118.0865	115.1634	24
The Dalles DNSTRM	8/6/97	117.282	117.8625	118.6352	116.1417	24
The Dalles DNSTRM	8/7/97	116.1572	117.0167	117.5853	114.3045	24
The Dalles DNSTRM	8/8/97	115.7363	116.7794	118.4453	114.1919	24
The Dalles DNSTRM	8/9/97	117.0944	118.2006	119.1293	115.1316	24
The Dalles DNSTRM	8/10/97	116.2805	116.9989	118.9474	114.888	22

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
The Dalles DNSTRM	8/11/97	116.2783	116.8674	118.8158	115.1117	24
The Dalles DNSTRM	8/12/97	116.8573	117.7368	118.8158	115.6168	24
The Dalles DNSTRM	8/13/97	116.5824	117.4562	118.5526	115.3947	24
The Dalles DNSTRM	8/14/97	116.4304	117.102	117.8947	115.4557	24
The Dalles DNSTRM	8/15/97	115.5027	116.5309	118.0133	113.8705	22
The Dalles DNSTRM	8/16/97	115.9386	116.8606	118.1818	114.4737	24
The Dalles DNSTRM	8/17/97	116.1042	117.0984	118.4453	114.2292	24
The Dalles DNSTRM	8/18/97	115.5088	116.5723	117.3913	113.9474	24
The Dalles DNSTRM	8/19/97	115.9232	116.7528	117.6548	114.6245	24
The Dalles DNSTRM	8/20/97	115.2748	116.7305	118.7335	113.3245	24
The Dalles DNSTRM	8/21/97	115.2508	116.3712	118.3486	113.2199	24
The Dalles DNSTRM	8/22/97	116.107	116.9469	117.8244	114.8294	24
The Dalles DNSTRM	8/23/97	115.4302	116.4159	117.4541	113.9108	24
The Dalles DNSTRM	8/24/97	114.8716	115.9615	117.8336	112.9751	24
The Dalles DNSTRM	8/25/97	115.2652	115.7824	117.4142	114.3421	24
The Dalles DNSTRM	8/26/97	115.4078	116.4056	117.7015	113.8158	24
The Dalles DNSTRM	8/27/97	114.724	115.5423	116.3158	111.8265	24
The Dalles DNSTRM	8/28/97	115.6799	116.6979	118.1579	114.3233	24
The Dalles DNSTRM	8/29/97	116.6087	117.1505	118.0026	115.3947	24
The Dalles DNSTRM	8/30/97	116.4368	117.0014	117.6548	115.4557	24
The Dalles DNSTRM	8/31/97	116.4416	117.046	117.81	115.4557	23
The Dalles FRBY	4/1/97	116.5834	120.0853	121.0733	110.3133	24
The Dalles FRBY	4/2/97	120.49	123.8624	125.066	111.4733	24
The Dalles FRBY	4/3/97	117.2614	121.0683	123.8095	109.1877	24
The Dalles FRBY	4/4/97	109.83	111.2657	112.6174	107.8249	24
The Dalles FRBY	4/5/97	111.1533	111.9754	112.9679	109.6433	24
The Dalles FRBY	4/6/97	112.1708	112.7162	113.5571	110.757	24
The Dalles FRBY	4/7/97	110.334	111.1241	112.0805	108.5562	24
The Dalles FRBY	4/8/97	109.424	109.9667	110.2564	108.1333	24
The Dalles FRBY	4/9/97	107.7848	108.4745	109.5047	106.8063	23
The Dalles FRBY	4/10/97	106.4216	106.7529	106.9191	105.7441	24
The Dalles FRBY	4/11/97	106.3365	106.7363	107.0588	105.5844	24
The Dalles FRBY	4/12/97	107.2535	107.9268	108.4544	106.2582	24
The Dalles FRBY	4/13/97	107.7733	108.2901	108.8507	106.7194	24
The Dalles FRBY	4/14/97	106.4929	106.6674	106.8602	106.0367	24
The Dalles FRBY	4/15/97	106.9204	107.4762	108.4433	106.0209	24
The Dalles FRBY	4/16/97	108.1495	108.3718	108.5865	107.4901	24
The Dalles FRBY	4/17/97	107.0152	107.3537	107.6416	106.4052	24
The Dalles FRBY	4/18/97	106.6604	107.0301	107.4271	105.8048	23
The Dalles FRBY	4/19/97	107.5054	107.7055	108.6436	105.9524	21
The Dalles FRBY	4/20/97	107.3971	107.6504	109.0667	106.291	18
The Dalles FRBY	4/21/97	108.7567	109.5354	110.9499	106.4136	21
The Dalles FRBY	4/22/97	116.3904	119.7022	121.7507	108.41	24
The Dalles FRBY	4/23/97	117.6235	118.7857	119.8676	115.0594	24
The Dalles FRBY	4/24/97	119.9422	121.4967	123.4293	117.8244	24
The Dalles FRBY	4/25/97	123.6404	124.2923	125.1969	122.4837	24
The Dalles FRBY	4/26/97	125.8817	127.0726	128.2119	122.6018	24
The Dalles FRBY	4/27/97	120.6066	121.8748	125.2312	118.2415	24
The Dalles FRBY	4/28/97	122.3697	125.8407	127.141	116.6446	24
The Dalles FRBY	4/29/97	117.9685	118.5592	118.9723	115.9631	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
The Dalles FRBY	4/30/97	118.6747	119.4364	119.9735	116.4258	24
The Dalles FRBY	5/1/97	117.1533	118.1573	119.5795	115.0919	24
The Dalles FRBY	5/2/97	118.9955	120.5405	122.4571	116.2698	24
The Dalles FRBY	5/3/97	117.9218	119.0927	121.5223	115.8103	24
The Dalles FRBY	5/4/97	119.8513	120.9992	121.916	117.1242	24
The Dalles FRBY	5/5/97	122.0357	122.9521	124.2105	119.4226	24
The Dalles FRBY	5/6/97	118.6898	119.3304	119.7644	117.5623	24
The Dalles FRBY	5/7/97	119.8428	120.5008	121.2878	118.6441	24
The Dalles FRBY	5/8/97	119.4588	120.0147	121.232	118.2176	24
The Dalles FRBY	5/9/97	120.2734	121.1028	121.7105	118.8976	24
The Dalles FRBY	5/10/97	121.7738	122.5359	123.3202	120.6037	24
The Dalles FRBY	5/11/97	121.7743	122.3884	122.8232	120.5767	24
The Dalles FRBY	5/12/97	123.6801	125.0483	127.6821	121.8421	24
The Dalles FRBY	5/13/97	129.5596	130.3686	131.2085	128.1374	24
The Dalles FRBY	5/14/97	129.9522	130.8077	131.6069	127.3448	24
The Dalles FRBY	5/15/97	126.1212	127.0086	127.7411	124.5383	24
The Dalles FRBY	5/16/97	124.1237	125.229	126.455	122.2076	24
The Dalles FRBY	5/17/97	124.4881	125.2752	125.8235	122.9551	24
The Dalles FRBY	5/18/97	127.385	128.7324	130.1587	125.2632	24
The Dalles FRBY	5/19/97	129.8095	130.5952	131.4248	128.4953	24
The Dalles FRBY	5/20/97	127.2065	127.7124	128.3245	126.3576	24
The Dalles FRBY	5/21/97	128.7732	129.6724	130.8609	126.7196	24
The Dalles FRBY	5/22/97	128.4434	129.2271	130.1587	127.2487	24
The Dalles FRBY	5/23/97	127.8682	128.9625	129.8013	125.9259	24
The Dalles FRBY	5/24/97	128.2223	128.5667	129.3263	127.3448	24
The Dalles FRBY	5/25/97	123.39	125.3459	127.8364	120.7124	24
The Dalles FRBY	5/26/97	122.957	124.7359	125.9894	120.4486	24
The Dalles FRBY	5/27/97	124.3829	125.6134	127.6316	122.4409	24
The Dalles FRBY	5/28/97	127.8528	128.9435	130.1189	125.9552	24
The Dalles FRBY	5/29/97	127.4949	127.95	128.5714	126.5172	24
The Dalles FRBY	5/30/97	127.5358	128.0089	128.4392	126.4201	24
The Dalles FRBY	5/31/97	126.8675	127.261	128.5337	125.9603	24
The Dalles FRBY	6/1/97	127.2204	127.8785	128.2322	125	24
The Dalles FRBY	6/2/97	127.9072	129.4373	130.4117	125.5263	24
The Dalles FRBY	6/3/97	131.067	132.3657	132.8	128.3245	23
The Dalles FRBY	6/4/97	131.0099	131.0918	131.9205	130.0265	13
The Dalles FRBY	6/5/97	129.5027	130.4226	131.0847	127.6316	24
The Dalles FRBY	6/6/97	127.6061	128.2384	129.1391	126.1214	24
The Dalles FRBY	6/7/97	126.9281	128.0012	129.404	124.0741	24
The Dalles FRBY	6/8/97	127.9465	130.478	131.6556	124.1425	24
The Dalles FRBY	6/9/97	129.3969	129.712	132.3179	127.4406	14
The Dalles FRBY	6/10/97	131.03	131.0882	132.0955	130.3311	13
The Dalles FRBY	6/11/97	130.0106	130.7162	132.2281	128.0423	19
The Dalles FRBY	6/12/97	127.7024	128.193	128.9683	126.7196	24
The Dalles FRBY	6/13/97	128.288	129.0507	129.9338	126.4901	24
The Dalles FRBY	6/14/97	129.3059	130.8029	132.5365	126.0927	20
The Dalles FRBY	6/15/97	129.9805	130.5744	132.3607	128.7417	21
The Dalles FRBY	6/16/97	131.2843	131.8571	132.3179	129.4973	21
The Dalles FRBY	6/17/97	131.0869	132.0996	132.6693	127.2727	23
The Dalles FRBY	6/18/97	129.0756	130.0879	130.83	127.0092	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
The Dalles FRBY	6/19/97	126.8379	128.0641	129.2651	123.0971	24
The Dalles FRBY	6/20/97	125.5675	127.0443	128.8742	123.3903	24
The Dalles FRBY	6/21/97	124.0228	124.6158	125.3652	122.1636	24
The Dalles FRBY	6/22/97	123.0441	124.8	125.9894	120.5534	24
The Dalles FRBY	6/23/97	119.1024	120.2157	123.2283	116.3399	24
The Dalles FRBY	6/24/97	119.5085	121.766	122.6913	116.3399	24
The Dalles FRBY	6/25/97	120.3954	121.2858	122.2222	117.5462	24
The Dalles FRBY	6/26/97	115.4316	116.9106	118.1818	113.272	24
The Dalles FRBY	6/27/97	117.8125	118.2589	119.2867	116.4908	24
The Dalles FRBY	6/28/97	115.9534	116.4688	117.1088	114.9076	24
The Dalles FRBY	6/29/97	114.392	115.1106	115.5172	113.0435	24
The Dalles FRBY	6/30/97	113.5365	114.1455	114.9867	111.7105	24
The Dalles FRBY	7/1/97	111.0453	111.3351	111.7105	110.3403	24
The Dalles FRBY	7/2/97	110.7418	111.373	112.1053	109.7113	24
The Dalles FRBY	7/3/97	112.1942	113.102	113.8889	110.8924	24
The Dalles FRBY	7/4/97	112.5368	113.2195	113.9814	111.3307	24
The Dalles FRBY	7/5/97	111.15	111.7291	112.8818	109.7497	24
The Dalles FRBY	7/6/97	110.7214	111.4064	111.8734	109.5926	24
The Dalles FRBY	7/7/97	110.7073	111.2589	111.7414	109.9738	24
The Dalles FRBY	7/8/97	110.4373	111.1665	112.4174	109.3421	24
The Dalles FRBY	7/9/97	109.1509	109.9305	110.3175	106.0686	24
The Dalles FRBY	7/10/97	106.9879	108.4203	109.4862	104.7431	24
The Dalles FRBY	7/11/97	107.767	108.623	109.5112	106.3158	24
The Dalles FRBY	7/12/97	106.857	107.6831	108.5639	105.5191	24
The Dalles FRBY	7/13/97	107.0882	108.8033	110.4497	104.7306	24
The Dalles FRBY	7/14/97	107.216	108.2099	109.9075	105.1383	24
The Dalles FRBY	7/15/97	108.0775	109.3875	110.8037	106.3158	24
The Dalles FRBY	7/16/97	109.8638	111.7755	112.8989	107.2273	24
The Dalles FRBY	7/17/97	109.8706	110.3763	111.008	107.7734	24
The Dalles FRBY	7/18/97	107.9533	109.428	110.686	105.5191	24
The Dalles FRBY	7/19/97	109.8807	111.528	112.4834	107.3587	24
The Dalles FRBY	7/20/97	111.9585	113.0529	114.1145	110.3038	24
The Dalles FRBY	7/21/97	110.863	111.5625	112.2016	108.2895	24
The Dalles FRBY	7/22/97	109.8724	111.4276	112.2691	107.6216	24
The Dalles FRBY	7/23/97	111.0713	112.0469	113.1926	109.1984	24
The Dalles FRBY	7/24/97	110.1112	110.949	112.4011	108.6728	24
The Dalles FRBY	7/25/97	108.7038	109.9228	111.2137	106.5703	24
The Dalles FRBY	7/26/97	109.1918	111.0414	112.3016	106.4474	24
The Dalles FRBY	7/27/97	111.2318	112.6963	113.7566	109.3544	24
The Dalles FRBY	7/28/97	112.1796	113.3723	114.6082	110.2902	24
The Dalles FRBY	7/29/97	110.9377	111.4526	111.9048	110.0396	24
The Dalles FRBY	7/30/97	109.7201	110.9181	112.4011	107.8947	24
The Dalles FRBY	7/31/97	109.677	110.8558	112.2368	107.8947	24
The Dalles FRBY	8/1/97	109.0697	110.6585	112.4339	105.7971	24
The Dalles FRBY	8/2/97	108.1362	109.6368	111.0672	106.0686	24
The Dalles FRBY	8/3/97	108.7811	110.1864	111.1989	106.8511	24
The Dalles FRBY	8/4/97	108.8502	109.8427	110.9499	107.3781	24
The Dalles FRBY	8/5/97	107.486	109.9425	111.7414	104.0576	24
The Dalles FRBY	8/6/97	108.2275	109.9098	111.5079	105.5336	24
The Dalles FRBY	8/7/97	105.8714	106.7677	109.2593	104.0736	20

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
The Dalles FRBY	8/8/97					
The Dalles FRBY	8/9/97					
The Dalles FRBY	8/10/97					
The Dalles FRBY	8/11/97					
The Dalles FRBY	8/12/97					
The Dalles FRBY	8/13/97					
The Dalles FRBY	8/14/97					
The Dalles FRBY	8/15/97					
The Dalles FRBY	8/16/97					
The Dalles FRBY	8/17/97					
The Dalles FRBY	8/18/97					
The Dalles FRBY	8/19/97					
The Dalles FRBY	8/20/97	106.4892	106.4892	110.1717	102.9178	12
The Dalles FRBY	8/21/97	105.2874	108.0989	112.0894	101.5748	24
The Dalles FRBY	8/22/97	106.0866	108.2659	111.3606	103.4166	24
The Dalles FRBY	8/23/97	105.1546	107.2751	109.5238	102.2368	24
The Dalles FRBY	8/24/97	104.3287	105.6966	108.0795	102.3684	24
The Dalles FRBY	8/25/97	107.7414	109.9878	112.7321	103.6891	24
The Dalles FRBY	8/26/97	107.7861	109.854	111.3907	104.6419	24
The Dalles FRBY	8/27/97	106.4823	109.2506	112.1372	102.635	24
The Dalles FRBY	8/28/97	106.1066	107.7323	109.5238	103.6891	24
The Dalles FRBY	8/29/97	107.2653	109.8083	110.8609	103.1579	24
The Dalles FRBY	8/30/97	106.837	109.3145	110.7427	102.9101	24
The Dalles FRBY	8/31/97	106.1976	108.2774	110.2258	102.9139	24
John Day TLWTR	4/1/97					
John Day TLWTR	4/2/97					
John Day TLWTR	4/3/97					
John Day TLWTR	4/4/97	115.6193	115	126.8421	112.7968	7
John Day TLWTR	4/5/97	113.2954	113	114.3989	112.3217	22
John Day TLWTR	4/6/97	113.2751	113	114.5357	112.336	24
John Day TLWTR	4/7/97	111.6283	111	112.9506	111.2861	23
John Day TLWTR	4/8/97	111.8395	112	112.9974	110.8781	20
John Day TLWTR	4/9/97	111.2021	111	111.7414	110.1183	19
John Day TLWTR	4/10/97	109.8497	110	110.3311	109.1743	24
John Day TLWTR	4/11/97	109.1746	109	109.7497	106.9409	20
John Day TLWTR	4/12/97	110.4681	110	111.7333	109.4364	17
John Day TLWTR	4/13/97	110.244	110	110.8898	109.3915	24
John Day TLWTR	4/14/97	109.3314	109	109.8143	108.971	24
John Day TLWTR	4/15/97	110.1772	110	111.6155	108.9592	19
John Day TLWTR	4/16/97	111.2724	111	111.9143	110.0132	22
John Day TLWTR	4/17/97	109.4513	111	116.5572	105.9202	24
John Day TLWTR	4/18/97	109.5655	110	110.7962	108.3333	23
John Day TLWTR	4/19/97	111.6092	112	113.5501	110.5193	24
John Day TLWTR	4/20/97	115.4881	120	125.2949	109.8296	24
John Day TLWTR	4/21/97	121.7697	132	140.1055	109.2593	24
John Day TLWTR	4/22/97	140.6983	141	142.7042	138.4717	24
John Day TLWTR	4/23/97	140.4406	141	142.2667	137.7922	24
John Day TLWTR	4/24/97	140.5053	141	145.1007	138.1935	24
John Day TLWTR	4/25/97	141.8829	142	144.6259	139.2904	19
John Day TLWTR	4/26/97	141.6527	142	144.0055	140.1585	17

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
John Day TLWTR	4/27/97	139.2725	140	141.5671	131.8783	20
John Day TLWTR	4/28/97	131.2836	136	142.5166	119.5251	18
John Day TLWTR	4/29/97	139.0885	140	142.5756	137.1391	24
John Day TLWTR	4/30/97	138.169	139	139.7368	135.9948	24
John Day TLWTR	5/1/97	139.3553	140	141.8758	136.1257	24
John Day TLWTR	5/2/97	137.7387	140	142.464	122.9961	24
John Day TLWTR	5/3/97	135.6099	138	140.0788	128.8714	24
John Day TLWTR	5/4/97	134.3475	135	137.3193	132.199	24
John Day TLWTR	5/5/97	129.7611	137	140.7068	114.7712	24
John Day TLWTR	5/6/97	136.458	137	138.2199	132.4641	24
John Day TLWTR	5/7/97	134.5469	136	137.2859	124.1199	23
John Day TLWTR	5/8/97	134.5789	136	137.9265	132.073	24
John Day TLWTR	5/9/97	137.547	138	138.7054	136.3399	24
John Day TLWTR	5/10/97	134.3451	136	138.401	130.5085	23
John Day TLWTR	5/11/97	129.0839	131	132.0631	120.7077	24
John Day TLWTR	5/12/97	136.2254	139	141.2698	131.8003	24
John Day TLWTR	5/13/97	140.5516	141	142.3483	139.4459	24
John Day TLWTR	5/14/97	141.1242	141	142.8	137.9447	24
John Day TLWTR	5/15/97	138.7222	140	142.328	136.1001	24
John Day TLWTR	5/16/97	137.6436	138	139.8406	135.4881	24
John Day TLWTR	5/17/97	139.8269	140	142.0983	137.9947	24
John Day TLWTR	5/18/97	139.6661	140	141.3793	132.8496	17
John Day TLWTR	5/19/97	139.9077	140	140.7162	139.1247	23
John Day TLWTR	5/20/97	139.882	140	140.9575	138.992	21
John Day TLWTR	5/21/97	139.658	139	141.5671	134.1722	11
John Day TLWTR	5/22/97	139.3572	139	140.2925	136.5435	20
John Day TLWTR	5/23/97	140.3474	140	141.5344	139.1247	24
John Day TLWTR	5/24/97	139.8339	140	140.6085	138.7268	20
John Day TLWTR	5/25/97	139.8998	140	140.7947	138.5224	20
John Day TLWTR	5/26/97	138.3302	138	139.314	137.3193	24
John Day TLWTR	5/27/97	139.35	140	141.1687	137.7632	24
John Day TLWTR	5/28/97	139.1487	140	141.1376	137.7309	24
John Day TLWTR	5/29/97	138.9715	139	140.5548	137.4834	24
John Day TLWTR	5/30/97	138.3971	138	138.7268	137.5661	24
John Day TLWTR	5/31/97	138.8982	139	139.6552	138.1963	24
John Day TLWTR	6/1/97	139.5853	139	139.8943	139.2622	24
John Day TLWTR	6/2/97	140.4667	140	141.4114	139.7098	24
John Day TLWTR	6/3/97	141.649	141	141.9786	141.2234	24
John Day TLWTR	6/4/97	141.1001	141	141.6	140.7407	24
John Day TLWTR	6/5/97	140.9923	141	141.3245	140.6332	24
John Day TLWTR	6/6/97	141.4422	141	142.0213	140.9511	24
John Day TLWTR	6/7/97	141.6179	141	142.0213	141.3793	24
John Day TLWTR	6/8/97	141.3048	141	141.7772	140.8432	24
John Day TLWTR	6/9/97	140.6973	141	141.5119	138.543	23
John Day TLWTR	6/10/97	140.7022	141	141.4569	139.3617	24
John Day TLWTR	6/11/97	140.1074	140	140.6374	139.2573	22
John Day TLWTR	6/12/97	139.9867	140	140.7703	139.0438	24
John Day TLWTR	6/13/97	140.2634	140	140.8488	139.4702	24
John Day TLWTR	6/14/97	139.876	140	140.9575	138.992	22
John Day TLWTR	6/15/97	139.3462	139	140.1062	137.2185	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
John Day TLWTR	6/16/97	140.253	140	140.7947	138.5733	24
John Day TLWTR	6/17/97	139.6608	140	140.7703	138.4106	23
John Day TLWTR	6/18/97	138.1192	138	139.2338	136.5918	24
John Day TLWTR	6/19/97	139.5146	139	140.5548	138.5733	24
John Day TLWTR	6/20/97	139.3648	139	140.1585	138.543	24
John Day TLWTR	6/21/97	139.6217	139	140.5333	138.1457	24
John Day TLWTR	6/22/97	137.7981	138	139.4702	136.0158	24
John Day TLWTR	6/23/97	136.6905	137	138.5526	135	24
John Day TLWTR	6/24/97	137.4846	138	139.5532	135.6671	24
John Day TLWTR	6/25/97	118.4444	118	124.734	112.7152	9
John Day TLWTR	6/26/97	126.0891	130	131.1258	112.037	24
John Day TLWTR	6/27/97	125.8627	127	133.8196	123.4437	24
John Day TLWTR	6/28/97	120.7854	127	131.4324	111.9205	24
John Day TLWTR	6/29/97	112.3166	112	114.5889	111.421	24
John Day TLWTR	6/30/97	115.5825	117	118.2423	111.2285	22
John Day TLWTR	7/1/97	111.7921	111	112.7464	110.9067	14
John Day TLWTR	7/2/97	112.6546	114	115.6579	110.2497	24
John Day TLWTR	7/3/97	113.5077	115	118.2299	110.921	24
John Day TLWTR	7/4/97	114.9326	117	117.9894	110.9643	24
John Day TLWTR	7/5/97	115.4012	117	118.0501	111.5232	24
John Day TLWTR	7/6/97	115.4614	118	118.5771	111.3158	24
John Day TLWTR	7/7/97	115.3251	118	119.4993	110.1183	24
John Day TLWTR	7/8/97	115.3772	118	119.709	110.0396	22
John Day TLWTR	7/9/97	114.7733	115	119.4702	109.2593	13
John Day TLWTR	7/10/97					
John Day TLWTR	7/11/97					
John Day TLWTR	7/12/97					
John Day TLWTR	7/13/97					
John Day TLWTR	7/14/97	116.429	116	119.9472	110.093	9
John Day TLWTR	7/15/97	116.9914	119	119.6311	114.2292	23
John Day TLWTR	7/16/97	116.643	119	119.8138	113.245	24
John Day TLWTR	7/17/97	118.3138	121	125.4305	110.596	24
John Day TLWTR	7/18/97	115.2399	119	120.2114	110.0132	23
John Day TLWTR	7/19/97	116.4102	119	120.1859	112.1372	24
John Day TLWTR	7/20/97	116.4268	119	120.0531	112.6984	24
John Day TLWTR	7/21/97	118.4016	118	120.0531	113.9442	8
John Day TLWTR	7/22/97					
John Day TLWTR	7/23/97	115.9372	116	119.3167	113.4641	15
John Day TLWTR	7/24/97	117.748	117	119.3421	111.4024	7
John Day TLWTR	7/25/97	116.6511	116	119.6286	109.8945	8
John Day TLWTR	7/26/97	115.108	119	119.6026	110.0396	24
John Day TLWTR	7/27/97	115.3241	118	119.5509	111.889	24
John Day TLWTR	7/28/97	116.3531	118	119.8939	113.0779	24
John Day TLWTR	7/29/97	115.8631	118	119.0225	112.7968	24
John Day TLWTR	7/30/97	115.0887	118	118.8904	111.1989	24
John Day TLWTR	7/31/97	114.6136	118	119.1041	109.8554	23
John Day TLWTR	8/1/97	112.1492	113	118.1579	108.6842	18
John Day TLWTR	8/2/97	112.4838	114	118.4697	108.4433	18
John Day TLWTR	8/3/97	116.5638	118	118.6262	113.245	23
John Day TLWTR	8/4/97	115.1876	115	117.942	107.5099	8

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
John Day TLWTR	8/5/97	111.7483	114	119.5251	106.5617	20
John Day TLWTR	8/6/97	113.3956	113	118.9974	107.6316	12
John Day TLWTR	8/7/97					
John Day TLWTR	8/8/97	113.5994	115	121.8833	107.7939	15
John Day TLWTR	8/9/97	113.081	114	120.2649	108.3554	17
John Day TLWTR	8/10/97	112.7566	115	120	108.2119	19
John Day TLWTR	8/11/97	113.4233	119	119.5767	107.1523	24
John Day TLWTR	8/12/97	114.0229	120	122.7815	106.8511	24
John Day TLWTR	8/13/97	114.8848	120	122.649	108.6093	24
John Day TLWTR	8/14/97	113.8437	119	120.557	108.0902	24
John Day TLWTR	8/15/97	112.9902	118	119.7875	106.7819	24
John Day TLWTR	8/16/97	112.2058	119	120.1591	104.6296	24
John Day TLWTR	8/17/97	112.3823	118	120.1591	105.298	24
John Day TLWTR	8/18/97	111.8658	119	122.1192	103.963	24
John Day TLWTR	8/19/97	112.3942	119	122.5892	104.6296	24
John Day TLWTR	8/20/97	112.7272	119	119.6808	104.3651	23
John Day TLWTR	8/21/97	112.7875	118	119.4737	105.2562	24
John Day TLWTR	8/22/97	112.4631	119	119.7889	104.8684	24
John Day TLWTR	8/23/97	112.2291	119	120.2649	104.4914	24
John Day TLWTR	8/24/97	112.6607	119	119.3891	104.4914	24
John Day TLWTR	8/25/97	113.2903	119	120.2114	105.6803	24
John Day TLWTR	8/26/97	113.086	118	119.3122	105.8511	24
John Day TLWTR	8/27/97	112.8194	119	119.7351	105.4018	24
John Day TLWTR	8/28/97	111.4115	117	119.5509	104.0951	23
John Day TLWTR	8/29/97	111.8076	118	119.6286	104.2161	24
John Day TLWTR	8/30/97	112.1135	118	119.496	104.6419	24
John Day TLWTR	8/31/97	112.3818	117	119.3076	105.4305	22
John Day FRBY	4/1/97	112.6921	113.4025	114.3045	111.1543	24
John Day FRBY	4/2/97	110.8451	111.1223	111.5033	110.2199	23
John Day FRBY	4/3/97	111.2641	111.6098	111.8037	110.4359	24
John Day FRBY	4/4/97	110.8683	111.1648	111.579	109.9869	24
John Day FRBY	4/5/97	111.6052	111.9726	112.533	111.0526	24
John Day FRBY	4/6/97	112.1856	112.5742	113.7203	111.0818	24
John Day FRBY	4/7/97	110.1715	110.4547	110.9354	109.7113	24
John Day FRBY	4/8/97	110.8164	111.0696	111.5486	110.1316	22
John Day FRBY	4/9/97	110.2412	110.5368	111.0092	109.53	24
John Day FRBY	4/10/97	108.59	108.9332	109.4241	107.9221	24
John Day FRBY	4/11/97	107.8514	108.1192	109.0909	107.2258	24
John Day FRBY	4/12/97	109.386	110.0824	110.6299	108.4746	24
John Day FRBY	4/13/97	109.3004	109.6113	110.1717	108.399	24
John Day FRBY	4/14/97	108.4525	108.7198	109.7113	107.7124	24
John Day FRBY	4/15/97	109.5676	110.781	112.0261	107.8431	24
John Day FRBY	4/16/97	109.9033	110.3116	110.8322	108.6275	24
John Day FRBY	4/17/97	107.4647	107.7458	108.366	106.7797	24
John Day FRBY	4/18/97	108.1216	108.6663	109.404	106.8421	24
John Day FRBY	4/19/97	109.9402	110.3478	111.0226	109.1149	24
John Day FRBY	4/20/97	109.7363	110.4033	111.2732	108.8657	24
John Day FRBY	4/21/97	109.4697	109.9086	110.4987	108.605	24
John Day FRBY	4/22/97	110.4674	110.9805	111.2732	109.4118	23
John Day FRBY	4/23/97	112.0661	112.9548	113.5278	110.8753	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
John Day FRBY	4/24/97	114.4063	115.5393	116.469	112.6482	23
John Day FRBY	4/25/97	116.2019	116.8408	118.0501	115.3141	24
John Day FRBY	4/26/97	121.7899	123.7777	124.9668	118.3136	24
John Day FRBY	4/27/97	122.4627	123.4954	124.5358	119.683	24
John Day FRBY	4/28/97	119.5058	119.8876	120.1591	118.2781	24
John Day FRBY	4/29/97	116.1896	116.7905	117.9045	115.3034	24
John Day FRBY	4/30/97	116.4435	117.0078	117.4202	115.4354	24
John Day FRBY	5/1/97	115.0087	115.4729	115.852	114.2105	24
John Day FRBY	5/2/97	115.3324	115.6731	116.2234	114.6631	24
John Day FRBY	5/3/97	118.5591	119.996	120.5805	116.2234	24
John Day FRBY	5/4/97	121.1491	121.8429	122.5426	120.1051	24
John Day FRBY	5/5/97	121.8577	122.1856	122.6316	121.1009	24
John Day FRBY	5/6/97	121.0863	121.419	121.7848	120.21	24
John Day FRBY	5/7/97	118.4101	119.789	121.232	115.7687	23
John Day FRBY	5/8/97	117.4946	118.0359	119.1293	116.1842	24
John Day FRBY	5/9/97	119.1518	120.1014	120.7124	117.2596	24
John Day FRBY	5/10/97	120.0753	120.6796	121.6359	118.9791	24
John Day FRBY	5/11/97	121.9681	122.4177	123.219	120.8936	24
John Day FRBY	5/12/97	123.8311	124.4623	125.3652	122.4274	24
John Day FRBY	5/13/97	123.1756	123.6536	124.0053	122.0899	24
John Day FRBY	5/14/97	123.5853	123.8356	124.2344	123.0159	24
John Day FRBY	5/15/97	124.1846	124.6399	125.2645	122.5	24
John Day FRBY	5/16/97	124.0202	124.6131	125.2645	122.8647	24
John Day FRBY	5/17/97	123.421	124.1864	124.8677	121.6074	24
John Day FRBY	5/18/97	122.6368	123.0309	124.0741	121.372	24
John Day FRBY	5/19/97	127.289	128.2035	128.6285	124.6032	24
John Day FRBY	5/20/97	125.0746	126.3384	127.8667	122.8117	24
John Day FRBY	5/21/97	122.3483	122.6254	122.9748	121.7219	24
John Day FRBY	5/22/97	123.6545	124.666	125.9308	121.9123	24
John Day FRBY	5/23/97	126.3421	126.6887	126.9231	125.3652	24
John Day FRBY	5/24/97	123.8752	124.9808	125.4642	121.9868	24
John Day FRBY	5/25/97	120.7146	121.7736	122.3108	118.9153	24
John Day FRBY	5/26/97	120.6895	121.4539	121.9287	118.9153	24
John Day FRBY	5/27/97	124.1251	125.1866	125.4282	120.5534	24
John Day FRBY	5/28/97	127.084	127.4899	128.1374	125.4282	24
John Day FRBY	5/29/97	127.0971	127.421	127.947	126.288	24
John Day FRBY	5/30/97	126.738	126.9897	127.1523	125.8621	23
John Day FRBY	5/31/97	125.9869	127.0196	127.8667	123.545	24
John Day FRBY	6/1/97	122.849	123.2304	123.6773	121.6645	24
John Day FRBY	6/2/97	121.1753	121.5233	122.0159	120.3728	24
John Day FRBY	6/3/97	124.1951	124.6778	124.9001	120.9333	23
John Day FRBY	6/4/97	125.295	125.6617	126.0638	124.4709	24
John Day FRBY	6/5/97	123.3122	124.0252	124.7682	121.5608	24
John Day FRBY	6/6/97	123.2338	124.2054	126.4628	121.7219	23
John Day FRBY	6/7/97	126.3191	127.6381	128.7234	123.8727	24
John Day FRBY	6/8/97	124.3655	125.2132	125.9947	122.649	24
John Day FRBY	6/9/97	127.0108	127.7634	128.7417	125.1989	24
John Day FRBY	6/10/97	130.3399	131.1987	132.3607	128.1167	22
John Day FRBY	6/11/97	128.9718	130.8849	132.5798	125.3316	24
John Day FRBY	6/12/97	123.3818	124.8543	126.0638	121.0317	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
John Day FRBY	6/13/97	121.9123	122.836	124.2021	120.557	24
John Day FRBY	6/14/97	124.6884	125.1908	126.5252	123.7086	23
John Day FRBY	6/15/97	127.8493	128.0933	128.2869	127.0557	24
John Day FRBY	6/16/97	126.5519	127.478	128.382	124.9337	24
John Day FRBY	6/17/97	126.2734	127.1389	128.1167	124.9337	23
John Day FRBY	6/18/97	123.7354	124.7121	125.5629	121.9287	24
John Day FRBY	6/19/97	119.5015	120.1958	121.7678	118.5771	24
John Day FRBY	6/20/97	118.8232	119.2922	120.4787	117.9657	24
John Day FRBY	6/21/97	120.9916	121.4653	121.8667	120.1591	24
John Day FRBY	6/22/97	120.1915	120.9306	121.457	118.0739	24
John Day FRBY	6/23/97	115.9557	117.1306	118.2299	114.042	24
John Day FRBY	6/24/97	115.7139	116.1804	116.4258	114.0604	24
John Day FRBY	6/25/97	118.0467	118.8862	119.2819	115.4354	24
John Day FRBY	6/26/97	118.9219	119.9343	120.5298	117.4373	24
John Day FRBY	6/27/97	118.6479	119.095	120	117.8808	24
John Day FRBY	6/28/97	117.3836	117.6385	117.8808	116.9536	24
John Day FRBY	6/29/97	116.9282	117.4567	117.976	116.0265	24
John Day FRBY	6/30/97	117.9132	118.3885	118.8	116.1162	23
John Day FRBY	7/1/97	113.7182	114.8019	115.9842	111.726	23
John Day FRBY	7/2/97	112.4591	113.0671	114.3421	111.4625	23
John Day FRBY	7/3/97	112.9737	113.953	116.2055	111.1989	24
John Day FRBY	7/4/97	113.5114	115.3606	117.9657	111.0672	24
John Day FRBY	7/5/97	114.1592	114.6326	114.7215	112.9974	24
John Day FRBY	7/6/97	112.8216	113.1256	113.4565	111.9895	24
John Day FRBY	7/7/97	110.9376	111.3074	111.726	109.9869	24
John Day FRBY	7/8/97	109.3519	109.7241	110.1449	108.3223	24
John Day FRBY	7/9/97	108.6332	108.8411	109.0186	108.0688	24
John Day FRBY	7/10/97	107.7539	107.9877	108.1902	107.1053	24
John Day FRBY	7/11/97	106.7112	107.0427	107.3879	105.9289	24
John Day FRBY	7/12/97	105.729	105.9166	106.0686	105.4018	24
John Day FRBY	7/13/97	105.4627	106.0348	107.1334	104.5932	24
John Day FRBY	7/14/97	108.3813	109.3527	109.8945	106.9829	24
John Day FRBY	7/15/97	110.0066	110.2632	110.5402	109.4737	24
John Day FRBY	7/16/97	112.5754	114.5807	116.6223	109.8684	24
John Day FRBY	7/17/97	111.2176	111.8667	113.0667	109.5364	24
John Day FRBY	7/18/97	109.4524	109.7707	110.3311	108.839	24
John Day FRBY	7/19/97	112.2432	114.3921	116.6003	109.5238	23
John Day FRBY	7/20/97	114.6017	116.4017	117.9521	112.3342	24
John Day FRBY	7/21/97	114.0772	114.4294	114.7606	113.2979	23
John Day FRBY	7/22/97	113.9032	114.4199	114.9867	112.4668	24
John Day FRBY	7/23/97	111.9889	112.2906	112.749	111.2583	23
John Day FRBY	7/24/97	111.2583	111.6226	112.053	110.3311	24
John Day FRBY	7/25/97	109.8079	110.2637	111.1258	108.8507	24
John Day FRBY	7/26/97	112.4168	114.4391	115.894	110.0264	24
John Day FRBY	7/27/97	113.6263	114.6932	116.1804	112.1532	24
John Day FRBY	7/28/97	115.1053	116.2909	117.8192	113.5099	24
John Day FRBY	7/29/97	113.2322	113.4884	113.9628	112.1854	24
John Day FRBY	7/30/97	112.1165	112.3814	112.749	111.3757	24
John Day FRBY	7/31/97	110.4856	110.9127	111.7881	109.2593	24
John Day FRBY	8/1/97	109.0022	109.4573	109.6561	107.3587	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
John Day FRBY	8/2/97	108.4562	108.8181	109.2348	107.7836	24
John Day FRBY	8/3/97	107.5708	107.8135	108.2011	106.9829	24
John Day FRBY	8/4/97	106.5815	106.9595	107.3879	105.7819	24
John Day FRBY	8/5/97	106.2488	106.8278	109.0789	105.3735	24
John Day FRBY	8/6/97	107.516	107.9155	108.4433	106.7017	24
John Day FRBY	8/7/97	107.2351	107.4795	107.7836	106.7194	24
John Day FRBY	8/8/97	107.7727	108.5541	109.3915	106.4559	24
John Day FRBY	8/9/97	107.773	108.1241	108.7417	106.8874	24
John Day FRBY	8/10/97	107.6962	108.0741	109.5238	107.0106	24
John Day FRBY	8/11/97	107.2861	107.9163	109.5238	106.3241	24
John Day FRBY	8/12/97	106.8684	107.4137	107.9365	105.7971	24
John Day FRBY	8/13/97	107.7363	108.0781	108.3223	106.4644	24
John Day FRBY	8/14/97	107.1759	107.5597	107.9893	106.3915	24
John Day FRBY	8/15/97	106.0352	106.6447	107.723	103.7135	24
John Day FRBY	8/16/97	104.1733	104.7912	106.4901	102.6455	23
John Day FRBY	8/17/97	104.2479	105.0696	106.4901	101.8519	24
John Day FRBY	8/18/97	103.1915	103.4296	103.9683	102.381	24
John Day FRBY	8/19/97	103.9136	104.6734	106.6401	102.3747	20
John Day FRBY	8/20/97	105.3189	105.8902	106.9149	104.3593	24
John Day FRBY	8/21/97	104.7154	105.0332	105.4161	104.2161	24
John Day FRBY	8/22/97	104.8597	105.3946	107.0292	103.9683	24
John Day FRBY	8/23/97	104.2222	104.6106	105.1724	103.5667	23
John Day FRBY	8/24/97	104.8181	105.1532	105.5925	104.2216	24
John Day FRBY	8/25/97	105.2622	105.7929	107.0479	104.6296	24
John Day FRBY	8/26/97	106.2733	106.7615	107.723	105.4305	24
John Day FRBY	8/27/97	105.0123	105.2747	105.5482	104.1005	24
John Day FRBY	8/28/97	103.8952	104.107	104.5093	103.3069	24
John Day FRBY	8/29/97	103.9553	104.1962	104.3767	103.4437	24
John Day FRBY	8/30/97	104.5421	104.8954	105.3192	104.106	24
John Day FRBY	8/31/97	105.5419	106.2207	108.1009	104.3825	23
McNary TLWTR	4/1/97	121.5376	123.214	124.9347	117.4084	24
McNary TLWTR	4/2/97	121.2844	122.0714	122.2513	119.5251	24
McNary TLWTR	4/3/97	119.6201	119.9651	120.4545	118.0611	24
McNary TLWTR	4/4/97	119.6858	120.6277	121.4854	117.9283	24
McNary TLWTR	4/5/97	118.6748	119.099	119.3122	117.328	24
McNary TLWTR	4/6/97	115.4314	116.7246	117.4603	113.6786	24
McNary TLWTR	4/7/97	118.6536	119.7774	119.9472	115.0993	22
McNary TLWTR	4/8/97	117.5852	119.4432	120.4515	111.9205	24
McNary TLWTR	4/9/97	116.3454	116.9626	117.2185	114.0212	24
McNary TLWTR	4/10/97	115.2596	116.323	117.2142	112.7968	24
McNary TLWTR	4/11/97	116.8534	117.1626	117.2368	115.3745	24
McNary TLWTR	4/12/97	114.605	115.55	116.1376	111.984	24
McNary TLWTR	4/13/97	111.6676	111.9814	112.3835	111.0667	24
McNary TLWTR	4/14/97	113.4806	114.8868	115.1194	110.6101	24
McNary TLWTR	4/15/97	115.5604	116.5449	117.1958	111.4927	24
McNary TLWTR	4/16/97	116.471	117.1334	117.4202	114.8344	24
McNary TLWTR	4/17/97	116.1133	117.5304	118.7251	113.8889	24
McNary TLWTR	4/18/97	117.0395	117.757	117.8905	114.6277	24
McNary TLWTR	4/19/97	118.3983	118.9708	119.4893	117.6471	24
McNary TLWTR	4/20/97	118.5257	119.2658	120.4486	116.5344	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary TLWTR	4/21/97	120.1772	120.9049	121.9868	118.9723	24
McNary TLWTR	4/22/97	126.3492	127.8235	128.1541	122.9139	24
McNary TLWTR	4/23/97	127.4696	127.638	128.0585	126.7905	24
McNary TLWTR	4/24/97	127.2904	128.0605	128.4392	126.1905	24
McNary TLWTR	4/25/97	126.1057	127.0741	127.9683	123.0871	24
McNary TLWTR	4/26/97	126.2657	126.8214	127.5132	125.4642	24
McNary TLWTR	4/27/97	126.1625	127.4268	128.5146	122.4138	24
McNary TLWTR	4/28/97	126.1175	127.5228	128.2667	124.3028	24
McNary TLWTR	4/29/97	127.8011	128.1473	128.4953	126.9588	24
McNary TLWTR	4/30/97	128.5949	129.1079	129.6937	127.7556	24
McNary TLWTR	5/1/97	128.5323	128.9166	129.2715	127.3448	24
McNary TLWTR	5/2/97	127.5834	128.299	129.5606	126.6225	24
McNary TLWTR	5/3/97	125.763	126.5532	126.9693	124.6358	24
McNary TLWTR	5/4/97	125.8482	127.0103	128.0632	123.5139	24
McNary TLWTR	5/5/97	124.542	125.4569	126.9841	123.2497	24
McNary TLWTR	5/6/97	124.8	126.0418	126.781	122.0608	24
McNary TLWTR	5/7/97	123.813	123.925	124.2105	123.6148	24
McNary TLWTR	5/8/97	125.1982	125.4787	125.6614	123.7467	24
McNary TLWTR	5/9/97	125.3224	125.5042	125.7936	124.967	24
McNary TLWTR	5/10/97	125.4141	126.0964	126.7457	123.4127	24
McNary TLWTR	5/11/97	125.953	126.8658	127.609	123.4127	24
McNary TLWTR	5/12/97	128.162	128.4266	128.6853	127.6228	24
McNary TLWTR	5/13/97	127.8112	128.1746	128.4759	127.139	24
McNary TLWTR	5/14/97	129.7155	130.6583	131.4171	127.5033	24
McNary TLWTR	5/15/97	129.6905	130.2225	130.6773	128.7234	24
McNary TLWTR	5/16/97	130.0773	130.6818	131.1585	129.1391	24
McNary TLWTR	5/17/97	132.4829	132.4829	133.0226	132.0955	9
McNary TLWTR	5/18/97	132.3892	132.3892	132.7128	131.8362	8
McNary TLWTR	5/19/97	132.8339	132.9986	133.244	132.1808	20
McNary TLWTR	5/20/97	132.3809	132.5364	133.4672	131.9092	20
McNary TLWTR	5/21/97	132.2457	132.2457	133.3778	131.0253	10
McNary TLWTR	5/22/97	130.7608	131.0893	131.3333	130.1333	24
McNary TLWTR	5/23/97	131.0979	131.6188	132.9333	130.1333	24
McNary TLWTR	5/24/97	131.6212	132.5757	132.7563	128.0585	24
McNary TLWTR	5/25/97	130.9146	131.5571	132.7128	130.0133	22
McNary TLWTR	5/26/97	129.9478	130.2734	131.6069	129.404	24
McNary TLWTR	5/27/97	129.7801	129.9163	130.0662	129.4584	24
McNary TLWTR	5/28/97	129.3973	129.8565	129.9338	128.2869	24
McNary TLWTR	5/29/97	128.5648	129.1041	131.2085	127.6596	22
McNary TLWTR	5/30/97	128.6381	129.2065	129.3725	127.6596	24
McNary TLWTR	5/31/97	128.996	129.1671	129.6	128.4379	24
McNary TLWTR	6/1/97	130.6986	130.9811	131.117	128.6853	24
McNary TLWTR	6/2/97	131.5251	132.0659	132.8877	130.7285	24
McNary TLWTR	6/3/97	131.8567	132.1908	133.4228	131.4171	24
McNary TLWTR	6/4/97	131.8278	132.1322	132.49	131.1081	21
McNary TLWTR	6/5/97	130.9349	130.9349	132.6693	130.4521	9
McNary TLWTR	6/6/97	132.812	132.9448	133.3778	131.9149	16
McNary TLWTR	6/7/97	132.9187	132.9187	133.5562	132.5333	3
McNary TLWTR	6/8/97	131.5604	131.6942	132.3138	130.8921	15
McNary TLWTR	6/9/97	131.3399	131.4076	132.5798	130.9333	14

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary TLWTR	6/10/97	132.2981	132.2981	133.2888	130.8	11
McNary TLWTR	6/11/97	131.5508	131.5508	131.9092	131.2417	9
McNary TLWTR	6/12/97	132.8	132.8	132.8	132.8	1
McNary TLWTR	6/13/97					
McNary TLWTR	6/14/97	131.7909	131.7909	133.1551	130.4	6
McNary TLWTR	6/15/97	132.8722	133.1145	133.4672	131.4667	16
McNary TLWTR	6/16/97	132.2237	132.2237	132.2237	132.2237	1
McNary TLWTR	6/17/97					
McNary TLWTR	6/18/97					
McNary TLWTR	6/19/97	129.5857	129.7942	130.6773	128.2493	14
McNary TLWTR	6/20/97	129.5934	130.2848	131.1671	128.5714	22
McNary TLWTR	6/21/97	127.8152	128.7165	128.8204	125.6991	24
McNary TLWTR	6/22/97	127.401	128.9331	132.5365	125.3652	24
McNary TLWTR	6/23/97	126.8223	127.8741	130.1587	125.3633	24
McNary TLWTR	6/24/97	127.9793	128.8206	130.4348	125.9552	24
McNary TLWTR	6/25/97	126.1666	126.9663	127.49	125.0667	24
McNary TLWTR	6/26/97	125.13	125.3292	125.6308	124.734	24
McNary TLWTR	6/27/97	124.7279	124.7279	124.9668	124.5358	10
McNary TLWTR	6/28/97					
McNary TLWTR	6/29/97	122.0869	122.9917	124.767	118.9586	16
McNary TLWTR	6/30/97	120.4228	121.6455	122.4599	117.223	24
McNary TLWTR	7/1/97	118.5184	119.3931	120.1324	117.2185	24
McNary TLWTR	7/2/97	118.4791	119.4259	120.2649	117.328	24
McNary TLWTR	7/3/97	119.412	120.0868	120.6117	117.9045	24
McNary TLWTR	7/4/97	118.2523	118.7719	120.4787	115.6706	24
McNary TLWTR	7/5/97	120.0565	121.3115	121.9545	118.4492	24
McNary TLWTR	7/6/97	118.8057	119.9914	121.1155	116.7109	24
McNary TLWTR	7/7/97	116.9059	117.8726	118.0611	114.3426	24
McNary TLWTR	7/8/97	115.3435	116.4521	116.9108	109.8143	24
McNary TLWTR	7/9/97	115.0577	115.394	115.4667	113.9628	24
McNary TLWTR	7/10/97	117.8643	119.7694	120.8499	113.8298	24
McNary TLWTR	7/11/97	117.4582	118.1626	118.5923	115.9151	24
McNary TLWTR	7/12/97	117.4062	118.2172	118.7251	114.8344	24
McNary TLWTR	7/13/97	116.2122	116.8239	117.1771	114.702	24
McNary TLWTR	7/14/97	117.2212	117.6315	118.2423	116.6223	24
McNary TLWTR	7/15/97	118.6149	119.5934	120.3728	116.4675	24
McNary TLWTR	7/16/97	120.0911	121.1256	122.4599	118.0371	23
McNary TLWTR	7/17/97	119.9615	120.3228	120.9893	119.1489	24
McNary TLWTR	7/18/97	119.779	120.6913	121.7507	117.9283	24
McNary TLWTR	7/19/97	119.086	120.1447	120.9333	117.1088	24
McNary TLWTR	7/20/97	119.1419	119.5133	120.0267	118.3155	24
McNary TLWTR	7/21/97	118.7666	119.4971	120.0535	117.757	24
McNary TLWTR	7/22/97	117.7408	119.7105	121.8833	112.4503	24
McNary TLWTR	7/23/97	117.8482	118.5522	119.2563	116.8212	24
McNary TLWTR	7/24/97	117.649	118.2718	120.557	116.0904	24
McNary TLWTR	7/25/97	115.8996	117.3909	117.9283	113.13	24
McNary TLWTR	7/26/97	114.834	116.0229	117.6627	113.245	24
McNary TLWTR	7/27/97	113.5553	113.8548	115.4461	113.0146	24
McNary TLWTR	7/28/97	117.9117	119.1293	121.4667	115.3333	24
McNary TLWTR	7/29/97	114.3689	115.0755	115.3333	112.8989	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary TLWTR	7/30/97	113.5202	113.9898	114.2098	112.2178	24
McNary TLWTR	7/31/97	113.6544	114.4454	114.7606	112.1854	24
McNary TLWTR	8/1/97	113.3673	114.2558	114.9669	110.5053	24
McNary TLWTR	8/2/97	111.9028	112.5155	112.8	110.3723	24
McNary TLWTR	8/3/97	115.2926	118.0932	119.4407	112.2503	24
McNary TLWTR	8/4/97	114.3304	115.2053	115.6706	111.5232	24
McNary TLWTR	8/5/97	114.7857	114.9559	115.3237	114.4754	24
McNary TLWTR	8/6/97	114.908	115.4098	116.1333	114.191	24
McNary TLWTR	8/7/97	114.7122	115.0139	115.3129	113.7333	24
McNary TLWTR	8/8/97	114.9626	117.0231	119.6808	112	24
McNary TLWTR	8/9/97	114.4573	116.4023	117.223	111.7177	24
McNary TLWTR	8/10/97	112.756	113.6994	116.9333	111.1702	24
McNary TLWTR	8/11/97	112.5966	113.2783	113.6968	111.7021	24
McNary TLWTR	8/12/97	112.5064	112.8326	113.1824	111.8351	24
McNary TLWTR	8/13/97	114.0114	115.36	116.0214	111.984	24
McNary TLWTR	8/14/97	113.454	113.9893	114.5527	111.1559	24
McNary TLWTR	8/15/97	112.9685	114.7566	115.4362	109.2617	24
McNary TLWTR	8/16/97	111.4804	113.7954	114.2857	107.8562	24
McNary TLWTR	8/17/97	109.3381	110.344	110.8289	107.4567	24
McNary TLWTR	8/18/97	112.5308	114.4384	115.0667	107.723	24
McNary TLWTR	8/19/97	115.994	119.1909	120.5333	111.0814	24
McNary TLWTR	8/20/97	114.6256	118.1043	118.8755	108.0795	23
McNary TLWTR	8/21/97	113.9688	118.2122	118.8329	106.6138	24
McNary TLWTR	8/22/97	112.6747	115.3804	115.5378	108.0795	24
McNary TLWTR	8/23/97	111.7674	113.4337	114.1145	108.4993	24
McNary TLWTR	8/24/97	109.5166	110.4168	112.2995	107.8249	24
McNary TLWTR	8/25/97	110.9488	113.1311	113.7333	107.0385	24
McNary TLWTR	8/26/97	112.8079	116.5207	118.8251	107.0385	24
McNary TLWTR	8/27/97	114.1042	118.3371	118.9907	106.6313	24
McNary TLWTR	8/28/97	110.8058	113.0481	114.8936	107.3041	24
McNary TLWTR	8/29/97	107.2544	107.2544	111.0519	106.6313	11
McNary TLWTR	8/30/97	112.3608	113.6793	115.2925	110.7713	24
McNary TLWTR	8/31/97	111.3572	111.9471	112.2995	108.4112	24
McNary FRBY OR	4/1/97	109.6352	110.175	110.9499	108.4967	24
McNary FRBY OR	4/2/97	111.7672	113.5789	115	108.3551	24
McNary FRBY OR	4/3/97	113.6354	114.5132	114.9933	111.4514	24
McNary FRBY OR	4/4/97	111.2291	112.0078	112.5	109.2961	24
McNary FRBY OR	4/5/97	109.0538	109.5265	110.093	108.0688	24
McNary FRBY OR	4/6/97	110.8409	112.1088	113.1824	108.6207	24
McNary FRBY OR	4/7/97	109.9678	110.2349	110.7713	109.4164	22
McNary FRBY OR	4/8/97	109.9549	110.407	111.0519	108.8977	24
McNary FRBY OR	4/9/97	108.0938	108.514	109.0305	107.4271	24
McNary FRBY OR	4/10/97	107.0313	107.4238	107.6923	106.2005	24
McNary FRBY OR	4/11/97	106.8948	107.5186	109.2227	105.6505	24
McNary FRBY OR	4/12/97	107.1525	108.0311	109.6	105.5409	24
McNary FRBY OR	4/13/97	106.6013	106.8301	107.0951	105.992	24
McNary FRBY OR	4/14/97	106.0556	106.3394	107.0479	105.305	24
McNary FRBY OR	4/15/97	106.5857	107.6871	110.4	105.1656	24
McNary FRBY OR	4/16/97	106.3015	106.6679	107.3041	105.6	24
McNary FRBY OR	4/17/97	108.7095	110.0927	112.5333	106.0927	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary FRBY OR	4/18/97	110.1666	111.0419	112.6005	108.9333	24
McNary FRBY OR	4/19/97	111.4658	112.4731	113.3423	109.9196	24
McNary FRBY OR	4/20/97	110.6551	112.1149	113.4953	108.0688	24
McNary FRBY OR	4/21/97	109.0655	109.9527	111.8351	107.8042	24
McNary FRBY OR	4/22/97	114.1598	116.9982	118.9586	108.4993	24
McNary FRBY OR	4/23/97	116.0978	116.338	116.622	115.2	24
McNary FRBY OR	4/24/97	116.6701	117.2189	117.8808	115.5585	23
McNary FRBY OR	4/25/97	118.3179	119.5957	122.8836	116.2698	24
McNary FRBY OR	4/26/97	120.5005	121.6746	122.5634	118.0371	24
McNary FRBY OR	4/27/97	119.6752	120.5987	121.2851	117.8192	24
McNary FRBY OR	4/28/97	116.9377	117.168	117.5766	116.4438	24
McNary FRBY OR	4/29/97	117.128	117.4724	117.8667	116.245	24
McNary FRBY OR	4/30/97	117.306	118.0351	118.8503	115.1596	24
McNary FRBY OR	5/1/97	114.9861	115.6642	117.0213	113.9257	24
McNary FRBY OR	5/2/97	116.9358	118.5895	119.5187	113.8114	24
McNary FRBY OR	5/3/97	118.1869	118.5957	118.883	116.8449	24
McNary FRBY OR	5/4/97	118.924	119.5809	122.2517	117.9045	24
McNary FRBY OR	5/5/97	118.6863	119.7844	122.4436	117.1088	24
McNary FRBY OR	5/6/97	118.7099	119.2282	119.5219	117.1504	24
McNary FRBY OR	5/7/97	117.1817	118.0895	120.7124	116.0053	24
McNary FRBY OR	5/8/97	118.6343	119.7102	121.2483	116.1376	22
McNary FRBY OR	5/9/97	120.8671	121.931	124.8011	119.4702	24
McNary FRBY OR	5/10/97	120.7621	121.8224	124.6684	119.4444	24
McNary FRBY OR	5/11/97	120.8274	121.6612	123.1383	119.3634	24
McNary FRBY OR	5/12/97	121.643	122.8078	126.3722	120.1065	24
McNary FRBY OR	5/13/97	122.201	122.7779	124.498	121.2283	24
McNary FRBY OR	5/14/97	121.7725	122.174	123.1593	120.8835	24
McNary FRBY OR	5/15/97	122.6307	123.4133	125.4011	121.3333	24
McNary FRBY OR	5/16/97	123.04	123.822	124.6338	121.618	24
McNary FRBY OR	5/17/97	122.9292	123.5327	124.1979	122.1039	24
McNary FRBY OR	5/18/97	123.1053	123.6884	124.2667	121.9868	24
McNary FRBY OR	5/19/97	124.759	125.2641	125.6065	123.4667	24
McNary FRBY OR	5/20/97	122.129	123.5945	124.7312	119.7597	24
McNary FRBY OR	5/21/97	120.1364	120.6222	121.5241	119.3591	24
McNary FRBY OR	5/22/97	122.5059	123.1686	125.2674	121.4953	24
McNary FRBY OR	5/23/97	122.6594	122.963	123.1593	121.8959	24
McNary FRBY OR	5/24/97	121.6067	122.3965	122.964	120.0267	24
McNary FRBY OR	5/25/97	120.4969	120.7582	121.0667	119.7333	24
McNary FRBY OR	5/26/97	120.6066	121.0023	121.4096	119.7875	24
McNary FRBY OR	5/27/97	120.7573	121.3976	122.5464	119.6286	24
McNary FRBY OR	5/28/97	121.6224	122.3324	123.2	120.557	24
McNary FRBY OR	5/29/97	122.4398	122.9576	124.1656	121.7623	24
McNary FRBY OR	5/30/97	122.2142	122.7376	123.9305	121.4667	24
McNary FRBY OR	5/31/97	121.5061	121.9245	122.2222	120.1065	24
McNary FRBY OR	6/1/97	118.8184	119.6896	120.1065	116.7553	24
McNary FRBY OR	6/2/97	119.4531	121.0913	122.6846	117.0213	24
McNary FRBY OR	6/3/97	123.0017	123.3497	123.7265	121.5343	24
McNary FRBY OR	6/4/97	121.9218	122.789	123.7265	120.5333	24
McNary FRBY OR	6/5/97	120.8676	121.3999	122.7696	119.9468	24
McNary FRBY OR	6/6/97	122.8902	123.7628	125.7028	120.8	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary FRBY OR	6/7/97	123.4602	123.7953	124.498	122.6969	24
McNary FRBY OR	6/8/97	122.6543	123.0641	123.9362	122.1629	24
McNary FRBY OR	6/9/97	123.2903	124.0752	127.3698	121.3049	24
McNary FRBY OR	6/10/97	124.6222	125.2065	126.0054	122.9946	24
McNary FRBY OR	6/11/97	123.8013	124.3698	125.7718	121.6867	24
McNary FRBY OR	6/12/97	120.8782	121.2799	122.0883	120.1872	23
McNary FRBY OR	6/13/97	122.6136	123.8787	124.9664	120.4	24
McNary FRBY OR	6/14/97	124.3825	124.8382	127.0415	123.6631	24
McNary FRBY OR	6/15/97	123.7038	124.015	124.5989	122.861	24
McNary FRBY OR	6/16/97	123.3958	123.7411	123.9625	122.6667	24
McNary FRBY OR	6/17/97	124.2087	124.6845	125.067	122.9333	24
McNary FRBY OR	6/18/97	121.1928	122.2188	122.9333	119.2819	24
McNary FRBY OR	6/19/97	120.7174	121.6205	122.3262	118.9655	24
McNary FRBY OR	6/20/97	121.5446	122.0499	122.6969	120.2128	24
McNary FRBY OR	6/21/97	120.6809	121.3624	121.6398	118.4	24
McNary FRBY OR	6/22/97	116.6343	117.5584	117.8667	114.8936	24
McNary FRBY OR	6/23/97	115.6802	116.7534	117.1315	113.9257	24
McNary FRBY OR	6/24/97	117.8767	119.3927	120.2918	115.1915	24
McNary FRBY OR	6/25/97	120.6879	121.7062	123.427	118.9333	24
McNary FRBY OR	6/26/97	119.025	119.5644	120.5608	117.4667	24
McNary FRBY OR	6/27/97	117.348	117.348	117.6	117.0213	10
McNary FRBY OR	6/28/97					
McNary FRBY OR	6/29/97	117.5911	117.7858	118.9008	116.9559	16
McNary FRBY OR	6/30/97	115.954	117.0297	118.6327	113.4667	24
McNary FRBY OR	7/1/97	113.0883	113.8505	115.2925	111.4058	24
McNary FRBY OR	7/2/97	112.559	113.5064	115.2925	110.8898	23
McNary FRBY OR	7/3/97	112.8689	114.2555	115.5792	110.8753	24
McNary FRBY OR	7/4/97	112.5349	113.5392	115.0134	111.3333	24
McNary FRBY OR	7/5/97	112.6807	113.3343	113.7097	111.3941	24
McNary FRBY OR	7/6/97	111.8654	112.3792	112.6836	110.9188	24
McNary FRBY OR	7/7/97	111.5021	112.2994	113.0667	110.2258	24
McNary FRBY OR	7/8/97	110.8018	111.1865	111.631	110.1198	24
McNary FRBY OR	7/9/97	110.5831	111.0863	111.3788	108.5447	24
McNary FRBY OR	7/10/97	107.8023	108.013	108.6782	107.4567	24
McNary FRBY OR	7/11/97	107.8952	108.6491	110.5333	106.7819	24
McNary FRBY OR	7/12/97	109.6998	111.3115	114.4	107.1713	24
McNary FRBY OR	7/13/97	111.4814	112.8878	115.1798	108.4993	24
McNary FRBY OR	7/14/97	112.3025	112.9392	114.5333	111.0814	24
McNary FRBY OR	7/15/97	112.3396	113.053	114.8	111.1851	24
McNary FRBY OR	7/16/97	112.5695	113.6736	115.2	110.5053	24
McNary FRBY OR	7/17/97	113.5238	114.0821	115.4155	112.5837	24
McNary FRBY OR	7/18/97	113.8884	114.8486	116.4894	111.5692	24
McNary FRBY OR	7/19/97	114.3197	115.3085	117.5134	112.8989	24
McNary FRBY OR	7/20/97	115.5188	116.4508	117.8046	113.369	24
McNary FRBY OR	7/21/97	115.8229	116.5195	117.2922	114	24
McNary FRBY OR	7/22/97	115.1594	116.0979	118.4492	113.6	24
McNary FRBY OR	7/23/97	113.1954	113.785	116.5333	112.2178	24
McNary FRBY OR	7/24/97	113.3599	114.5673	118.0481	111.2882	24
McNary FRBY OR	7/25/97	113.4202	114.388	116.8883	111.421	24
McNary FRBY OR	7/26/97	113.7885	114.4968	115.9787	112.5166	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary FRBY OR	7/27/97	113.758	114.9449	117.1123	112.1172	24
McNary FRBY OR	7/28/97	113.5712	114.5268	116.1981	112	24
McNary FRBY OR	7/29/97	112.3574	112.7451	113.2353	111.482	24
McNary FRBY OR	7/30/97	111.9439	113.3391	117.246	109.7204	24
McNary FRBY OR	7/31/97	111.4538	113.3267	117.223	108.9096	24
McNary FRBY OR	8/1/97	111.5117	113.6024	116.5554	108.4993	24
McNary FRBY OR	8/2/97	112.1717	114.4104	117.246	108.9096	24
McNary FRBY OR	8/3/97	111.3274	111.3274	113.8852	109.3333	10
McNary FRBY OR	8/4/97	112.595	115.7259	118.4	108.4993	24
McNary FRBY OR	8/5/97	111.206	113.1794	118.0851	108.6093	24
McNary FRBY OR	8/6/97	110.1223	111.2611	114.0562	108.5106	24
McNary FRBY OR	8/7/97	113.0465	115.076	116.8675	108.9214	24
McNary FRBY OR	8/8/97	111.8813	112.9024	115.2406	109.6257	24
McNary FRBY OR	8/9/97	108.9253	109.7238	110.4278	107.4667	24
McNary FRBY OR	8/10/97	108.8526	110.2183	112.8514	106.6667	24
McNary FRBY OR	8/11/97	108.9572	111.1326	115.9091	106.1252	24
McNary FRBY OR	8/12/97	109.3305	111.4947	115.6417	106.2583	22
McNary FRBY OR	8/13/97	109.3234	111.2626	114.7256	106.2667	24
McNary FRBY OR	8/14/97	110.1866	111.9467	113.4771	107.8877	24
McNary FRBY OR	8/15/97	109.9745	110.9628	112.3822	108.6022	24
McNary FRBY OR	8/16/97	108.3201	108.7774	109.6386	107.0951	24
McNary FRBY OR	8/17/97	107.6322	108.732	110.4418	106.008	24
McNary FRBY OR	8/18/97	109.3208	112.0767	114.3432	105.3405	24
McNary FRBY OR	8/19/97	108.5439	110.2395	113.253	105.992	24
McNary FRBY OR	8/20/97	107.1339	107.5005	107.7748	105.8511	24
McNary FRBY OR	8/21/97	107.0223	108.0384	110.3862	105.298	24
McNary FRBY OR	8/22/97	108.3308	109.6063	112.5668	106.6489	24
McNary FRBY OR	8/23/97	109.5427	111.682	113.2708	106.2583	24
McNary FRBY OR	8/24/97	109.1717	109.6371	110.992	108.1225	24
McNary FRBY OR	8/25/97	107.7011	108.1167	108.9572	106.8273	24
McNary FRBY OR	8/26/97	107.6218	108.4042	109.9462	106.4257	24
McNary FRBY OR	8/27/97	105.9779	106.3422	106.9241	105.1862	24
McNary FRBY OR	8/28/97	106.9633	108.1044	110.4139	105.2	24
McNary FRBY OR	8/29/97	105.86	105.86	106.4171	105.5851	9
McNary FRBY OR	8/30/97	106.5356	107.2902	108.8472	105.474	24
McNary FRBY OR	8/31/97	107.3491	108.9814	112.349	105.3548	24
McNary FRBY WA	4/1/97	107.1512	107.4141	108.0475	106.7974	24
McNary FRBY WA	4/2/97	110.1448	111.9684	113.1126	107.1895	24
McNary FRBY WA	4/3/97	112.7531	113.5005	113.6968	111.2	24
McNary FRBY WA	4/4/97	110.8527	111.1566	111.4362	109.6946	24
McNary FRBY WA	4/5/97	109.1157	109.7035	110.2258	108.0688	24
McNary FRBY WA	4/6/97	111.0748	112.7587	114.4	108.8859	24
McNary FRBY WA	4/7/97	110.5011	111.2035	111.4514	109.2715	23
McNary FRBY WA	4/8/97	109.7654	110.3419	111.1554	107.9681	24
McNary FRBY WA	4/9/97	107.2658	107.7137	108.1117	106.4901	24
McNary FRBY WA	4/10/97	106.6481	106.8992	107.2944	106.0686	24
McNary FRBY WA	4/11/97	106.4256	107.3175	108.0475	105.2562	24
McNary FRBY WA	4/12/97	107.0233	107.4495	107.8772	106.2005	24
McNary FRBY WA	4/13/97	106.3734	106.5849	106.9426	105.7257	24
McNary FRBY WA	4/14/97	105.7056	106.09	106.25	104.9137	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary FRBY WA	4/15/97	106.6582	107.3522	108.6667	105.8278	24
McNary FRBY WA	4/16/97	107.3678	107.6546	107.8667	106.9333	24
McNary FRBY WA	4/17/97	108.3145	108.8959	109.6	107.4172	24
McNary FRBY WA	4/18/97	110.0189	110.5087	111.0067	109.2123	24
McNary FRBY WA	4/19/97	111.8203	112.4538	113.2075	110.9772	24
McNary FRBY WA	4/20/97	109.8419	111.5153	113.1081	107.1429	24
McNary FRBY WA	4/21/97	108.2049	109.3756	110.253	106.6138	24
McNary FRBY WA	4/22/97	112.9675	114.7165	115.8177	109.6946	24
McNary FRBY WA	4/23/97	112.8401	113.7029	114.9135	110.9626	24
McNary FRBY WA	4/24/97	115.2511	116.266	117.374	113.5278	24
McNary FRBY WA	4/25/97	116.6705	117.8048	118.7003	115.0594	24
McNary FRBY WA	4/26/97	118.4218	119.418	120.1072	116.6003	24
McNary FRBY WA	4/27/97	116.908	117.7239	118.6327	114.6277	24
McNary FRBY WA	4/28/97	114.8112	115.4064	115.9304	113.8482	24
McNary FRBY WA	4/29/97	115.1145	115.4273	115.6	114.4192	24
McNary FRBY WA	4/30/97	115.2267	115.7421	116.1981	114.0187	24
McNary FRBY WA	5/1/97	112.7907	113.095	113.5638	111.9363	24
McNary FRBY WA	5/2/97	116.0376	117.674	118.4739	113.1474	24
McNary FRBY WA	5/3/97	117.7883	118.0035	118.2181	116.8449	24
McNary FRBY WA	5/4/97	117.5686	118.1157	119.0981	116.7768	24
McNary FRBY WA	5/5/97	118.0229	119.1931	119.8402	116.313	24
McNary FRBY WA	5/6/97	117.9081	118.8839	119.5219	115.5673	24
McNary FRBY WA	5/7/97	115.9632	116.7181	117.0635	114.7368	24
McNary FRBY WA	5/8/97	118.2434	119.5866	120.2128	116.4021	24
McNary FRBY WA	5/9/97	119.6489	120.5954	121.6467	118.2781	24
McNary FRBY WA	5/10/97	119.6089	120.1595	120.9827	118.7583	24
McNary FRBY WA	5/11/97	119.9487	120.8934	121.5712	118.7003	24
McNary FRBY WA	5/12/97	120.8271	122.1002	122.953	119.0413	24
McNary FRBY WA	5/13/97	121.2507	121.7994	122.5503	120.3753	24
McNary FRBY WA	5/14/97	120.5838	121.3861	122.118	119.1176	24
McNary FRBY WA	5/15/97	121.3796	122.6796	123.3645	119.4667	24
McNary FRBY WA	5/16/97	121.1442	122.122	123.231	119.7875	24
McNary FRBY WA	5/17/97	121.1917	122.4209	123.5294	119.4149	24
McNary FRBY WA	5/18/97	121.2686	122.5327	123.2713	119.2563	24
McNary FRBY WA	5/19/97	122.3532	123.2517	124.124	120.9613	24
McNary FRBY WA	5/20/97	119.1335	120.3429	122.043	116.8449	24
McNary FRBY WA	5/21/97	117.9858	119.2288	120.0535	115.7543	24
McNary FRBY WA	5/22/97	120.043	120.5576	121.0456	118.8251	24
McNary FRBY WA	5/23/97	120.0793	120.4616	120.8835	119.1176	24
McNary FRBY WA	5/24/97	118.439	118.8044	119.1176	117.757	24
McNary FRBY WA	5/25/97	117.6627	118.0626	118.5581	116.9333	24
McNary FRBY WA	5/26/97	118.234	119.0422	119.9734	117.0439	24
McNary FRBY WA	5/27/97	118.1866	119.1019	119.6547	116.5782	24
McNary FRBY WA	5/28/97	119.8833	120.9465	121.4667	118.1939	24
McNary FRBY WA	5/29/97	120.6419	121.2126	121.7914	119.8402	24
McNary FRBY WA	5/30/97	120.9784	121.5698	122.0883	120.1602	24
McNary FRBY WA	5/31/97	120.1889	120.8688	121.208	118.775	24
McNary FRBY WA	6/1/97	117.6083	118.2947	119.0413	116.4894	24
McNary FRBY WA	6/2/97	118.9069	120.661	121.5818	116.6003	24
McNary FRBY WA	6/3/97	121.4151	121.7434	122.0134	120.4301	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary FRBY WA	6/4/97	119.6836	120.2369	121.1796	118.4	24
McNary FRBY WA	6/5/97	119.5925	120.4558	120.8278	118.3511	24
McNary FRBY WA	6/6/97	121.1946	121.9487	122.49	120	24
McNary FRBY WA	6/7/97	121.7409	122.4296	122.9223	120.2937	24
McNary FRBY WA	6/8/97	120.4428	121.1384	121.8959	119.4149	24
McNary FRBY WA	6/9/97	120.577	121.609	122.6238	119.0413	24
McNary FRBY WA	6/10/97	121.2035	121.8673	122.3861	120.3209	24
McNary FRBY WA	6/11/97	120.8898	121.2444	121.4765	119.2771	24
McNary FRBY WA	6/12/97	119.335	119.7973	121.0174	118.4492	24
McNary FRBY WA	6/13/97	122.5456	124.3306	125.3691	119.2256	24
McNary FRBY WA	6/14/97	123.5521	124.0682	124.6649	122.6969	24
McNary FRBY WA	6/15/97	123.2168	123.8066	124.698	122.1925	24
McNary FRBY WA	6/16/97	122.9301	123.3848	123.6948	122.0588	24
McNary FRBY WA	6/17/97	123.2416	123.9335	124.1287	121.3333	24
McNary FRBY WA	6/18/97	119.3026	120.3089	121.2	117.2872	24
McNary FRBY WA	6/19/97	119.3984	120.7938	121.6288	116.8659	24
McNary FRBY WA	6/20/97	120.6298	121.5298	122.0883	119.016	24
McNary FRBY WA	6/21/97	119.7138	120.7585	121.2366	116.1333	24
McNary FRBY WA	6/22/97	115.3611	115.838	116.245	113.6786	24
McNary FRBY WA	6/23/97	115.5974	116.2688	116.7109	113.5458	24
McNary FRBY WA	6/24/97	118.1231	119.9701	120.9055	115.0794	24
McNary FRBY WA	6/25/97	121.2406	122.5474	123.7903	119.3076	24
McNary FRBY WA	6/26/97	118.9516	119.5069	120.8278	117.2	24
McNary FRBY WA	6/27/97	116.7688	116.7688	117.0667	116.5113	10
McNary FRBY WA	6/28/97					
McNary FRBY WA	6/29/97	117.9061	117.9833	118.3646	117.6	16
McNary FRBY WA	6/30/97	116.7582	117.4951	118.3646	115.5496	24
McNary FRBY WA	7/1/97	113.7146	114.2502	115.6	112.4834	24
McNary FRBY WA	7/2/97	112.114	112.9471	114.077	110.7427	24
McNary FRBY WA	7/3/97	113.7117	114.6697	115.6915	112.3342	24
McNary FRBY WA	7/4/97	113.4017	114.7728	115.8389	111.5846	24
McNary FRBY WA	7/5/97	114.0616	114.6804	115.1678	113.1191	24
McNary FRBY WA	7/6/97	112.5044	112.872	113.1824	111.5846	24
McNary FRBY WA	7/7/97	110.9584	111.4467	111.6	109.8274	24
McNary FRBY WA	7/8/97	111.4277	111.7616	112.2995	110.9188	24
McNary FRBY WA	7/9/97	111.2066	111.6437	112.2995	109.4793	24
McNary FRBY WA	7/10/97	107.8519	108.1464	109.0788	107.3236	24
McNary FRBY WA	7/11/97	107.6007	108.261	109.3209	106.516	24
McNary FRBY WA	7/12/97	110.679	111.9438	113.4487	109.0305	24
McNary FRBY WA	7/13/97	114.0864	115.6975	118.1818	112.085	24
McNary FRBY WA	7/14/97	114.6996	115.6166	116.1549	113.0667	24
McNary FRBY WA	7/15/97	113.5027	113.9272	115.6	112.8989	24
McNary FRBY WA	7/16/97	114.3938	116.8558	119.0349	111.4362	24
McNary FRBY WA	7/17/97	115.1995	115.9506	116.5775	114.1711	24
McNary FRBY WA	7/18/97	115.8529	116.9891	118.5333	114.2098	24
McNary FRBY WA	7/19/97	116.5684	118.2469	119.9198	114.4947	24
McNary FRBY WA	7/20/97	117.839	119.4489	120.5094	115.7543	24
McNary FRBY WA	7/21/97	117.5359	118.245	118.6577	116.2667	24
McNary FRBY WA	7/22/97	115.1603	115.8096	116.6889	114.2287	24
McNary FRBY WA	7/23/97	114.1575	115.8755	118.1333	111.6866	24

Daily TDGS data from COE Monitoring Stations

Site	Date	Average 24hour	12high h	Max	Min	NumHours
McNary FRBY WA	7/24/97	115.2676	116.2835	117.8905	113.5458	24
McNary FRBY WA	7/25/97	115.704	117.0303	118.1575	113.6968	24
McNary FRBY WA	7/26/97	115.6326	116.5446	117.223	113.8298	24
McNary FRBY WA	7/27/97	115.5395	116.6852	118.8251	113.9814	24
McNary FRBY WA	7/28/97	115.9775	117.364	122.4599	114	24
McNary FRBY WA	7/29/97	113.1977	113.5407	114.1711	112.5501	24
McNary FRBY WA	7/30/97	112.0015	112.4946	113.3511	111.2299	24
McNary FRBY WA	7/31/97	110.7507	111.0322	112.1172	110.2258	24
McNary FRBY WA	8/1/97	111.2635	112.2943	115.7543	109.9867	24
McNary FRBY WA	8/2/97	111.1174	111.4222	112.1333	110.4	24
McNary FRBY WA	8/3/97	112.5941	113.2591	117.223	110.1333	24
McNary FRBY WA	8/4/97	112.1365	113.0115	114.4947	110.7713	24
McNary FRBY WA	8/5/97	111.7967	112.8304	115.7124	109.9867	24
McNary FRBY WA	8/6/97	111.2	112.147	114.5527	109.7075	24
McNary FRBY WA	8/7/97	111.0954	111.3167	111.631	110.2667	24
McNary FRBY WA	8/8/97	111.2852	111.6582	112.5837	110.5333	24
McNary FRBY WA	8/9/97	109.8886	110.7782	111.3941	108	24
McNary FRBY WA	8/10/97	108.3896	109.3338	110.6809	106.5333	24
McNary FRBY WA	8/11/97	108.9776	109.8199	113.369	107.4567	24
McNary FRBY WA	8/12/97	108.9924	110.177	111.8825	107.0667	24
McNary FRBY WA	8/13/97	109.8602	110.594	111.749	108.2999	24
McNary FRBY WA	8/14/97	110.0225	110.3596	110.8289	109.4793	24
McNary FRBY WA	8/15/97	108.4776	108.7606	109.1644	107.5067	24
McNary FRBY WA	8/16/97	108.4592	109.5049	111.3941	106.9426	24
McNary FRBY WA	8/17/97	108.3182	109.2849	110.7095	106.5421	24
McNary FRBY WA	8/18/97	107.4017	107.9957	109.5174	106.4	24
McNary FRBY WA	8/19/97	107.8513	108.716	110.3079	106.5333	24
McNary FRBY WA	8/20/97	107.6068	108.4578	109.1153	105.8433	24
McNary FRBY WA	8/21/97	106.9007	108.3944	110.2394	104.7745	24
McNary FRBY WA	8/22/97	108.1647	109.228	112.4498	106.7819	24
McNary FRBY WA	8/23/97	109.3375	110.2555	111.3941	107.9893	24
McNary FRBY WA	8/24/97	109.3404	110.4473	111.3941	107.1904	24
McNary FRBY WA	8/25/97	107.318	108.1152	108.9572	106.2667	24
McNary FRBY WA	8/26/97	107.8903	108.5813	110.0806	106.2583	24
McNary FRBY WA	8/27/97	106.5995	107.0987	107.7437	105.7257	24
McNary FRBY WA	8/28/97	107.2679	107.6358	108.5333	106.4	24
McNary FRBY WA	8/29/97	106.525	106.525	107.5899	105.7181	10
McNary FRBY WA	8/30/97	107.6121	108.5917	110.4558	105.8745	24
McNary FRBY WA	8/31/97	107.3473	108.4966	111.4094	105.2209	24

Appendix 4. Juvenile GBT Sampling data.

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Bonneville	4/8/97	CH	1	27	0	0
Bonneville	4/8/97	ST		14	0	0
Bonneville	4/10/97	CH	1	30	0	1
Bonneville	4/10/97	ST		28	0	0
Bonneville	4/12/97	CH	1	23	0	0
Bonneville	4/12/97	ST		39	0	1
Bonneville	4/16/97	CH	1	38	0	0
Bonneville	4/16/97	ST		43	0	0
Bonneville	4/18/97	CH	1	100	0	3
Bonneville	4/18/97	ST		45	0	1
Bonneville	4/20/97	CH	1	100	0	4
Bonneville	4/20/97	ST		50	0	0
Bonneville	4/22/97	CH	1	90	0	1
Bonneville	4/22/97	ST		100	1	3
Bonneville	4/24/97	CH	1	100	0	2
Bonneville	4/24/97	ST		100	6	3
Bonneville	4/26/97	CH	1	100	11	1
Bonneville	4/26/97	ST		100	19	5
Bonneville	4/28/97	CH	1	100	1	0
Bonneville	4/28/97	ST		100	21	4
Bonneville	4/30/97	CH	1	100	6	1
Bonneville	4/30/97	ST		100	10	4
Bonneville	5/2/97	CH	1	100	2	0
Bonneville	5/2/97	ST		100	14	3
Bonneville	5/4/97	CH	1	100	5	2
Bonneville	5/4/97	ST		100	10	2
Bonneville	5/6/97	CH	1	100	5	2
Bonneville	5/6/97	ST		100	12	2
Bonneville	5/8/97	CH	1	100	1	3
Bonneville	5/8/97	ST		100	11	3
Bonneville	5/10/97	CH	1	82	4	0
Bonneville	5/10/97	ST		100	8	3
Bonneville	5/12/97	CH	1	100	2	1
Bonneville	5/12/97	ST		100	9	4
Bonneville	5/14/97	CH	1	63	2	1
Bonneville	5/14/97	ST		100	9	8
Bonneville	5/16/97	CH	1	3	0	0
Bonneville	5/16/97	ST		45	5	4
Bonneville	5/18/97	CH	1	8	0	0
Bonneville	5/18/97	ST		100	17	4
Bonneville	5/20/97	CH	1	47	3	0
Bonneville	5/20/97	ST		100	8	2
Bonneville	5/22/97	CH	1	56	6	3
Bonneville	5/22/97	ST		100	21	15
Bonneville	5/24/97	CH	1	66	7	2
Bonneville	5/24/97	ST		100	17	10
Bonneville	5/26/97	CH	1	32	1	0
Bonneville	5/26/97	ST		100	8	4

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Bonneville	5/28/97	CH	1	42	6	1
Bonneville	5/28/97	ST		100	15	6
Bonneville	5/30/97	CH	1	73	4	2
Bonneville	5/30/97	ST		100	24	13
Bonneville	6/1/97	CH	0	1	0	0
Bonneville	6/1/97	CH	1	31	3	0
Bonneville	6/1/97	ST		72	15	3
Bonneville	6/3/97	CH	1	42	0	0
Bonneville	6/3/97	ST		100	18	1
Bonneville	6/5/97	CH	0	100	4	0
Bonneville	6/5/97	CH	1	13	0	0
Bonneville	6/5/97	ST		54	20	3
Bonneville	6/7/97	CH	0	100	1	0
Bonneville	6/7/97	ST		51	14	2
Bonneville	6/9/97	CH	0	100	4	0
Bonneville	6/9/97	ST		21	7	1
Bonneville	6/11/97	CH	0	99	2	0
Bonneville	6/11/97	CH	1	1	1	0
Bonneville	6/11/97	ST		21	2	0
Bonneville	6/13/97	CH	0	100	1	0
Bonneville	6/13/97	ST		17	3	0
Bonneville	6/15/97	CH	0	100	3	1
Bonneville	6/15/97	ST		7	0	0
Bonneville	6/17/97	CH	0	100	9	2
Bonneville	6/17/97	ST		5	1	0
Bonneville	6/19/97	CH	0	100	6	0
Bonneville	6/19/97	ST		2	0	0
Bonneville	6/21/97	CH	0	100	1	0
Bonneville	6/23/97	CH	0	100	1	0
Bonneville	6/25/97	CH	0	100	2	0
Bonneville	6/27/97	CH	0	100	0	0
Bonneville	6/29/97	CH	0	100	0	0
Bonneville	7/1/97	CH	0	100	0	0
Bonneville	7/3/97	CH	0	100	0	0
Bonneville	7/5/97	CH	0	100	1	0
Bonneville	7/7/97	CH	0	100	0	0
Bonneville	7/12/97	CH	0	100	0	0
Bonneville	7/15/97	CH	0	100	0	0
Bonneville	7/17/97	CH	0	100	0	0
Bonneville	7/19/97	CH	0	100	0	0
Bonneville	7/22/97	CH	0	100	0	0
Bonneville	7/24/97	CH	0	100	0	0
Bonneville	7/26/97	CH	0	100	0	0
Bonneville	7/29/97	CH	0	100	0	0
Bonneville	7/31/97	CH	0	100	0	0
Bonneville	8/2/97	CH	0	100	0	0
Bonneville	8/5/97	CH	0	100	0	0
Bonneville	8/7/97	CH	0	100	0	0

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Bonneville	8/9/97	CH	0	100	0	0
Bonneville	8/12/97	CH	0	88	0	1
Bonneville	8/14/97	CH	0	100	0	0
Bonneville	8/16/97	CH	0	100	0	1
Bonneville	8/19/97	CH	0	100	0	0
Bonneville	8/21/97	CH	0	100	0	0
Bonneville	8/23/97	CH	0	100	0	0
Bonneville	8/26/97	CH	0	81	0	0
Bonneville	8/28/97	CH	0	39	0	0
Bonneville	8/30/97	CH	0	69	0	0
Ice Harbor	4/8/97	CH	1	1	0	0
Ice Harbor	4/8/97	ST		3	0	0
Ice Harbor	4/11/97	CH	1	1	0	0
Ice Harbor	4/11/97	ST		15	0	0
Ice Harbor	4/15/97	CH	1	11	0	0
Ice Harbor	4/15/97	ST		98	6	3
Ice Harbor	4/18/97	CH	1	10	0	0
Ice Harbor	4/18/97	ST		100	15	7
Ice Harbor	4/22/97	CH	1	32	1	0
Ice Harbor	4/22/97	ST		100	1	4
Ice Harbor	4/25/97	CH	1	74	1	1
Ice Harbor	4/25/97	ST		100	1	1
Ice Harbor	4/29/97	CH	1	95	2	1
Ice Harbor	4/29/97	ST		100	3	0
Ice Harbor	5/2/97	CH	1	94	1	1
Ice Harbor	5/2/97	ST		100	2	2
Ice Harbor	5/6/97	CH	1	15	0	0
Ice Harbor	5/6/97	ST		100	2	1
Ice Harbor	5/9/97	CH	1	36	0	0
Ice Harbor	5/9/97	ST		100	1	2
Ice Harbor	5/13/97	CH	1	20	0	0
Ice Harbor	5/13/97	ST		100	0	5
Ice Harbor	5/16/97	CH	1	24	1	0
Ice Harbor	5/16/97	ST		100	2	3
Ice Harbor	5/20/97	CH	1	17	3	2
Ice Harbor	5/20/97	ST		100	11	2
Ice Harbor	5/23/97	CH	1	15	3	1
Ice Harbor	5/23/97	ST		100	7	1
Ice Harbor	5/27/97	CH	1	8	1	0
Ice Harbor	5/27/97	ST		100	7	6
Ice Harbor	5/30/97	CH	1	20	0	0
Ice Harbor	5/30/97	ST		100	9	3
Ice Harbor	6/3/97	CH	1	24	1	0
Ice Harbor	6/3/97	ST		100	4	6
Ice Harbor	6/6/97	CH	1	11	1	0
Ice Harbor	6/6/97	ST		100	6	1
Ice Harbor	6/10/97	CH	0	2	0	0
Ice Harbor	6/10/97	CH	1	10	2	1

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Ice Harbor	6/10/97	ST		100	17	3
Ice Harbor	6/13/97	CH	0	1	0	0
Ice Harbor	6/13/97	CH	1	5	1	0
Ice Harbor	6/13/97	ST		60	4	2
Ice Harbor	6/17/97	ST		34	6	1
Ice Harbor	6/20/97	ST		3	0	0
John Day	4/7/97	CH	1	10	0	0
John Day	4/7/97	ST		17	0	0
John Day	4/9/97	CH	1	4	0	0
John Day	4/9/97	ST		12	0	0
John Day	4/11/97	CH	1	18	0	0
John Day	4/11/97	ST		8	0	0
John Day	4/13/97	CH	1	17	0	0
John Day	4/13/97	ST		5	0	0
John Day	4/15/97	CH	1	55	0	0
John Day	4/15/97	ST		19	0	0
John Day	4/17/97	CH	1	43	0	0
John Day	4/17/97	ST		20	0	0
John Day	4/19/97	CH	1	74	0	0
John Day	4/19/97	ST		47	0	0
John Day	4/21/97	CH	1	100	0	0
John Day	4/21/97	ST		100	1	0
John Day	4/23/97	CH	1	61	0	0
John Day	4/23/97	ST		100	2	0
John Day	4/25/97	CH	1	28	0	0
John Day	4/25/97	ST		100	5	1
John Day	4/27/97	CH	1	23	1	0
John Day	4/27/97	ST		100	10	0
John Day	4/29/97	CH	1	73	0	1
John Day	4/29/97	ST		100	8	0
John Day	5/1/97	CH	1	23	0	0
John Day	5/1/97	ST		62	1	0
John Day	5/3/97	CH	1	14	0	0
John Day	5/3/97	ST		89	6	0
John Day	5/5/97	CH	1	11	0	0
John Day	5/5/97	ST		100	1	0
John Day	5/7/97	CH	1	12	1	0
John Day	5/7/97	ST		45	0	0
John Day	5/9/97	CH	1	30	0	0
John Day	5/9/97	ST		100	0	0
John Day	5/11/97	CH	1	65	1	0
John Day	5/11/97	ST		100	3	0
John Day	5/13/97	CH	1	16	0	0
John Day	5/13/97	ST		64	2	0
John Day	5/15/97	CH	1	25	0	0
John Day	5/15/97	ST		100	4	0
John Day	5/17/97	CH	1	15	0	0
John Day	5/17/97	ST		92	3	0

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
John Day	5/19/97	CH	1	15	1	0
John Day	5/19/97	ST		100	10	0
John Day	5/21/97	CH	1	26	3	0
John Day	5/21/97	ST		100	12	0
John Day	5/23/97	CH	1	36	7	0
John Day	5/23/97	ST		86	8	0
John Day	5/25/97	CH	1	34	2	0
John Day	5/25/97	ST		100	7	0
John Day	5/27/97	CH	1	24	6	0
John Day	5/27/97	ST		63	9	0
John Day	5/29/97	CH	1	12	1	0
John Day	5/29/97	ST		57	7	0
John Day	5/31/97	CH	1	4	0	0
John Day	5/31/97	ST		40	3	0
John Day	6/2/97	CH	1	8	0	0
John Day	6/2/97	ST		36	0	0
John Day	6/4/97	CH	0	31	0	0
John Day	6/4/97	ST		22	2	0
John Day	6/6/97	CH	1	100	0	0
John Day	6/6/97	ST		29	7	0
John Day	6/8/97	CH	1	94	0	0
John Day	6/8/97	ST		14	5	0
John Day	6/10/97	CH	0	49	1	0
John Day	6/10/97	ST		6	3	1
John Day	6/12/97	CH	0	33	0	0
John Day	6/12/97	ST		10	3	0
John Day	6/14/97	CH	0	65	0	0
John Day	6/14/97	ST		14	2	0
John Day	6/16/97	CH	0	34	0	0
John Day	6/16/97	ST		4	1	0
John Day	6/18/97	CH	0	20	0	0
John Day	6/18/97	ST		3	1	0
John Day	6/20/97	CH	0	75	0	0
John Day	6/20/97	ST		8	2	0
John Day	6/22/97	CH	0	68	1	0
John Day	6/24/97	CH	0	26	0	0
John Day	6/26/97	CH	0	100	0	0
John Day	6/28/97	CH	0	100	0	0
John Day	6/30/97	CH	0	75	0	0
John Day	7/2/97	CH	0	100	0	0
John Day	7/4/97	CH	0	63	0	0
John Day	7/6/97	CH	0	100	0	0
John Day	7/8/97	CH	0	47	0	0
John Day	7/10/97	CH	0	100	0	0
John Day	7/12/97	CH	0	89	0	0
John Day	7/14/97	CH	0	79	0	0
John Day	7/16/97	CH	0	83	0	0
John Day	7/18/97	CH	0	37	0	0

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
John Day	7/21/97	CH	0	11	0	0
John Day	7/23/97	CH	0	39	0	0
John Day	7/25/97	CH	0	11	0	0
John Day	7/28/97	CH	0	69	0	0
John Day	7/30/97	CH	0	6	0	0
John Day	8/1/97	CH	0	86	0	0
John Day	8/4/97	CH	0	72	0	0
John Day	8/6/97	CH	0	44	0	0
John Day	8/8/97	CH	0	100	0	0
John Day	8/11/97	CH	0	100	0	0
John Day	8/13/97	CH	0	49	0	0
John Day	8/15/97	CH	0	100	0	0
John Day	8/18/97	CH	0	55	0	0
John Day	8/20/97	CH	0	100	0	0
John Day	8/22/97	CH	0	37	0	0
John Day	8/25/97	CH	0	47	0	0
John Day	8/27/97	CH	0	69	0	0
John Day	8/29/97	CH	0	20	0	0
Lower Granite	4/7/97	ST		100	0	1
Lower Granite	4/9/97	ST		100	0	0
Lower Granite	4/11/97	ST		100	0	3
Lower Granite	4/13/97	ST		100	0	2
Lower Granite	4/15/97	ST		100	0	2
Lower Granite	4/17/97	CH	1	32	0	0
Lower Granite	4/17/97	ST		100	0	1
Lower Granite	4/19/97	CH	1	100	0	1
Lower Granite	4/19/97	ST		100	0	0
Lower Granite	4/21/97	CH	1	100	0	1
Lower Granite	4/21/97	ST		100	0	0
Lower Granite	4/23/97	CH	1	100	1	3
Lower Granite	4/23/97	ST		100	0	0
Lower Granite	4/25/97	CH	1	100	0	2
Lower Granite	4/25/97	ST		100	0	0
Lower Granite	4/27/97	CH	1	100	2	0
Lower Granite	4/27/97	ST		100	0	1
Lower Granite	4/29/97	CH	1	100	0	0
Lower Granite	4/29/97	ST		100	0	0
Lower Granite	5/1/97	CH	1	100	0	0
Lower Granite	5/1/97	ST		100	0	1
Lower Granite	5/3/97	CH	1	100	0	0
Lower Granite	5/3/97	ST		100	0	1
Lower Granite	5/5/97	CH	1	100	0	0
Lower Granite	5/5/97	ST		100	0	0
Lower Granite	5/7/97	CH	1	100	1	0
Lower Granite	5/7/97	ST		100	0	1
Lower Granite	5/9/97	CH	1	100	0	1
Lower Granite	5/9/97	ST		100	0	0
Lower Granite	5/11/97	CH	1	100	1	1

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Lower Granite	5/11/97	ST		100	0	2
Lower Granite	5/13/97	CH	1	100	0	0
Lower Granite	5/13/97	ST		100	0	2
Lower Granite	5/15/97	CH	1	100	1	0
Lower Granite	5/15/97	ST		100	0	0
Lower Granite	5/17/97	CH	1	100	0	0
Lower Granite	5/17/97	ST		100	0	1
Lower Granite	5/19/97	CH	1	100	0	2
Lower Granite	5/19/97	ST		100	0	1
Lower Granite	5/21/97	CH	1	100	0	1
Lower Granite	5/21/97	ST		100	0	0
Lower Granite	5/23/97	CH	1	91	1	1
Lower Granite	5/23/97	ST		100	0	3
Lower Granite	5/25/97	CH	1	100	0	0
Lower Granite	5/25/97	ST		100	0	0
Lower Granite	5/27/97	CH	1	36	0	0
Lower Granite	5/27/97	ST		100	0	2
Lower Granite	5/29/97	CH	1	17	1	0
Lower Granite	5/29/97	ST		100	0	1
Lower Granite	5/31/97	CH	1	15	0	1
Lower Granite	5/31/97	ST		100	0	2
Lower Granite	6/2/97	CH	1	63	0	0
Lower Granite	6/2/97	ST		100	0	0
Lower Granite	6/4/97	CH	1	19	0	0
Lower Granite	6/4/97	ST		100	0	0
Lower Granite	6/6/97	CH	1	5	0	0
Lower Granite	6/6/97	ST		100	0	1
Lower Granite	6/8/97	CH	1	3	0	0
Lower Granite	6/8/97	ST		100	0	0
Lower Granite	6/10/97	CH	1	9	0	0
Lower Granite	6/10/97	ST		100	1	1
Lower Granite	6/12/97	CH	1	9	0	1
Lower Granite	6/12/97	ST		100	1	0
Lower Granite	6/14/97	CH	1	11	0	0
Lower Granite	6/14/97	ST		100	0	1
Lower Granite	6/16/97	ST		100	0	1
Lower Granite	6/18/97	ST		100	0	4
Lower Granite	6/20/97	ST		100	0	3
Lower Granite	6/22/97	ST		79	0	0
Lower Granite	6/24/97	ST		58	0	0
Lower Granite	6/26/97	ST		50	1	2
Lower Granite	6/28/97	ST		87	3	1
Lower Granite	6/30/97	ST		100	1	1
Lower Granite	7/2/97	ST		71	0	3
Little Goose	4/8/97	ST		24	0	1
Little Goose	4/10/97	ST		91	2	1
Little Goose	4/12/97	ST		100	4	6
Little Goose	4/14/97	CH	1	1	0	0

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Little Goose	4/14/97	ST		100	3	0
Little Goose	4/16/97	CH	1	5	0	0
Little Goose	4/16/97	ST		68	1	1
Little Goose	4/18/97	CH	1	31	0	1
Little Goose	4/18/97	ST		100	4	0
Little Goose	4/20/97	CH	1	58	0	0
Little Goose	4/20/97	ST		100	0	0
Little Goose	4/22/97	CH	1	78	0	0
Little Goose	4/22/97	ST		100	0	0
Little Goose	4/24/97	CH	1	50	0	0
Little Goose	4/24/97	ST		100	0	0
Little Goose	4/26/97	CH	1	40	0	0
Little Goose	4/26/97	ST		100	0	0
Little Goose	4/28/97	CH	1	100	0	0
Little Goose	4/28/97	ST		100	0	0
Little Goose	4/30/97	CH	1	100	0	0
Little Goose	4/30/97	ST		100	0	0
Little Goose	5/2/97	CH	1	100	0	0
Little Goose	5/2/97	ST		100	0	0
Little Goose	5/4/97	CH	1	100	0	1
Little Goose	5/4/97	ST		100	0	0
Little Goose	5/6/97	CH	1	93	0	0
Little Goose	5/6/97	ST		99	0	0
Little Goose	5/8/97	CH	1	100	0	0
Little Goose	5/8/97	ST		100	0	1
Little Goose	5/10/97	CH	1	100	0	0
Little Goose	5/10/97	ST		100	0	0
Little Goose	5/12/97	CH	1	100	0	0
Little Goose	5/12/97	ST		100	0	0
Little Goose	5/14/97	CH	1	100	0	0
Little Goose	5/14/97	ST		100	0	0
Little Goose	5/16/97	CH	1	100	1	2
Little Goose	5/16/97	ST		100	2	1
Little Goose	5/18/97	CH	1	100	3	1
Little Goose	5/18/97	ST		100	1	0
Little Goose	5/20/97	CH	1	68	5	1
Little Goose	5/20/97	ST		100	2	0
Little Goose	5/22/97	CH	1	56	4	1
Little Goose	5/22/97	ST		100	1	0
Little Goose	5/24/97	CH	1	27	1	0
Little Goose	5/24/97	ST		100	2	0
Little Goose	5/26/97	CH	1	100	0	0
Little Goose	5/26/97	ST		100	0	0
Little Goose	5/28/97	CH	1	51	0	0
Little Goose	5/28/97	ST		100	0	0
Little Goose	5/30/97	CH	1	52	0	1
Little Goose	5/30/97	ST		100	0	0
Little Goose	6/1/97	CH	1	62	0	2

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Little Goose	6/1/97	ST		100	0	0
Little Goose	6/3/97	CH	1	57	1	1
Little Goose	6/3/97	ST		100	0	0
Little Goose	6/5/97	CH	1	6	1	0
Little Goose	6/5/97	ST		100	1	0
Little Goose	6/7/97	CH	1	13	1	0
Little Goose	6/7/97	ST		100	3	1
Little Goose	6/9/97	CH	1	11	2	1
Little Goose	6/9/97	ST		100	11	4
Little Goose	6/11/97	CH	1	11	2	0
Little Goose	6/11/97	ST		100	7	0
Little Goose	6/13/97	CH	1	9	1	0
Little Goose	6/13/97	ST		100	6	0
Little Goose	6/15/97	CH	1	4	0	0
Little Goose	6/15/97	ST		100	11	0
Little Goose	6/17/97	ST		42	10	4
Little Goose	6/19/97	ST		63	2	0
Little Goose	6/21/97	ST		36	2	0
Little Goose	6/23/97	ST		27	1	0
Little Goose	6/25/97	ST		15	0	0
Little Goose	6/27/97	ST		21	0	0
Little Goose	6/29/97	ST		11	0	0
Lower Monumental	4/7/97	CH	1	4	0	0
Lower Monumental	4/7/97	ST		23	2	0
Lower Monumental	4/9/97	CH	1	4	0	0
Lower Monumental	4/9/97	ST		75	1	0
Lower Monumental	4/11/97	CH	1	4	0	0
Lower Monumental	4/11/97	ST		35	0	4
Lower Monumental	4/13/97	CH	1	9	2	0
Lower Monumental	4/13/97	ST		100	1	5
Lower Monumental	4/15/97	CH	1	17	0	0
Lower Monumental	4/15/97	ST		91	12	1
Lower Monumental	4/17/97	CH	1	27	1	0
Lower Monumental	4/17/97	ST		100	4	3
Lower Monumental	4/19/97	CH	1	60	1	2
Lower Monumental	4/19/97	ST		100	3	0
Lower Monumental	4/21/97	CH	1	49	0	0
Lower Monumental	4/21/97	ST		100	1	3
Lower Monumental	4/23/97	CH	1	100	2	4
Lower Monumental	4/23/97	ST		100	1	5
Lower Monumental	4/25/97	CH	1	61	2	1
Lower Monumental	4/25/97	ST		100	2	3
Lower Monumental	4/27/97	CH	1	100	6	1
Lower Monumental	4/27/97	ST		100	3	0
Lower Monumental	4/29/97	CH	1	71	5	0
Lower Monumental	4/29/97	ST		100	8	0
Lower Monumental	5/1/97	CH	1	100	5	1
Lower Monumental	5/1/97	ST		100	4	1

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Lower Monumental	5/3/97	CH	1	100	5	1
Lower Monumental	5/3/97	ST		100	5	4
Lower Monumental	5/5/97	CH	1	100	1	1
Lower Monumental	5/5/97	ST		100	5	0
Lower Monumental	5/7/97	CH	1	100	2	0
Lower Monumental	5/7/97	ST		100	3	1
Lower Monumental	5/9/97	CH	1	72	0	0
Lower Monumental	5/9/97	ST		100	1	2
Lower Monumental	5/11/97	CH	1	100	0	0
Lower Monumental	5/11/97	ST		100	0	0
Lower Monumental	5/13/97	CH	1	100	3	4
Lower Monumental	5/13/97	ST		100	0	2
Lower Monumental	5/15/97	CH	1	100	4	1
Lower Monumental	5/15/97	ST		99	2	6
Lower Monumental	5/17/97	CH	1	71	17	7
Lower Monumental	5/17/97	ST		100	6	3
Lower Monumental	5/19/97	CH	1	48	12	1
Lower Monumental	5/19/97	ST		100	24	4
Lower Monumental	5/21/97	CH	1	76	19	4
Lower Monumental	5/21/97	ST		100	21	7
Lower Monumental	5/23/97	CH	1	50	10	0
Lower Monumental	5/23/97	ST		100	13	1
Lower Monumental	5/25/97	CH	1	47	2	3
Lower Monumental	5/25/97	ST		100	2	2
Lower Monumental	5/27/97	CH	1	73	3	4
Lower Monumental	5/27/97	ST		100	4	0
Lower Monumental	5/29/97	CH	1	39	0	2
Lower Monumental	5/29/97	ST		100	6	4
Lower Monumental	5/31/97	CH	1	27	2	1
Lower Monumental	5/31/97	ST		100	5	5
Lower Monumental	6/2/97	CH	1	66	2	2
Lower Monumental	6/2/97	ST		100	1	2
Lower Monumental	6/4/97	CH	1	31	3	0
Lower Monumental	6/4/97	ST		100	7	4
Lower Monumental	6/6/97	CH	1	13	0	0
Lower Monumental	6/6/97	ST		100	6	0
Lower Monumental	6/8/97	CH	1	14	3	0
Lower Monumental	6/8/97	ST		100	16	6
Lower Monumental	6/10/97	CH	1	2	0	0
Lower Monumental	6/10/97	ST		100	3	0
Lower Monumental	6/12/97	CH	1	3	0	0
Lower Monumental	6/12/97	ST		100	12	3
Lower Monumental	6/14/97	CH	1	12	0	0
Lower Monumental	6/14/97	ST		100	2	1
Lower Monumental	6/16/97	ST		100	26	4
Lower Monumental	6/18/97	ST		100	39	4
Lower Monumental	6/20/97	ST		100	13	4
Lower Monumental	6/22/97	ST		100	10	3

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Lower Monumental	6/24/97	ST		100	7	5
Lower Monumental	6/26/97	ST		81	3	1
Lower Monumental	6/28/97	ST		41	0	3
Lower Monumental	6/30/97	ST		26	0	2
McNary	4/8/97	CH	1	34	0	0
McNary	4/8/97	ST		4	0	0
McNary	4/10/97	CH	1	80	0	0
McNary	4/10/97	ST		17	0	0
McNary	4/12/97	CH	1	88	0	0
McNary	4/12/97	ST		21	0	0
McNary	4/14/97	CH	1	100	0	0
McNary	4/14/97	ST		23	0	0
McNary	4/16/97	CH	1	100	0	0
McNary	4/16/97	ST		83	0	0
McNary	4/18/97	CH	1	77	0	0
McNary	4/18/97	ST		100	0	0
McNary	4/20/97	CH	1	81	0	0
McNary	4/20/97	ST		100	0	4
McNary	4/22/97	CH	1	100	0	0
McNary	4/22/97	ST		100	0	1
McNary	4/24/97	CH	1	100	0	0
McNary	4/24/97	ST		100	1	2
McNary	4/26/97	CH	1	100	0	4
McNary	4/26/97	ST		100	1	1
McNary	4/28/97	CH	1	100	1	0
McNary	4/28/97	ST		100	2	1
McNary	4/30/97	CH	1	100	0	0
McNary	4/30/97	ST		100	2	1
McNary	5/2/97	CH	1	100	0	1
McNary	5/2/97	ST		100	1	1
McNary	5/4/97	CH	1	100	0	2
McNary	5/4/97	ST		100	1	1
McNary	5/6/97	CH	1	100	2	1
McNary	5/6/97	ST		100	1	0
McNary	5/8/97	CH	1	100	2	0
McNary	5/8/97	ST		100	0	1
McNary	5/10/97	CH	1	100	1	2
McNary	5/10/97	ST		100	0	0
McNary	5/12/97	CH	1	100	2	0
McNary	5/12/97	ST		100	0	1
McNary	5/14/97	CH	1	100	1	1
McNary	5/14/97	ST		100	0	1
McNary	5/16/97	CH	1	100	3	1
McNary	5/16/97	ST		100	2	1
McNary	5/18/97	CH	1	100	3	3
McNary	5/18/97	ST		100	1	3
McNary	5/20/97	CH	1	81	3	1
McNary	5/20/97	ST		100	2	2

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
McNary	5/22/97	CH	1	100	2	1
McNary	5/22/97	ST		100	5	3
McNary	5/24/97	CH	1	100	11	1
McNary	5/24/97	ST		100	7	0
McNary	5/26/97	CH	0	48	0	0
McNary	5/26/97	CH	1	52	1	1
McNary	5/26/97	ST		36	1	1
McNary	5/28/97	CH	0	81	0	0
McNary	5/28/97	CH	1	19	1	1
McNary	5/28/97	ST		10	0	0
McNary	5/30/97	CH	0	62	1	0
McNary	5/30/97	CH	1	38	0	0
McNary	5/30/97	ST		58	0	4
McNary	6/1/97	CH	0	48	0	0
McNary	6/1/97	CH	1	52	5	2
McNary	6/1/97	ST		75	6	3
McNary	6/3/97	CH	0	76	0	0
McNary	6/3/97	CH	1	24	0	0
McNary	6/3/97	ST		82	3	2
McNary	6/5/97	CH	0	71	0	0
McNary	6/5/97	CH	1	29	2	0
McNary	6/5/97	ST		30	8	1
McNary	6/7/97	CH	0	83	1	1
McNary	6/7/97	CH	1	17	1	0
McNary	6/7/97	ST		18	2	0
McNary	6/9/97	CH	0	89	4	0
McNary	6/9/97	CH	1	11	0	0
McNary	6/9/97	ST		18	1	0
McNary	6/11/97	CH	0	73	5	0
McNary	6/11/97	CH	1	18	3	0
McNary	6/11/97	ST		18	2	0
McNary	6/13/97	CH	0	92	5	4
McNary	6/13/97	CH	1	8	1	0
McNary	6/13/97	ST		24	12	2
McNary	6/15/97	CH	0	94	14	6
McNary	6/15/97	CH	1	6	3	1
McNary	6/15/97	ST		9	3	0
McNary	6/19/97	CH	0	97	4	2
McNary	6/19/97	CH	1	3	1	0
McNary	6/19/97	ST		9	3	2
McNary	6/21/97	CH	0	100	1	0
McNary	6/23/97	CH	0	100	0	1
McNary	6/25/97	CH	0	100	0	0
McNary	6/27/97	CH	0	100	1	2
McNary	6/29/97	CH	0	100	2	3
McNary	7/1/97	CH	0	100	0	0
McNary	7/3/97	CH	0	100	0	2
McNary	7/5/97	CH	0	100	0	1

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
McNary	7/7/97	CH	0	100	0	0
McNary	7/9/97	CH	0	100	0	0
McNary	7/11/97	CH	0	100	0	0
McNary	7/15/97	CH	0	100	0	0
McNary	7/17/97	CH	0	100	0	0
McNary	7/19/97	CH	0	100	0	0
McNary	7/22/97	CH	0	100	0	0
McNary	7/24/97	CH	0	100	0	0
McNary	7/26/97	CH	0	100	0	0
McNary	7/29/97	CH	0	100	0	0
McNary	7/31/97	CH	0	100	0	0
McNary	8/2/97	CH	0	100	0	1
McNary	8/5/97	CH	0	100	0	0
McNary	8/7/97	CH	0	100	0	0
McNary	8/9/97	CH	0	100	0	0
McNary	8/12/97	CH	0	100	0	0
McNary	8/14/97	CH	0	100	0	0
McNary	8/16/97	CH	0	100	0	0
McNary	8/19/97	CH	0	100	0	0
McNary	8/21/97	CH	0	100	0	0
McNary	8/23/97	CH	0	100	0	0
McNary	8/26/97	CH	0	100	0	0
McNary	8/28/97	CH	0	100	0	0
McNary	8/30/97	CH	0	100	0	0
Rock Island	4/7/97	CH	1	5	0	0
Rock Island	4/9/97	CH	1	44	1	2
Rock Island	4/11/97	CH	1	51	1	1
Rock Island	4/11/97	ST		6	0	0
Rock Island	4/14/97	CH	1	44	2	2
Rock Island	4/14/97	ST		5	0	0
Rock Island	4/16/97	CH	1	39	2	4
Rock Island	4/16/97	ST		36	0	0
Rock Island	4/18/97	CH	1	18	1	1
Rock Island	4/18/97	ST		64	0	1
Rock Island	4/21/97	CH	1	100	2	1
Rock Island	4/21/97	ST		99	0	0
Rock Island	4/23/97	CH	1	100	2	6
Rock Island	4/23/97	ST		84	2	1
Rock Island	4/25/97	CH	1	95	4	1
Rock Island	4/25/97	ST		100	0	1
Rock Island	4/28/97	CH	1	100	6	11
Rock Island	4/28/97	ST		100	1	8
Rock Island	4/30/97	CH	1	100	6	6
Rock Island	4/30/97	ST		100	2	0
Rock Island	5/2/97	CH	1	100	8	3
Rock Island	5/2/97	ST		100	3	1
Rock Island	5/5/97	CH	1	100	13	2
Rock Island	5/5/97	ST		100	9	5

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Rock Island	5/7/97	CH	1	100	15	7
Rock Island	5/7/97	ST		100	11	7
Rock Island	5/9/97	CH	1	100	10	6
Rock Island	5/9/97	ST		100	8	5
Rock Island	5/12/97	CH	1	100	8	9
Rock Island	5/12/97	ST		100	5	11
Rock Island	5/14/97	CH	1	100	4	26
Rock Island	5/14/97	ST		77	3	9
Rock Island	5/16/97	CH	1	100	12	4
Rock Island	5/16/97	ST		100	6	5
Rock Island	5/19/97	CH	1	100	14	23
Rock Island	5/19/97	ST		100	17	18
Rock Island	5/21/97	CH	1	100	16	29
Rock Island	5/21/97	ST		100	22	31
Rock Island	5/23/97	CH	1	100	6	3
Rock Island	5/23/97	ST		100	16	7
Rock Island	5/28/97	CH	1	100	15	43
Rock Island	5/28/97	ST		100	37	17
Rock Island	5/30/97	CH	1	100	11	63
Rock Island	5/30/97	ST		100	30	77
Rock Island	6/2/97	CH	1	100	21	34
Rock Island	6/2/97	ST		100	49	33
Rock Island	6/4/97	CH	1	100	22	45
Rock Island	6/4/97	ST		100	43	61
Rock Island	6/6/97	CH	1	100	27	60
Rock Island	6/6/97	ST		73	41	46
Rock Island	6/9/97	CH	1	100	16	42
Rock Island	6/9/97	ST		100	56	39
Rock Island	6/11/97	CH	1	100	59	49
Rock Island	6/11/97	ST		100	55	56
Rock Island	6/13/97	CH	1	98	64	63
Rock Island	6/13/97	ST		100	71	64
Rock Island	6/16/97	CH	1	43	7	2
Rock Island	6/16/97	ST		85	46	14
Rock Island	6/18/97	CH	0	2	0	1
Rock Island	6/18/97	CH	1	44	16	5
Rock Island	6/18/97	ST		100	44	23
Rock Island	6/20/97	CH	0	5	0	2
Rock Island	6/20/97	CH	1	1	0	0
Rock Island	6/20/97	ST		78	25	14
Rock Island	6/23/97	CH	0	14	0	1
Rock Island	6/23/97	CH	1	4	1	0
Rock Island	6/23/97	ST		57	27	9
Rock Island	6/25/97	CH	0	27	5	2
Rock Island	6/25/97	CH	1	3	1	0
Rock Island	6/25/97	ST		43	19	7
Rock Island	6/27/97	CH	0	50	5	2
Rock Island	6/27/97	ST		40	12	5

Results of GBT Monitoring of Juvenile Salmonids at sites on the Columbia and Lower Snake Rivers

Site	Date	Species	Age	Exams	Number Fin GBT	Number LL Occl
Rock Island	6/30/97	CH	0	99	9	3
Rock Island	6/30/97	CH	1	1	0	0
Rock Island	6/30/97	ST		37	8	3
Rock Island	7/2/97	CH	0	99	3	6
Rock Island	7/2/97	CH	1	1	0	0
Rock Island	7/2/97	ST		26	4	5
Rock Island	7/7/97	CH	0	100	0	3
Rock Island	7/7/97	ST		10	1	0
Rock Island	7/9/97	CH	0	65	2	0
Rock Island	7/9/97	CH	1	1	0	0
Rock Island	7/9/97	ST		7	0	1
Rock Island	7/11/97	CH	1	100	2	1
Rock Island	7/11/97	ST		4	0	0
Rock Island	7/14/97	CH	0	100	5	2
Rock Island	7/16/97	CH	0	100	2	5
Rock Island	7/18/97	CH	0	84	2	4
Rock Island	7/21/97	CH	0	100	4	1
Rock Island	7/23/97	CH	0	100	0	3
Rock Island	7/25/97	CH	0	78	2	0
Rock Island	7/28/97	CH	0	100	3	2
Rock Island	7/30/97	CH	0	100	2	2
Rock Island	8/1/97	CH	0	100	1	1
Rock Island	8/4/97	CH	0	100	1	0
Rock Island	8/6/97	CH	0	100	0	0
Rock Island	8/8/97	CH	0	100	1	2
Rock Island	8/11/97	CH	0	97	1	1
Rock Island	8/13/97	CH	0	76	1	0
Rock Island	8/15/97	CH	0	100	0	0
Rock Island	8/18/97	CH	0	91	3	0
Rock Island	8/20/97	CH	0	100	2	0
Rock Island	8/22/97	CH	0	97	1	6
Rock Island	8/25/97	CH	0	88	1	1
Rock Island	8/27/97	ch	0	73	3	2
Rock Island	8/29/97	ch	0	100	1	0

Appendix 5. Adult GBT sampling data.

Results of GBT Exams of Adult Salmonids at Priest Rapids Dam

	Chinook			Steelhead			Sockeye		
Date	Exams	Number GBT	Percent	Exams	Number GBT	Percent	Exams	Number GBT	Percent
7/15/97	16	3	18.8%	3	0	0.0%	181	18	9.9%
7/22/97	82	3	3.7%	11	0	0.0%	220	11	5.0%
7/24/97	49	1	2.0%	12	1	8.3%	229	1	0.4%
7/29/97	54	0	0.0%	22	0	0.0%	200	6	3.0%
8/5/97	38	1	2.6%	28	0	0.0%	73	0	0.0%
8/7/97	52	2	3.8%	45	2	4.4%	57	3	5.3%
8/12/97	79	2	2.5%	47	1	2.1%	22	0	0.0%

Results of GBT Exams of Adult Salmonids at Bonneville Dam

	Chinook			Steelhead			Sockeye		
Date	Exams	Number with GBT	Percent	Exams	Number with GBT	Percent	Exams	Number with GBT	Percent
4/23/97	100	0	0.0%	0	0		0	0	
4/30/97	89	0	0.0%	3	1	33.3%	0	0	
5/2/97	30	0	0.0%	1	0	0.0%	0	0	
5/5/97	50	0	0.0%	1	0	0.0%	0	0	
5/8/97	70	0	0.0%	6	0	0.0%	0	0	
5/12/97	50	0	0.0%	3	0	0.0%	0	0	
5/14/97	40	0	0.0%	6	1	16.7%	0	0	
5/16/97	50	0	0.0%	6	2	33.3%	0	0	
5/19/97	44	0	0.0%	13	0	0.0%	0	0	
5/22/97	45	1	2.2%	6	1	16.7%	0	0	
5/27/97	60	0	0.0%	6	1	16.7%	0	0	
6/2/97	32	0	0.0%	0	0		1	0	0.0%
6/5/97	17	0	0.0%	10	0	0.0%	1	1	100.0%
6/9/97	26	0	0.0%	0	0		4	1	25.0%
6/11/97	31	2	6.5%	11	4	36.4%	3	3	100.0%
6/13/97	10	0	0.0%	8	4	50.0%	13	10	76.9%
6/16/97	17	0	0.0%	16	1	6.3%	40	25	62.5%
6/19/97	18	0	0.0%	12	2	16.7%	41	34	82.9%
6/23/97	7	0	0.0%	16	2	12.5%	60	15	25.0%
6/25/97	28	1	3.6%	28	4	14.3%	65	9	13.8%
6/27/97	20	1	5.0%	0	0		60	3	5.0%
6/30/97	23	0	0.0%	40	0	0.0%	75	0	0.0%
7/3/97	26	0	0.0%	42	1	2.4%	75	0	0.0%
7/7/97	40	0	0.0%	0	0		60	0	0.0%
7/9/97	24	0	0.0%	54	0	0.0%	30	0	0.0%
7/11/97	35	0	0.0%	0	0		60	0	0.0%
7/14/97	30	0	0.0%	0	0		30	0	0.0%
7/16/97	30	0	0.0%	48	0	0.0%	30	0	0.0%

Results of GBT Exams of Adult Chinook Salmon at Lower Granite Dam

Date	Exams	Number with GBT	Percent
4/11/97	1	0	0.0%
4/19/97	1	0	0.0%
4/20/97	1	0	0.0%
4/23/97	1	0	0.0%
4/24/97	3	0	0.0%
4/26/97	1	0	0.0%
4/27/97	1	0	0.0%
4/28/97	4	0	0.0%
4/29/97	6	0	0.0%
4/30/97	21	0	0.0%
5/1/97	19	0	0.0%
5/2/97	17	0	0.0%
5/3/97	49	0	0.0%
5/4/97	41	0	0.0%
5/5/97	80	0	0.0%
5/6/97	80	0	0.0%
5/7/97	166	0	0.0%
5/8/97	302	0	0.0%
5/9/97	325	0	0.0%
5/10/97	227	0	0.0%
5/11/97	139	0	0.0%
5/12/97	186	0	0.0%
5/13/97	364	0	0.0%
5/14/97	59	0	0.0%
5/15/97	20	0	0.0%
5/16/97	32	0	0.0%
5/20/97	8	0	0.0%
5/21/97	13	0	0.0%
5/22/97	47	0	0.0%
5/23/97	35	0	0.0%
5/24/97	24	0	0.0%
5/25/97	66	0	0.0%
5/26/97	45	0	0.0%
5/27/97	38	0	0.0%
5/28/97	50	0	0.0%
5/29/97	58	0	0.0%
5/30/97	35	0	0.0%
5/31/97	53	0	0.0%
6/1/97	50	0	0.0%
6/2/97	27	0	0.0%
6/3/97	21	0	0.0%

6/4/97	38	0	0.0%
6/5/97	20	0	0.0%
6/6/97	18	0	0.0%
6/7/97	26	0	0.0%
6/8/97	11	0	0.0%
6/9/97	36	0	0.0%
6/10/97	19	0	0.0%
6/11/97	10	0	0.0%
6/12/97	26	0	0.0%
6/13/97	34	0	0.0%
6/14/97	10	0	0.0%
6/15/97	15	0	0.0%
6/16/97	24	0	0.0%
6/17/97	6	0	0.0%
6/18/97	184	0	0.0%
6/19/97	154	0	0.0%
6/20/97	164	0	0.0%
6/21/97	298	0	0.0%
6/22/97	89	1	1.1%
6/23/97	273	0	0.0%
6/24/97	187	0	0.0%
6/25/97	184	0	0.0%
6/26/97	113	0	0.0%
6/27/97	125	0	0.0%
6/28/97	149	1	0.7%
6/29/97	141	1	0.7%
6/30/97	109	0	0.0%
7/1/97	122	0	0.0%
7/2/97	87	0	0.0%
7/3/97	119	0	0.0%
7/4/97	76	0	0.0%
7/5/97	88	1	1.1%
7/6/97	71	1	1.4%
7/7/97	80	0	0.0%
7/8/97	63	0	0.0%
7/9/97	59	0	0.0%
7/10/97	70	0	0.0%
7/11/97	37	0	0.0%
7/12/97	28	0	0.0%
7/13/97	22	0	0.0%
7/14/97	13	0	0.0%
7/15/97	15	0	0.0%
7/16/97	26	0	0.0%
7/17/97	16	0	0.0%
7/18/97	20	0	0.0%
7/19/97	22	0	0.0%
7/20/97	12	0	0.0%
7/21/97	7	0	0.0%
7/22/97	11	0	0.0%

7/23/97	4	0	0.0%
7/24/97	8	0	0.0%
7/25/97	4	0	0.0%
7/26/97	10	0	0.0%
7/27/97	9	0	0.0%
7/28/97	3	0	0.0%
7/29/97	5	0	0.0%
7/30/97	6	0	0.0%
7/31/97	1	0	0.0%
8/1/97	3	0	0.0%
8/2/97	4	0	0.0%
8/3/97	7	0	0.0%
8/4/97	4	0	0.0%
8/5/97	1	0	0.0%

BEFORE THE OREGON ENVIRONMENTAL QUALITY COMMISSION

Oregon Trout, Inc.; National Wildlife Federation; Northwest Environmental Advocates; Petitioners.	Withdrawal of Petition for Rulemaking

On December 15, 1997, pursuant to OAR 340-11-046 and OAR 137-01-070, Oregon Trout, Inc., National Wildlife Federation, and Northwest Environmental Advocates ("Petitioners") submitted a petition for rulemaking, asking the Oregon Environmental Quality Commission to initiate rulemaking to promulgate a rule or amend an existing rule to designate ten waterbodies in Oregon as "Outstanding Resource Waters" ("ORWs") under the state anti-degradation policy, OAR 340-41-026. At this time, the Commission has not acted to deny the petition or to initiate rulemaking. OAR 137-01-070(2)(c). Petitioners hereby notify the Commission and the Department of Environmental Quality that they withdraw the petition.

Date: January 9, 1998.

Respectfully submitted,

Peter M.K. Frost

for Petitioners Oregon Trout, Inc.; National Wildlife Federation, Northwest Environmental Advocates

State of Oregon
Department of Environmental Quality **Memorandum**

Date: December 29, 1997

To: Environmental Quality Commission

From: Langdon Marsh, Director

Subject: Agenda Item E, EQC Meeting January 9, 1998

Statement of Purpose
Geoff Pampush of Oregon Trout, Peter Frost of National Wildlife Federation, and Nina Bell of Northwest Environmental Advocates filed a Petition for Rulemaking on December 15, 1997, under OAR 340-11-046 and OAR 137-01-070 (circulated to EQC members, available for review at DEQ). This petition requests the Environmental Quality Commission to designate ten waterbodies as "Outstanding Resource Waters" under the state anti-degradation policy, OAR-340-41-026. The petition includes proposed language for the rule adoption. By Oregon law, the Environmental Quality Commission has 30 days to either initiate the rulemaking process or to deny it. This staff report supplies some background on the Outstanding Resource Water designation, and a recommendation to the Commission concerning the proposed rule.

Authority of the Commission with Respect to the Issue
The Commission has authority to adopt or deny the rule presented in this petition for rulemaking under OAR 340-11-046 and 137-01-070 (Attachment A), which allow an interested person to petition the agency to adopt, amend or repeal a rule. This particular petition requests the Commission to designate ten waterbodies as Outstanding Resource Waters, and the Commission is given the authority to do so under OAR 340-41-026. A copy of the Antidegradation Rule (340-41-026) is attached herein (Attachment B)

Summary of Public Input Opportunity
There has not been public review or comment on the proposed rule. If rulemaking were initiated, the usual opportunities for public review and comment would ensue.

Background
The state's antidegradation policy was adopted in September of 1991 (OAR-340-41-026, Attachment B). This rule, based on provisions for outstanding resource waters described in the federal Clean Water Act, includes a provision for designation of Outstanding Resource Waters (ORW). These are waters designated as *"extraordinary resource waters or as critical habitat"*, and are so designated in order to *"protect the water quality values that affect ecological integrity of critical habitat or special water quality values that are vital to the unique character of those waterbodies."* When designating ORW, the rule further directs the EQC to *"provide a process for determining what activities are allowed that would not affect the outstanding resource values,"*

In 1992, the Department requested nominations for ORW status from agencies that manage water bodies. No nominations were made, so the Department proceeded to scrutinize nine internally proposed waterbodies for Outstanding Resource Designation. The Policy Advisory Committee (PAC) reviewed the nominations. At that time, in lieu of sending nominations forward to the Environmental Quality Commission, the PAC advised the Department to work with the Policy Advisory Committee to develop a process for Outstanding Resource Water Designation. The resulting process was outlined in an internal Issue Paper (Attachment C, Outstanding Resource Waters Implementation Plan), completed in June 1995. At this time the PAC also indicated that two of the proposed waterbodies be nominated during the next triennial review. The two recommendations were Crater Lake for its aesthetic value and clear water, and Waldo Lake for the ultra-oligotrophic state, water clarity and color. The

PAC found the remaining seven sites, considered at that time, to have insufficient data available to recommend ORW status. Budget limitations prevented the Agency from bringing the two proposed sites forward for nomination during the 1994-1996 triennial review. However, the Agency does intend to review proposals for ORW during the upcoming triennial review.

The policy developed by the PAC for proceeding with ORW nominations (Attachment C) is summarized briefly here. Nominations for ORW would be considered during the triennial review process. During a six month period, solicitations for proposed sites would be made for sites to be proposed by other agencies and citizens. After receipt of proposals, the Department would spend an additional 6 months evaluating the characteristics of the proposed sites for nomination as Outstanding Resource Waters. In addition to determining whether the proposed resource was truly outstanding, this evaluation would include a determination of what kind and level of protection the resource needs, what policy implications would be created by designating that site as an ORW, and what risks the outstanding values face. This information would be used to prioritize the proposed sites for nomination. The availability of staff resources would then determine how many sites would be recommended for nomination. The Department would carry the proposed sites to the EQC for nomination. Rule making activities including public evaluation and staff review would follow for those sites nominated by the Commission. This extended review would include initiation of a management process including review of ORW boundaries, collection of baseline data needed to develop a protection strategy, and initiation of Memoranda of Agreement with appropriate agencies, in addition to incorporation of public comments. The EQC would then consider the refined nominations for designation as ORW sites. Final drafts of management Plans intended for protection of the Outstanding Resource Water would be completed and approved by the Commission within two years following ORW designation.

Table 1. Schedule proposed by Policy Advisory Committee, with '98-'00 review period.

Activity	**Time in Months**	**Proposed '98-'01 Schedule**
Develop Screening Criteria (a one-time step)	3	January-March '98
Proposals Accepted for Evaluation (from all sources)	6	April-September, '98
Evaluation Against Criteria (includes prioritization of sites)	6	October '98-March '99
EQC Nomination (from list of qualified sites)	2	April-May '99
Extensive Public Review & Management Plan development	18	June 1999-November 2000
EQC Designation	4	December 2000- March '01
Management Plan Approval by EQC	up to 24	March '03

Although this internal nomination process has been described, the Department has not yet identified specific criteria to define the term "outstanding." Given the many high quality waters of the state, screening criteria are necessary to provide guidance for identification of outstanding resource quality. Prompted by the upcoming triennial review, the recent Memoranda of Agreement with the National Marine Fisheries Service to consider salmonid core areas as ORWs, and recent budget changes to allow Department staffing, the Department is currently working on these criteria. They will be available by April, 1998, so they can be circulated with a public request for proposed ORW sites, as the first step for ORW nominations in the 1998 triennial review.

Despite the allowance for an Outstanding Resource Water designation in the federal Clean Water Act of 1975, and the adoption of the state rule in 1991, no Oregon Waters currently have ORW designation. While various

activities to nominate water bodies and to develop policy for this status have taken place since 1991, additional policy analysis regarding the implications of ORW designation is still necessary. Based on current knowledge, few other states have adopted state rules regarding ORW, nor have they designated water bodies as ORW, so there is little precedent for this designation. Despite the work on this designation to date, several policy questions remain, for example, how future ORW designation would affect existing point source permits.

Alternatives and Evaluation

The petition has identified ten sites for immediate designation as Outstanding Resource Waters, for outstanding resource values including fish habitat, aquatic diversity, and drinking water (Table 2). The petition has requested rulemaking by the EQC; thus the Commission must provide a written decision within 30 days, to either accept the rule and forward the rule to the Secretary of State and proceed with public notice, or to deny adoption of the rule. However, in denying the rule as written the Commission may also direct the Department to further work on the issue.

The state ORW rule (OAR 340-41-026) specifies two things be included in a rule designating sites as Outstanding Resource Waters. The rule specifically directs the Commission to "*establish the water quality values to be protected and provide a process for determining what activities are allowed that would not affect the outstanding resource values*" (OAR 340-41-026). The petition under consideration includes only identification of the waterbodies for ORW; it does not identify the outstanding values, nor does it provide direction regarding allowed activities or specific values to protect.

The proposed rule also presents some technical difficulties. The petitioners identify salmonid and fish habitat as an outstanding resource in each of the ten proposed sites in the attached petition. Several water quality variables are identified as important to fish habitat, including temperature and pH. Temperature and pH are critical to fish habitat, however, four of the ten waterbodies proposed include segments that have been identified as Water Quality Impaired due to temperature, and are included on the list of quality-limited waters required by section 303(d) of the federal Clean Water Act (Donner und Blitzen, North Fork of the John Day, Elk River, and Steamboat Creek). One of the river sections is also listed as water quality impaired for pH (Steamboat Creek). An additional two waterbodies included in the petition are not currently on the 303(d) list, but temperature data collected during the summer of 1997 by the Department along with recently acquired data from the National Resources Conservation Service, indicate that violations of the temperature standard also occur in some segments of these sites (Kilchis River and the North Fork of the Trask River). These sites currently support fish populations, and are considered important fish habitat by other natural resource agencies (Table 2). Due to this technical issue, the Department proposes to work with the petitioners and the relevant agencies to examine the options for ORW designation. These waters may indeed have other outstanding qualities, and therefore should be evaluated by the Department as part of the triennial review.

Given the above outlined limitations of the proposed rule, and the current schedule and progress by the Department toward ORW nominations, the Department recommends that the sites identified in the petition be evaluated for ORW nomination with other proposed sites, according to the schedule proposed above. Those sites that meet the Department criteria for ORW will be presented to the EQC for nomination as ORW, and if nominated, for subsequent rulemaking activity. Rulemaking would include an extended period of public review and comment, as well as an opportunity to quantitatively specify the water quality parameters to be protected, and to initiate management plans to implement the identified protection level.

Conclusions

The current petition has some limitations that result in the Department recommendation to deny the petition for rulemaking. The proposed rule language identifies only the river segments that should be designated; it does not identify either the outstanding value, or the proposed implementation policy to protect the proposed values. Six of

Table 2. The sites proposed for ORW status, the outstanding values identified in the petition supporting material, DEQ 303(d) status, and other special status that may protect sites, or provide supporting information for outstanding value.

Nominated Water Body	Outstanding Quality	Water Quality	303(d) status	Special Status
Donner und Blitzen	fish & wildlife	DO Temperature Turbidity pH	Temperature, South Fork, mouth to HW	National wild & scenic river BLM revising management plan
North Fork John Day	salmonids; aquatic diversity; reference site	DO Temperature Turbidity pH	Temperature in summer, mouth to Wilderness boundary	large % in John Day Wilderness portion is federal wild & scenic river USFS preparing watershed analysis
Little North Santiam	drinking water source; aquatic diversity; salmonids	DO turbidity temperature turbidity pH	no 303d listing	Under Three Basin rule Tier 1 key watershed FEMAT
Upper North Santiam	drinking water; rainbow & cutthroat; aquatic diversity	DO Temperature Turbidity pH	no 303d listing	Under Three Basin Rule Tier 2 Key Watershed FEMAT
Waldo Lake	fish (bull trout; cutthroat; rainbow; brook), tailed frog; bald eagle; recreational use	DO temperature turbidity pH	no 303d listing	previously ORW nominated for clarity; direction from Policy Committee to nominate with next ORW nominations State Scenic Waterway
Elk River	coho, fall chinook & winter steelhead	DO Temperature turbidity pH	Temperature, mouth to N/S Fork; N fork OK Habitat modification; mouth to Anvil Cr	national wild & scenic river state scenic waterway Tier 1 key watershed FEMAT OCSRI core area for fall chinook & winter steelhead

Nominated Water Body	Outstanding Quality	Water Quality	303 d status	Special Status
Steamboat Creek	salmonids; salamander; tailed frog; fishing	DO Temperature turbidity pH	Temperature & pH in summer, mouth to Headwaters	Tier 1 key watershed watershed analysis underway by USFS and BLM under study for Wild & Scenic River High priority basin for salmon Umpqua Cutthroat trout, a federal endangered species OCSRI critical coho habitat
Kilchis River	salmonid habitat & core area	DO Temperature Turbidity pH	candidate for 303d '98 for Temperature North Fork Kilchis; Coal Cr	Tier 1 key watershed CZMA jurisdiction Priority OCSRI basin; critical coho & steelhead habitat essential chum habitat Little South Fork is an ODFW recovery watershed watershed analysis underway
North Fork Trask River	salmonids, tailed frog, drinking water source	DO Temperature Turbidity pH	North Fork candidate for 303d in '98 for Temperature	Tier 1 key BLM FEMAT watershed Proposed Wild & Scenic River Washington Co. & state scenic corridor CZMA Priority basin under OCSRI OSCRI critical coho habitat
Salmonberry River	Salmonids; tailed frog; salamander	DO Temperature Turbidity pH	no 303d listing	CZMA North Coast Ag SB1010 Plan OCSRI critical coho & steelhead ODFW fish Management Plan Nehalem Basin Management Plan

the sites included on the list have fish habitat identified as an outstanding value in the supporting material, but also experience temperatures that exceed our water quality standards. Four are currently on the 303(d) list, and two will be added this year. This creates a conflict between outstanding resource value intended for high quality water, and concurrent status as a water-quality limited body for the identified outstanding value.

Due to the limitations of the proposed rulemaking language, and the legal question posed by concurrent status as an ORW and water quality limitation, the Department proposes to review these sites as potential nominations. Staff is currently developing criteria for screening ORW proposals, and recommends that the sites listed in this nomination be compared to these criteria, once the criteria are developed. Sites found to be both appropriate candidates for ORW status and of sufficient priority will be presented to the Commission for future nomination and the subsequent rulemaking process. Before returning to the Commission for ORW designation, staff would identify both the outstanding values and implementation strategies for protecting these sites, and have initiated the creation of management plans with landowners. In addition, the Department would have time to address the legal questions posed by the conflicting ORW and water quality limited status, as well as other potential conflicts.

Intended Future Actions

The Department intends to develop screening criteria to evaluate waters of the state for outstanding resource status, during January, February and March of 1998, and to then initiate a six month process to invite the public to propose sites for Outstanding Resource Water status. Staff would then have a six month period available to evaluate the proposed nominations, and would present the Commission with qualifying nominations. Should the Commission approve nominated waterbodies, staff would then proceed with rulemaking activities for those waterbodies.

Department Recommendation

The Department recommends that the Commission deny the petition for designation of the ten waters nominated for Outstanding Resource Waters based on the limitations of the proposed rulemaking language; any decision made by the Commission regarding this petition must be submitted to the petitioners with in 30 days. The Department also proposes to work with the petitioners to modify the petition for the ten sites so they may be considered and prioritized along with other sites proposed during the triennial review process.

Attachments

A. Petition to Promulgate, Amend or Repeal Rule, OAR 137-01-070
B. Antidegradation Rule, OAR-340-41-026
C. Issue Paper on Outstanding Resource Waters Implementation Plan, June 1995

References

Petition filed by Oregon Trout, National Wildlife Federation and Northwest Environmental Advocates, available for review at DEQ, 811 SW 6th Ave, Portland. Copies also available from Peter Frost, National Wildlife Federation, 2031 S. E. Belmont Street, Portland, OR 97214

Approved:

Section:

Division:

Report Prepared By: Avis Newell
Phone: (503)229-6018
Date Prepared: December 29, 1997

Attachment A: Oregon Administrative Rule 137-01-070, Petition to Promulgate, Amend or Appeal Rule

oral submissions received at the hearing, and the presiding officer's recommendation, if any.

(3) The rulemaking record shall be maintained by the rules coordinator. The agency shall make the rulemaking record available to members of the public upon request.

Stat. Authority: ORS 183.341
Stat. Implemented: ORS 183.330(2) 183.335(3)

Agency Rulemaking Action

137-01-050 At the conclusion of the hearing, or after receipt of the presiding officer's requested report and recommendation, if any, the agency may adopt, amend, or repeal rules covered by the notice of intended action. The agency shall fully consider all written and oral submissions.

Stat. Authority: ORS 183.341
Stat. Implemented: ORS 183.335(3)

Secretary of State Rule Filing

137-01-060 (1) The agency shall file in the office of the Secretary of State a certified copy of each rule adopted, including rules that amend or repeal any rule.

(2) The rule shall be effective upon filing with the Secretary of State unless a different effective date is required by statute or a later effective date is specified in the rule.

Stat. Authority: ORS 183.341
Stat. Implemented: ORS 183.355

Note: Rule 137-01-070 was adopted by the Attorney General as required by ORS 183.390. Agencies must apply this rule without further adoption or amendment.

Petition to Promulgate, Amend, or Repeal Rule

137-01-070 (1) An interested person may petition an agency to adopt, amend, or repeal a rule. The petition shall state the name and address of the petitioner and any other person known to the petitioner to be

interested in the rule. The petition shall be legible, signed by or on behalf of the petitioner, and shall contain a detailed statement of:

(a) The rule petitioner requests the agency to adopt, amend, or repeal. When a new rule is proposed, the petition shall set forth the proposed language in full. When an amendment of an existing rule is proposed, the rule shall be set forth in the petition in full with matter proposed to be deleted enclosed in brackets and proposed additions shown by boldface;

(b) Facts or arguments in sufficient detail to show the reasons for and effects of adoption, amendment, or repeal of the rule;

(c) All propositions of law to be asserted by petitioner.

(2) The agency:

(a) May provide a copy of the petition, together with a copy of the applicable rules of practice, to all persons named in the petition;

(b) May schedule oral presentations;

(c) Shall, in writing, within 30 days after receipt of the petition, either deny the petition or initiate rulemaking proceedings.

Stat. Authority: ORS 183.390
Stat. Implemented: ORS 183.390

Temporary Rulemaking Requirements (as amended effective 1/1/96)

137-01-080 (1) If no notice has been provided before adoption of a temporary rule, the agency shall give notice of its temporary rulemaking to persons, entities, and media specified under ORS 183.335(1) by mailing or personally delivering to each of them a copy of the rule or rules as adopted and a copy of the statements required under ORS 183.335(5). If a temporary rule or rules are over ten pages in length, the agency may provide a summary and state how and where a copy of the rule or rules may be obtained. Failure to give this notice shall not affect the validity of any rule.

(2) The agency shall file with the Secretary of State a certified copy of the temporary rule and a copy of the statement required by ORS 183.335(5).

F. PETITION FOR RULEMAKING

An interested person may petition an agency to adopt, amend or repeal any rule in accordance with the Attorney General's Uniform Rule. ORS 183.390. As required by statute, the Attorney General has adopted a Uniform Rule for submission, consideration and disposition of these petitions. Uniform Rule 137-01-070. Agencies cannot exercise independent rulemaking authority on this subject. Uniform Rule 137-01-070 requires an interested person to submit the actual language of the proposed rule in full. The Uniform Rule further requires a petitioner to explain the general effect of the rule, not just the effect on the petitioner. See p. A-10 for a sample petition to amend.

Within 30 days of the submission of a petition to adopt, amend or repeal a rule, the agency must either deny the petition in writing or initiate rulemaking. ORS 183.390. If the agency is already reviewing the rule or subject matter addressed by the rulemaking petition, it may grant the petition and begin rulemaking. If the agency decides not to adopt the rule exactly as proposed by the petitioner, it may nevertheless grant the petition and begin rulemaking. The rule as proposed can be amended during the course of the rulemaking. Alternatively, the agency may deny the request and inform the petitioner that the subject raised in the rulemaking petition is under consideration.

The uniform rule gives the agency discretion to schedule oral presentations. It does not require an agency denying a petition to set forth its reasons. The governing statute provides only that the denial must be "in writing." ORS 183.390.

G. PERIODIC RULE REVIEW

An agency must review all its rules at least once every three years. Model Rule 137-01-085 governs periodic rule review. The Model Rule clarifies that this review includes rules previously reviewed as well as rules promulgated since the last review. Although ORS 183.545 specifies only that the review must include an analysis of each rule's effect on business, the factors for review listed in ORS 183.550(2) make it clear that a fundamental inquiry into all aspects of a rule's effect is required.

Attachment B: Oregon Administrative Rule 340-41-026, Antidegradataion Rule

(57) "Ecologically Significant Cold-Water Refuge" exists when all or a portion of a waterbody supports stenotypic cold-water species (flora or fauna) not otherwise widely supported within the subbasin, and either:

(a) Maintains cold-water temperatures throughout the year relative to other segments in the subbasin, providing summertime cold-water holding or rearing habitat that is limited in supply, or;

(b) Supplies cold water to a receiving stream or downstream reach that supports cold-water biota.

Stat. Auth: ORS 183.500, 468.020, 468.705, 468.710 & 468.735 ORS 468B.048
Stat. Implemented: ORS 468B.048
Hist.: DEQ 128. f. & ef. 1-21-77; DEQ 24-1981, f. & ef. 9-8-81;
DEQ 16-1988, f. & cert. ef. 7-12-88; DEQ 16-1989, f. & cert. ef. 7-31-89 (and corrected 8-3-89); DEQ 30-1989, f. & cert. ef. 12-14-89; DEQ 22-1990, f. & cert. ef. 7-6-90; DEQ 14-1991, f. & cert. ef. 8-13-91; DEQ 17-1991, f. & cert. ef. 9-30-91

Highest and Best Practicable Treatment and Control Required

340-41-010 [SA 26, f. 6-1-67; Repealed by DEQ 128, f. & ef. 1-21-77]

Restriction on the Discharge of Sewage and Industrial Wastes and Human Activities Which Affect Water Quality in the Waters of the State

340-41-015 [SA 26, f. 6-1-67; Repealed by DEQ 128, f. & ef. 1-21-77]

Maintenance of Standards of Quality

340-41-020 [SA 26, f. 6-1-67; DEQ 28, f. 5-24-71, ef. 6-25-71; Repealed by DEQ 128, f. & ef. 1-21-77]

Implementation of Treatment Requirements and Water Quality Standards

340-41-022 [DEQ 28, f. 5-24-71, ef. 6-25-71; DEQ 46, f. 6-15-72, ef. 7-1-72; Repealed by DEQ 128, f. & ef. 1-21-77]

Mixing Zones

340-41-023 [DEQ 55, f. 7-2-73, ef. 7-15-73; Repealed by DEQ 128, f. & ef. 1-21-77]

Testing Methods

340-41-024 [DEQ 55, f. 7-2-73, ef. 7-15-73; Repealed by DEQ 128, f. & ef. 1-21-77]

General Water Quality Standards

340-41-025 [SA 26, f. 6-1-67; DEQ 39, f. 4-5-72, ef. 4-15-72; DEQ 55, f. 7-2-73, ef. 7-15-73; Repealed by DEQ 128, f. & ef. 1-21-77]

Policies and Guidelines Generally Applicable to All Basins

340-41-026 (1) In order to maintain the quality of waters in the State of Oregon, the following is the general policy of the EQC:

(a) Antidegradation Policy for Surface Waters. The purpose of the Antidegradation Policy is to guide decisions that affect water quality such that unnecessary degradation from point and nonpoint sources of pollution is prevented, and to protect, maintain, and enhance existing

surface water quality to protect all existing beneficial uses. The standards and policies set forth in OAR 340-41-120 through 340-41-962 are intended to implement the Antidegradation Policy;

(A) High Quality Waters Policy: Where existing water quality meets or exceeds those levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, and other designated beneficial uses, that level of water quality shall be maintained and protected. The Environmental Quality Commission, after full satisfaction of the intergovernmental coordination and public participation provisions of the continuing planning process, and with full consideration of sections (2), (3) and (5) of this rule, however, may allow a lowering of water quality in these high quality waters if they find:

(i) No other reasonable alternatives exist except to lower water quality; and

(ii) The action is necessary and justifiable for economic or social development benefits and outweighs the environmental costs of lowered water quality; and

(iii) All water quality standards will be met and beneficial uses protected.

(B) The Director or a designee may allow lower water quality on a short term basis in order to respond to emergencies or to otherwise protect public health and welfare;

(C) Water Quality Limited Waters Policy: For water quality limited waterbodies, the water quality shall be managed as described in section (3) of this rule;

(D) Outstanding Resource Waters Policy: Where existing high quality waters constitute an outstanding state or national resource such as those waters designated as extraordinary resource waters, or as critical habitat areas, the existing water quality and water quality values shall be maintained and protected, and classified as "Outstanding Resource Waters of Oregon". The Commission may specially designate high quality waterbodies to be classified as Outstanding Resource Waters in order to protect the water quality parameters that affect ecological integrity of critical habitat or special water quality values that are vital to the unique character of those waterbodies. The Department will develop a screening process and establish a list of nominated waterbodies for Outstanding Resource Waters designation in the Bienniel Water Quality Status Assessment Report (305(b) Report). The priority waterbodies for nomination include:

(i) National Parks;

(ii) National Wild and Scenic Rivers;

(iii) National Wildlife Refuges;

(iv) State Parks; and

(v) State Scenic Waterways.

(E) The Department will bring to the Commission a list of waterbodies which are proposed for designation as Outstanding Resource Waters at the time of each Trienniel Water Quality Standards Review;

(F) In designating Outstanding Resource Waters, the Commission shall establish the water quality values to be protected and provide a process for determining what activities are allowed that would not affect the outstanding resource values. After the designation, the Commission shall not allow activities that may lower water quality below the level established except on a short term basis to respond to emergencies or to otherwise protect human health and welfare.

(b) Point source discharges shall follow policies and guidelines in sections (2), (5) and (6) of this rule, and nonpoint source activities shall follow guidelines in sections (7), (8), (9), (10), and (11) of this rule.

(2) In order to maintain the quality of waters in the State of Oregon, it is the general policy of the EQC to require that growth and development be accommodated by increased

efficiency and effectiveness of waste treatment and control such that measurable future discharged waste loads from existing sources do not exceed presently allowed discharged loads except as provided in section (3) of this rule.

(3) The Commission or Department may grant exceptions to sections (2) and (6) of this rule and approvals to section (5) of this rule for major dischargers and other dischargers, respectively. Major dischargers include those industrial and domestic sources that are classified as major sources for permit fee purposes in OAR 340-45-075(2).

(a) In allowing new or increased discharged loads, the Commission or Department shall make the following findings:

(A) The new or increased discharged load would not cause water quality standards to be violated;

(B) The new or increased discharged load would not unacceptably threaten or impair any recognized beneficial uses. In making this determination, the Commission or Department may rely upon the presumption that if the numeric criteria established to protect specific uses are met the beneficial uses they were designed to protect are protected. In making this determination the Commission or Department may also evaluate other state and federal agency data that would provide information on potential impacts to beneficial uses for which the numeric criteria have not been set;

(C) The new or increased discharged load shall not be granted if the receiving stream is classified as being water quality limited under OAR 340-41-006(30)(a), unless:

(i) The pollutant parameters associated with the proposed discharge are unrelated either directly or indirectly to the parameter(s) causing the receiving stream to violate water quality standards and being designated water quality limited; or

(ii) Total maximum daily loads (TMDLs), waste load allocations (WLAs) load allocations (LAs), and the reserve capacity have been established for the water quality limited receiving stream; and compliance plans under which enforcement action can be taken have been established; and there will be sufficient reserve capacity to assimilate the increased load under the established TMDL at the time of discharge; or

(iii) Effective July 1, 1996, in waterbodies designated water-quality limited for dissolved oxygen, when establishing WLAs under a TMDL for waterbodies meeting the conditions defined in this rule, the Department may at its discretion provide an allowance for WLAs calculated to result in no measurable reduction of dissolved oxygen. For this purpose, "no measurable reduction" is defined as no more than 0.10 mg/L for a single source and no more than 0.20 mg/L for all anthropogenic activities that influence the water quality limited segment. The allowance applies for surface water DO criteria and for Intergravel DO if a determination is made that the conditions are natural. The allowance for WLAs would apply only to surface water 30-day and seven-day means, and the IGDO action level; or

(iv) Under extraordinary circumstances to solve an existing, immediate, and critical environmental problem that the Commission or Department may consider a waste load increase for an existing source on a receiving stream designated water quality limited under OAR 340-41-006(30)(a) during the period between the establishment of TMDLs, WLAs and LAs and their achievement based on the following conditions:

(I) That TMDLs, WLAs and LAs have been set; and

(II) That a compliance plan under which enforcement actions can be taken has been established and is being implemented on schedule; and

(III) That an evaluation of the requested increased load shows that this increment of load

will not have an unacceptable temporary or permanent adverse effect on beneficial uses; and

(IV) That any waste load increase granted under subparagraph (iv) of this paragraph is temporary and does not extend beyond the TMDL compliance deadline established for the waterbody. If this action will result in a permanent load increase, the action has to comply with subparagraphs (i) or (ii) of this paragraph.

(D) Effective July 1, 1996, in any waterbody identified by the Department as exceeding the relevant numeric temperature criteria specified for each individual water quality management basin identified in OAR 340-41-205, OAR-340-41-245, OAR-340-41-285, OAR-340-41-325, OAR-340-41-365, OAR-340-41-445, OAR-340-41-485, OAR-340-41-525, OAR-340-41-565, OAR-340-41-605, OAR-340-41-645, OAR-340-41-685, OAR-340-41-725, OAR-340-41-765, OAR-340-41-805, OAR-340-41-845, OAR-340-41-885, OAR-340-41-925, OAR-340-41-965, and designated as water quality limited under Section 303(d) of the Clean Water Act, the following requirements shall apply to appropriate watersheds or stream segments in accordance with priorities established by the Department. The Department may determine that a plan is not necessary for a particular stream segment or segments within a water-quality limited basin based on the contribution of the segment(s) to the temperature problem:

(i) Anthropogenic sources are required to develop and implement a surface water temperature management plan which describes the best management practices, measures, and/or control technologies which will be used to reverse the warming trend of the basin, watershed, or stream segment identified as water quality limited for temperature;

(ii) Sources shall continue to maintain and improve, if necessary, the surface water temperature management plan in order to maintain the cooling trend until the numeric criterion is achieved or until the Department, in consultation with the Designated Management Agencies (DMAs), has determined that all feasible steps have been taken to meet the criterion and that the designated beneficial uses are not being adversely impacted. In this latter situation, the temperature achieved after all feasible steps have been taken will be the temperature criterion for the surface waters covered by the applicable management plan. The determination that all feasible steps have been taken will be based on, but not limited to, a site-specific balance of the following criteria: protection of beneficial uses; appropriateness to local conditions; use of best treatment technologies or management practices or measures; and cost of compliance;

(iii) Once the numeric criterion is achieved or the Department has determined that all feasible steps have been taken, sources shall continue to implement the practices or measures described in the surface water temperature management plan in order to continually achieve the temperature criterion;

(iv) For point sources, the surface water temperature management plan will be part of their National Pollutant Discharge Elimination System Permit (NPDES);

(v) For nonpoint sources, the surface water temperature management plan will be developed by designated management agencies (DMAs) which will identify the appropriate BMPs or measures;

(vi) A source (including but not limited to permitted point sources, individual landowners and land managers) in compliance with the Department or DMA (as appropriate) approved surface water temperature management plan shall not be deemed to be causing or contributing to a violation of the numeric criterion if the surface water temperature exceeds the criterion;

(vii) In waters the Department determines to be critical for bull trout recovery, the goal of a bull trout surface water temperature management plan is to specifically protect those habitat ranges necessary to maintain the viability of existing stocks by restoring stream and riparian

conditions or allowing them to revert to conditions attaining the coolest surface water temperatures possible under natural background conditions;

(E) Waters of the state exceeding the temperature criteria will be identified in the Clean Water Act (CWA), Section 303(d) list developed by the Department according to the schedule required by the Clean Water Act. This list will be prioritized in consultation with the DMAs to identify the order in which those waters will be addressed by the Department and the DMAs;

(F) In basins determined by the Department to be exceeding the numeric temperature criteria, and which are required to develop surface water temperature management plans, new or increased discharge loads from point sources which require an NPDES permit under Section 402 of the Clean Water Act or hydro-power projects which require certification under Section 401 of the Clean Water Act are allowed a 1.0°F total cumulative increase in surface water temperatures as the surface water temperature management plan is being developed and implemented for the water quality limited basin if:

(i) In the best professional judgment of the Department, the new or increased discharge load, even with the resulting 1.0°F cumulative increase, will not conflict with or impair the ability of a surface water temperature management plan to achieve the numeric temperature criteria; and

(ii) A new or expanding source must demonstrate that it fits within the 1.0°F increase and that its activities will not result in a measurable impact on beneficial uses. This latter showing must be made by demonstrating to the Department that the temperature change due to its activities will be less than or equal to 0.25°F under a conservative approach or by demonstrating the same to the EQC with appropriate modeling.

(G) Any source may petition the Department for an exception to paragraph (F) of this subsection, provided:

(i) The discharge will result in less than 1.0°F increase at the edge of the mixing zone, and subparagraph (ii) or (iii) of this paragraph applies;

(ii) The source provides the necessary scientific information to describe how the designated beneficial uses would not be adversely impacted; or

(iii) The source demonstrates that:

(I) It is implementing all reasonable management practices;

(II) Its activity will not significantly affect the beneficial uses; and

(III) The environmental cost of treating the parameter to the level necessary to assure full protection would outweigh the risk to the resource.

(H) Any source or DMA may petition the Commission for an exception to paragraph (F) of this subsection, provided:

(i) The source or DMA provides the necessary scientific information to describe how the designated beneficial uses would not be adversely impacted; or

(ii) The source or DMA demonstrates that:

(I) It is implementing all reasonable management practices;

(II) Its activity will not significantly affect the beneficial uses; and

(III) The environmental cost of treating the parameter to the level necessary to assure full protection would outweigh the risk to the resource.

(I) In waterbodies designated by the Department as water-quality limited for bacteria, and in accordance with priorities established by the Department, development and implementation of a bacteria management plan shall be required of those sources that the Department determines to be contributing to the problem. The Department may determine that a plan is not necessary for a

particular stream segment or segments within a water-quality limited basin based on the contribution of the segment(s) to the problem. The bacteria management plans will identify the technologies, BMPs and/or measures and approaches to be implemented by point and nonpoint sources to limit bacterial contamination. For point sources, their National Pollutant Discharge Elimination System permit is their bacteria management plan. For nonpoint sources, the bacteria management plan will be developed by designated management agencies (DMAs) which will identify the appropriate BMPs or measures and approaches.

(J) The activity, expansion, or growth necessitating a new or increased discharge load is consistent with the acknowledged local land use plans as evidenced by a statement of land use compatibility from the appropriate local planning agency.

(b) Oregon's water quality management policies and programs recognize that Oregon's water bodies have a finite capacity to assimilate waste. Unused assimilative capacity is an exceedingly valuable resource that enhances in-stream values specifically, and environmental quality generally. Allocation of any unused assimilative capacity should be based on explicit criteria. In addition to the conditions in subsection (a) of this section, the Commission or Department shall consider the following:

(A) Environmental Effects Criteria:

(i) Adverse Out-of-Stream Effects. There may be instances where the non-discharge or limited discharge alternatives may cause greater adverse environmental effects than the increased discharge alternative. An example may be the potential degradation of groundwater from land application of wastes;

(ii) Instream Effects. Total stream loading may be reduced through elimination or reduction of other source discharges or through a reduction in seasonal discharge. A source that replaces other sources, accepts additional waste from less efficient treatment units or systems, or reduces discharge loadings during periods of low stream flow may be permitted an increased discharge load year-round or during seasons of high flow, as appropriate;

(iii) Beneficial Effects. Land application, upland wetlands application, or other non-discharge alternatives for appropriately treated wastewater may replenish groundwater levels and increase streamflow and assimilative capacity during otherwise low streamflow periods.

(B) Economic Effects Criteria. When assimilative capacity exists in a stream, and when it is judged that increased loadings will not have significantly greater adverse environmental effects than other alternatives to increased discharge, the economic effect of increased loading will be considered. Economic effects will be of two general types:

(i) Value of Assimilative Capacity. The assimilative capacity of Oregon's streams are finite, but the potential uses of this capacity are virtually unlimited. Thus it is important that priority be given to those beneficial uses that promise the greatest return (beneficial use) relative to the unused assimilative capacity that might be utilized. In-stream uses that will benefit from reserve assimilative capacity, as well as potential future beneficial use, will be weighed against the economic benefit associated with increased loading;

(ii) Cost of Treatment Technology. The cost of improved treatment technology, non-discharge and limited discharge alternatives shall be evaluated.

(4)(a) A receiving stream shall be designated as water quality limited through the biennial water quality status assessment report prepared to meet the requirements of Section 305(b) of the Water Quality Act. Appendix A of the Status Assessment report shall identify: what waterbodies are water quality limited, the time of year the water quality standards violations occur, the segment of stream or area of waterbody limited, the parameter(s) of concern, whether it is water

quality limited under OAR 340-41-006(30)(a), (b) or (c). Appendix B and C of the Status Assessment report shall identify the specific evaluation process for designating waterbodies limited;

(b) The WQL list contained in Appendix A of the Status Assessment report shall be placed on public notice and reviewed through the public hearing process. At the conclusion of the hearing process and the evaluation of the testimony received, Appendix A will become the official water quality limited list. The Department may add a waterbody to the water quality limited list between status assessment reports after placing that action out on public notice and conducting a public hearing;

(c) For interstate waterbodies, the state shall be responsible for completing the requirements of section (3) of this rule for that portion of the interstate waterbody within the boundary of the state;

(d) For waterbodies designated WQL under OAR 340-41-006(30)(c), the Department shall establish a priority list and schedule for future water quality monitoring activities to determine if the waterbody should be designated WQL under OAR 340-41-006(30)(a) or (b), if estimated TMDLs need to be prepared, and if an implementation plan needs to be developed and implemented;

(e) For waterbodies designated WQL under OAR 340-41-006(30)(b), requests for load increases shall be considered following subsection (3)(b) of this rule.

(5) For any new waste sources, alternatives which utilize reuse or disposal with no discharge to public waters shall be given highest priority for use wherever practicable. New source discharges may be approved subject to the criteria in section (3) of this rule.

(6) No discharges of wastes to lakes or reservoirs shall be allowed except as provided in section (3) of this rule.

(7) Log handling in public waters shall conform to current EQC policies and guidelines.

(8) Sand and gravel removal operations shall be conducted pursuant to a permit from the Division of State Lands and separated from the active flowing stream by a water-tight berm wherever physically practicable. Recirculation and reuse of process water shall be required wherever practicable. Discharges, when allowed, or seepage or leakage losses to public waters shall not cause a violation of water quality standards or adversely affect legitimate beneficial uses.

(9) Logging and forest management activities shall be conducted in accordance with the Oregon Forest Practices Act so as to minimize adverse effects on water quality.

(10) Road building and maintenance activities shall be conducted in a manner so as to keep waste materials out of public waters and minimize erosion of cut banks, fills, and road surfaces.

(11) In order to improve controls over nonpoint sources of pollution, federal, state, and local resource management agencies will be encouraged and assisted to coordinate planning and implementation of programs to regulate or control runoff, erosion, turbidity, stream temperature, stream flow, and the withdrawal and use of irrigation water on a basin-wide approach so as to protect the quality and beneficial uses of water and related resources. Such programs may include, but not be limited to, the following:

(a) Development of projects for storage and release of suitable quality waters to augment low stream flow;

(b) Urban runoff control to reduce erosion;

(c) Possible modification of irrigation practices to reduce or minimize adverse impacts

from irrigation return flows;

(d) Stream bank erosion reduction projects.

Stat. Auth: ORS 183.500, 468.020, 468.705, 468.710 & 468.735 ORS 468B.048
Stat. Implemented: ORS 468B.048
Hist: DEQ 128, f. & ef. 1-21-77; DEQ 1-1980, f. & ef. 1-9-80; DEQ 13-1989, f. & cert. ef. 6-14-89; DEQ 22-1990, f. & cert. ef. 7-6-90; DEQ 17-1991, f. & cert. ef. 9-30-91

Biological Criteria

340-41-027 Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.

Stat. Auth.: ORS 468.735
Hist.: DEQ 14-1991, f. & cert. ef. 8-13-91

340-41-029 [Renumbered to 340-40-001 thru 340-40-080]

Beneficial Uses of Waters to be Protected by Special Water Quality Standards

340-41-030 [SA 26, f. 6-1-67; Repealed by DEQ 128, f. & ef. 1-21-77]

Policy on Sewerage Works Planning and Construction

340-41-034

(1) Oregon's publicly owned sewerage utilities have since 1956 developed an increasing reliance on federal sewerage works construction grant funds to meet a major portion of the cost of their sewerage works construction needs. This reliance did not appear unreasonable based on federal legislation passed up through 1978. Indeed, the Environmental Quality Commission (EQC) has routinely approved compliance schedules with deadlines contingent on federal funding. This reliance no longer appears reasonable based on recent and proposed legislative actions and appropriations and the general state of the nation's economy.

(2) The federal funds expected for future years will address a small percentage of Oregon's sewerage works construction needs. Thus, continued reliance by DEQ and public agencies on federal funding for sewerage works construction will not assure that sewage from a growing Oregon population will be adequately treated and disposed of so that health hazards and nuisance conditions are prevented and beneficial uses of public waters are not threatened or impaired by quality degradation.

(3) Therefore, the following statements of policy are established to guide future sewerage works planning and construction:

(a) The EQC remains strongly committed to its historic program of preventing water quality problems by requiring control facilities to be provided prior to the connection of new or increased waste loads;

(b) The EQC urges each sewerage utility in Oregon to develop, as soon as practicable, a financing plan which will assure that future sewerage works construction, operation, maintenance and replacement needs can be met in a timely manner. Such financing plans will be a prerequisite to Department issuance of permits for new or significantly modified sewerage facilities, for approval of plans for new or significantly modified sewerage facilities, or for access to funding assistance from the state pollution control bond fund. The Department may accept assurance of development

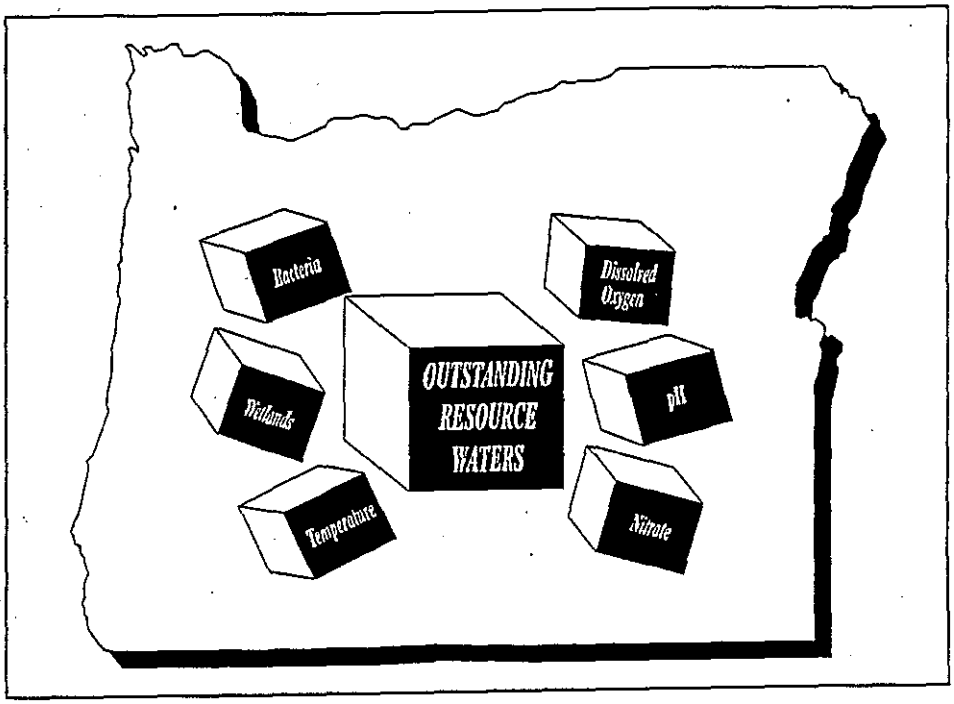
Attachment C: Internal DEQ Issue Paper on Outstanding Resource Waters Implementation Plan, June, 1995

June 1995

FINAL ISSUE PAPER

Outstanding Resource Waters

Implementation Plan



State of Oregon

Crater Lake • Darlingtonia Wayside
Donner und Blitzen River
Eagle Creek • Minam River
Metolius River • North Fork John Day River
North Fork Sprague River • Waldo Lake

Department of Environmental Quality
Standards & Assessment Section
811 Sixth Avenue
Portland, Oregon 97204

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INTRODUCTION

1.1 BACKGROUND

1.1.1 Oregon's Antidegradation Policy

Oregon's antidegradation policy is set forth in the Oregon Administrative Rules, Chapter 340, Division 41, Rule 026, and classifies the surface waters of the state into three groups. **High Quality Waters** include all waters not included in one of the other two classes and are managed with an antidegradation approach. **Water Quality Limited Waters** are those in which water quality is degraded below water quality standards and requires management by total maximum daily loads, which is a nondegradation approach. **Outstanding Resource Waters** are those bodies for which the state has specified a nondegradation approach because of outstanding qualities or critical habitat for endangered species. Outstanding Resource Waters (ORWs) are defined in OAR 340-41-026(1):

"(D) Outstanding Resource Water Policy: Where existing high quality waters constitute an outstanding state or national resource such as those waters designated as extraordinary resource waters, or as critical habitat areas, the existing water quality and water quality values shall be maintained and protected, and classified as 'Outstanding Resource Waters.' The Commission may specially designate high quality waterbodies to be classified as Outstanding Resource Waters in order to protect the water quality parameters that affect ecological integrity of critical habitat or special water quality values that are vital to the unique character of those waterbodies. The Department will develop a screening process and establish a list of nominated waterbodies for Outstanding Resource Waters in the Biennial Water Quality Status Assessment Report (305 (b) Report). The priority waterbodies for nomination include:

(i) National Parks;

(ii) National Wild and Scenic Rivers;

(iii) National Wildlife Refuges;

(iv) State Parks; and

(v) State Scenic Waterways.

(E) The Department will bring to the Commission a list of waterbodies which are proposed for designation as Outstanding Resource Waters at the time of each Triennial Water Quality Standards Review.

(F) In designating Outstanding Resource Waters, the Commission shall establish the water quality values to be protected and provide a process for determining what activities are allowed that would not affect the outstanding resource values. After the designation, the Commission shall not allow activities that may lower water quality below the level established except on a short term basis to respond to emergencies or to otherwise protect human health and welfare."

ORWs are thus a "tier" of waterbody classification included in the antidegradation policy, which allows the state to apply a level of protection even higher than that accorded to high quality waters. Oregon's antidegradation policy does not specify that ORWs are necessarily intended to be pristine, only that they are not water quality limited.

1.1.2 Process

The Department of Environmental Quality (DEQ) administers the federal *Clean Water Act* in the State of Oregon. As part of its responsibilities under Section 303 of the Act, DEQ is required to review Oregon's water quality standards at least once every 3 years. This process is commonly called the Triennial Water Quality Standards Review, or simply the Triennial Review. The Outstanding Resource Waters nomination process has been included by DEQ as a component of the Triennial Review as specified in the antidegradation policy cited above.

- ***Technical Advisory Committee:***

Water quality standards are established using the best available scientific information within a public policy framework. Beginning with the 1992-1994 triennial review, DEQ decided to establish a Technical Advisory Committee for water quality standards. The Committee was drawn from academe and government, and is comprised of experts in complementary fields related to water quality criteria.

For specific water quality standards, subcommittees with additional expertise were established. The role of the Technical Advisory Committee and its subcommittees is to help to ascertain whether there is sufficient new or additional information upon which to modify water quality standards. This Committee has peer reviewed the Outstanding Resource Waters Issue Paper.

- ***Policy Advisory Committee:***

In order to set the process within the appropriate public policy context, DEQ also decided to establish an analogous Policy Advisory Committee. The policy committee was drawn from academe, industry, and environmental advocacy groups and provides candid, critical and constructive comments, advice, and recommendations on policy issues. The major public policy issues for given water quality standards are selection of the appropriate level of protection, the need to protect specific beneficial uses in specific seasons, the implementation and compliance difference between narrative and numeric standards, the timing of standards implementation in relation to the cost of compliance, and establishing acceptable levels of risk. The Policy Advisory Committee developed the ORW nomination/designation process described in the second part of this issue paper.

1.2 FORMAT AND CONTENT OF ISSUE PAPER

1.2.1 Outstanding Resource Waters Priority Waterbody Nominations

The Environmental Quality Commission (EQC), at the conclusion of the 1991 Triennial Water Quality Standards Review, directed DEQ to establish an ORW nomination's list in the 1992 305(b) Report. DEQ was to evaluate this priority nomination's list during the next triennial review and bring forth waterbodies for EQC designation. The technical analysis section contains sections for each waterbody, with subsections for the setting, outstanding values, significant water quality parameters, adequacy of limnological data, and technical feasibility. The policy analysis section also has sections for each waterbody, with subsections for need, policy ramifications, and managerial feasibility. The recommendations section summarizes the technical and policy analyses, and makes a recommendation for each waterbody. Appendices have been added when appropriate to support the text. Like the text, the references have also been arranged by waterbody.

Outstanding Resource Waters (ORWs) are defined in OAR 340-41-026(1)

1.2.2 Outstanding Resource Waters Nomination/ Designation Process

The Outstanding Resource Waters Nomination/Designation Process section of this issue paper was generated by the Policy Advisory Committee (PAC). The PAC reviewed the DEQ nomination and evaluation presented in Section 2 and decided to develop and propose a different nomination, evaluation, and designation process to be used in all subsequent triennial reviews. This section lays out a stepwise process for future ORW nomination/designation with appropriate criteria.

2

TECHNICAL ANALYSIS

2.1 INITIAL NOMINATIONS

The antidegradation policy was adopted by the Environmental Quality Commission (EQC) and became effective on September 30, 1991. This made the first opportunity for initiating the ORW process — the 1992–1994 triennial review. DEQ staff began to develop an ORW nomination's list in January 1992 by sending a request for nominations to the agencies administering those waterbodies. These agencies included the Oregon Department of Fish and Wildlife, the Oregon Department of Parks and Recreation, the National Park Service, The U.S. Forest Service, and the Bureau of Land Management. No nominations were received, save a blanket nomination by the Oregon Department of Fish and Wildlife of the 17,820 miles of Oregon streams deemed "outstanding" by the Northwest Power Planning Council.

Since no specific nominations for priority waterbodies were received, DEQ staff then met and conducted an informal screening. Screening criteria for the nominations were largely the subjective best professional judgment of staff regarding the presence of extraordinary limnological characteristics and critical habitat. A group of nine nominations resulted, including those for six stream segments, two lakes and one wetland (see Table 2-1). These nominations were identified in the 1992 Oregon 305(b) Report. In April 1992, DEQ announced the nominations and requested data from interested parties. In general, very little data are available for most of the waterbodies nominated.

2.2 DESIGNATION CRITERIA

This issue paper represents a summary of the screening process for bringing the nominations to the point of requesting designations. The process is explained below.

2.2.1 Technical Criteria

Several technical issues are apparent in examining the rule cited in Section 1.1 for Oregon's Outstanding Resource Waters. The fundamental issue is the relationship between: (1) the water quality parameters and the "ecological integrity" of critical habitat; or (2) the special water quality values and the unique character of the waterbodies. The outstanding values of a given waterbody are usually known and need only to be clearly articulated. The relationship between the outstanding values and water quality parameters may or may not be known. Adequate scientific data are required to establish this relationship. Moreover, the amount of data required may be highly variable, depending on the complexity of the relationship.

A second issue is that of technical feasibility. Is it technically feasible to maintain and protect the identified water quality parameters in the given waterbody? In many cases the answer will be positive, but if there is a technical constraint, it needs to be identified before the designation process. For example, a hot spring might

have outstanding values related to water temperature, but no application of standards would have an effect on the diminution of heat flow from a geothermal system. Certainly, environmental variability will also affect our ability to control a natural system. There may also be situations in which a water quality parameter is identified for which there is no existing water quality standard. For example, nutrients (e.g., nitrogen or phosphorus) may affect plant growth, which in turn affects turbidity, but there is no state water quality standard for nutrients, because of the extremely wide range of nutrient requirements among species.

2.2.2 Policy Criteria

Some policy issues are also readily apparent on a review of the rule for ORWs. First, it should be stated that EPA views the designation of an ORW as a **permanent** commitment to nondegradation for that waterbody. Given this condition, the policy evaluation for an ORW designation needs to be very carefully, if not exhaustively, conducted. One of the inescapable policy ramifications of an ORW designation for flowing water is that upstream practices and activities must meet the nondegradation status at least for the water quality parameters specifically related to the outstanding values.

A second policy-related issue in the screening of ORW nominations is that of need. Since the screening/designation process is staff-limited, an attempt has been made to prioritize the nominations based on whether or not the waterbody and its outstanding values are at risk. In the case of headwaters entirely within wilderness areas, there is likely very low risk. In other cases, especially those without specific management plans, there may be identifiable risk to the resource. Any cases in which the waterbody is presently being impacted would receive the highest policy priority.

Finally, there is the issue of managerial feasibility. This will be largely governed by the existing managerial framework for the waterbody. Management will likely be simplest for bodies of water under single proprietorship, and with single use designations. Pre-existing management plans may also make designation more feasible. Flowing water under varying ownership would likely be much more difficult to manage. In most cases, the existence of a management plan for the vicinity or waterbody itself would simplify the management feasibility issue. However, it is possible that the uses mandated by the managing agency could conflict with the requirements for ORW management, thereby reducing managerial feasibility.

2.3 NOMINATED WATERBODIES

The nine priority waterbodies nominated for ORW status during the 1992-1994 triennial review are presented in Table 2-1. All have status as Federal Wild and Scenic Rivers, national parks, state parks or State Scenic Waterways. The remainder of this section is comprised of a brief description of each body of water.

2.3.1 Crater Lake

Crater Lake is one of the most famous and remarkable lakes in this country. The lake is located at the western edge of Klamath County along the spine of the Cascade Range with a surface elevation of 6,176 feet (1882 m). It is contained in a very deep volcanic caldera and is the deepest lake in the United States, with a maximum depth of 1,932 feet (589 m). The area of the lake is 20.5 square miles (53.2 km^2), with a drainage area of only 27 square miles (i.e., the area within the caldera). In addition to its striking setting, the lake is renowned for its clarity and blue color. It is surrounded entirely by Crater Lake National Park, and is a tourist destination for some 600,000 people annually. The only development in the vicinity of the lake is the National Park Service lodge and associated facilities.

2.3.2 Darlingtonia Wayside

Darlingtonia Botanical Wayside is a 5-acre wetland in western Lane County, about 5 miles north of Florence. The wetland is inhabited by many plant species characteristic of bogs, including *Darlingtonia californica*, the California pitcher plant. This plant is striking because of the large, hooded insectivorous structures, up to 3 feet in height. The wetland is contiguous to U.S. Highway 101, and receives a large number of visitors each year.

2.3.3 Donner und Blitzen River

The Donner und Blitzen River is located in central Harney County, in the Snake River Basin/High Desert ecoregion. It flows generally northward from headwaters on Steens Mountain to Malheur Lake, draining a total watershed of approximately 1,000 square miles. The portions under federal Wild and Scenic Rivers designation in-

Table 2-1: Waterbodies Nominated for Outstanding Resource Waters Status

Name	Present Status	Extent
Crater Lake	National Park	13,139 acres
Darlingonia Wayside	State Park	5 acres
Donner und Blitzen River	Federal Wild and Scenic River	74.8 miles
Eagle Creek	Federal Wild and Scenic River	27 miles
Metolius River	Federal Wild and Scenic River	28.6 miles
Minam River	Federal Wild and Scenic River	39 miles
North Fork John Day River	Federal Wild and Scenic River	54.1 miles
North Fork Sprague River	Federal Wild and Scenic River	15 miles
Waldo Lake	State Scenic Waterway	6,298 acres

clude the South Fork Blitzen, Little Blitzen, Big Indian Creek, Little Indian Creek and Fish Creek and their headwaters, and 16.75 miles of the Donner und Blitzen from its confluence with the Little Blitzen to Page Springs, a total of 74.8 miles of stream.

2.3.4 Eagle Creek

Eagle Creek is located at the northern extreme of Baker County and flows southward into the Snake River. Its headwaters are in the Eagle Cap Wilderness of the Wallowa Mountains and it is one of the most pristine streams in the state. Bull trout are found in the creek. Twenty-seven miles of the stream, four within the Wilderness and 23 to the south, are under federal Wild and Scenic Rivers protection and are nominated for ORW designation.

2.3.5 Metolius River

The Metolius River is located in western Jefferson County, and flows for a total of 28.6 miles from its spring-fed origins northwards into Billy Chinook Lake (a hydroelectric reservoir) where it joins the Deschutes River. It is known for its pristine nature and especially for its fisheries, which include the largest population of bull trout in the state. The Metolius River is a federally designated Wild and Scenic Waterway.

2.3.6 Minam River

The Minam River is located along the border of Union and Wallowa Counties, flowing northwest into the Wallowa River. Its headwaters drain the west-northwest side of the Eagle Cap Wilderness of the Wallowa Mountains, and like, Eagle Creek, it is one of the most pristine streams in Oregon. The 39 miles within the Wilderness Area have federal Wild and Scenic Rivers status and are thus nominated as an ORW.

2.3.7 North Fork John Day River

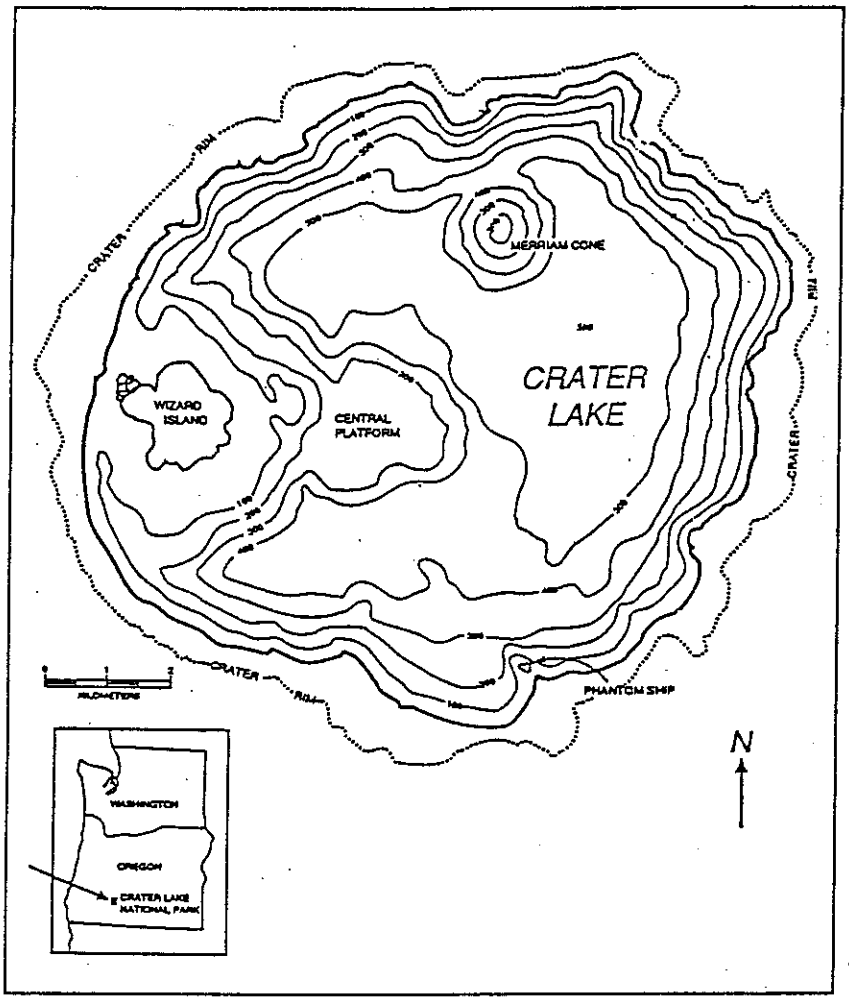
The North Fork of the John Day River is located at the northeastern corner of Grant County and its headwaters drain the western side of the Blue Mountains. Bull trout still exist in this stream. A total of 54.1 miles of stream, beginning with the headwaters and downstream to the confluence with Camas Creek, is under federal Wild and Scenic Rivers protection, and thus nominated for ORW status.

2.3.8 North Fork Sprague River

The North Fork of the Sprague River is located at the eastern edge of Klamath County. It flows southwest from headwaters north of Gearhart Mountain, joining the mainstem of the Sprague River before flowing into Upper Klamath Lake. Bull trout are still found in this section of the drainage. Fifteen miles of the North Fork of Sprague River at its headwaters are under federal Wild and Scenic Rivers designation.

2.3.9 Waldo Lake

Waldo Lake is located at the very eastern edge of Lane County in the central Oregon Cascade Moun-



Source: Larson, et al. 1993

Figure 2-1: Bathymetric Map of Crater Lake

tains, with a surface elevation of 5,414 feet. The basin is a glacial depression of moderate depth, reaching a maximum of 420 feet. The lake has an area of 6,298 acres, and is surrounded by a relatively small drainage basin of 31 square miles. This lake, like Crater Lake, is known for the color and clarity of its water, and it is thought to be one of the most oligotrophic lakes in the world. Development in the area surrounding the lake is limited to three campgrounds and a horseback riding encampment some distance from the lake. Waldo Lake is a State Scenic Waterway and lies entirely within Deschutes National Forest, bordering the Three Sisters Wilderness Area.

2.4 TECHNICAL ANALYSIS

2.4.1 Crater Lake

- ***Setting:***

The following discussion of Crater Lake has been extracted almost entirely from a recent compilation of studies published by the National Park Service (Larson et al. 1993a). The limnology of the lake has been the subject of a 10-year study sponsored by the National Park Service (NPS), aimed specifically at identifying anthropogenic impacts. A bathymetric map of Crater Lake is presented in Figure 2-1.

Crater Lake lies on the spine of the Cascade Range in southern Oregon, occupying a large caldera produced by the violent eruption of Mount Mazama approximately 6,850 years ago (Bacon and Lanphere 1990, in Larson et al. 1993b). Byrne (1965) first described in detail the bathymetry of the lake. Volcanism subsequent to the explosion produced the physical structures within the caldera, including the central platform (250 m depth) and Merriam cone (150 m depth), and Wizard Island, which emerges 235 m above the surface of the lake (Figure 2-1). Geothermal activity continues in the vicinity and strong geochemical evidence suggests that there is hydrothermal input at the bottom of the lake (Collier et al. 1993). The rim of the caldera rises an average of approximately 300 m above the present lake surface.

Crater Lake was filled to almost its present level around 6,000 years ago; its present surface level averages about 1889 m above sea level. The average depth of the lake is 325 m, with a maximum depth of 589 m. The shoreline length is 31 km. Sources of water to the lake are direct precipitation, runoff from the caldera rim and groundwater inflow. Loss is by evaporation and seepage (Redmond 1993). Climatic factors appear to have caused a maximum of up to 6 meters variation in the surface level of the lake since 1900 (Redmond 1993; Nelson et al. 1993).

Crater Lake is classified as ultra-oligotrophic. Hasler (1938) measured secchi depths of as deep as 40 m in 1937, and Larson (1972) recorded a 100 cm-diameter Secchi depth of 44 m in 1969, a depth record for lakes (Larson et al. 1990). Nitrogen and phosphorus are available to plants in only very small amounts (Larson and McIntire 1993). Nutrient concentrations over the period 1983-1991 were extremely low, with nitrate-N averaging 0.61 μg/l between 0 and 200 m, Kjeldahl-N averaging 18.52 μg/l and total phosphorus averaging 28.22 μg/l. Primary production in the lake is likely nitrogen limited in the euphotic zone (Gregory et al. 1993; Collier et al. 1993), and phytoplankton production rates during the 10-year NPS study ranged from 17.7 to 87.1 mg C m^{-2} hr^{-1} (McIntire et al. 1993). The Crater Lake phytoplankton assemblage is often composed largely of small diatoms, but also includes significant numbers of chlorophytes, cryptophytes, dinoflagellates, and unidentified picoplankton. The great penetration of light enables measurable phytoplankton productivity at depths of up to 200 m. Modeling suggests that most of the primary production in Crater Lake is based on recycled nitrogen; 80–90 percent of the nitrogen for new production is supplied through upward mixing of deep, relatively nutrient rich water (Collier et al. 1993). Significant benthic production by mosses and attached epiphytic algae takes place at depths between 30 and 80 m around the edges of the lake (McIntire, et al. 1994).

The fauna of Crater Lake include a zooplankton assemblage dominated by rotifers and cladocerans (Larson, et al. 1993). Several species of fish were introduced by man in 1886 (Larson, personal communication 1994). Kokanee salmon are now found in schools throughout the lake and are largely planktivorous. In contrast, rainbow trout tend to be distributed more along the edges of the lake and eat more benthic and terrestrial invertebrates than do kokanee (Buktenica and Larson 1993).

- ***Outstanding Value(s):***

The outstanding values of Crater Lake are well known and easily summarized. The setting of the volcanic caldera is dramatic and breathtaking, and the lake itself is extraordinarily clear, with a perceived color of deep blue. These characteristics combine to provide a unique aesthetic experience to all who visit the lake.

- ***Significant Water Quality Parameters:***

Since there has been concern over possible changes in the water quality of Crater Lake over the past 10 years, the significant water quality parameters have been identified and well studied (Larson et al. 1993a), although major data gaps still exist. The direct parameters of concern are clarity, measured as Secchi depth (measured with a 30 cm or 100 cm Secchi disk), depth of light penetration (photometer), and turbidity (transmissiometer); and color, measured as the backscattering of blue light (wavelength — 400 nm). The backscattering of blue light is largely dependent upon the very small size of the suspended particles (Larson 1993). Thus, the clarity and color of the lake are dependent on the concentration and size of particles in the lake. However, phytoplankton are included in the range of particles which affect the clarity and possibly the color. Phytoplankton density is generally thought to be controlled by nutrient availability and/or zooplankton grazing pressure. Therefore, the nutrient flux or concentrations and zooplankton densities may ultimately affect the clarity and color of Crater Lake.

Analyses of the Secchi, photometer and transmissiometer data, as well as lake color, were conducted as part of the NPS 10-year study. The results of the analysis of the Secchi disk data are of primary interest because they comprise the longest historical data base, with readings as early as 1896. The Secchi disk data are "clouded" by variability. It is not possible on the basis of the Secchi disk data to prove that clarity in Crater Lake has decreased significantly; it is also not possible to prove that it has not (Larson and Hurley 1993a). Photometer data were collected as early as 1969, and are also inconclusive (Larson and Hurley 1993b). The transmissiometer data were collected only in 1987–89, but allow a more substantive analysis of lake clarity within this limited timeframe. A surface transparency maximum usually occurs in late spring-early summer and a minimum usually occurs in mid-late summer. Both can be correlated to water column stability and biological processes (Hurley and Larson 1993).

Overall, the NPS 10-year study was unable to confirm or deny the possible anthropogenic enrichment of the lake with nitrogen, and the potential resultant reduction in lake clarity. However, in calculating the nitrogen budget of the lake, Collier et al. (1993) found the potential calculated anthropogenic contribution to the lake to be an infinitesimal fraction of the total, and in their judgment, highly unlikely as a cause. Since sewage facilities have been installed, nutrient enrichment is no longer a potential problem.

Aside from possible nutrient enrichment, one may speculate that the greatest lasting anthropogenic impact to Crater Lake may be the introduction of kokanee salmon and rainbow trout (and exotic invertebrate species as possible food sources for them) into a system which historically had no fish. The food web of the lake has been drastically impacted by these introductions (Bukica and Larson 1993). For example, anecdotal evidence suggests that two species of salamanders which were once common in Crater Lake may have been seriously impacted by rainbow trout, since they have been found in rainbow trout stomachs but are no longer common in the lake. Also, it is certainly plausible to speculate that the planktivorous fish have reduced the ability of the indigenous zooplankton species to control phytoplankton blooms by grazing, thus playing an indirect role in controlling clarity in the lake.

- ***Adequacy of Limnological Data:***

The 10-year study by the National Park Service has provided adequate data to relate the outstanding values to water quality parameters. The studies have been specifically aimed, in part, at understanding the clarity and color of Crater Lake, and the role of any anthropogenic impacts on them. While the studies have been inconclusive in determining the trajectory of the lake's clarity and color, and man's impact, Crater Lake is now one of the best studied (if not understood) lakes in the state.

- ***Technical Feasibility:***

There is no apparent technical limitation in the concept of preserving Crater Lake's outstanding natural values by imposing a nondegradation status on the waterbody. Natural eutrophication may occur over hundreds to thousands of years, but the great size and volume of the lake may tend to mitigate this. This is an insignificant factor with respect to ORW designation (as opposed to cultural or anthropogenic eutrophication). Since the state has no existing standards for nutrients, the natural background concentrations would need to be default criteria for nitrogen and phosphorus in Crater Lake.

2.4.2 Darlingtonia Wayside

- ***Setting:***

The following discussion is excerpted entirely from Christy (1979). Darlingtonia Wayside is described as a bog, occupying a shallow depression among stabilized dunes. The north, east, and south sides are bounded by lodgepole pine and Sitka spruce forest, and Highway 101 abuts the west side. Water apparently enters from the east side and the site stays saturated all year long. A boardwalk has been constructed from the parking lot into the bog to minimize impacts from visitors. A map of Darlingtonia Wayside is presented in Figure 2-2.

Darlingtonia Wayside is inhabited by plant species characteristic of bog habitats, including tamarack (*Pinus contorta*), Western red cedar (*Thuja plicata*), hemlock (*Tsuga heterophylla*), California wax-myrtle (*Myrica californica*), salal (*Gaultheria shallon*), huckleberry (*Vaccinium ovatum*), California pitcher plant (*Darlingtonia californica*), Laborador-tea(*Ledum glandulosum*), sedges ((*Carex* spp.), deer fern (*Blechnum spicant*), St. John's-wort (*Hypericum anagaloides*), and sphagnum mosses (*Sphagnum* spp.).

- ***Outstanding Value(s):***

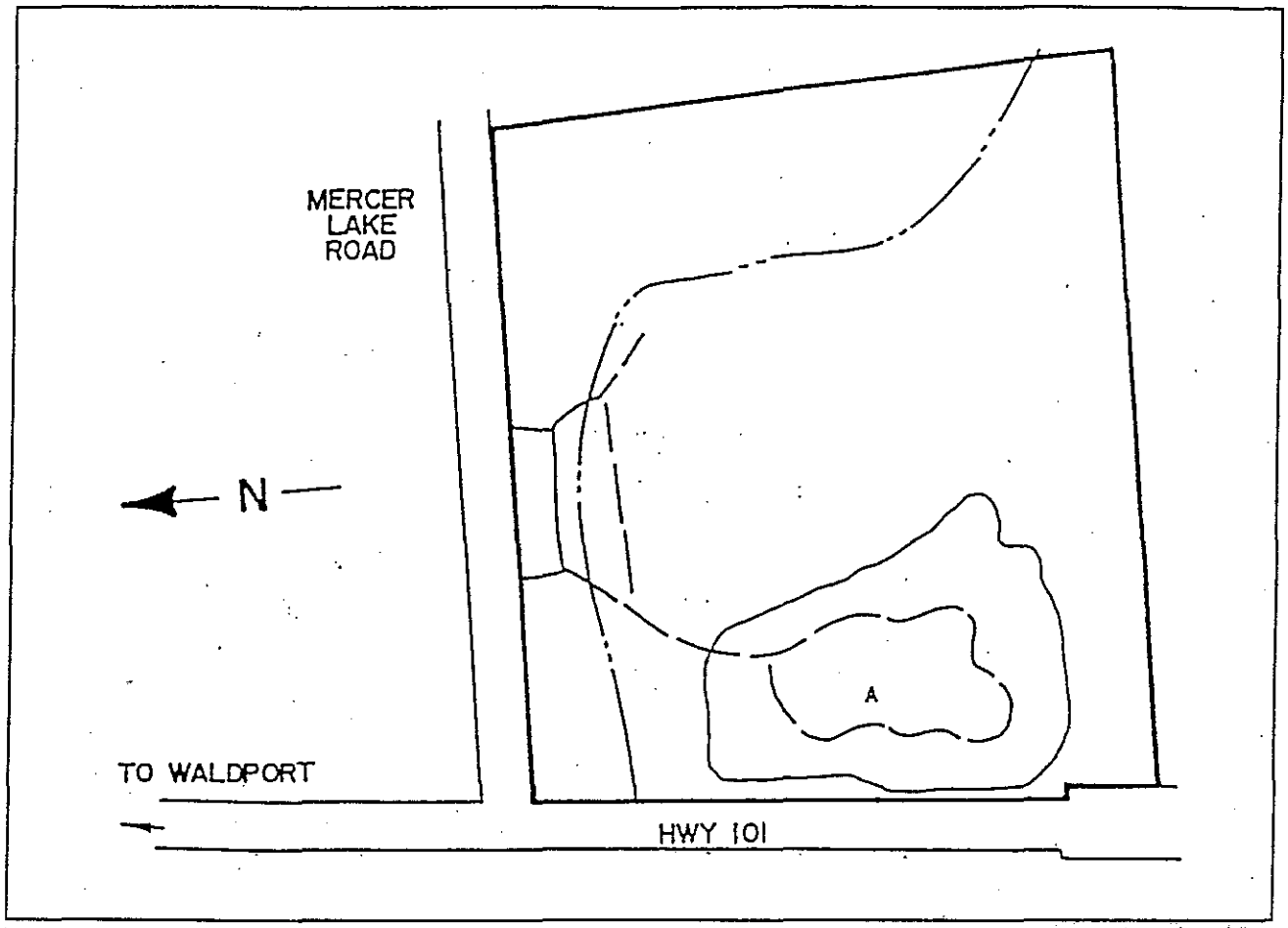
The outstanding value of Darlingtonia Wayside is defined by the presence of indigenous bog species, principally the California pitcher plant at a very accessible site. The Oregon Natural Area Preserves Advisory Committee report to the State Land Board indicated that *"the apparent infilling of the area by shrubs, and the small size of the Darlingtonia population do not make this site a very exceptional expression of the species. The site is valuable, however, because of its proximity to Highway 101 and the excellent opportunity it affords to expose, in a non-destructive manner, large volumes of the public to one of our interesting bog types."*

- ***Significant Water Quality Parameters:***

No data are available on water quality at Darlingtonia Wayside. It seems logical that hydrology, not water quality, per se, is primary to the maintenance of the bog species at the site, but degradation of existing water quality would certainly affect the bog.

- ***Adequacy of Limnological Data:***

There are no site-specific data on the hydrology of the site. Given the nature of hydrologic data, however, it would be difficult to correlate possible activities with predicted changes in the hydrology of the wetland. The data on community biology are adequate to characterize the site among others of its type in the state.



Source: The Nature Conservancy Data Base Program

Figure 2-2: Map of Darlingtonia Wayside

- ***Technical Feasibility:***

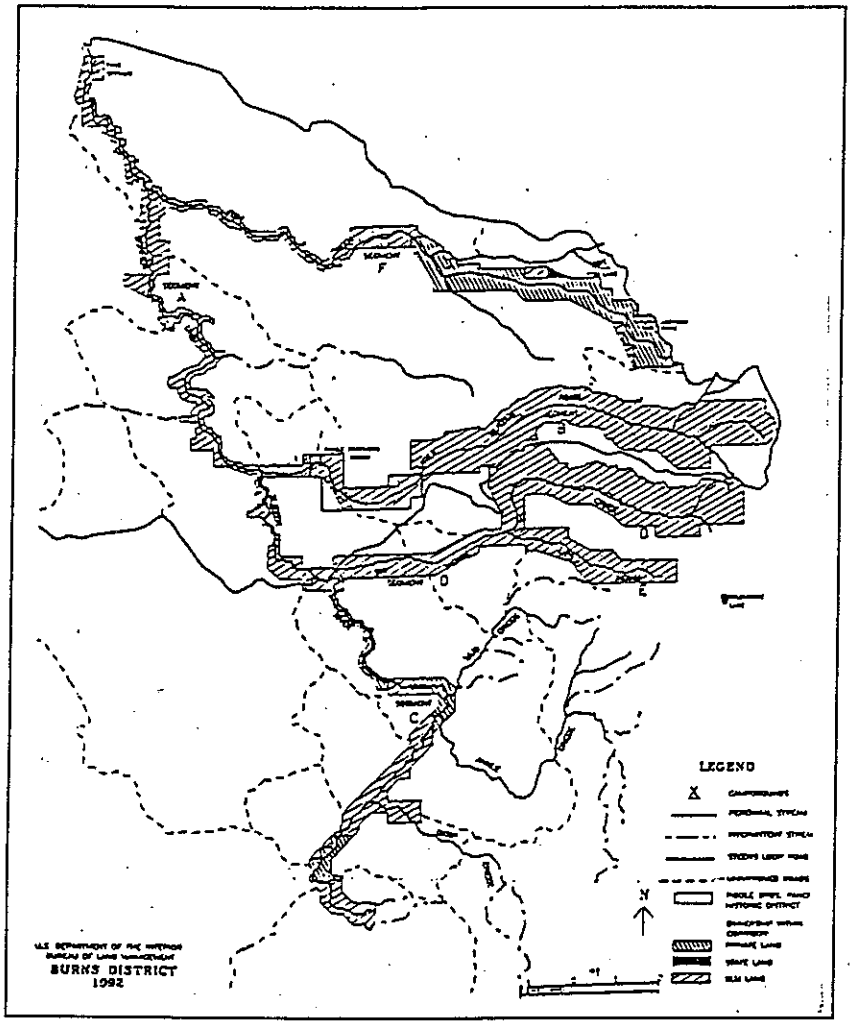
The site is apparently succeeding from bog to swamp, with active infilling of trees and shrubs. This succession will ultimately lead to the elimination of the bog species (Christy 1979). Thus, maintenance of the site is not technically feasible over the long term.

2.4.3 Donner und Blitzen River

- ***Setting:***

Much of the following description is taken from the Donner und Blitzen Management Plan and Environmental Assessment (Bureau of Land Management 1992). Steens Mountain is the northernmost extension of the basin and range province — a 30-mile long uplifted fault block. The Donner und Blitzen River originates on and drains the northwest side of Steens Mountain, flowing northward into Malheur Lake. A map of the Wild and Scenic segments of the Donner und Blitzen River is presented in Figure 2-3. Steens Mountain rises to 9,773 feet, and snowmelt from the mountain provides much of the input to runoff and groundwater recharge in the vicinity of Malheur Lake (Rinella and Schuler 1991). During the Pleistocene, two episodes of glaciation carved u-shaped valleys through which the headwaters of the Donner und Blitzen now run.

Rainfall on Steens Mountain can exceed 60 inches per year, whereas rainfall in the Malheur Lake vicinity averages about 10 inches per year (Rinella and Schuler 1991). Flows at Page Springs, the downstream limit of the Wild and Scenic segment of the river and the upstream limit of Malheur National Wildlife Refuge, generally range from about 300–700 cubic feet per second (cfs) during the annual maximum and 25–100 dur-



Source: Bureau of Land Management — 1993

Figure 2-3: Map of the Donner und Blitzen River

ing the annual minimum. Water quality in the Donner und Blitzen headwaters apparently ranges from pristine to heavily impacted by nonpoint source pollution.

Riparian condition in the Wild and Scenic segments ranges from excellent to poor, as does aquatic habitat condition (Bureau of Land Management 1992, 1993). Water quality at Page Springs only partially supports beneficial uses, with pH and nutrient exceedances (Department of Environmental Quality 1992).

- ***Outstanding Value(s):***

The management plan for the Donner und Blitzen River (Bureau of Land Management 1993) lists recreation, including fishing and fisheries, as two of the outstandingly remarkable values leading to its designation as a Wild and Scenic River. Much of the outstanding value of the area is related to the uniqueness of the geological setting, especially the occurrence of glacial canyons. The Blitzen River supports a population of native redband trout, listed as a Candidate 2 Threatened and Endangered species (Oregon Natural Heritage Program 1991). Other fish species in the system include mountain whitefish, redside shiner, longnose dace and mottled sculpin.

- ***Significant Water Quality Parameters:***

Limited data are available on water quality in the basin. The Bureau of Land Management (1993) reports the presence of the indigenous fish species listed above is generally indicative of good habitat condition and good water quality. Thus, water quality parameters of interest can be narrowed only to those most likely to affect the aquatic community which supports the fish, especially the redband trout population. These would generally include temperature, dissolved oxygen, and turbidity.

- ***Adequacy of Limnological Data:***

The U.S. Geological Survey has maintained a gaging station at Page Springs, with some 64 years of flow data and 10 years of water quality data. Additionally, the Bureau of Land Management has accumulated 10 years of quarterly water quality data on the Donner und Blitzen, including stations on the Little Blitzen River, the south Fork of the Donner und Blitzen River, and Big Indian Creek. However, nowhere are these data systematically summarized or analyzed. At this point in time, the data are clearly inadequate to support an ORW designation, but analysis of the existing data could support a future designation.

- ***Technical Feasibility:***

The technical feasibility of ORW

status for the Donner und Blitzen cannot be established given the lack of appropriate limnological data. There is no apparent technical factor that would make such a designation infeasible from the outset. Since the watershed problems are generally attributable to nonpoint sources, one might expect more difficulty in identifying and/or quantifying them.

2.4.4 Eagle Creek

- ***Setting:***

There is insufficient information available to write this section; none was received from the administering agencies.

- ***Outstanding Value(s):***

There is insufficient information to write this section.

- ***Water Quality Parameters:***

There is insufficient information to write this section.

- ***Adequacy of Limnological Data:***

There are inadequate limnological data to assess the technical feasibility.

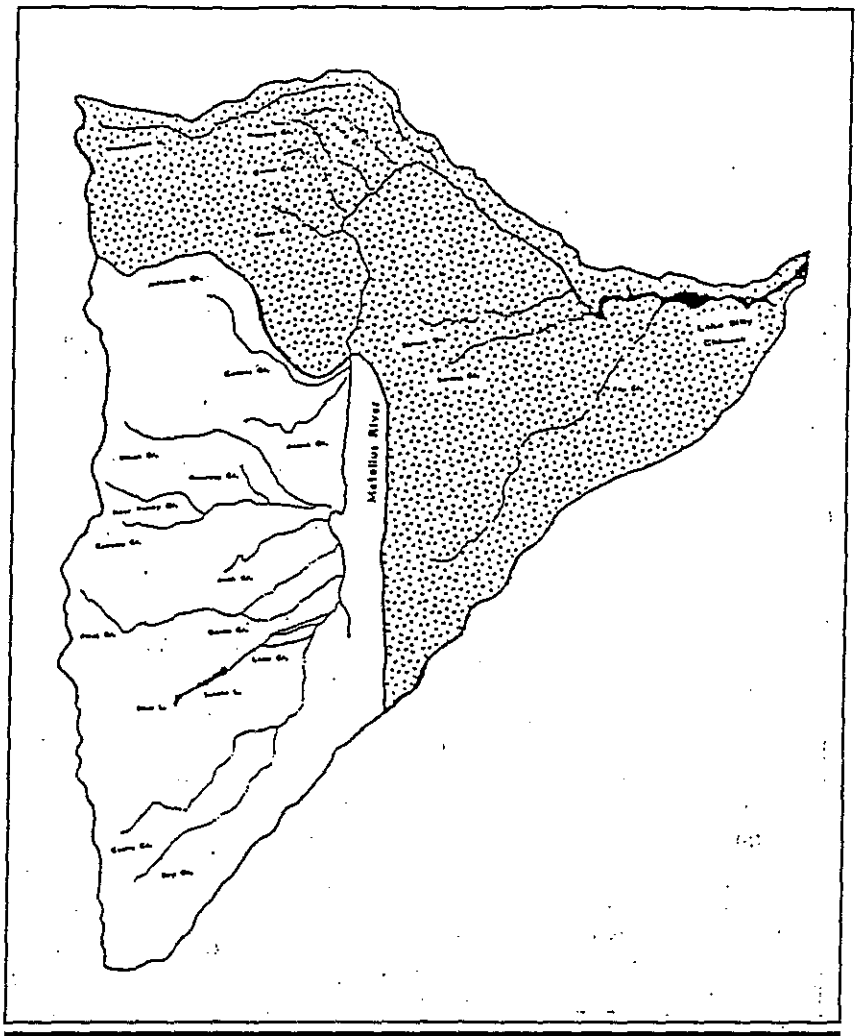
- ***Technical Feasibility:***

Technical feasibility cannot be assessed with the existing data base.

2.4.5 Metolius River

- ***Setting:***

The following description of the Metolius River setting is taken in its entirety from Riehle (1993).



Source: Reihle — 1993

Figure 2-4: Map of The Metolius River

The Metolius basin is on the east side of the crest of the Cascade Range to its confluence with the Deschutes River at Lake Billy Chinook. The upper basin lies within volcanic rocks that have been subject to past and present glaciation. The center of the basin is an outwash plain which is the source of many spring fed tributaries as well as Metolius Springs, the source of the mainstem of the river. Cache Creek and Dry Creek extend the basin as far south as Three Sisters Wilderness Area. A map of the Metolius River is presented in Figure 2-4.

Riparian vegetation is diverse and stands of ponderosa pine, western larch, and douglas fir grow in the flats of the outwash plain. Streams in the upper Metolius basin provide high quality habitat which is characterized by undercut banks, side channels, backwater areas and high densities of woody debris. The macroinvertebrate fauna is characteristic of cold, clear water, and emergences of some species of aquatic insects, upon which trout characteristically feed (mayflies, stoneflies and caddisflies), are apparently prolonged. Fisheries in the Metolius River include those

for rainbow trout, bull trout, kokanee salmon, mountain whitefish, and two introduced species — brown trout and brook trout. The bull trout population in the Metolius River is the most robust in the state (Robart personal comm. 1994).

- ***Outstanding Value(s):***

The outstanding values of the Metolius River are tied to its pristine nature. The temperature and clarity are especially important and reflect the good riparian condition in the basin.

- ***Significant Water Quality Parameters:***

Cold temperature and low turbidity are clearly key water quality parameters supporting the extraordinary resource values and critical habitat in the Metolius River. Temperature is especially important for maintaining bull trout since they are a temperature sensitive species. Bull trout temperature optima fall at 4.0°C (40-41°F) for fry growth and 4–10°C (37–48°F) for juvenile growth (Sturdevant, et al. 1994). In the Metolius River, bull trout spawning and first year rearing are apparently limited to maximum temperatures of 4.5°C (40°F) (Ratliff 1992). The U.S. Forest Service has identified sediment and temperature as primary concerns in the Metolius basin (Reihle 1993).

- ***Adequacy of Limnological Data:***

Based on the amount of data collected from 1988 through 1992 by the U.S. Forest Service, there appears to be adequate data to support the identification of key water quality parameters. These data have not been analyzed in sufficient detail, however, to support a specific management plan.

- ***Technical Feasibility:***

There do not appear to be any technical constraints to maintaining the key water quality parameters in the Metolius River. The bull trout population in the Metolius is rated at low risk of extinction (Ratliff and Howell 1992). These authors list suppressing factors as over harvest, hybridization and competition with brook trout, and habitat degradation.

2.4.6 Minam River

- ***Setting:***

There is insufficient information available to write this section; none was received from the administering agencies.

- ***Outstanding Value(s):***

There is insufficient information to write this section.

- ***Water Quality Parameters:***

There is insufficient information to write this section.

- ***Adequacy of Limnological Data:***

There are inadequate limnological data to assess the technical feasibility.

- ***Technical Feasibility:***

Technical feasibility cannot be assessed with the existing data base.

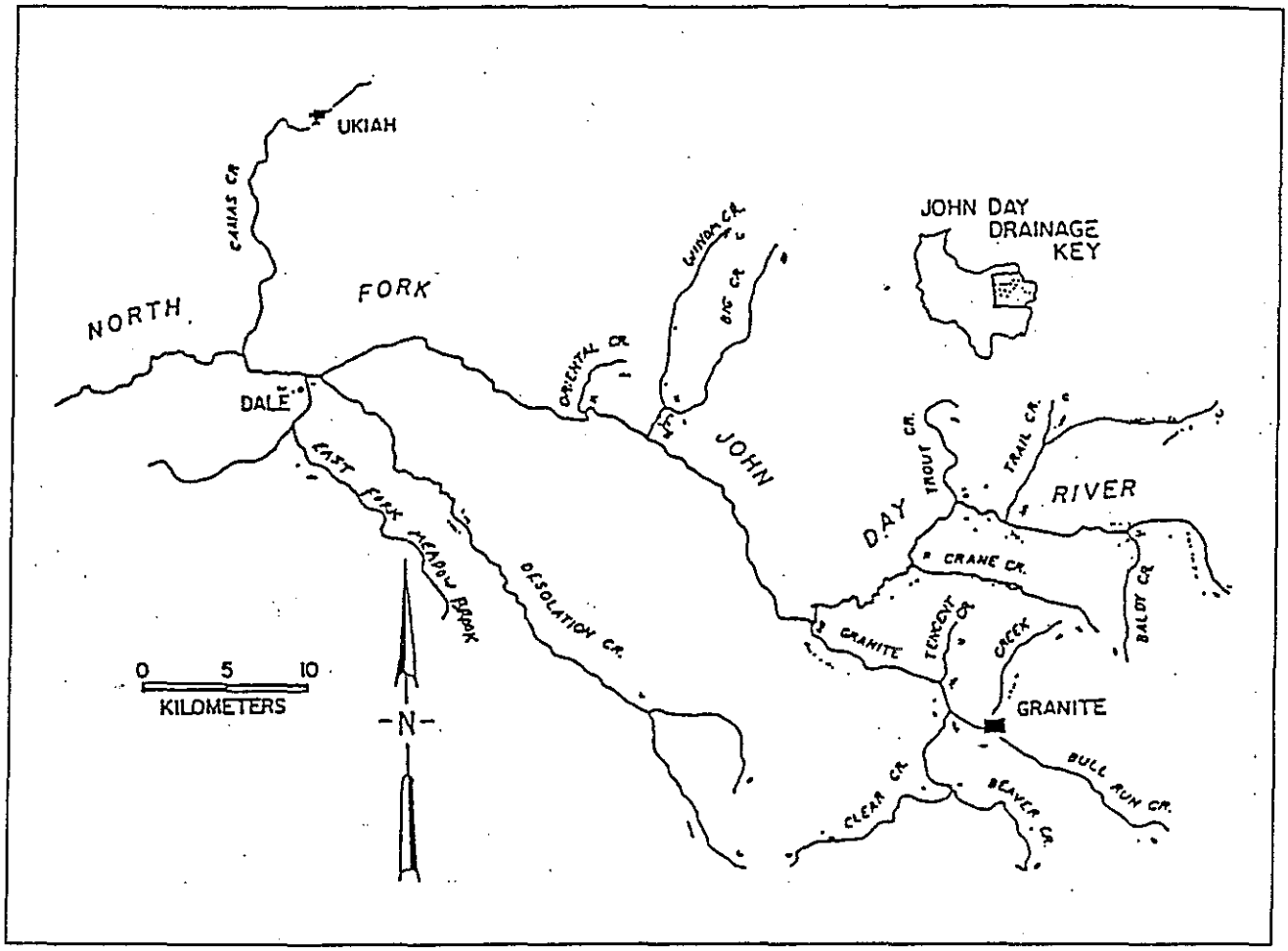
2.4.7 North Fork John Day River

- ***Setting:***

The North Fork of the John Day River under consideration includes 54.1 miles of the headwaters in the Blue Mountains. The following information is taken mainly from the draft management plan and environmental impact statement coauthored by the Bureau of Land Management and the Oregon Parks and Recreation Department (1993). The headwaters of the North Fork of the John Day River range between 2,500 and 8,000 feet altitude and provide more than 60 percent of the flow in the John Day basin. The North Fork originates in the Elkhorn Mountains, where up to 40 inches of precipitation per year falls largely as snow. Granite Creek is the major tributary. A map of the North Fork of the John Day River is presented in Figure 2-5.

The subbasin in general is considered to have good water quality and aquatic habitat, but most of the vicinity had been historically dredged for gold. Large piles of dredge tailings are visible in much of the watershed. The headwaters are within the North Fork John Day Wilderness Ares and riparian areas and are presently in good condition. Further downstream, the impacts of mining and agricultural activities are evident.

The North Fork is very important to the fisheries of the John Day Basin. It is the major producer of wild spring chinook salmon (70%) and summer steelhead (43%) in the basin. Of additional importance, bull trout and native redband trout are found in the North Fork. Other fish species found in the subbasin include Pacific lamprey, sculpin(s), and mountain whitefish.



Source: The Claire and Gray — 1993

Figure 2-5: Map of North Fork John Day River

The North Fork population of bull trout is thought to be one of the healthiest in the state. Ratliff and Howell (1992) estimate the status of North Fork John Day bull trout to be one of concern (i.e., between low and moderate risk of extinction). Suppressing factors are thought to be habitat degradation and competition hybridization with brook trout. Claire and Gray (1993) list the habitat degradation factors in order of priority: (1) water temperature - spring destruction; (2) riparian habitat loss; (3) loss of instream structure and gravel; (4) sediment inputs; (5) chemical mine waste; and (6) food supply.

- ***Outstanding Value(s):***

The outstanding value of the North Fork of the John Day River is its remaining pristine nature, especially as it supports and acts as habitat for the salmonid fishes.

- ***Significant Water Quality Parameters:***

Related strictly to salmonid habitat, and particularly to bull trout, temperature is a key water quality parameter in this basin. We may also infer that turbidity, as it relates to sediment load and the quality of spawning habitat, is likewise an important parameter for all of the salmonid fishes.

- ***Adequacy of Limnological Data:***

There is inadequate limnological data to assess the technical feasibility.

- ***Technical Feasibility:***

The technical feasibility cannot be assessed with the available data base.

2.4.8 North Fork Sprague River

- ***Setting:***

The 15 miles of the North Fork of the Sprague River under consideration are its headwaters which are contiguous to the north edge of the Gearhart Mountain Wilderness area. There is a dearth of information on this stream.

- ***Outstanding Value(s):***

Tributaries to the Sprague River host some of the few remaining populations of the Klamath stock of bull trout. However, bull trout are no longer found in the mainstem (Long 1979 cited in U.S. Forest Service 1989): Cold temperatures must be assumed to characterize the habitat in which bull trout still persist in the Klamath Basin.

- ***Significant Water Quality Parameters:***

There is insufficient information to write this section.

- ***Adequacy of Limnological Data:***

There are inadequate limnological data to assess the technical feasibility.

- ***Technical Feasibility:***

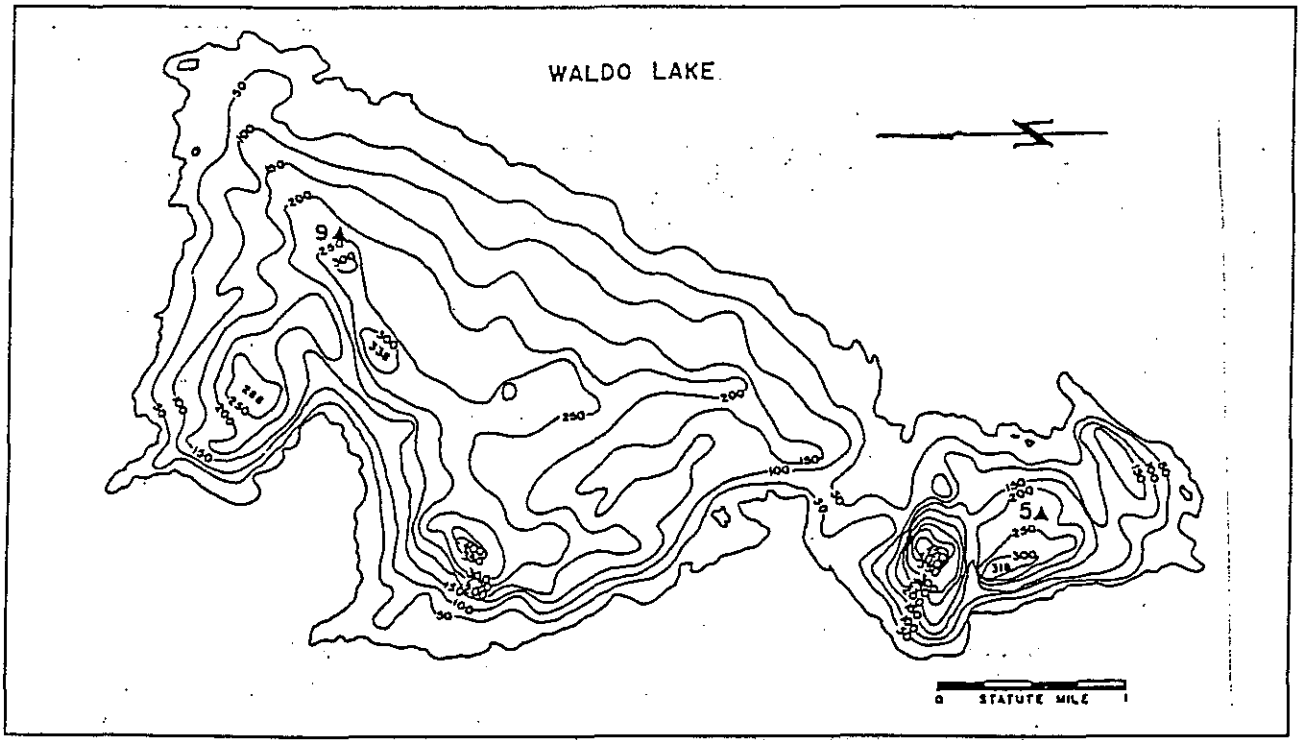
Technical feasibility cannot be assessed with the existing data base.

2.4.9 Waldo Lake

- ***Setting:***

Waldo Lake is located along the crest of the Cascade Range in central Oregon; a bathymetric map is presented in Figure 2-6. The lake covers 6,298 acres, with a maximum depth of 420 feet (128 m) and an average depth of 128 feet (39 m), at an altitude of 5,414 feet (Johnson et al. 1985). The basin is thought to be a glacial trough formed during the Pleistocene and filled some 10,000 to 12,000 years ago (Larson and Donaldson 1970). Waldo Lake has a surface area of 6,298 acres and is surrounded by a drainage area of 31 square miles. It drains into the North Fork of the Middle Fork of the Willamette River.

Like Crater Lake, Waldo Lake is classified as ultraoligotrophic. The lake is characterized by its high transparency and cobalt blue color. It has the lowest ionic strength ever measured in a lake and is thought to be one of the purest lakes in the world. The



Source: Larson and Donaldson — 1970

Figure 2-6: Bathymetric Map of Waldo Lake

electrical conductivity is as low as 3 μmhos cm^{-1} (Johnson et al. 1985). Using a 100-cm Secchi disk, Larson (1970) measured a transparency of 115 feet (35 m) on July 23, 1969. Nutrient concentrations are extremely low, and phytoplankton primary production averaged 29 mgC m^{-2} hr^{-1} during summer, only about half that of Crater Lake (Larson 1972). A significant portion of the lake's primary production is also apparently contributed by benthic (attached) diatoms and macrophytes, due to the extraordinary depth of light penetration. The aquatic moss, *Hygrohypnum*, is found at all depths of the lake. Waldo Lake supports small populations of kokanee salmon, and eastern brook and rainbow trout, which we assume to have been introduced.

- ***Outstanding Value(s):***

The major outstanding characteristic of Waldo Lake is its ultra-oligotrophic state. This is evidenced by the lake's clarity and color, which lend it a great aesthetic value. There may also be some scientific value to the lake, as it is likely one of the purest lakes in the world.

- ***Significant Water Quality Parameters:***

As with Crater Lake, the significant water quality parameters associated with Waldo Lake's outstanding values are water clarity and color. Waldo Lake has not been studied to the extent of Crater Lake, but the parameters directly involved with clarity are turbidity and the size-distribution of particles suspended in the lake. Parameters which can indirectly affect clarity would include any factors which would directly or indirectly affect the phytoplankton productivity or standing stock in the lake, e.g., nutrients. Larson and Donaldson (1970) collected data on clarity and light transmission in Waldo Lake. This study was aimed partially at documenting the existing water quality when the lake was made accessible by a paved road in 1969. They recorded extinction coefficients between 0.087 and 0.044 m^{-1} in the blue range (300–550 nm).

- ***Adequacy of Limnological Data:***

Although Waldo Lake is a little studied lake, the specific types of data collected by Larson and Donaldson (1970) make a good case for the limnological data being adequate for evaluation in the ORW context. There are benchmarks for light transmission and for phytoplankton productivity. Given the great amount of data recently collected on Crater Lake and its general applicability to Waldo lake as well, the Department believes that there is sufficient data to support designation of Waldo Lake as an ORW.

- ***Technical Feasibility:***

As with Crater Lake, there is no apparent technical limitation to applying a nondegradation status to specific water quality parameters to maintain the lake's outstanding character and value. Waldo Lake may tend to evolve towards more productivity as it ages over hundreds to thousands of years, that is, it may undergo natural eutrophication. While this process cannot be prevented, the time scale of that process is much greater than the time scale of management activities, which might be envisioned in tens or hundreds of years.

2.5 POLICY ANALYSIS

2.5.1 Crater Lake

- ***Need:***

The National Park Service developed a general management plan for Crater Lake in 1977. The plan contains a Statement for Management which periodically inventories the park's condition and analyzes its problems. The latest iteration of this document was completed in 1992. According to the Statement, *"management objectives for Crater Lake are geared to protection of the caldera ecosystem from human influence while monitoring the lake water quality for changes."* This orientation of management objectives was partially in response to Public Law 97-250 passed by Congress in 1982, which mandated the -year study of lake water quality reported above and directed the Secretary of the Interior to *"implement such actions as may be necessary to assure the protection of the lake's natural pristine water quality."* With the recent resiting of the park facilities' septic drainfield away from the lake, the NPS has shown its management direction consistent with the concept of nondegradation and its resolve to preserve the outstanding values of Crater Lake. Thus, need does not appear to be an overriding consideration at this point in time.

- ***Ramifications:***

The policy ramifications of designating Crater Lake an ORW are straightforward. There is no apparent inconsistency with the existing management direction and there are no downstream implications. The designation of Crater Lake would serve to demonstrate the Department's intent to utilize

the ORW classification under appropriate circumstances. Since Crater Lake is of such great national interest and stature, the only apparent ramifications would be the negative perceptions if it were not designated an ORW.

- ***Managerial Feasibility:***

Crater Lake is wholly under the administration of the National Park Service. The designation of Crater Lake as an ORW does not appear at all inconsistent with the existing management philosophy. There are no apparent factors which would act to reduce this factor, thus Crater Lake would seem the ideal in managerial feasibility. A memorandum of understanding between the Department and the NPS would suffice to implement any minor additions or changes to the existing management plan.

2.5.2 Darlingtonia Wayside

- ***Need:***

The California pitcher plant (*Darlingtonia californica*) is listed as a Category 4 species by the Oregon Natural Heritage Program (1991). Category 4 includes taxa of concern which are not currently threaed or endangered, but are either: (1) very rare but currently secure, or (2) declining in numbers or habitat but still too common to be proposed as threatened or endangered.

Darlingtonia Wayside is managed by the Oregon Parks and Recreation Department. The park includes a total of 17 acres: the bog of 5 acres and another 12 acres to the northeast and south. Human impact to the site is minimized by the use of wooden walkways and exclusion from the rest of the site. The site is not at apparent risk from any imminent development.

- ***Ramifications:***

Designating Darlingtonia Wayside an ORW would not have any ramifications on the status of the California pitcher plant: as explained in the technical analysis, this location is a minor occurrence of the species. It would have ramifications for local development, in that any project contiguous to the Wayside would likely alter the groundwater hydrology. Wetlands standards are presently in development by the Department and it is assumed the authority exists for the Department to enforce. Therefore, any development which would alter the groundwater hydrology at the Wayside would be precluded by its designation as an ORW.

- ***Managerial Feasibility:***

Designation of Darlingtonia Wayside as an ORW would be managerially feasible. As stated above, it is managed solely by the Oregon Parks and Recreation Department. A memorandum of agreement could suffice to make any required adjustments in management. There is no apparent contradiction between the objective of getting people into the area on boardwalks to see the vegetation with minimal impact, and with its management on a nondegradation status.

2.5.3 Donner und Blitzen River

- ***Need:***

The Bureau of Land Management developed a management plan and environmental assessment for the Wild and Scenic portion of the Donner und Blitzen River in 1992–93 (Bureau of Land Management 1992, 1993). Management objectives and actions are stated in the plan for riparian management, fish and wildlife management, and water quality and quantity. The overall management objective for water quality is to improve water quality to meet or exceed requirements for all beneficial uses. As part of this objective a stated goal is to *"cooperate and assist the State of Oregon Department of Environmental Quality Water Quality program with the study of the Donner und Blitzen River as a potential 'Outstanding Resource Waters'* with state mandated water quality standards. Management actions include the continued collection of water quality data, and to assess the effect of irrigation of the 80 acres of meadow at the Riddle Ranch (Little Blitzen River) on water quality.

The Bureau of Land Management plan does not affect the portions of the river corridor under private ownership. About half of the Fish Creek corridor and 20 percent of the Donner und Blitzen upstream of the confluence with Big Indian Creek are private. The riparian and aquatic habitat condition of the segments under private ownership were not assessed by the Bureau of Land Management (1992).

Although the management plan is consistent with the intent of an ORW, this vicinity is also managed for grazing. There are five grazing allotments within the Wild and Scenic area, and many of the river miles are accessible to livestock. While large acreages are involved, for example, in the South Steens allotment, monitoring has shown heavy to severe utilization along multiple reaches of the riparian zones with slight to light upland utilization. Serious agricultural impacts exist at this time.

Of the 63 stream miles of riparian habitat assessed by the Bureau in 1991, 8.1 were in poor condition, 17.7 miles were in fair condition, 25.1 miles were in good condition, and 11.0 miles were in excellent condition (Bureau of Land Management 1993). The management plan proposes *"a timeline of 15 years for livestock and wild-horse management actions which will lead to protection and enhancement of the outstanding remarkable values within the river corridor."*

- ***Ramifications:***

The most straightforward ramification of ORW status for the Donner und Blitzen River appears to be the effect of nondegradation status on the private landowners along the Fish Creek and upstream Donner und Blitzen corridors. However, the only active agriculture within an actual river corridor appears to be that of the 80 acre Riddle Ranch, which is actually owned by the Bureau of Land Management and operated under a title transfer agreement (Bureau of Land Management 1993). It is not clear what impacts agricultural activities outside the river corridor proper would have, but nondegradation status would certainly impinge on activities such as irrigation.

- ***Managerial Feasibility:***

The managerial feasibility of ORW status for the Donner und Blitzen River is somewhat complicated by the issue of multiple ownership. Most of the corridor surrounding the Wild and Scenic portion of the river is owned and managed by the Bureau of Land Management. However, 3,312 acres of the corridor are in private ownership as compared to the 19,313 under the Bureau of Land Management. Additionally, the state of Oregon owns 40 acres in the corridor (Bureau of Land Management 1993). However, since the Bureau of Land Management's management plan is clearly consistent with an ORW designation, managerial feasibility should not be a constraint to ORW designation.

2.5.4 Eagle Creek

- ***Need:***

The existing management plan for Eagle Creek is contained in the Land and Resource Management Plan for Wallowa-Whitman National Forest (U.S. Forest Service 1990) under the authority of the Forest Service. The management of the Wild and Scenic Rivers in Wallowa Whitman N. F. is *"intended to preserve the special values of those rivers or river segments which are part of the National Wild and Scenic Rivers System... The objective is to maintain the characteristics which contributed to their classification."* Thus the present management objectives appear to be consistent with those implicit in a nondegradation status. Management guidelines do allow for permit salvage and scheduled timber harvest within scenic and recreational river segments. The upper 4 miles of the river are in the Eagle Cap Wilderness Area and are classified as wild; however, the remaining 23 miles are outside the wilderness area and are classified as recreational (17) and scenic (6).

- ***Ramifications:***

The ramifications of designating Eagle Creek an ORW are minimal. Since these are headwaters, there are no upstream activities with which to be concerned. Conditions are now pristine and are expected to remain so. There would be ramifications to the limited activities allowed along the recreational and scenic reaches of the stream outside the wilderness area, but these would be expected to be minor in nature.

- ***Managerial Feasibility:***

Managerial feasibility is not perceived as a problem for the designation of Eagle Creek as an ORW. All of the federal Wild and Scenic portions of the stream are within Wallowa-Whitman National Forest. A memorandum of agreement with the U.S. Forest Service would likely suffice to implement the needed details.

2.5.5 Metolius River

- ***Need:***

The existing management plan for the Metolius River is contained in the Land and Resource Management Plan for Deschutes National Forest (U.S. Forest Service 1990) under the authority of the Forest Service. The Metolius River is managed under the following goal: *"to protect and enhance those outstandingly remarkable values that qualified segments of the Metolius River for inclusion in the National Wild and Scenic Rivers System."* Additionally, the entire Metolius basin is managed as the Metolius Conservation Area. Under the plan for the river itself, most activities which would affect water quality in the river are curtailed or prohibited. However the plan does allow for mining activities, which *"must be conducted in a manner that minimizes surface disturbance, sedimentation and pollution, and visual impairment."* Placer mining activities are seen by this Department as generally inconsistent with the stated goal of the management plan.

- ***Ramifications:***

There would be some ramifications to designating the Metolius River an ORW. Generally, the streams involved are headwaters, and most of the watershed above 4,800 feet in elevation lies within Mount Jefferson, Washington or Three Sisters wilderness areas (Riehle 1993). Timber harvest in the basin left a substantial number of clear cuts in the basin in the 1970s and 80s. Any activities which increase stream temperatures or turbidity would certainly be impacted by the designation of this stream as an ORW. These activities would include road building, timber harvest, and placer mining.

- ***Managerial Feasibility:***

The managerial feasibility of ORW status on the Metolius River should be near optimal. The sole landowner is the U.S. Forest Service, which is presently developing a management plan for the Wild and Scenic segment of the river. Because of the river's notoriety as a fly fishing location, the awareness of water quality as an issue is expected to be very high. An ORW management plan could presumably be implemented through a memorandum of agreement with the Forest Service.

2.5.6 Minam River

- ***Need:***

The existing management plan for the Minam River is contained in the Land and Resource Management Plan for Wallowa-Whitman National Forest (U.S. Forest Service 1990) under the authority of the Forest Service. The management of the Wild and Scenic Rivers in Wallowa Whitman N. F. is *"intended to preserve the special values of those rivers or river segments which are part of the National wild and Scenic Rivers System... The objective is to maintain the characteristics which contributed to their classification."* The entirety of the Wild and Scenic segment of the Minam River is within the Eagle Cap Wilderness Area, and therefore at minimal risk.

- ***Ramifications:***

Designation of the Minam River as an ORW should not have any significant ramifications. There are no significantly degrading activities within the wilderness area, and there are no upstream areas as these are headwaters.

- ***Managerial Feasibility:***

Managerial feasibility for the Minam River is near ideal. The sole landowner is the U.S. Forest Service, whose management plan is consistent with ORW designation. The ORW management plan could be implemented through a memorandum of agreement between the Department and the U.S. Forest Service.

2.5.7 North Fork John Day River

- ***Need:***

The existing management plans for the North Fork of the John Day River are contained in the Land and Resource Management Plans for Umatilla National Forest (U.S. Forest Service 1990a) and Wallowa-Whitman National Forest (U.S. Forest Service 1990c) under the authority of the U.S. Forest Service. Eleven river miles are within Wallowa-Whitman National Forest and the remaining 43.1 miles are within Umatilla National Forest. All but 3.5 miles of headwaters in Wallowa Whitman National Forest are within the boundaries of the North Fork John Day Wilderness Area (classified Wild). Within Umatilla National Forest, 24.3 miles are within the North Fork John Day Wilderness area (classified Wild), and 18.8 miles are outside the wilderness area (10.5 miles classified Scenic and 8.3 miles classified Recreational). While activities in the wilderness area (Wild River segments) are almost totally restricted, limited activities, which include timber harvest and livestock grazing, are permitted in the Scenic and Recreational river segments.

- ***Ramifications:***

There would be significant ramifications to the designation of the North Fork John Day River as an ORW. There would be no effect on activities in the Wild segments as they are managed as wilderness areas, but on the downstream segments there could be ramifications to Forest Service permitted activities. Most importantly, there is a considerable amount of land in private ownership in the drainage for the 8.3 miles of the river classified and managed as Recreational. Water quality of the streams draining into the North Fork John Day would need to meet the nondegradation standard, including Meadow Brook, which flows through the unincorporated town of Dale.

- ***Managerial Feasibility:***

Management of the North Fork John Day as an ORW would be somewhat complicated by the fact that it has the full range of Wild and Scenic designation and greatly complicated because there is pri-

vate ownership in the lower drainages. There would be no anticipated difficulty with the headwaters, which are in the Wallowa-Whitman and Umatilla National Forest-administered portions of the North Fork John Day Wilderness Area. Downstream management would become increasingly more problematic with the Scenic and then Recreational management portions of the river, but any inconsistencies in management direction could be resolved through a memorandum of agreement with Umatilla National Forest. Some information on the status of degradation and present activities would be required to formulate a management plan for the private drainages. A viable alternative might be to consider only the Wild and Scenic portions for ORW designation.

2.5.8 North Fork Sprague River

- ***Need:***

The existing management plan for the North Fork of the Sprague River is contained in the Land and Resource Management Plan for Fremont National Forest (U.S. Forest Service 1989a) under the authority of the U.S. Forest Service. This plan includes the upper 15 miles of the river which are classified as Scenic. Bull trout are thought to be extirpated from this reach (U.S. Forest Service 1989b). The rationale of designating this segment an ORW based on its value as bull trout, even in the future, is flawed. This is because the drainages which still host bull trout join the North Fork of the Sprague River well downstream of the Wild and Scenic portion (Ziller 1992), and the intervening reach is degraded. If an ORW strategy were to be successful in addressing survival of the Klamath basin bull trout stock, it would need to include a far larger segment of the North Fork Sprague River basin.

- ***Ramifications:***

The ramifications of designating the North Fork Sprague River an ORW appear to be minimal. The nominated reach is contiguous to Gearhart Mountain Wilderness Area and the management objectives of the Forest Service are assumed to be consistent with ORW status.

- ***Managerial Feasibility:***

Since the sole landowner on the nominated reach is the U.S. Forest Service, managerial feasibility is expected to be high. As with the other Forest Service administered nominations, a memorandum of agreement would likely suffice to implement the ORW management plan.

2.5.9 Waldo Lake

- ***Need:***

The lake is totally within Willamette National Forest, and thus, also subject to the Land and Resource Management Plan for Willamette National Forest (U.S. Forest Service 1990) under the authority of the Forest Service. Almost all of the area immediately surrounding the lake has been designated "Dispersed Recreation—Semiprimitive Nonmotorized." Corridors of the designation "Dispersed Recreation—Semiprimitive Motorized" extend to the two campground areas on the east shore of the lake (Shadow Bay and North Waldo-Islet). The activities allowed within these designations should be, in general, nondeleterious to the health of the lake. A caveat to this statement is that the latter designation allows the deployment of motorized boats to and on the lake. Impacts had not yet been attributed to motor boats as of 1986 (State Parks and Recreation Division 1986).

The management plan for the Waldo Lake Wilderness Area is also contained in the management plan for Willamette National Forest (U.S. Forest Service 1990). The Wilderness Area totals over 37,000 acres to the north and west of the lake. The goal of Wilderness management is to *"balance the needs for unmodified natural environments with recreational, scientific, biological and educational values. A management emphasis on conservation and restraint is applied to Wilderness areas to assure that nonconforming uses have minimal impacts on the ecosystem as specified in the Wilderness Act and other legislation."* Activities allowed under this management emphasis are generally consistent with maintaining water quality in the lake. However, since Waldo Lake has a state, instead of a federal, scenic designation, the U.S. Forest Service has no specific management plan for the lake itself.

A management plan for Waldo Lake has been recommended by the State Parks and Recreation Division (1986), now the Oregon Parks and Recreation Department. The recommended plan subdivided Waldo Lake into two classifications: Waldo Lake Natural Area and Waldo Lake Scenic Area. These classifications are intended to *"allow Waldo Lake to be managed in such a manner to protect and enhance the pure quality of the water, the high quality recreation experience, and the primitive scenic grandeur of the area as seen*

Table 2-2: Summary of Factors and Staff Findings

Name	Technical Factors			Policy Factors		Finding
	Parameters Identified	Data Adequate	Technically Feasible	Established Need	Managerially Feasible	
Crater Lake	Yes	Yes	Yes	No	Yes	Yes
Darlingtonia Wayside	Yes	No	No	No	?	No
Donner und Blitzen River	Yes	No	?	Yes?	Yes	No
Eagle Creek	Yes	No	?	No	Yes	No
Metolius River	Yes	No	?	No	Yes	No
Minam River	Yes	No	?	No	Yes	No
North Fork John Day River	Yes	No	?	No	Yes	No
North Fork Sprague	Yes	No	?	No	Yes	No
Waldo Lake	Yes	Yes	Yes	No	Yes	Yes

from the Lake." This management plan is implemented through a memorandum of understanding with the U.S. Forest Service.

- ***Ramifications:***

The policy ramifications of designating Waldo Lake an ORW are straightforward. Though it does not enjoy the national stature of Crater Lake, Waldo Lake is a logical choice for ORW status based on its standing in limnological terms. It is possible that maintaining the water quality values in Waldo Lake would require the eventual curtailment of motorized boat activity.

- ***Managerial Feasibility:***

Designation of Waldo Lake as an ORW suggests no problems in terms of managerial feasibility. The sole land manager is the U.S. Forest Service, whose management objectives are in no way inconsistent with ORW status. A memorandum of agreement or understanding should serve to implement the ORW management plan.

2.6 STAFF FINDINGS

The discussion of the preceding sections and resulting staff findings are summarized below and in Table 2-2. The Department finds that Crater Lake and Waldo Lake should be designated as Outstanding Resource Waters, and that the Donner und Blitzen be again considered for designation during the 1995-97 triennial water quality standards review.

2.6.1 Crater Lake

The Department strongly recommends that Crater Lake be designated an Outstanding Resource Water. Due to the 10-year study conducted by the U.S. Park Service, the limnology is adequately described to support the needs of ORW designation. The physical and administrative status of the lake make it both technically and managerially feasible for ORW purposes. While the lake is not thought to be at risk, there has been and remains a considerable amount of concern around the issue of water quality. The stated management objectives of the Park Service are certainly consistent with ORW status. This waterbody should have the highest priority for becoming an ORW.

2.6.2 Darlingtonia Wayside

The Department recommends that Darlingtonia Wayside not be designated an ORW. First, the site is not truly outstanding, based on the botanical occurrence of the California pitcher plant. Second, no data on water quality and/or hydrology are available. Third, maintenance of the site as a bog is not technically feasible, based on its successional state.

2.6.3 Donner und Blitzen River

The Department recommends that the headwaters of the Donner und Blitzen River be reconsidered for ORW designation during the 1995-1997 triennial water quality standards review. The existing data are not adequate to support designation at this time, but there is some need based on documented habitat and water quality degrada-

tion. The Department proposes that it establish a memorandum of understanding with the Bureau of Land Management to analyze the existing data and acquire new information, as stipulated in the management plan (BLM 1993).

2.6.4 Eagle Creek

The Department recommends that Eagle Creek not be designated an Outstanding Resource Water based on the lack of adequate information.

2.6.5 Metolius River

The Department recommends that the Metolius River not be designated an Outstanding Resource Water based the lack of adequate information.

2.6.6 Minam River

The Department recommends that the Minam River not be designated an Outstanding Resource Water based on the lack of adequate information.

2.6.7 North Fork John Day River

The Department recommends that the North Fork of the John Day River not be designated an Outstanding Resource Water based on the lack of adequate information.

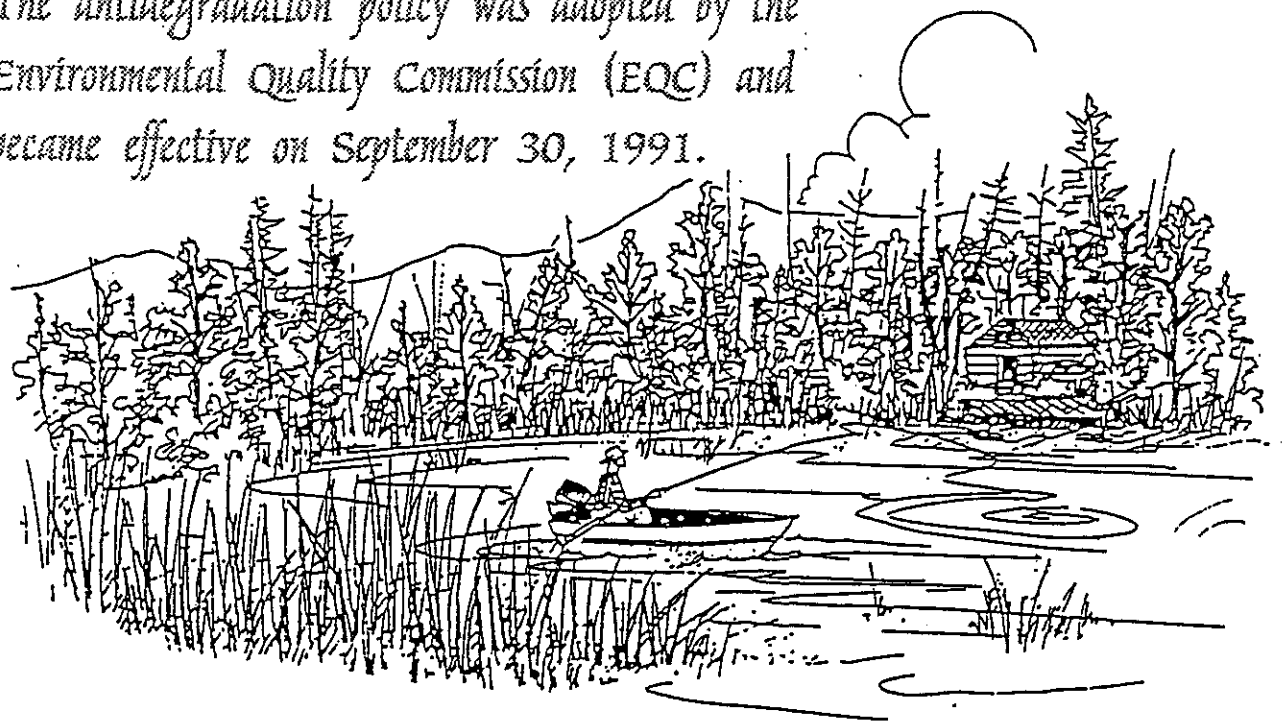
2.6.8 North Fork Sprague River

The Department recommends that the North Fork of the Sprague River not be designated an Outstanding Resource Water based on the lack of adequate information. The Department will work with the Oregon Department of Fish and Wildlife on addressing the survival of the Klamath basin stock of bull trout.

2.6.9 Waldo Lake

The Department recommends that Waldo Lake be designated an Outstanding Resource Water. It is noteworthy that this lake is one of the purest in the world, and is at some level of risk due to the anthropogenic activities conducted there, including the presence of power boats on the lake. The limnological data are adequate to establish the water quality parameters of concern. Management is limited to one agency, the U.S. Forest Service, whose management objectives are not inconsistent with its designation as an ORW.

The antidegradation policy was adopted by the Environmental Quality Commission (EQC) and became effective on September 30, 1991.



3

NOMINATION AND DESIGNATION PROCESS

Subsequent to the 1992-1994 Triennial Water Quality Standards Review, all waters of the state will be eligible for nomination as ORWs. The nomination and designation process presented below is intended as an iterative component of the triennial water quality standards review and to supersede the process and criteria used in Section 2 of this issue paper.

3.1 POLICY ADVISORY COMMITTEE PROCESS

The Policy Advisory Committee (PAC) was established to provide balanced input from diverse groups having a stake in the quality of the state's waters. Committee membership is shown in Table 3-1.

PAC members agreed that recommendations should be consensual if possible. Votes taken on most issues were nearly unanimous; those

Table 3-1: Policy Advisory Committee

NAME	AFFILIATION
Craig Johnston, Chair	Northwestern School of Law
Ward Armstrong	Oregon Forest Industries Council
Bill Bakke	Oregon Trout
Nina Bell	Northwest Environmental Advocates
Bill Gaffi	Association of Clean Water Agencies
Bob Gilbert	James River Corporation
Jim Griggs	Confederated Tribes of the Warm Springs Reservation
Mike Houck	Urban Streams Council
Sha Spady	(Unaffiliated)
Terry Smith	League of Oregon Cities
Larry Trosi	Oregon Farm Bureau
Benno Warkenton	Oregon State University
Jim Whitty	Association of Oregon Industries

casting dissenting votes were invited to propose additional alternatives that would address their concerns, or write minority reports for inclusion in this paper. In the few cases when the group was evenly divided over an issue, no recommendation was made. A list of interested parties, including nearly 300 names, was compiled. All parties received notices of meetings. Meetings were open to the public, and a public comment period was provided during the afternoon.

The PAC was charged with developing the nomination/designation process for ORWs considered under future triennial reviews. The PAC appointed a subcommittee consisting of Ward Armstrong, Nina Bell, Bill Perry, and Kathleen Williams (alternate for Bill Bakke) to craft a draft nomination/designation process to present to the entire body. The subcommittee developed the process presented below, which was adopted by the PAC with only minor modifications.

3.2 POLICY ISSUES CONSIDERED

3.2.1 Level of Protection

The level of protection is the central policy issue for ORWs. Oregon's antidegradation rule, discussed in Section 1.1.1, establishes the basic nondegradation approach: *"existing water quality and water quality values shall be maintained and protected."* This is interpreted to indicate that where assimilative capacity for a parameter exists in excess of the standard, that remaining assimilative capacity will be maintained. It should be noted here that not all water quality standards are to be maintained on a nondegradation status in a given ORW: only those that *"affect the ecological integrity or critical habitat or...are vital to the unique character"* are to be awarded this general level of protection.

Two classes of Outstanding Resource Waters are envisioned, based on the level of protection within the nondegradation approach. They are consistent with EPA's guidance for Tier 2.5 and Tier 3.0, and are named "Outstanding State Resource Waters" and "Outstanding National Resource Waters", respectively. Tier 2.5 waters would allow creative approaches such as offsets or trading subsequent to increases in available assimilative capacity. Tier 3.0 waters would not allow such approaches, and gains in assimilative capacity would not be available to sources for degradation. Subject to EPA antibacksliding policies, Tier 2.5 designations might be reversible, whereas Tier 3.0 designations would be permanent. Thus, Tier 2.5 would create a level of protection greater than that for high quality waters, but less than that for Tier 3.0 ORWs. Also, Tier 2.5 could involve a number of somewhat different approaches for different waterbodies, whereas Tier 3.0 designation would be invariably constrained.

The level and timing of interim protection for petitioned or nominated waterbodies is also at issue. There should be a reasonable level of interim protection at some early stage in the process, when it is recognized that a particular body of water meets the general criteria for ORW designation. This protection should be adequate to ensure that no degradation takes place during the remainder of the process.

3.2.2 Departmental Resource Limitations

It is generally recognized that the Water Quality Division of the Department has far more work than resources. This ongoing situation requires prioritization of work and has a corollary that some work does not get done. There are likely to be more petitions and/or nominations for ORWs than could possibly be processed and implemented by the Departmental staff. The effect of this limitation on the process is perceived as a significant issue because it logically forces prioritization of ORW activities at some point in the nomination/designation process.

3.3 STEPS IN THE NOMINATION/DESIGNATION PROCESS

The PAC envisions an ORW nomination/designation process as outlined in Table 3-2. The portion of the process from petition through designation is estimated at 3 years in duration and is intended to be included in the triennial water quality standards review. Completion of the management plan and subsequent approval by the Environmental Quality Commission are estimated at a maximum of an additional 2 years. Thus, the entire process would last up to 5 years.

3.3.1 Petition

At the beginning of the Department's triennial review, the public announcement would include an invitation to the public, interest groups, and agencies to petition for ORW status for waterbodies of their choice. Information would be circulated in the announcement on how to obtain the petition form and instructions from the Department. A period of 6 months would be open for ORW petitions at the beginning of each triennial review.

Table 3-2: Proposed Milestones and Timeline for Proposed ORW Nomination/Designation Process

Process	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
Allotted Time	6 Months	6 Months	2 Months	18 Months	4 Months	Not More Than 2 Years	
Activity	Proposed Nomination; "Petition"	DEQ Evaluation Against Criteria	EQC Nomination	Extensive Public Evaluation & Staff Review	EQC Designation	Complete Management Plan	EQC Plan Approval

The PAC recognized that although the petitioning portion of the process would be open for 6 months every 3 years or so, existing EQC rules provide for an expedited emergency rule process. Thus, in true emergencies, petitioners could approach the EQC outside the normal petition process in order to gain interim protection.

A draft petition form is included in Appendix A of this issue paper. The petition form would request sufficient information for the EQC to fully consider it for nomination, and would encourage submission of all available pertinent data. Essential information in the petition would include:

- Identification of the special character of the body of water;
- If at all possible, the related water quality parameters; and
- Any information concerning imminent degradation or activity.

Nominal application information would include any available information and data on the natural history and limnology of, and anthropogenic impacts to, the waterbody.

3.3.2 Department Evaluation Against Criteria

The proposed process allows a second 6-month period for the Department to determine which applications will be evaluated, which meet the ORW criteria, and which might need immediate action. First, the Department would determine which applications are accepted for the nomination process. Reasons for rejection would include ascertaining that: (1) the application is incomplete; (2) natural processes are such that water quality values are declining over time and nothing can be done to improve them; and (3) an "Act of God" has eliminated the values for which protection is being sought.

Second, Department staff would review the accepted petitions to determine whether they qualify for designation by evaluating them against two criteria: (1) is the waterbody an outstanding resource based upon water quality attributes; and (2) is existing protection insufficient to adequately protect the water quality values related to its uniqueness? Third, staff would rank the urgency of ORW designation against the criterion of imminent degradation of water quality values. Fourth, staff would determine how much Department time and resources would be required to conduct the necessary analyses requisite to designation.

3.3.3 Environmental Quality Commission Nomination

As the third step in the proposed process, the EQC would approve or disapprove staff recommendations for nomination. Those waterbodies meeting the screening criteria in step 2, but not nominated, would remain as active petitions and would again be considered for nomination in the succeeding triennial review. Waterbodies nominated would be limited to those judged to be most urgent, and in accordance with available Department resources. Nomination by the EQC would carry a very high expectation of eventual designation.

Those waterbodies nominated by the EQC would receive interim protection immediately. This interim protection would include, but not be limited to:

- Active implementation of the high quality waters antidegradation policy;
- A requirement for EQC approval for minor permittees seeking new or increased loads for water quality parameters related to their ORW status (in addition to major permittees);
- A review of all permits for an appropriate level of interim protection; and
- Triggering of nonpoint source best management practices, including those specified in SB 1010 for agriculture.

3.3.4 Public and Staff Review

The fourth step in the proposed process would allow a one and one half year period for the extensive planning and analysis, and public participation required to support an EQC designation. This review would address three major issues. First, the water quality parameters to be controlled would need to be substantiated, with additions to, or deletions from, the preliminary list as required. Second, the management strategy for those water quality parameters would need to be identified. This would require identifying what existing or potential activities could occur without adversely affecting these parameters, and thus, the unique values of the ORW. A regulatory approach for these activities would be developed. Third, the issue of level of protection would be addressed by identifying whether the ORW should be designated as Tier 2.5 or Tier 3.0. During this phase of the process, perceived economic hardships might be addressed by moving from Tier 3.0 to Tier 2.5, thus allowing for some creativity in the use of gained assimilative capacity. Conversely, the need for increased assimilative capacity, for example, for cold water temperatures in marginal bull trout habitat, would argue strongly for Tier 3.0 status.

The extensive review process would also deal with additional issues. The suggested geographic boundaries of the nominated ORW could be adjusted at this time. Baseline conditions for the appropriate water quality parameters would be established, utilizing all possible opportunities for the acquisition of needed water quality data. Finally, the potential memoranda of agreement/understanding with the appropriate management agencies would be explored and negotiated prior to EQC designation.

3.3.5 Environmental Quality Commission Designation

The fifth step in the proposed process is envisioned as the last within the 3-year period of the triennial review. At this step, the EQC would approve or deny the designation, or remand the nomination back to staff for revision and/or representation. A denial would presumably be based on one of two criteria. One possibility is that the rationale underlying the nomination was faulty. That is, the information acquired or developed during step 4 shows that there is no need for ORW status to protect the unique water quality-related values. The second possibility is that the one or more insurmountable management problems have been identified that cannot be resolved within the existing ORW management framework. In this case, the EQC could choose to deny or hold the nomination.

Subsequent to the 1992–1994 Triennial Water Quality Standards Review, all waters of the state will be eligible for nomination as ORWs.

3.3.6 Management Plan Development

The proposed process would allow up to 2 years subsequent to EQC designation (and the triennial review) for the development of a management plan. This plan would include all of the implementation components necessary to assure maintenance of the key water quality parameters.

3.3.7 Environmental Quality Commission Management Plan Approval

The EQC would have an opportunity to review and approve or deny the management plan with this seventh and final step in the proposed process. EQC options would again include approval, denial, or remanding the plan back to staff for revision and representation.

3.4 POLICY ADVISORY COMMITTEE PREFERENCES

In addition to preferring the ORW nomination/designation process described above, the PAC prefers to delay the nomination of Crater and Waldo Lakes until the initial set of nominations in that process. The PAC would prefer that the nomination of these two waterbodies be made an automatic part of this initial set of nominations.

4

RECOMMENDATIONS

The Department of Environmental Quality's recommendation for a Outstanding Resource Waters standard was developed using the information provided in this issue paper, the Technical and Policy Advisory Committee's preferences, and the public comment obtained during the Public Workshops.

Technical Advisory Committee Preference: The Technical Advisory Committee was used as a peer review group on this particular issue paper and were not asked to provide a preference.

Policy Advisory Committee Preferences: The Policy Advisory Committee prefers the nomination/designation process described in Section 2 and suggest delaying the nomination of Crater and Waldo Lakes until the initial set of nominations in that process is made.

Summary of Public Comment from Public Workshops: In May 1995, public workshops were held in La Grande, Bend, Portland, Medford, Eugene, and Newport. Presentations were given on each of the standards under review and a discussion period was held. A total of 46 members of the public participated, representing: local, state, and federal agencies; industry; environmental groups; agriculture; forestry; consulting firms; and unaffiliated citizens. Written comments were also accepted in addition to participation in the workshops.

The following issues were raised with respect to the Advisory Committee's recommendations for an Outstanding Resource Waters implementation process:

1. **Issue:** State and federal-designated wild and scenic waterways should be automatically designated as ORWs.

   Department Response: Staff do not believe that a wild and scenic designation implies a need for ORW status. Wild and scenic designations are based in part on the land uses surrounding the waterbody, the appearance of the riparian area, and other recreational values that are not related to water quality. ORWs are based on beneficial uses specifically related to water quality parameters which the Department regulates. Therefore, it is appropriate for wild and scenic waterways to go through the full nomination and designation process.

2. **Issue:** The Outstanding Resource Waters policy is not needed: existing standards are fully protective of the water quality characteristics under the regulatory authority of the EQC.

   Department Response: Water quality standards are generally set to provide protection at a level where no *measurable* impacts to beneficial uses can be detected. Although no impacts can be measured, some human-induced risk normally exists whenever water quality differs from that which existed

prior to the advent of anthropogenic activity. For this reason, society (via a public process and decision of the EQC) may determine that full protection is not enough, and a higher standard should be maintained.

3. **Issue:** ORWs should be developed so that beneficial uses other than those which inspired the designation are also fully protected. For example, the Bull Run watershed should not be designated an ORW for some other beneficial use at the expense of municipal drinking water. Local interests should be included in the designation process to assure that important uses are not compromised.

Department Response: Staff agree that whenever possible one beneficial use should not be protected to the detriment of other designated uses. However, the *Clean Water Act* specifies that the most sensitive beneficial use should be protected. One of the qualifications of an ORW designation is that the specially protected use should represent a unique resource to the state or nation. Because of this uniqueness, the ORW-protected use would be considered the most sensitive use; other beneficial uses could be allowed to suffer as a consequence. Using Waldo Lake as an example, if the Lake were designated an ORW for clarity, and breakdown products from petroleum-based hydrocarbons released by motor boats were shown to reduce that clarity, future use of motorized vehicles on the Lake might be prohibited.

Notwithstanding the above reasoning, beneficial uses with wide societal support are unlikely to suffer because of an ORW designation. The ORW designation process recommended by the PAC provides a number of opportunities for public involvement. An Advisory Committee representing the interested parties would be established and public hearings would be held prior to an EQC designation decision. Additionally, the success of any management plan would depend on the buy-in of those individuals and agencies who are called upon to implement the plan.

The Department agrees with the recommendations of the Policy Advisory Committee regarding a nomination and designation process for implementation of the Outstanding Resource Waters policy.

4. **Issue:** More specific criteria and procedures should be developed in the draft rule than are present in the Issue Paper. For example, the potential interim potection measures imposed upon EQC nomination should be further described.

Department Response: Implementation guidance will be developed that provides a greater level of detail than that provided by the PAC recommendations. However, it should be noted that the ORW recommendations will not result in additional rule language. The Outstanding Resource Waters policy is part of the Antidegradation Policy mandated by EPA. The existing rule language is nearly identical to that suggested by EPA; it was not considered for revision during this Review.

Department of Environmental Quality Recommendation: The Department agrees with the recommendations of the Policy Advisory Committee regarding a nomination and designation process for implementation of the Outstanding Resource Waters policy. Staff will produce a guidance manual that outlines the steps required for designation.

5

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APPENDIX

A

Outstanding Resource Waters: Final Implementation Plan (1991)

(Nomination Cover Form & Instruction Sheet)

APPENDIX A

OUTSTANDING RESOURCE WATERS: FINAL IMPLEMENTATION PLAN (1991)

In order to identify, nominate, and designate high quality waters as Outstanding Resource Waters, the following steps will be taken to implement the antidegradation policy. At this time, staff resources are limited. The implementation plan will be phased in as resources and data are available.

1. Establish an ORW Working Committee with representatives appointed by the Director of DEQ. These representatives should be from the recreation/environmental community, state and federal agencies, and representatives from industry and tribes, or other appropriate affected agencies, or organizations.

2. Define the water quality criteria that will be used to judge whether a waterbody needs to be designated as an ORW (for example, waters that provide critical habitat, exceptional pristine water quality, exceptional recreational opportunities, and/or already designated by other state or federal agencies as a special waterbody, etc.). Develop a point and ranking system in order to prioritize the waterbody segments.

3. Identify stream segments/lakes of concern that meet the criteria where data is available. Identify and prioritize stream segments/lakes that need further monitoring information gathered to determine if they should be listed as candidate waters.

4. Conduct public meetings on the candidate stream segments/lakes to obtain additional information about the identified stream segments and relative priority for protection. Determine if a basin by basin approach will be feasible, or whether the highest priority waterbodies statewide will be identified, with the amount of resources available determining the level of effort.

5. Identify the types of management plan that may be needed for the stream segments/lakes. Assure cooperation and involvement from affected parties. A management plan is intended to be a document describing the waterbody, the type of activities that may be allowed or prohibited in order to protect the waterbody and identification of responsibilities for protecting those waters. If the waterbody is on federal or state lands, draft memoranda of agreement with appropriate agencies to be used to establish the management plans.

6. Present the priority candidate list, the water quality information, and management plan for the waterbodies identified to the EQC for adoption.

7. Establish memoranda of agreement with appropriate local, state or federal agencies for implementing the management plans.

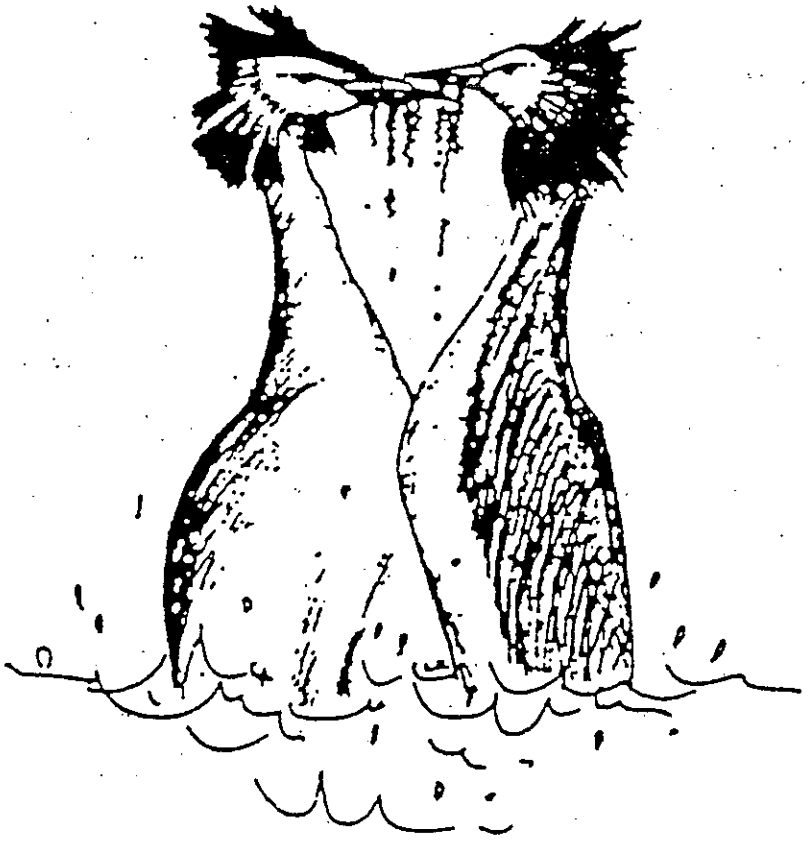
8. Management plans should be designed to protect and enhance the values of the waterbody by identifying the kinds and amounts of public use the

waterbody can sustain without impact to the values for which it was designated. Identification of special values or beneficial uses, level of water quality needed to protect those values and uses, and a management approach to restrict uses will be needed using a watershed protection approach. Land uses existing at the time of designation may continue if the special resource values will be protected. However, any new uses or activities will need to be reviewed in terms of compatibility with the management plan.

9. Under OAR 340, Division 13-005 Wilderness Policy, the Department must *"maintain the environment of wilderness areas essentially at a pristine state free from air, water and noise pollution."* Also in OAR 340-13-015 and -020, it states that no person shall commence activities which cause emissions of water pollutants, or may discharge wastes or conduct activities that cause measurable increases in color, turbidity, temperature, or bacterial contamination; a measurable decrease in dissolved oxygen; a change in pH; or any toxic pollutants.

Given this policy and the Department's desires to begin gathering information for appropriate designations, the Department recommends that information related to waterbodies located in wilderness areas, State Scenic Waterways, and Federal Wild and Scenic Rivers be evaluated with the first year after adoption of the antidegradation policy. Other waterbodies will be considered for designation based on the recommendations of the ORW Review Committee, public review, and/or staff resources.

The implementation plan will be phased in as resources and data are available.



FINAL

State of Oregon
Department of Environmental Quality

OUTSTANDING RESOURCE WATERS NOMINATION

COVER SHEET

Name: _____

Organization (if appropriate): _____

Waterbody Nominated: _____

County or Counties: _____

River Miles (if appropriate): _____

Key Beneficial Use(s): _____

_____

_____

Associated Water Quality Value(s): _____

_____

_____

Is there a threat to existing water quality? _____

_____

_____

_____

_____

Names of other sponsoring groups: _____

_____

_____

_____

_____

Signature: _____ Date: _____

FINAL

State of Oregon
Department of Environmental Quality

OUTSTANDING RESOURCE WATERS NOMINATION

INSTRUCTION SHEET

The Department of Environmental Quality (DEQ) is responsible for implementing Oregon's water quality standards, which include the Antidegradation Policy (OAR 340-41-026). Under this policy (copy attached), the Environmental Quality Commission (EQC) may specially designate certain waterbodies as "outstanding resource waters". Nominations for this classification are made through the DEQ as part of the Triennial Water Quality Standards Review. The DEQ must screen these nominations and provide a list of nominated waterbodies for the EQC.

Outstanding resource waters receive the highest level of water quality protection that can be provided by the state. In order to make a designation, the EQC requires enough information to: (1) clearly identify the body of water involved; (2) identify the beneficial use(s) and understand how they are related to the waterbody's unique character; and (3) understand how the unique character of the waterbody is supported and/or affected by specific water quality values. Your complete answers to the instructions and questions below will allow the DEQ staff to process your nomination.

1. Completely identify the waterbody nominated, including any delimiting factors such as river miles. If the nomination is for only part of a waterbody, explain why, and describe the rationale for the delimitation. Include geographic description (that is, township, range and station), if known.

2. Describe the unique character of the waterbody. Cite or provide any data or articles to substantiate this claim.

3. Describe the beneficial use(s) related to the unique character. Beneficial uses include: domestic and industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing, salmonid fish spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydroelectric power, and commercial navigation and transportation. Be specific and complete. For example, if fishing is the beneficial use, include information on the target species and on the fishery (numbers of fishermen, hours fished, fish taken, etc.).

4. Identify any sources of data on the beneficial use(s). Does your organization, if you represent one, keep any records on the use of the waterbody? Include copies if feasible.

5. Explain how the unique character of the waterbody is related to water quality. Try to identify specific water quality parameters associated with this character or value. Cite or provide any scientific or popular documentation on water quality.

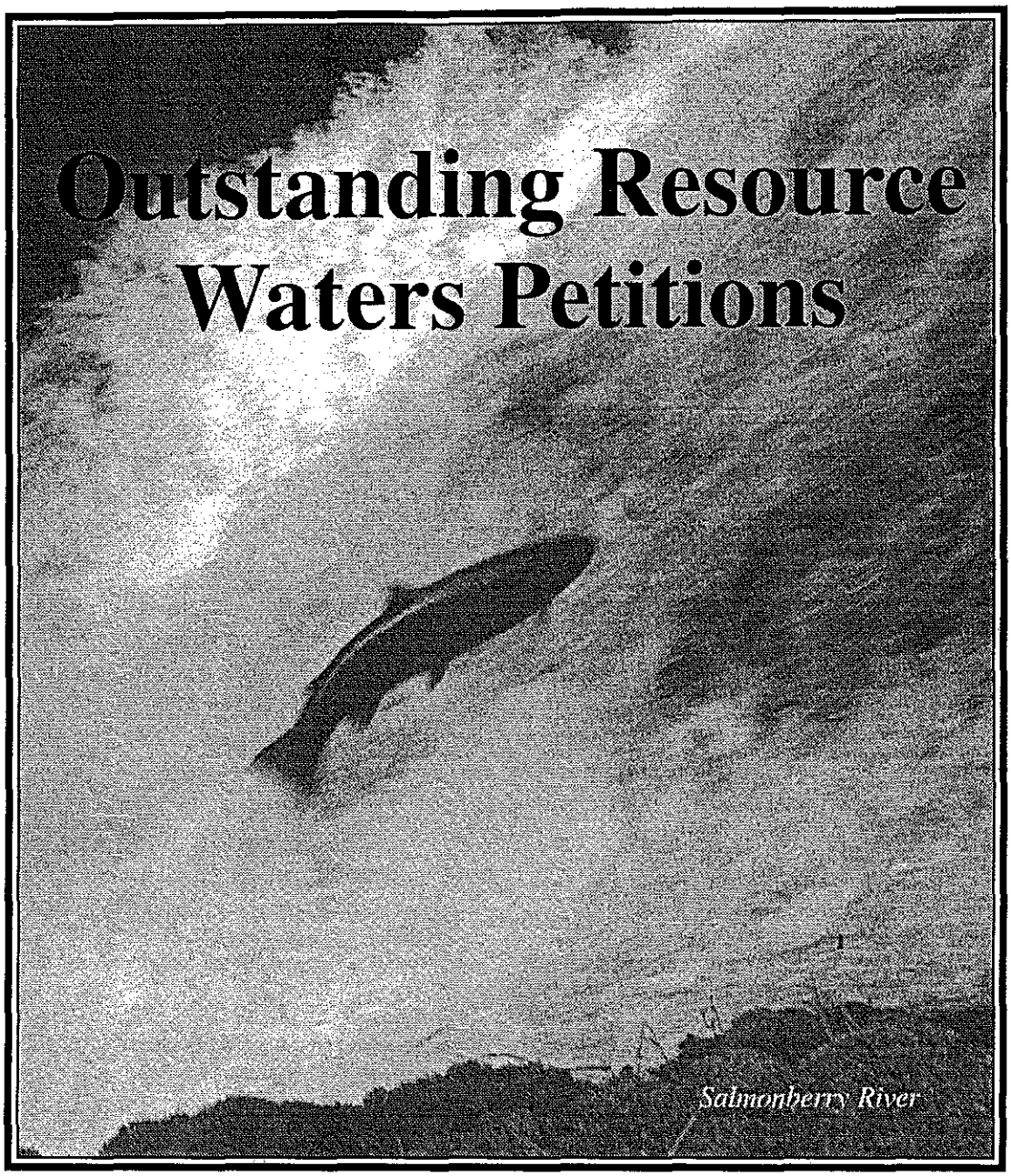
6. Has the water quality affecting the beneficial use or unique character been impacted in the past, or is it being impacted now? Again, provide any documentation.

7. Is there a specific impending activity from which you are seeking to protect this body of water?

8. Does the waterbody presently have any special state or federal status, such as Wild and Scenic Rivers? Is there an existing management plan for the area which will affect water quality?

9. Can you provide any other information germane to the Outstanding Resource Waters designation process?

Outstanding Resource Waters Petitions



Oregon Trout

National Wildlife Federation

Northwest Environmental Advocates

December 15, 1997

Langdon Marsh
Director
Oregon Department of Environmental Quality
811 S.W. Sixth Avenue
Portland, Oregon 97204

Dear Mr. Marsh,

We are pleased to submit to you to administer for the Environmental Quality Commission this petition for rulemaking, which proposes ten waterbodies in the State of Oregon as "Outstanding Resource Waters."

As you know, the purpose of the Outstanding Resource Water rule is to include in a special, protective category those waters in Oregon that have existing high water quality and that constitute an outstanding state or national resource. Using that and other relevant criteria, this petition proposes for designation all or segments of the Donner und Blitzen River, the Elk River, the Kiltches River, the Little North Fork of the Santiam River, the North Fork of the John Day River, the North Fork of the Trask River, the Salmonberry River, Steamboat Creek, the Upper North Santiam River, and Waldo Lake watersheds. These waterbodies are undeniably some of the "best of what is left" in Oregon.

The Department has in many respects been a leader among public agencies in its efforts and successes in protecting and restoring water quality in Oregon. We look forward to working constructively with you in public rulemaking proceedings so that Oregonians may fulfill the great opportunity to protect these special waterbodies as Outstanding Resource Waters.

Sincerely,

Geoff Pampush
Executive Director
Oregon Trout

Peter M.K. Frost
Acting Center Director
National Wildlife Federation

Nina Bell
Executive Director
Northwest Environmental Advocates

BEFORE THE OREGON ENVIRONMENTAL QUALITY COMMISSION

Oregon Trout, Inc.; National Wildlife Federation; Northwest Environmental Advocates; Petitioners.	)	Petition for Rulemaking

Pursuant to OAR 340-11-046 and OAR 137-01-070, Oregon Trout, Inc., National Wildlife Federation, and Northwest Environmental Advocates ("Petitioners") respectfully submit this petition for rulemaking. Petitioners request that the Oregon Environmental Quality Commission ("EQC") promulgate a rule or amend an existing rule to designate ten waterbodies in Oregon as "Outstanding Resource Waters" ("ORWs") under the state anti-degradation policy, OAR 340-41-026. The new or amended rule would state:

> "(_) The Commission hereby designates the following waterbodies as Outstanding Resource Waters:
>
> (_) Donner und Blitzen River, including the mainstem (from river mile 44.75 [at Page Springs dam] to river mile 58.25) in Township 33S and Range 32 ½ E; the Little Blitzen River (from river mile 0 to river mile 12.5) in Township 33 S and Range 32 ½ E, 32 3/4 E, 33 E; the South Fork Blitzen (from river mile 0 to river mile 16.5) in Township 34 S and Range 32 3/4 and Township 33 S-34 S and Range 32 ½ E; Big Indian Creek (from river mile 0 to river mile 10) in Township 33 S and Range 32 3/4 E-33 E and Township 34 S and Range 32 3/4 E; Little Indian Creek (from river mile 0 to river mile 3.7) in Township 33 S and Range 33 E and Township 34 S and Range 32 3/4 E; Fish Creek (from river mile 0 to river mile 13.25) in Township 32 S and Range 32 ½ E, 32 3/4 E, 33 E and Township 32 ½ S and Range 33 E and Township 33 S and Range 32 ½ E, 32 3/4 E, 33 E; Ankle Creek (from river mile 0 to river mile 6.5) in Township 33-34 S and Range 32 3/4 E; Mud Creek (from river mile 0 to river mile 4) in Township 33-34 S and Range 32 3/4 E; and Deep Creek (from river mile 0 to river

mile 3) in Township 33-34 S and Range 32 3/4 E.

( ) Elk River, including the mainstem (from river mile 10 to river mile 31) in Township 32 S-33 S and Range 14 W-15 W, Rock Creek (from the mouth to river mile 1) in Township 32 S and Range 14 W, Anvil Creek (from the mouth to river mile 1) in Township 33 S and Range 14 W, Bald Mountain Creek (from the mouth to river mile 7) in Township 33 S and Range 14 W, Red Cedar Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, Panther Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, Butler Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, Blackberry Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, and the North Fork (from the mouth to river mile 5) in Township 33 S and Range 13 W.

( ) Kilchis River, including the mainstem from the confluence of the North and South Forks of the Kilchis to its confluence with Clear Creek in Township 1 N-2 N and Range 9W; the North Fork of the Kilchis River (from the mouth to the headwaters) in Township 1 N-2 N and Range 8 W-9 W; the South Fork of the Kilchis River (from the mouth to the headwaters) in Township 1 N and Range 8 W-9 W; the Little South Fork of the Kilchis (from the mouth to the headwaters) in Township 1 N and Range 8 W-9 W, Coal Creek (from the mouth to the headwaters) in Township 1 N and Range 8 W-9 W; Clear Creek (from the mouth to the headwaters) in Township 1 S and Range 9 W; and Schroeder Creek (from the mouth to the headwaters) in Township 2 N and Range 8 W.

( ) Little North Santiam River, from the mouth to the confluence of Battle Axe Creek and Opal Creek at river mile 26, in Township 8 S and Range 4 E-5 E.

( ) North Fork of the John Day River, from the headwaters to the confluence with the John Day River in Township 7 S-9 S and Range 26 E-36 E.

( ) North Fork of the Trask River, including the mainstem (from the headwaters to the confluence of the mainstem of the Trask River, approximately 17 miles in length), Bark Shanty Creek (from the mouth to the headwaters) in Township 1 S-2 S to Range 7 W, Clear Creek (from the mouth to the headwaters) in Township 1 S and Range 7 W, and the Middle Fork of the North Fork (from the mouth to Barney Reservoir) in Township 1 S and Range 6 W.

( ) Salmonberry River, from the mainstem (from the mouth to Pennoyer Creek at river mile 14) in Township 3 N and Range 6 W-8 W, the South Fork

(from the mouth to headwaters at river mile 3) in Township 2 N-3 N and Range 7 W, Ripple Creek (from the mouth to headwaters at river mile 2) in Township 2 N-3 N and Range 7 W, Wolf Creek (from the mouth to river mile 2) in Township 2 N-3 N and Range 6 W, and the North Fork (from the mouth to river mile 2) in Township 2 N-3 N and Range 6 W-7 W.

( ) Steamboat Creek, from the mainstem (from the headwaters to the confluence of the mainstem with the North Umpqua River), Canton Creek (from the mouth to the headwaters), Little Rock Creek (from the mouth to the headwaters), City Creek (from the mouth to the headwaters, including St. Peter Creek), Horse Heaven Creek (from the mouth to the headwaters), Cedar Creek (from the mouth to the headwaters), Steelhead Creek (from the mouth to the headwaters), Big Bend Creek (from the mouth to the headwaters), Reynolds Creek (from the mouth to the headwaters), Singe Creek (from the mouth to the headwaters), and Deep Creek (from the mouth to the headwaters).

( ) Upper North Santiam River, from river mile 69 to river mile 104, in Township 10 S-13 S and Range 5 E-7 E.

( ) Waldo Lake, in Township 21 S, Range 6 E."

(If an amendment to the existing rule, the language above is underlined.)

The facts and arguments to support this petition, and petitioners' propositions of law, are contained in the appended separate petitions for each of the waterbodies named above. OAR 137-01-070(1)(b) & (c).

Date: December 15, 1997.

Respectfully submitted,

Geoff Pampush
Executive Director
Oregon Trout, Inc.
117 S.W. Front Avenue
Portland, Oregon 97204
(503) 222-9290

Peter M.K. Frost
Acting Director
National Wildlife Federation
2031 S.E. Belmont Street
Portland, Oregon 97214
(503) 230-0421

Nina Bell
Executive Director
Northwest Environmental Advocates
302 Haseltine Building
133 S.W. Second Avenue
Portland, Oregon 97204
(503) 295-0490

LIST OF NOMINATED WATERBODIES

1. Donner Und Blitzen River
2. Elk River
3. Kilchis River
4. Little North Santiam River
5. North Fork of the John Day River
6. North Fork of the Trask River
7. Salmonberry River
8. Steamboat Creek Watershed
9. Upper North Santiam River
10. Waldo Lake

OUTSTANDING RESOURCE

WATER PETITION

for the

Donner Und Blitzen River

OUTSTANDING RESOURCE WATER PETITION
for the
Donner Und Blitzen River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate 88.3 miles of the Donner und Blitzen River and its tributaries as Outstanding Resource Waters ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. This includes the mainstem (from river mile 44.75 [at Page Springs dam] to river mile 58.25) in Township 33S and Range 32 ½ E; the Little Blitzen River (from river mile 0 to river mile 12.5) in Township 33 S and Range 32 ½ E, 32 3/4 E, 33 E; the South Fork Blitzen (from river mile 0 to river mile 16.5) in Township 34 S and Range 32 3/4 and Township 33 S-34 S and Range 32 ½ E; Big Indian Creek (from river mile 0 to river mile 10) in Township 33 S and Range 32 3/4 E-33 E and Township 34 S and Range 32 3/4 E; Little Indian Creek (from river mile 0 to river mile 3.7) in Township 33 S and Range 33 E and Township 34 S and Range 32 3/4 E; Fish Creek (from river mile 0 to river mile 13.25) in Township 32 S and Range 32 ½ E, 32 3/4 E, 33 E and Township 32 ½ S and Range 33 E and Township 33 S and Range 32 ½ E, 32 3/4 E, 33 E; Ankle Creek (from river mile 0 to river mile 6.5) in Township 33-34 S and Range 32 3/4 E; Mud Creek (from river mile 0 to river mile 4) in Township 33-34 S and Range 32 3/4 E; and Deep Creek (from river mile 0 to river mile 3) in Township 33-34 S and Range 32 3/4 E. This designation would largely coincide with the stream segments that Congress has designated as the federal Donner und Blitzen Wild and Scenic River. Pub. L. No. 100-557, § 102, 102 Stat. 2782 (Oct 28, 1988).

The Donner und Blitzen originates on Steens Mountain and flows west and north into Malheur Lake, where it enters the Malheur National Wildlife Refuge. The watershed drains approximately 1,000 square miles, and is within the ecoregions of the high desert mountain ranges and the high desert dry barren basins. Snowmelt and groundwater provide all of the water flow of the river. The Donner und Blitzen is within the Malheur Lake Basin, Donner und Blitzen River Sub Basin.

Most of the stream bed and adjacent lands are owned by the federal government and under the jurisdiction of the federal Bureau of Land Management ("BLM"). Of the 88.3 river miles under this petition, 65.5 river miles flow through federal public lands and 22.8 river miles flow through private lands. Of the 26,985 acres in the "river area" (generally defined as one-quarter mile back from the ordinary high water mark) adjacent to the stream segments, 20,153 acres are

publicly-owned and 6,832 acres are privately-owned. At this time, one major landowner -- Roaring Springs Ranches, Inc., which owns lands along the South Fork of the Blitzen and its tributary creeks -- is investigating a proposal to swap its lands for BLM lands outside of the watershed. The swap that would further consolidate federal public ownership of the stream bed and adjacent riparian lands in the watershed.

(2) Unique Character of the Donner und Blitzen

The Donner und Blitzen River is unique because it is one of the few rivers in the Malheur Lake Basin that supports diverse populations of healthy and at-risk fish and wildlife. The Donner und Blitzen River provides critical habitat, as defined in OAR 340-41-006(40), for a healthy stock of wild native redband trout. The State of Oregon has designated redband trout as a state sensitive species (ODFW 1996). In fact, the Oregon Department of Fish and Wildlife ("ODFW") has designated all of the Donner und Blitzen and its tributaries as a two-fish/catch-and-release stream to protect the extraordinary fishing opportunities in the watershed. "Redband trout populations in the Donner und Blitzen subbasin appear to be the most closely related to the Malheur River redband trout of any of the Malheur Lake Basin populations, although it shows unique characters indicating its several thousand years of reproductive isolation since a lava dam isolated Malheur Lake from the Malheur River" (Kostow 1995).

In addition to providing habitat for the redband trout, the Donner und Blitzen supports the resident fish species of mountain whitefish, longnose dace, mottled sculpin, and redside shiner. Among these species, "[m]ountain whitefish are the only whitefish native to Oregon" (Kostow 1995). "The presence of these different species is indicative of good stream habitat, small to moderate stream size, and good water quality" (BLM 1991).

The river corridor also contains a wide diversity of wildlife habitat, with over 250 species of amphibians, reptiles, birds, and mammals in the area (DOI 1993). Additionally, the river corridor supports twenty-two sensitive plant species (DOI 1993). A recent botanical survey of riparian areas indicated that the Donner und Blitzen crosses four distinct botanical zones and contains a diversity of rare plants and plant communities that likely "greatly exceed anything found in a similarly-sized area in the northern Great Basin" (Vander Schaff 1992).

The Donner und Blitzen River, including the parts of the river that petitioners seek to have nominated as an ORW, have been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Clarke 1997; Li et al. 1995; Oregon AFS 1993). ADA designation indicates that the AFS believes the Donner und Blitzen River should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon" (Li et al. 1995; Oregon AFS 1993). This designation is based upon the following three values:

1) *Genetic Refuge*. A "genetic refuge" is defined as a watershed with "a low incidence of exotic species or limited history of hatchery stocking that may be

important to protect examples of native aquatic assemblages." The Donner und Blitzen River is a genetic refuge for unique fauna populations of mottled sculpin (*Cottus bairdi*) and mountain whitefish (*Prosopium williamsoni*), and core populations of redband trout (*Oncorhynchus mykiss*).

2) *Highly Sensitive*. The Donner und Blitzen River is a relatively healthy watershed which is highly sensitive to disturbance or cumulative effects of current and future human uses.

3) *Connecting Corridor*. The Donner und Blitzen River is a connecting corridor. A "connecting corridor" is defined as "streams [or] watersheds that link existing protection areas with other important habitats; connect disjunct or potentially disjunct populations in a basin; or connect important habitats needed to support different life history stages for one or more populations [e.g., connect spawning with rearing habitats]" (Oregon AFS 1993).

(3) Beneficial Uses Related to the Unique Character of the Donner und Blitzen River

The beneficial uses of the Donner und Blitzen River that are directly related to the unique character of the waterbody include: (1) salmonid fish rearing (trout); (2) salmonid fish spawning (trout); (3) resident fish and aquatic life; (4) wildlife; and (5) fishing (DEQ 1997b). The Donner und Blitzen River supports these beneficial uses as the river provides critical habitat for the following species:

1) Redband trout (*Oncorhynchus mykiss ssp.*). Redband trout have been petitioned for listing under the federal Endangered Species Act ("ESA"). Redband trout are on the American Fisheries Society's list of species of concern (ODFW 1996). And ODFW has designated redband trout in the Donner und Blitzen as "vulnerable" on the Oregon sensitive species list (ODFW 1996). "Vulnerable" means redband trout are among the "[s]pecies for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases, populations are sustainable and protective measures are being implemented; in others, populations may be declining and improved protective measures are needed to maintain sustainable populations over time" (ODFW 1996). Redband trout are listed on the sensitive species list because of "[w]ater sparse climate; drought. Land and water use practices particularly in basin floors, reduce[d] habitat quality, and sever[ed] connections between streams and lakes, isolate[d] stream populations and reduce[d] abundance. Impacts through genetic introgression and competition with introduced hatchery rainbow trout" (ODFW 1996).

/ / /

2) Mottled Sculpin (*Cottus bairdi spp.*). Mottled sculpin are relatively common in the Malheur Lake basin, and occur in several stream segments in the Donner und Blitzen watershed.

3) Mountain whitefish (*Prosopium williamsoni*). The populations of mountain whitefish in the Donner und Blitzen River and Kiger Lake, just west of the Steens' summit, are the only populations in the Malheur Lake basin as a whole. About 8% of the species' composition is comprised in the mainstem Donner und Blitzen from Page Springs Dam upstream to the confluence with Big Indian Creek (ODFW 1983).

4) Longnose dace (*Rhinichthys cataractae*). Populations of longnose dace are relatively common in the upper watershed of the Donner und Blitzen; about 12% of the species' composition is comprised in these areas (ODFW 1983).

5) As noted, fishing is a popular beneficial use of the Donner und Blitzen. ODFW has designated all stream reaches covered under this petition as two-fish/catch-and-release stream segments to preserve the quality of fishing in the watershed. The quality of fishing is contingent, of course, on the survival of the resident salmonids listed above.

(4) Relationship Between the Unique Character and the Water Quality of the Donner und Blitzen River

The unique characteristic of the Donner und Blitzen River, its ability to support a diversity of aquatic species and provide critical habitat, is directly related to the high quality of its water and to the currently relatively intact watershed processes that support that quality. The water quality parameters in the river that affect ecological integrity of critical habitat are biological criteria, dissolved oxygen, habitat modification, flow modification, pH, sedimentation, temperature, and turbidity (DEQ 1996). Significant degradation of any of these parameters will jeopardize the Donner und Blitzen's ability to provide critical habitat.

DEQ should fully maintain and protect this level of water quality so that it may protect all aquatic species in the Donner und Blitzen. See OAR § 340-41-0026(1)(a)(A) (stating that where existing water quality exceeds those levels necessary to support beneficial uses, that level of water quality should be maintained and protected) (DEQ 1997c). DEQ attempts to meet this standard through water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

/ / /

1) Redband Trout:

While redband trout require cold streams mainly above valley bottoms, the species can tolerate more varied stream habitats than many other salmonids (DEQ 1996). However, redband trout are particularly sensitive to loss of riparian cover during the summer months, which causes elevated stream temperatures (Kostow 1995). Populations in the Donner und Blitzen River subbasin are "thought to be depressed due to the combined effects of habitat problems, including cattle grazing, water withdrawals and passage barriers, and the 1992 and 1994 droughts" (Kostow 1995). According to ODFW, populations have generally rebounded from the drought, and their habitat is improving since livestock have been excluded from much of the river (Bowers 1997). However, passage barriers on the Malheur National Refuge (outside of the scope of this petition) are still a "major problem" for the species in the basin (Ibid.).

The relatively healthy population of redband in the Donner und Blitzen is important because so much of the species has been extirpated elsewhere or is at high risk. The Secretaries of Agriculture and Interior have found that, for the Upper Columbia River basin as a whole, "[d]espite their broad distribution, relatively few strong resident redband populations exist. Known or predicted strong areas include 17 percent of the historical range and 24 percent of the present range. Only 30 percent of the watersheds supporting spawning and rearing populations were classified as having strong populations" (U.S. D.O.A. 1997)

2) Mottled Sculpin:

Mottled sculpin live only in cool streams. In particular, mottled sculpin do not tolerate temperatures in excess of 78.8 degrees Fahrenheit. Large gravel or rubble, and riffles are also necessary to provide cover and spawning habitat (ODFW 1996). "Populations [of mottled sculpin] are undoubtedly depressed due to recent drought in southeast Oregon, and are believed to be threatened by land management and forestry practices" (Kostow 1995).

3) Mountain Whitefish:

Mountain whitefish prefer large pools in the winter and riffle areas in the summer. The gravel of stream riffle areas provide spawning grounds for the mountain whitefish, and "[u]nlike Oregon's native salmon and trout, whitefish do not dig a bed to bury their eggs, but broadcast spawn instead" (Kostow 1995). The streams mountain whitefish prefer to inhabit are usually larger streams with average temperatures of 48-52 degrees Fahrenheit (Kostow 1995).

/ / /

4) Longnose Dace:

The longnose dace is "apparently common in swift streams of coastal and Columbia River drainages," but "[g]eographic variation has been noted in this species. . . . [N]o comprehensive systematic studies have been undertaken" (Kostow 1995).

The DEQ currently uses numeric criteria to protect the resident fishery and other beneficial uses listed above. The numeric criteria applicable to the Malheur Lake Basin are as follows:

- Dissolved Oxygen:

  From spawning until fry emergence from the gravels, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997a).

- Temperature:

  The temperature standard is 50 degrees Fahrenheit for native Oregon bull trout, 55 degrees Fahrenheit for native salmonid spawning, egg incubation, and fry emergence from the egg and from the gravels in the basin, and 64 degrees Fahrenheit for salmonid fish rearing (DEQ 1997a).

- Turbidity:

  No more than a ten percent cumulative increase in natural stream turbidities shall be allowed (DEQ 1997a).

- pH:

  Between 7.0-9.0. (DEQ 1997a).

These numeric criteria, however, may fail to protect and maintain the water quality necessary to protect the complex aquatic habitat requirements of all of the species listed above. For example, the current temperature standard for the Malheur Lake Basin, of which the Donner und Blitzen River is a part, is 64 degrees Fahrenheit for salmonid rearing and 55 degrees Fahrenheit for salmonid spawning and incubation (DEQ 1997a). However, temperatures in certain discrete, recovering stream segments of the Donner und Blitzen may be lower than the numeric standard. At a sampling station at the Page Springs Dam, near the downstream border of an area where cattle have been excluded from riparian areas for over 15 years, the mainstem Donner und Blitzen recorded temperatures of 44.6 (5\25\95), 41.9 (5\23\96), 67.6 (9\11\96), and

44.1 (5\21\97) (DEQ 1997e). Because these readings were taken during high flows from spring snowmelt or during the fall, when temperatures drop, they are not indicative of summer temperatures, during which exceedences occur every year with regularity. Nonetheless, stream temperatures in discrete places appear to be recovering to a more optimal range for beneficial uses of the river. Mountain whitefish, for example, prefer temperatures ranging from 48-52 degrees Fahrenheit (Kostow 1995).

The current temperature standard fails to fully protect and maintain beneficial uses in the Donner und Blitzen for two reasons. First, it fails to protect existing temperatures, which sometimes may be lower than the standard. Second, it establishes an artificially high threshold for any action to prevent water quality degradation, i.e., once water temperatures rise to the standard, certain beneficial uses will already suffer irreparable harm: mountain whitefish, for example, experience near-lethal temperatures at 64 degrees Fahrenheit (ODFW 1983).

Although DEQ uses numeric criteria almost exclusively to determine whether beneficial uses are being protected, it has also utilized two narrative criteria: habitat modification and flow modification. When using these two criteria to determine whether a waterbody is supporting its beneficial uses, however, DEQ has stated that a waterbody will violate these narrative criteria only when it also violates "an associated numeric water standard" (DEQ 1995). By interpreting a violation of narrative criteria to be dependent on a violation of a numeric criterion, DEQ has eliminated protections that narrative criteria may otherwise offer for beneficial uses.

Therefore, in order to protect the beneficial uses listed in this petition and to reduce risk to the listed species, the EQC has two options. One, rewrite the numeric and narrative criteria so that they actually protect the full suite of habitat requirements necessary to support the beneficial uses listed, as required by 33 U.S.C. § 1313(c)(2) and 40 C.F.R. § 131.3; or two, protect the existing high quality values of the Donner und Blitzen River by designating it as an ORW.

(5) Past and Present Threats to Water Quality in the Donner und Blitzen River

The primary historic anthropogenic activities in the stream segments of the Donner und Blitzen covered under this petition are cattle grazing; camping, hunting, and fishing; one water withdrawal; an agricultural field (hay); and limited primitive motorized vehicular use.

Historic cattle grazing has had serious degrading impact on riparian vegetation and water quality in the watershed. As recently as 1992, five botanical surveyors from the Oregon Natural Heritage Program reported:

> Grazing has had a broadscale affect (sic) upon the riparian and upland vegetation in the Blitzen River system. Nearly every reach of every river segment has been grazed this year, some of which is obvious trespass. The South Fork of the Blitzen was so heavily grazed that the riparian habitat was essentially destroyed over a significant part of the segment. . .

> . The detrimental effects of grazing in riparian systems is well documented and the Blitzen River system exhibits the usual effects. Of greatest concern to the surveyors was the general lack of reproduction in black cottonwood and willow stands.
>
> (Vander Schaff 1992).

Similarly, in 1992, the BLM found that forty-five percent of surveyed aquatic habitat for resident fish was in a "poor" to "fair" condition (DOI 1993). DEQ made a similar finding in 1995 (DEQ 1995b). In turn, ODFW has linked land management practices such as cattle grazing to depressed populations of mottled sculpin in the Donner und Blitzen River watershed. (Kostow 1995).

DEQ has analyzed the Donner und Blitzen and three tributaries for the parameters of flow modification, habitat modification, sediment, and temperature (DEQ 1996). Subsequently, DEQ listed the Little Blitzen and the South Fork as water quality limited for the parameter of temperature in the summer; in 1995 both tributaries exceeded the temperature standard of 64 degrees: the Little Blitzen recorded a 7-day average of 67.7 degrees, and the South Fork recorded 7-day averages of 65.7, 74.3, and 74.6 degrees (DEQ 1996).

Relying in part on such data, in February, 1997, the United States District Court for the District of Oregon held that the BLM had violated the Wild and Scenic Rivers Act, because its 1993 management plan for the river would allow cattle to continue to degrade riparian vegetation and water quality, and would allow the construction of new parking lots and roads along the river (Haggerty, J. 1997). The court prohibited the BLM from authorizing any livestock grazing, constructing any new roads or parking lots, or diverting any water, unless and until the BLM revises its river management plan and writes an environmental impact statement. Oregon Natural Desert Association v. Green, 953 F. Supp. 1133 (D. Or. 1997). Further, the court ordered the BLM to construct a new fence along the west bank of the South Fork of the Donner und Blitzen, which has created a large pasture encircling the South Fork and its tributary creeks, and can facilitate the complete exclusion of livestock from this important, low-gradient and accessible (to livestock) stream segment.

(6) Impending Threats to the Donner und Blitzen River

Since cattle have been excluded or removed from roughly forty miles of public riparian lands in the river area, informal surveys show a marked recovery of riparian plants, especially woody species such as willows. Fish habitat has also improved considerably (Bowers 1997). Over time, the recovery of woody riparian species and native grasses may result in adjacent waters attaining all water quality standards. Moreover, in 1997, the BLM withdrew its application to the Oregon Water Resources Department for a right to divert water from the Little Blitzen River to flood irrigate historic hayfields. At this time, no water is legally diverted from any stream segment in the Donner und Blitzen watershed covered under this petition.

The removal of grazing and other changes presage dramatic improvements in water quality in the Donner und Blitzen watershed. However, the BLM recently announced its intent to begin the process which is likely to lead to the reintroduction of cattle into the river area, and may include new parking lots and roads. 62 Fed. Reg. 120 (June 23, 1997) (announcing the agency's intent to issue a new EIS for Southeast Oregon, and to analyze in part resumed activities such as cattle grazing along the Donner und Blitzen River). A recent compilation of peer-reviewed literature concludes that no study has ever found that cattle benefit riparian zones (Belsky 1997). Rather, some studies show only that new grazing practices are less damaging to riparian zones than traditional grazing practices (Ibid.). In fact, two other literature reviews have concluded that no grazing system is compatible with a healthy aquatic ecosystem (Meehan and Platts 1978; Platts and Wagstaff 1984). In turn, any new or improved roads in the river area are likely to modify natural drainage paths, accelerate erosion processes, and alter streams, including "streamflow regimes, sediment transport and storage, channel bank and bed configurations, substrate composition, and stability of slopes adjacent to streams" (FEMAT 1993).

The reintroduction of cattle and the creation of improved motorized vehicle access and facilities along the Donner und Blitzen is likely to prevent any continued recovery of riparian plants such as willows, and to inhibit improvement of water quality that may otherwise allow the Donner und Blitzen to achieve and perhaps surpass water quality standards.

(7) Special Status Conferred on the Donner und Blitzen River

The Donner und Blitzen River has been designated as follows. While these designations reflect unique characteristics that distinguish the Donner und Blitzen River, none alone provides the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, the EQC alone may supply missing water quality protections by designating the Donner und Blitzen as an ORW.

A. The Donner und Blitzen River is a national wild and scenic river, which gives it priority status for nomination as an ORW (DEQ 1997d). Congress designated a 74.8-mile segment of the Donner und Blitzen River, from the mainstem (from river mile 0 to river mile 16.75), the Little Blitzen River (from river mile 0 to river mile 12.5), the South Fork Blitzen (from river mile 0 to river mile 16.5), Big Indian Creek (from river mile 0 to river mile 10), Little Indian Creek (from river mile 0 to river mile 3.7), and Fish Creek (from river mile 0 to river mile 13.25), as a federal wild and scenic river.

(8) Other Information Related to the Donner und Blitzen River

DEQ previously and internally nominated the Donner und Blitzen as an ORW (DEQ 1995a).

Further, the timing is good for designation of the river as an ORW. As noted, the BLM is writing a revised river plan in an EIS that will evaluate its proposed management of the Donner und Blitzen River and other lands in Southeast Oregon. 62 Fed. Reg. 120 (June 23, 1997). Insofar as the BLM is obligated to "cooperate" with DEQ for the purpose of "eliminating" pollution in the river, 16 U.S.C. 1283(c), the timing is perfect for an ORW designation, because the BLM could incorporate the new designation into its new management plan. Further, the BLM has previously stated that one of its management objectives for the river was to assist DEQ with study of the river as an ORW (DEQ 1995).

(9) Data Sources

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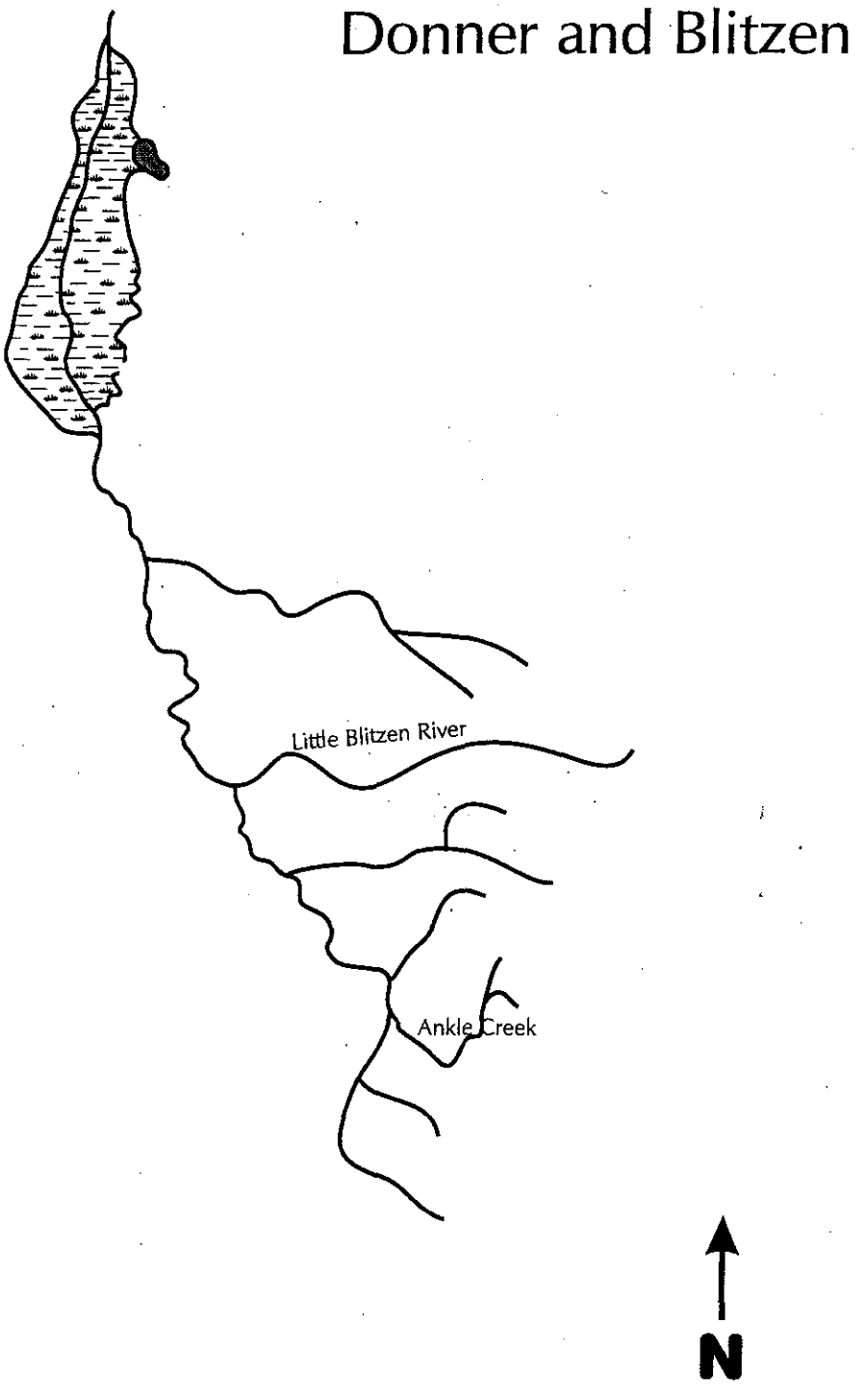
Donner and Blitzen River



OUTSTANDING RESOURCE

WATER PETITION

for the

Elk River

OUTSTANDING RESOURCE WATER PETITION
for the
Elk River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate forty-three miles of the Elk River as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. This designation includes the mainstem (from river mile 10 to river mile 31) in Township 32 S-33 S and Range 14 W-15 W, Rock Creek (from the mouth to river mile 1) in Township 32 S and Range 14 W, Anvil Creek (from the mouth to river mile 1) in Township 33 S and Range 14 W, Bald Mountain Creek (from the mouth to river mile 7) in Township 33 S and Range 14 W, Red Cedar Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, Panther Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, Butler Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, Blackberry Creek (from the mouth to river mile 2) in Township 33 S and Range 13 W, and the North Fork (from the mouth to river mile 5) in Township 33 S and Range 13 W.

The Elk River originates on Iron Mountain in the Siskiyou National Forest and flows west into the Pacific Ocean just south of Cape Blanco in southwest coastal Oregon. The Elk River watershed consists of 58,388 acres. 45,206 acres, or 77.4% of the watershed, is owned by the federal government and under the jurisdiction of the U.S. Forest Service. 12,418 acres, or 21.2% of the watershed, is privately-owned. 764 acres, or 1.3% of the watershed, is owned by the federal government and under the jurisdiction of the Bureau of Land Management (U.S. Forest Service 1997). The first twelve miles of the Elk (only the upper two of which are included in this request) flow through private lands. These private lands are outside of any urban growth boundary, and are zoned for farm and forestry resource uses. The Elk lies within the South Coast Basin, Sixes Sub Basin, and borders the south side of the Grassy Knob Wilderness Area.

(2) Unique Character of the Elk River

The Elk River is unique because it is one of the most outstanding waterbodies in the State of Oregon based on habitat for wild salmon. In 1997, the Forest Service reported:

The Elk River supports one of the most important and valuable wild runs of anadromous

fish in coastal Oregon. Factors attributed to this include the remarkable water quality, the relatively undeveloped and undisturbed watershed[,] and the advanced hatchery and species management by the Oregon Department of Fish and Wildlife.
(U.S. Forest Service 1997).

Similarly, the State of Oregon has found that "[t]he Elk River supports one of the most important and valuable wild runs of anadromous fish (salmon and steelhead) in coastal Oregon. A joint study by [the U.S. Forest Service] and Oregon State University shows that the Elk and many of its tributaries contain prime habitat in pristine condition" (Oregon Department of Parks and Recreation 1992). The Oregon Coastal Salmonid Restoration Initiative ("CSRI") states the Elk River sustains a returning population of 1,000 to 2,000 adult winter steelhead, and ODFW identified "self-sustaining populations of resident cutthroat trout and wild rainbow trout in remote reaches of the Elk River" (OCSRI 1997).

The Governor's Natural Resource Office designated the Elk River as Core Salmonid Area for fall chinook and winter steelhead in the CSRI (OCSRI 1997). The Office found that the "Elk River is believed to produce more fish per mile than any Oregon river" (OCSRI 1997) (emphasis added). There are no barriers to fish migration within the Elk. Designation of the forty-three miles of the Elk River and its major tributary creeks as an ORW would coincide geographically with the Core Salmonid Area for winter steelhead and fall chinook in the CSRI (OCSRI 1997).

Similarly, when designating the Elk River as a federal wild and scenic river in 1988, Congress identified as its outstandingly remarkable values anadromous fish, water quality, and natural features (U.S. Senate 1988). "The fisheries value of the federally designated sections of the Elk River is considered outstandingly remarkable based on the diversity of populations; excellent spawning and rearing habitat; downstream sport and commercial fishery; high productivity for its size; national reputation for excellent fishing; and the focus for fisheries research" (U.S. Forest Service 1994).

Consistent with the quality of the river, the Elk has been designated as a Tier 1 Key Watershed (OF-57) by the federal Forest Ecosystem Management Team ("FEMAT") (FEMAT 1993). This designation is based upon the contribution that the watershed makes to anadromous salmonid conservation, and the link that it provides in a network of watersheds that contribute to the protection of at-risk fish stocks (FEMAT 1993). The Elk River is one of 139 Tier 1 Key Watersheds which have been identified (FEMAT 1993). As a Key Watershed, the Elk River represents "the best of what is left" (FEMAT 1993).

The Elk River, including the parts of the river that petitioners nominate as an ORW, has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Clarke 1997; Li et al. 1995; Oregon AFS 1993). ADA designation indicates that the AFS believes the Elk River should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon." (Li et al. 1995; Oregon AFS 1993). This designation is based upon the following six values:

(5) Rainbow trout (*Oncorhynchus mykiss*): the Elk is one of the few coastal watersheds with remnant populations of non-anadromous rainbow trout; they are estimated to populate 40 stream miles, including 27 miles within the mainstem; the lower North Fork and upper North Fork; and other tributaries (U.S. Forest Service 1997).

(6) Southern torrent salamander (*Rhyactotriton variegatus*): the southern torrent is a species of concern with the U.S. Fish and Wildlife Service. It inhabits cold, clear streams in the Elk River watershed. It is known to occur along the mainstem and at least one tributary creek (U.S. Forest Service 1997).

(7) Chum salmon (*Oncorhynchus keta*): the U.S. Fish and Wildlife Service recognizes a "remnant population" in the Elk, but the Oregon Department of Fish and Wildlife ("ODFW") does not. ODFW believes that the very small numbers of chum observed in the Elk on some years may be strays, possibly from Coos Bay tributaries. ODFW has observed no spawning chum and no juvenile chum in spring estuary sampling (Stauff 1997).

(4) Relationship Between the Unique Character and the Water Quality of the Elk River

The unique character of the Elk River, its ability to support a diversity of aquatic species and provide critical habitat, is directly related to the high quality of its water and to the relatively intact watershed processes that support that quality. The U.S. Forest Service has specifically found that "[t]he excellent water quality in the Elk River is recognized as being a critical component of several river values . . ." (U.S. Forest Service 1994). In fact, the quality of water in the Elk River led the ODFW to construct a fish hatchery at river mile 14, which is covered under this petition. The Forest Service has found:

> The water clarity in the Elk River is outstanding, and is recognized as being a critical component of several river values. The striking blue-green color and crystalline water quality are exceptional. Water clarity affects recreational uses such as fishing, boating, rafting, and sight-seeing along the Elk River.
>
> (Forest Service 1997).

The water quality parameters that affect the ecological integrity of critical habitat and the ability to support a diversity of aquatic species in the Elk are aquatic weeds or algae, bacteria, dissolved oxygen, habitat modification, flow modification, sedimentation, temperature, and turbidity (DEQ 1996). Habitat modification and temperature affects the beneficial uses of resident fish and aquatic life, and salmonid fish spawning and rearing (DEQ 1996). The State of Oregon has found that "fish production levels observed are directly related to the quality and quantity of available spawning and rearing habitat" (Oregon Department of Parks and Recreation 1992). "Rearing of juvenile anadromous fish at the hatchery depends on a constant supply of cool

water drawn directly from the river in an area where water temperatures can reach critical levels in summer. Water quality levels in the river must be maintained for the hatchery to continue to operate successfully" (Reeves) (emphasis added).

DEQ should fully maintain and protect this level of water quality so that it may protect all aquatic species in the Elk. See OAR § 340-41-026(1)(a)(A) (stating that where existing water quality exceeds those levels necessary to support beneficial uses, that level of water quality should be maintained and protected) (DEQ 1997c). DEQ attempts to meet this standard through water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Coho Salmon:

Coho are particularly sensitive to loss of long-lasting, complex in stream structure, e.g., large wood complexes, flood plains, braided channels, beaver ponds, and lakes (Kostow 1995). In contrast to the larger streams upon which chinook depend, coho require much smaller, low gradient tributaries and side channels for spawning and reproduction (ODFW 1996).

2) Chinook Salmon:

Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (Kostow 1995). Chinook prefer a gradient of less than three percent in spawning areas, and because one of the "most critical links for survival of this species" is clean gravel, chinook are particularly affected by increases in fine sediment loads (Kostow 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (Kostow 1995). "Clean, stable spawning gravel, cool freshwater temperatures, and healthy estuarine ecosystems are probably the most critical elements for natural production" of chinook salmon (ODFW 1996).

Juvenile chinook require deep riffles, woody debris, and shoreline riparian vegetation for cover and feeding areas (Kostow 1995). Rearing chinook are particularly affected by impacts to lower basin habitat complexity (Kostow 1995).

3) Coastal Cutthroat Trout:

"Coastal cutthroat trout tend to spawn in very small (first and second order) tributaries. Young fry move into channel margin and backwater habitats during the first several weeks. During the winter, juvenile cutthroat trout use low velocity

pools and side channels with complex habitat created by large wood" (Kostow 1995).

Unfortunately, migrating populations are declining throughout Oregon, while the resident populations appear stable, suggesting that there may be problems within the migratory corridor, the estuaries or near-shore marines systems (ODFW 1996).

4) Rainbow Trout:

Rainbow are most commonly found in river reaches that are inaccessible to anadromous fish (Kostow 1995). Freshwater habitat degradation which affected the water quality in turn has affected rainbow trout populations. Historically, coastal stream systems were "structurally complex with large in stream wood, flood plains, beaver ponds, braided channels, and coastal marshes and bogs" (Kostow 1995). However, human activities, including logging and road construction, have altered these ecosystems, by removing components that were essential to rainbow trout production, and had the most widespread impact on the populations (Kostow 1995).

5) Winter Steelhead:

Because steelhead utilize multiple stream habitats, migrating between the uppermost reaches of tributaries and large streams, the range of habitat protected must extend to the furthest reaches of all tributaries (RVCG 1997). Steelhead are able to spawn in gradient slopes up to five degrees, with pea to orange sized gravel and temperatures ranging between 45-58 degrees (ODFW 1992b). Steelhead are most productive in complex habitats characterized by large and small wood, and require deep holding pools prior to spawning (ODFW 1992b). Because juveniles spend up to four years in freshwater, they are particularly susceptible to changes in temperature and water flows.

6) Tailed Frog:

The tailed frog requires cold, fast-flowing permanent streams in forested areas, with temperatures ranging from 41-61 degrees Fahrenheit (ODFW 1996). "[T]ailed frogs have exacting habitat requirements, including the lowest known temperature requirements, and one of the narrowest temperature tolerances of any of the world's frogs" (ODFW 1996). To meet this low temperature requirement, the tailed frog needs the heavy canopy cover associated with old growth forests (ODFW 1996). DEQ has also recognized the temperature-sensitive nature of the tailed frog, stating that first year tadpoles select water temperatures below 50 degrees Fahrenheit (DEQ 1995d).

The DEQ currently uses numeric criteria to protect the beneficial uses listed above. The numeric criteria applicable to the South Coast Basin are as follows:

- Dissolved Oxygen:

From spawning until fry emergence from the gravel, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997a).

- Temperature:

The temperature standard is 55 degrees Fahrenheit for salmonid spawning, egg incubation, and fry emergence from the egg and from the gravel in the basin, and 64 degrees Fahrenheit for salmonid fish rearing (DEQ 1997a).

- Turbidity:

No more than a ten percent cumulative increase in natural stream turbidities shall be allowed (DEQ 1997a).

- pH:

Between 6.5-8.5 for estuarine and fresh waters, and 7.0-8.5 for marine waters (DEQ 1997a).

These numeric criteria, however, may fail to protect and maintain the water quality necessary to protect the salmonids listed above. For example, the temperature standard for the Elk River is 64 degrees Fahrenheit for salmonid rearing and 55 degrees Fahrenheit for salmonid spawning and incubation (DEQ 1997a). However, it appears that temperatures in the Elk are often actually lower than the numeric standard. At a sampling station at Highway 101, the Elk recently recorded temperatures of 48.2 (3\5\96), 60.6 (6\18\96), 67.3 (9\10\96), 51.3 (1\28\97), 50.9 (3\11\97), and 63.1 (6\17\97) (DEQ 1997e). (These data are from a public Storet database; petitioners assume that DEQ has more complete data in-house.) Although exceedences occur, stream temperatures in the Elk appear to be declining (McSwain 1988). In places, temperatures are nearing an optimal range for certain beneficial uses of the river. Winter steelhead, for example, prefer temperatures ranging from 45-58 degrees Fahrenheit during spawning (ODFW 1992b), and the tailed-frog prefers temperatures ranging from 41-61 degrees Fahrenheit (ODFW 1996).

The current temperature standard fails to fully protect and maintain beneficial uses in the Elk for two reasons. First, it fails to protect existing temperatures, which are often lower than the standard. Second, it establishes an artificially high threshold for any agency action to prevent water quality degradation, i.e., DEQ and other public agencies may not act until and unless

temperatures rise to the standard, at which point certain beneficial uses will already have suffered irreparable harm: winter steelhead and the tailed-frog, for example, experience near-lethal temperatures at 64 degrees Fahrenheit.

A second problem with current standards is the numeric standard for sediment. The standard prohibits more than a ten percent increase over background levels of turbidity, but that standard appears be violated seasonally: in the winter, with high flows; and in the summer, when suction dredge placer mining operations violate the standard in an illegal "mixing zone" below a dredge (U.S. Forest Service 1997).

Although DEQ uses numeric criteria almost exclusively to determine whether beneficial uses are being protected, it has also utilized two narrative criteria: habitat modification and flow modification. When using these two criteria to determine whether a waterbody is supporting its beneficial uses, however, DEQ has stated that a waterbody will violate these narrative criteria only when it also violates "an associated numeric water standard" (DEQ 1995d). By interpreting a violation of narrative criteria to be wholly dependant upon an associated violation of numeric criteria, DEQ has eliminated much of the protections that narrative criteria offer for beneficial uses.

Therefore, in order to protect the beneficial uses listed in this petition and to reduce risk to the listed species, the EQC is provided by law with two options. One, rewrite the numeric and narrative criteria so that they actually protect the full suite of habitat requirements necessary to support the beneficial uses listed, as required by 33 U.S.C. § 1313(c)(2) and 40 C.F.R. § 131.3; or two, protect the existing high quality values of the Elk River by designating it as an ORW.

(5) Past and Present Threats to Water Quality in the Elk River

Historically, the Elk River was subject to a large number of upstream and instream gold mining operations (U.S. Forest Service 1994). These operations degraded water quality by removing the armor layer of the river bed and discharging mining wastes, both of which periodically and significantly increased turbidity. Significant turbidity in the Elk had two results: it harmed salmonids, which need clear water to survive, and it led to the periodic shut-down of ODFW's fish hatchery: the hatchery requires clean, non-turbid supply water to raise salmon. High turbidity levels and the denudation of riparian areas from logging and road-building (see below) have in part caused the Elk to become water quality limited from its mouth to Anvil Creek at river mile 14 for the parameters of habitat modification and temperature in the summer (DEQ 1996); see (DEQ 1995b) (reviewing anthropogenic causes of high water temperatures).

The State of Oregon's attempts to halt destructive mining operations in the Elk and its tributaries was manifested recently in the decision by ODFW to appeal U.S. Forest Service approval of three suction dredge placer mining operations on the bed of the Elk (ODFW 1992a). As a part of that appeal, ODFW determined that there are seventy-one asserted mining claims on

the bed of the Elk (McEwen 1992). While only one claim has been determined to be valid, a second claim is presently undergoing a validity test. Validation involves re-opening the discovery site, sampling for minerals, then performing an economic analysis to determine if mining is prudent (Cooley 1997). If these claims are determined by federal agencies to be valid, only DEQ assertion of proper restrictions on new sources of pollution may adequately protect the beneficial uses of the Elk River.

Water quality in the Elk River also suffers from sedimentation caused by road failures, collapsing road sidecast, and the delivery of sediment from road surfaces. The Elk River watershed contains 195 miles of federal, state, county, and private roads. On Forest Service lands, 114 miles of road exist, 11.3 of which are "paved," 4 of which are "native" and, predominately, 94.2 miles of which are "aggregate." Ninety-three percent of these roads were constructed before 1974, and they were built poorly in the context of water quality: many roads were built near streams, in unstable areas, and with sidecast (rather than endhaul) of loose fill. Furthermore, parts of the road system are prone to failure, in part because soils in the watershed are relatively sensitive: although existing road-related slides are located primarily on high sensitivity lands, fully 25% of slides occur on only moderately-sensitive lands (U.S. Forest Service 1997).

The Forest Service has taken some steps to ameliorate road failures and to reduce the delivery of sediment from existing and failed roads. Since 1991, it has decommissioned 10 miles of road, and it has also pulled back some sidecast from streams. But even in its most recent draft analysis of the watershed, the agency fails to identify specifically its further priorities for obliterating roads, replacing culverts, or eliminating sidecast (U.S. Forest Service 1997).

Furthermore, in 1996 and 1997, 50 to 75-year storm events "heavily damaged" the Forest Service road system. At this time, fifteen to twenty individual damage sites exist, including a site at which one lane failed on the main river road, and numerous side roads had to be closed where stream crossings failed. The Forest Service and Army Corps of Engineers are currently jointly considering methods to stabilize or improve the many roads. (U.S. Forest Service 1997). Because any excavation of or deposition into the river bed requires at least certification from DEQ, DEQ has the opportunity to ensure that any such activity is consistent with fully protecting water quality and beneficial uses.

Last, historic logging in the Elk watershed continues to degrade water quality. Between 1954 and 1989, 300 million board feet were logged off of national forest system lands alone (U.S. Forest Service 1997). Many of these lands now are sources of sediment during heavy rains. More important, logging in riparian areas in combination with the construction and location of the Elk River road have led to frequently high water temperatures. Whereas prior to 1940 most of the mainstem had a tall forest canopy of conifers, it does not now. Further, the river road was constructed on the south bank where the river flows east to west. The Forest Service has reported:

> The combination of road construction in 1954 followed by high flood flows in 1955 ... caused massive road failures, resulted in a major loss of several miles of riparian vegetation on the south bank. . . . Today, the riparian area on the south bank remains altered from its pre-1955 condition. The riparian area below the road in several areas has a larger component of hardwoods and immature conifers and less mature conifers. Hardwoods are not sufficient in height to adequately shade the mainstem during the summer. As the conifers continue to grow, stream shade will increase.
>
> (U.S. Forest Service 1997).

The agency has specifically attributed frequent high stream temperatures in the mainstem to logging and roadbuildling on the mainstem and on Butler, Bald Mountain, and Panther Creeks (Ibid).

(6) Impending Threats to the Elk River

Mining in the Elk River continues to threaten water quality. Although the Department of the Interior withdrew from entry for mining the 17-mile segment of the Elk that is classified under federal law as a "recreational" wild and scenic river, 61 Fed. Reg. 5719 (Feb. 14, 1996), and the upper 2-mile segment classified as "wild" was withdrawn by Congress in 1988, withdrawal prohibits only the assertion of new mining claims -- it does nothing to ameliorate impacts from continued mining on pre-existing valid claims. At this time, of the seventy-one asserted mining claims on the bed of the Elk, sixty-nine claimants are entitled to validate their mining claim, and one (the "Golden Coast" claim) has. Last summer, significant turbidity at the hatchery was attributed to operations on the valid claim (Rogers 1997).

In addition to the threat to water quality from mining activities, the U.S. Forest Service has found that "[t]he primary threats and risks to salmonid habitat within the [designated sections] and to the salmonid production in the Upper Elk River Basin, are primarily from roading and harvest activities conducted in areas upstream and outside of the designated [wild and scenic river] sections. Threats include increases in temperature and increased coarse sediment delivered from upstream tributaries" (U.S. Forest Service 1992). "Many older roads with poor locations and inadequate drainage control and maintenance pose high risks of erosion and sedimentation of stream habitats" (FEMAT 1993).

The third threat to water quality in the Elk River is future logging. Although the President's Forest Plan allocated 46% of the watershed to a "late-successional reserve" category, 3,304 acres remain in the "matrix," and the Forest Service's objective is to log them (U.S. Forest Service 1997). The U.S. Forest Service has already conducted one sale of 500 acres for "commercial thinning purposes," and has included another large timber sale on its Schedule of Proposed Actions, with a final decision to be made in two to three years (Esprance 1997). Moreover, the Forest Service has acknowledged the threat to water quality from logging on private lands outside of its control; in particular, the agency notes excessive sediment loading into

Bald Mountain Creek from logging activities in that subwatershed (U.S. Forest Service 1997). Because "[a] key factor in the maintenance of Forest salmonid resources is management of riparian areas," activities such as road construction, mining, and logging continue to threaten the fish populations by altering the watershed (U.S. Forest Service 1989).

(7) Special Status Conferred on the Elk River

The Elk River has been given special designation under federal and state laws. While these designations show the unique characteristics that distinguish the Elk River, none of these designations alone provides the comprehensive oversight and management planning necessary to fully protect water quality. Significantly, the EQC alone can establish the missing water quality protection by designating the Elk as an ORW.

A. The Elk River is a national wild and scenic river, which gives it priority status for nomination as an ORW (DEQ 1997d). In 1988, Congress designated a seventeen-mile segment of the Elk River, from Anvil Creek (river mile 14) to the confluence of the North and South Forks (river mile 31), and a two mile segment of the North Fork (from the mouth to river mile 2), as a federal wild and scenic river. The seventeen-mile segment was specifically designated as "recreational," and the two mile segment was specifically designated as "wild" (Phillips 1997). Under the Wild and Scenic Rivers Act ("WSRA"), the U.S. Forest Service is required to "cooperate" with DEQ toward "eliminating" pollution in the Elk. 16 U.S.C. 1283(c).

B. The Elk River is a state scenic waterway, which also gives it priority status for nomination as an ORW (DEQ 1997d). In 1989, the State of Oregon designated a 17.1-mile segment of the Elk River, from the ODFW fish hatchery to the confluence of the North and South Forks (river mile 31), a 6.1-mile segment of the North Fork (from the mouth to approximately river mile 6.1), and a 5 mile segment of the South Fork (from the mouth to approximately river mile 5) as a state scenic waterway (U.S. Forest Service 1994; Phillips 1997). The Oregon Legislature enacted the state scenic waterways program in part specifically to "preserve the natural setting and water quality of the lakes and such rivers" that are designated under the act. ORS 390.815 (emphasis added).

C. The Elk River lies within a Tier 1 Key Watershed (OF-57) (FEMAT 1993).

D. The Elk River is located within the Oregon State Coastal Salmon Recovery Plan area and has been designated as Core Salmonid Habitat for fall chinook and winter steelhead (OCSRI 1997).

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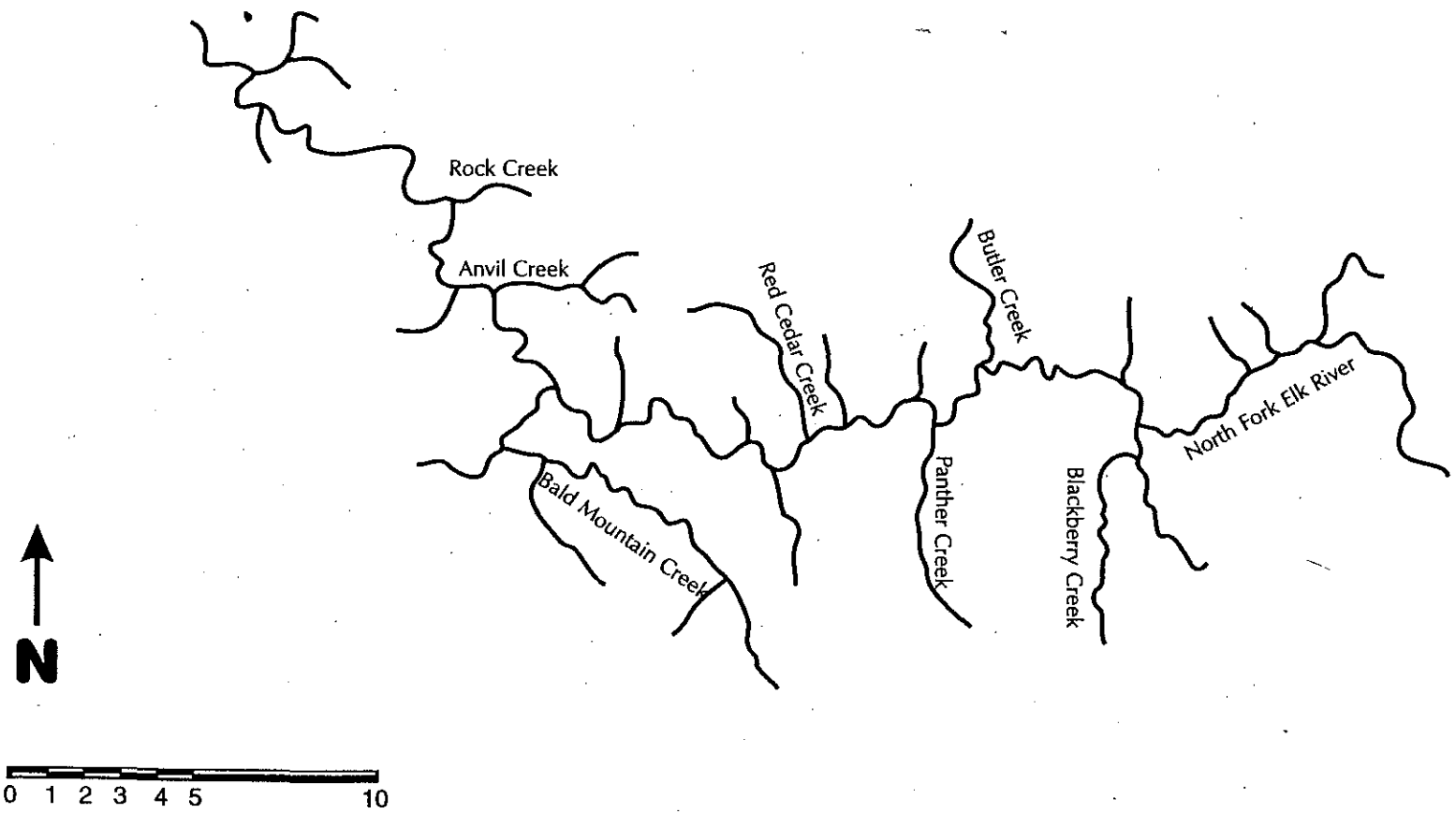
Elk River


Rock Creek
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Butler Creek
North Fork Elk River
Bald Mountain Creek
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OUTSTANDING RESOURCE

WATER PETITION

for the

Kilchis River

OUTSTANDING RESOURCE WATER PETITION
for the
Kilchis River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate the Kilchis River as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. This petition includes the mainstem of the Kilchis River from the confluence of the North and South Forks of the Kilchis to its confluence with Clear Creek in Township 1 N-2 N and Range 9W, the North Fork of the Kilchis River (from the mouth to the headwaters) in Township 1 N-2 N and Range 8 W-9 W, the South Fork of the Kilchis River (from the mouth to the headwaters) in Township 1 N and Range 8 W-9 W, the Little South Fork of the Kilchis (from the mouth to the headwaters) in Township 1 N and Range 8 W-9 W, Coal Creek (from the mouth to the headwaters) in Township 1 N and Range 8 W-9 W, Clear Creek (from the mouth to the headwaters) in Township 1 S and Range 9 W, and Schroeder Creek (from the mouth to the headwaters) in Township 2 N and Range 8 W.

The Kilchis River is located at the northern end of the Oregon Coast Range on the west side of the Cascade Mountains and drains directly into the Tillamook Bay. It lies within the North Coast Basin and the Tillamook Bay subbasin. Eighty percent of the surrounding land is within the Tillamook State Forest and is managed by the Oregon Department of Forestry. Only ten percent of the surrounding land is owned by private agriculture interests and private landowners (Huntington, Frissell 1997).

(2) Unique Character of the Kilchis River

The Kilchis River is unique because it is one of the few watersheds remaining in the North Coast Basin that still retains the water quality and habitat characteristics necessary to support a diversity of fish and wildlife species. These unique characteristics can be attributed largely to the location of the waterbody within the most extensive and unfragmented forested area in the Oregon Coast Range (Huntington, Frissell 1997).

Historically, the entire North Coast Basin contained habitat characteristics that were dominated by complex old growth in upland areas and braided channels and marshlands in lowland areas (ODFW 1995). The forests shaded the rivers and provided complex channel structure with large woody debris. This resulted in cool water temperatures, controlled flows, deep pools, and complex bank structure. Minimal erosion occurred, leading to high water

quality, low sediment levels, and clean gravel (ODFW 1995). These habitat conditions were ideal for many aquatic species native to the Coast Range. For salmon in particular, these conditions made Tillamook Bay basin the most productive basin on the Oregon Coast (Huntington, Frissell 1997).

However, many factors have led to the decline of these habitat conditions which has led, in turn, to the decline of many native coastal species. Activities such as timber harvest, irrigation, urbanization, and agricultural development incrementally and cumulatively have impacted the ecological processes that historically supported the characteristics listed above (ODFW 1995). For example, braided lowland channels have been lost due to channelization. Timber harvest practices have stripped stream banks of their vegetation and removed the large woody debris so important to maintaining complex stream structure and cool water temperatures. Construction of roads for timber harvest on steep, unstable slopes above the streams has increased sediment flows, impeding fish passage and choking critical salmon spawning areas.

Despite the decline in aquatic habitat quality throughout the basin, there is a network of watersheds, including the Kilchis River, that are now refuges on the larger landscape and that provide critical habitat to numerous at-risk and healthy aquatic species. Because of this unique status, the Kilchis River has been identified as an anchor for at-risk stocks of spring chinook, coho, chum, and winter steelhead (FEMAT 1993). In contrast, the Kilchis River also provides critical habitat for one of the healthiest populations of fall chinook salmon in the lower 48 states (Huntington, Frissell 1997). Additionally, the Kilchis River provides habitat to the Columbia seep salamander, the tailed frog, and many other aquatic species that have fairly exacting habitat requirements and are particularly vulnerable to habitat modifications.

The following is a list of some of the unique attributes of the Kilchis River that have been identified in recent studies.

- The Kilchis River is among the highest priorities for watershed and salmon restoration on the Oregon Coast (Bradbury et al. 1995).

- The Kilchis River watershed is a recognized source watershed for coho salmon, chum salmon, chinook salmon, and steelhead (Barber et al. 1994), as well as a Core Area for coho and chum spawning and rearing (OCSRI 1997).

- Coal Creek, which is within the Kilchis River watershed, has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Oregon AFS 1993). ADA designation indicates that Coal Creek should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon." This designation is based upon the following three values:

  1) *Genetic Refuge.* Coal Creek is a genetic refuge for remnant populations of chum salmon, coho salmon, winter steelhead, and seagoing cutthroat trout. A "genetic refuge" is defined as a watershed with "a low incidence of exotic species or limited history of hatchery stockings that may be important to protect examples of native aquatic assemblages."

2) *Highly Sensitive.* Coal Creek is a relatively healthy watershed that may be highly sensitive to disturbance or cumulative effects of future human uses.

3) *Scientific Value.* Coal Creek has value as a monitoring area where valuable baseline or long-term data sets exist.

- The Kilchis River has been designated a Tier I Key Watershed (OB-83) by the federal Forest Ecosystem Management Team ("FEMAT"). This designation is based upon the contribution that the watershed makes to anadromous salmonid conservation and the link that it provides in a network of watersheds that contribute to the protection of at-risk fish stocks (FEMAT 1993).

(3) Beneficial Uses Related to Unique Character of the Kilchis River

The following are the recognized beneficial uses of the Kilchis River that are directly related to the unique character of the waterbody: 1) anadromous fish passage; 2) salmonid rearing; 3) salmonid spawning; 4) resident fish and aquatic life; and 5) fishing.

A. Anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life: the Kilchis River provides critical habitat for the following species:

1) Coho salmon (*Oncorhynchus kisutch*): designated as "critical" on the Oregon sensitive species list; candidate species under the Federal Endangered Species Act. 61 Fed. Reg. 38011 (July 25, 1995).

2) Chum salmon (*Oncorhynchus keta*): designated as "critical" on the Oregon sensitive species list (ODFW 1996); candidate species under the Federal Endangered Species Act.

3) Fall chinook salmon (*Oncorhynchus tshawytscha*): classified as a Level I Healthy Stock (Huntington et al 1996). A Level I classification refers to populations that are at least two-thirds as abundant as would be expected absent human impacts (Huntington et al. 1996).

4) Winter steelhead (*Oncorhynchus mykiss irideus*): a listing decision under the Federal Endangered Species Act for winter steelhead is due in February 1998.

5) Seagoing and resident cutthroat trout (*Oncorhynchus clarki clarki*): designated as "critical" on the Oregon sensitive species list (ODFW 1996).

6) Columbia seep salamander (*Rhyacotriton kezeri)*: designated as a state sensitive species (ODFW 1996).

7) Tailed frog (*Ascaphus truei*): designated as "vulnerable" on the state sensitive species list (ODFW 1996).

B. Fishing

Tillamook Bay rivers are the second most popular recreational salmon and steelhead fishery in northwestern Oregon (Radtke 1997). The Kilchis River upstream to the North Fork is open to sport fishing for steelhead, fall and spring chinook, jack salmon, and chum salmon during dates specified by the Oregon Department of Fish and Wildlife (ODFW 1997). Upstream from the North Fork and including all tributaries and the South Fork is closed year round to sport fishing (ODFW 1997).

(4) Relationship Between the Unique Character and the Water Quality of the Kilchis River

The unique character of the Kilchis River, its ability to support a diversity of aquatic species, is directly related to the high quality of its water and to the currently intact watershed processes that support that quality. The Department of Environmental Quality, is charged by statute, with the responsibility to fully maintain and protect this level of water quality in order to protect those aquatic species mentioned above. OAR § 340-41-0026(1)(a)(A). The DEQ accomplishes this through the establishment of in-stream water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3, which should be supplemented by the attached habitat requirements published by the Tillamook Bay National Estuary Project ("TNEP"). This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Chinook Salmon:

Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (ODFW 1995). Chinook prefer a gradient of less than 3% in spawning areas, and because one of the "most critical links for survival of this species" is clean gravel, chinook are particularly affected by increases in fine sediment loads (ODFW 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (ODFW 1995). Chinook prefer temperatures as low as 41°F for incubation, and 45°F for rearing (TBNEP 1997, attached).

Juvenile chinook require deep riffles, woody debris, and shoreline riparian vegetation for cover and feeding areas (ODFW 1995). Rearing chinook are particularly affected by impacts to lower basin habitat complexity (ODFW 1995).

2) Coho Salmon:

Coho are particularly sensitive to loss of long-lasting, complex instream structure, e.g., large wood complexes, flood plains, braided channels, beaver ponds, and lakes (ODFW 1995). In contrast to the larger streams upon which chinook depend, coho require much smaller, low gradient tributaries and side channels for spawning and reproduction (ODFW 1996). Coho require temperatures as low as 40°F for incubation, and 53°F for rearing (TBNEP 1997, attached).

3) Steelhead:

Because steelhead utilize multiple stream habitats, migrating between the uppermost reaches of tributaries and large streams, the range of habitat protected must extend to the furthest reaches of all tributaries (RVCG 1997). Steelhead are able to spawn in gradient slopes up to 5 degrees, with pea to orange sized gravel (ODFW 1992). They require temperatures as low as 40°F for incubation, and 45°F for rearing (TBNEP, 1997, attached). Steelhead are most productive in complex habitats characterized by large and small wood, and require deep holding pools prior to spawning (ODFW 1992). Because juveniles spend up to four years in freshwater, they are particularly susceptible to changes in temperature and water flows.

4) Chum Salmon:

Chum salmon require temperatures as low as 40°F for incubation and 44°F for rearing. Juvenile chum are particularly vulnerable to high sediment levels, with death occurring with as low as 15.8 g/l (TBNEP 1997, attached). Chum appear to be most dependent on the lower portions of stream habitats, where habitat degradation is most likely (ODFW 1996).

5) Coastal Cutthroat Trout:

Coastal cutthroat trout require temperatures as low as 43°F for incubation and 49°F for rearing. Fry and juveniles are dependant upon backwater pools and large woody debris (TBNEP 1997, attached). Coastal cutthroat use estuaries extensively for rearing and before upstream migration (TBNEP 1997).

6) Columbia Seep Salamander:

This salamander requires cold, clear springs and small headwater streams, with temperatures ranging between 48°-52° F (ODFW 1996). Because this species is sensitive to heat and the loss of body moisture, they cannot survive in dry or warm environments. ODFW noted that a reason for the Columbia seep salamander's sensitive status is that "[h]eadwater stream and spring habitats . . . are not adequately protected" (ODFW 1996).

7) Tailed Frog:

This frog requires cold, fast-flowing permanent streams in forested areas, with temperatures ranging from 41°-61° F (ODFW 1996). "[T]ailed frogs have exacting habitat requirements, including the lowest known temperature requirements, and one of the narrowest temperature tolerances of any of the world's frogs" (ODFW 1996). To meet this low temperature requirement, the tailed frog needs the heavy canopy cover associated with old growth forests (ODFW 1996). DEQ has also recognized the temperature-sensitive nature of the tailed frog, stating that first year tadpoles select water temperatures below 50° F (DEQ 1995).

The DEQ currently uses numeric criteria, almost exclusively, to protect the beneficial uses listed above. The numeric criteria applicable to the North Coast Basin are as follows:

- Dissolved Oxygen: From spawning until fry emergence, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997).

- Temperature: 55° Fahrenheit for salmonid spawning and incubation, and 64° Fahrenheit for salmonid rearing (DEQ 1995).

- Turbidity: No more than a 10% cumulative increase shall be allowed.

- pH: Between 6.5 – 8.5 for estuarine and fresh waters.

Data show that the water quality of the Kilchis River is significantly higher than current numeric criteria of Oregon's water quality standards. For example, results of DEQ sampling in March of 1997, showed temperatures ranging from 42.1° - 46.2° F (DEQ 1997a). While the petitioners believe that these temperatures are actually warmer than is ideal for many species present in the Kilchis River, such as Chum salmon which prefer temperatures as low as 40° F during incubation, they are sufficiently cool as to provide excellent habitat that should be protected from any degradation through the Tier III nondegradation policy provided by ORW status.

In fact, allowing any degradation of current water quality down to numeric criteria, whether through application of the Department's Tier II antidegradation (socioeconomic balancing) policy for High Quality Waters or outright failure to apply the Tier II antidegradation policy, will seriously jeopardize and likely eliminate some of the existing beneficial uses in the Kilchis River. For example, maintaining water quality in the river higher than current numeric criteria is important because of the presence of the sensitive Columbia seep salamander and the tailed frog in the Kilchis River. These species prefer temperatures of 48°-52° F and 41° - 61° F respectively.

In order to protect these most sensitive beneficial uses, the only alternative to the ORW designation is for DEQ to actively interpret and apply its narrative criteria in order to prevent further

warming of water temperatures and degradation of other water quality parameters. To date, DEQ has not applied its narrative criteria or its mandate to protect beneficial uses as stand-alone components of water quality standards promulgated pursuant to the Clean Water Act. The only exception to this is within DEQ's 303(d)(1) program where it has identified waters that violate water quality standards due to habitat modification and flow modification, both narrative criteria. There, however, DEQ has failed to give full meaning to the narrative criteria by requiring a concurrent violation of numeric criteria in order to justify listing of waterbodies for violating standards (DEQ 1995). In other words, despite some effort to identify and apply narrative criteria to water quality limited waters, DEQ actually relies solely upon its numeric criteria, even where there is evidence of beneficial uses that require higher water quality. For this reason, conferring ORW status on the Steamboat Creek watershed is the most likely method to preserve the current quality of these exceptional high quality waters and possibly the only viable method of doing so.

This is underscored by the fact that if the Department were to chose to apply its narrative criteria as a method of protecting the existing beneficial uses of the Kilchis River, it would have to do so by actively applying its Tier II antidegradation policy for High Quality Waters to both point and nonpoint sources of degradation, an approach that does not appear to have been considered in the Kilchis River or elsewhere in the state. It is undoubtedly a far greater undertaking to institute such a state-wide program than to confer ORW status upon the exceptional waters of the Kilchis River.

(5) Past and Present Threats to Water Quality in the Kilchis River

While the Kilchis River is located within the "most extensive, unfragmented forested area in the Oregon Coast Range," (Huntington, Frissell 1997), it is positioned within a river basin characterized by natural geologic instability, steep topography, weathered volcanic soils, and restricted stream channel structure. These attributes make the area highly erosion-prone and at a high risk for mass slope failures. Specifically, the erosion risk within the Kilchis watershed has been ranked by the Tillamook Basin National Estuary Project as being moderate to very severe (Nehlsen et al. 1995).

In an area naturally prone to mass soil movement processes, human land use activities such as timber harvesting, grazing, road building, and road maintenance can serve to exacerbate the problem and pose great risk to the aquatic system. This problem was particularly apparent during the 1930s to 1950s when approximately 65-70% of the Kilchis watershed was burned during the "Tillamook Burn." As a result of the burn and associated salvage logging, the area experienced wide-scale loss of streamside vegetation and increased in-stream sediment loads up to 2000 times normal background levels that dramatically impacted the functioning ability of the aquatic system.

Today, the Kilchis watershed is in the process of recovering from these stresses, and the majority is under forest cover (Nehlsen et al. 1995). Designating the Kilchis as an ORW will protect habitat for healthy populations, as well as allow the imperiled species to recover. Without the designation, the unique qualities of the Kilchis remain at risk.

(6) Impending Threats to the Kilchis River

As indicated by the above section, the Kilchis River watershed is located within an area naturally prone to disturbance regimes that are only exacerbated by human land use activities. The presence of the species listed in this petition, however, is a clear indication that, despite the natural and human related stresses placed on the watershed, the Kilchis still retains the water quality and habitat characteristics necessary to support numerous fish and wildlife species. The majority of the species cited within this petition require quite similar habitat requirements: deep pools, clean gravel, cold and clean water, complex channel structure, instream woody debris, and shoreline vegetation. These requirements, however, are currently faced with serious impending threats.

Also threatening the Kilchis River is the risk of extensive timber harvest. The forested land surrounding the Kilchis River, once subject to the extensive effects of the "Tillamook Burn" is now reaching harvestable age. The Kilchis River is located within the Tillamook State Forest, which is administered by the Oregon Board of Forestry. The Board of Forestry is currently considering the adoption of an administrative rule which would declare timber production and harvest as the primary purpose for which the lands will be managed. The Board is also developing a Northwest State Forest Plan, which will govern land management within the Kilchis River watershed. If both the proposed rule and plan are adopted the water quality of the Kilchis will be placed at risk.

The plan calls for extensive management of the forest landscape and will allow logging, associated road building, and maintenance activities. The effects associated with logging practices are well documented, and they include increased solar radiation, decreased supply of large woody debris, erosion of streambanks, increased stream width, decreased stream depth, and higher water temperatures (Spence et al. 1996). These effects severely impact fish and other aquatic species that are dependent on specific habitat characteristics. Specifically, chinook, coho, chum, coastal cutthroat trout, and steelhead require clean gravel and low water temperatures for spawning, and chinook and steelhead are also dependent upon deep holding pools near spawning areas. Potential logging activity will seriously impact these species' abilities to effectively spawn. Additionally, the tailed frog requires water temperatures as low as 41°F, and increased temperatures from logging practices will seriously impair its survival.

The Board of Forestry has not finalized either the "primary purpose" rule or the plan. This petition, therefore, provides DEQ with an excellent, albeit narrow, window of opportunity to provide the necessary protections for the Kilchis that are currently absent.

(7) Special Status Conferred on the Kilchis River

The Kilchis River has been attributed with the following federal, state, and local designations. While these designations reflect the far-reaching importance of the unique characteristics that distinguish the Kilchis River watershed, none of these designations provide the comprehensive oversight and management planning necessary to fully protect these

characteristics. Significantly, it is within the Environmental Quality Commission's sole province to accomplish such protection through Outstanding Resource Water designation.

A. The Kilchis River contains parts of a Tier I Key Watershed managed by the Bureau of Land Management (OB-83) (FEMAT 1993). The management plan associated with FEMAT is focused toward achieving biological diversity while attaining economic and social goals. These goals are to be achieved through the adaptive management of various ecosystems.

B. The Kilchis River is under the jurisdiction of the CZMA (USCOE 1994).

C. The Kilchis River is located within the Tillamook Basin, an area for which the State Department of Agriculture is currently developing an Agricultural Water Quality Management Area Plan pursuant to ORS §§ 568.900- 568.933 (OCSRI 1997). The accompanying management plan is scheduled to be completed within four years and fully implemented within ten years (OCSRI 1997). The purpose of the plan will be the "prevention and control of water pollution from agricultural activities and soil erosion" within the management area. OAR 603-95-0010(5).

D. The Kilchis River, between Coal Creek and Mapes Creek, is designated by the Division of State Lands as Essential Salmonid Habitat for chum salmon (OSCRI 1997).

E. ODFW considers the Little South Fork of the Kilchis a recovery watershed (Barber et al. 1994).

F. The Kilchis River is located within the Oregon State Coastal Salmon Recovery Plan because it provides critical habitat for coho and steelhead salmon (OCSRI 1997).

G. The Kilchis Watershed has been selected by the Tillamook Bay National Estuary Project for a model watershed analysis project that will later be integrated into a Comprehensive Conservation and Management Plan for the entire Tillamook Basin (Nehlsen et al. 1995). In addition, the local Natural Resource Conservation Service office will be participating in the development of this watershed analysis and a Kilchis Basin Plan.

(8) Other Information Related to the Kilchis River

There are very few watersheds in the North Coast Basin that contain aquatic habitat quality equal to that found in the Kilchis River watershed. This habitat provides a vital link to the health and long-term productivity of numerous aquatic species. Ensuring the survival of these species is dependent upon protecting and maintaining existing water quality values and preventing degradation.

Additionally, the outstanding attributes of the Kilchis directly contribute to the water quality of Tillamook Bay. Preserving the water quality of the Kilchis is essential, not only for maintaining the Bay as a healthy aquatic system, but also for preserving the economy of an area so dependent on Tillamook Bay's sustainability.

As several recent scientific studies have shown, salmonid and other aquatic species have very specific water quality requirements. Fluctuations in water temperature, suspended sediment loads, or modifications to habitat or stream flow can have both immediately and cumulatively deleterious effects on these species (Spence et al. 1996). Current in-stream water quality standards are simply not sufficient to protect these species from risk. As the human population in northern Oregon continues to rapidly grow, protecting high quality waterbodies from fluctuations that jeopardize the health of the species listed will become increasingly difficult. Designating the Kilchis River as an Oregon Outstanding Resource Water is necessary in order to protect, not only the ecological integrity of the critical habitat of these species, but also the special water quality values that are essential to the unique characteristics of the Kilchis River.

(9) Data Sources

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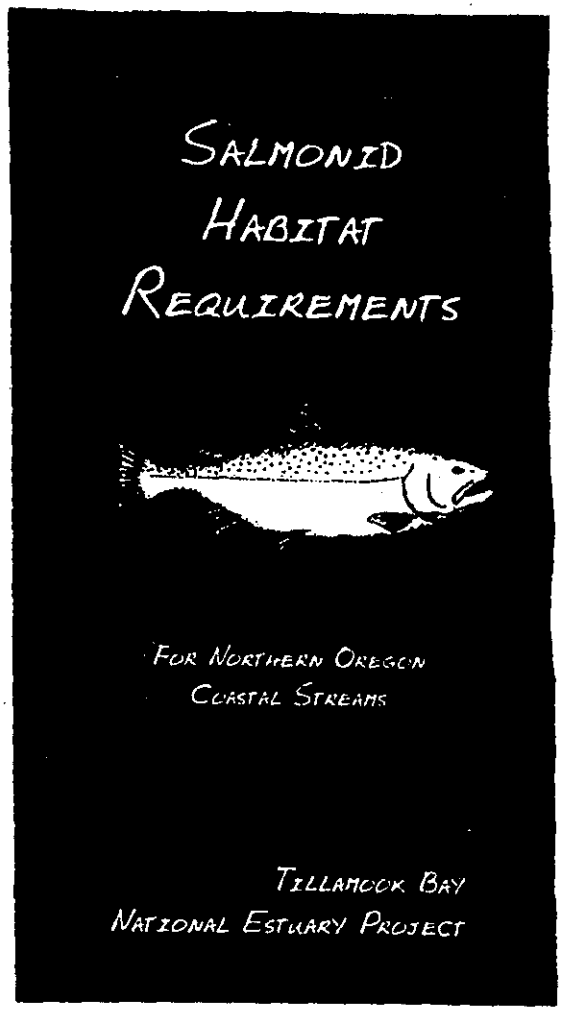
Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Incubation		Rearing						Status
	Incubation Temp.	Fry Emerge	Fry Habitat	Juvenile Habitat	Preferred Temp.	Freshwater Residency Period	Estuary Residency Period	Notes	1996 Status
Chinook - Fall	0 0–20°C; best 5.0–14 4°C	Mar–May	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Estuaries play a vital role in survival of young	Healthy and stable
Chinook - Spring	0 0–20°C; best 5 0–14 4°C	Feb–Mar	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Large body size limits movement over barriers	Depressed
Coho	4 4–13 3°C	Feb–June	Backwater pools and stream edges	Pools in summer, off channel alcoves, ponds, dam pools with complex cover in winter	11.8 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	One year Spring smolt	Move through 2–9 days	Low pH (<5.01) can be lethal to alevins	Listed sensitive on state lists
Chum	4 4–13.3°C	Late Mar–Apr	Move directly into estuary	High sediment levels (15.8–54.9 g/l) will kill juveniles	6.7 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	Hours to a few days, leave quickly Spring smolt	2–32 days	Use estuaries immediately for food and adjustment	Depressed
Steelhead-Winter	4 4–13.3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2 -3 years Spring smolt	Move through in days	Good habitat = small and large wood complexity	Depressed
Steelhead - Summer	4 4 - 13 3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2–3 years Spring smolt	Move through in days	Summer steelhead require deep cool pools to live in before spawning	Hatchery fish - depressed
Sea Run Cutthroat Trout	8 1–17 2°C	Mar–May	Stream edges and backwater pools, large wood important	Prefer pools but are often displaced by coho or steelhead, low velocity pools and side channels in winter	9.5–12.9°C Growth stops at 20.3°C lethal at 23.0°C	2-4 Years Spring smolt	Used extensively as adults before upstream migration	Rearing in estuary is common	Depressed

Abbreviations used: C - Celsius (0°C = 32°F, 10°C = 50°F, 20°C = 68°F); cm - centimeters (2.54 cm = 1 inch); LWD - large woody debris; m - meters (1 m = 3.3 ft); max - maximum; mg/l - milligrams per liter (28.35 mg = 1 ounce, 1 liter = 1.06 quarts); mm - millimeter (25.4 mm = 1 inch); m/s - meters per second.



Habitat

Salmonid populations in the Pacific Northwest have been in decline for many decades. As a result some populations are listed as threatened or endangered species. One of the reasons for their decline is a lack of suitable habitat.

Studies show that salmon require a range of conditions in which to migrate upstream, spawn, and grow. This chart outlines some of those conditions and represents best professional judgement compiled from scientific reports and studies. It is designed to be a reference chart.

Dissolved Oxygen - The oxygen carried in the water is called dissolved oxygen and is required by fish. The amount of dissolved oxygen in the water varies with water temperature. Salmonids, in general, tend to require high levels of dissolved oxygen.

Temperature - In general, colder temperatures are preferred by salmon. Colder water carries more dissolved oxygen and also slows fish metabolism, which allows fish to gain weight more easily and grow to larger sizes.

Velocity - Water velocity needs to be great enough to provide continuous oxygen supply, but slow enough not to wash away eggs and juvenile salmon.

Percent Fines - "Fines" refer to the very small sediments carried by the water. Too much sediment in streams can stop migrations and kill fish by clogging gills and suffocating eggs. Fines prevent fish from getting essential dissolved oxygen.

Depth and Substrate - Salmonids seek good places to make their redds, or nests. Appropriate conditions depend on the size of the gravel in the nest and the depth of water.

For more information about salmon, water quality, or other related topics, contact the National Estuary Project at (503) 322-2222 or visit our web site at:
http://osu.orst.edu/dept/tbaynep/nephome.html

Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Spawning (including upstream migration)									
	Migration	Spawn Timing	Location	Substrate Size	Water Depth	Water Velocity	Dissolved Oxygen	Spawning Water Temp	Percent Fines Tolerable	Notes
Chinook - Fall	Sep–Dec	Oct–Jan	Mainstem and large tributaries	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.1–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Large body size limits movement over barriers
Chinook - Spring	Apr–Jun	Sep–Oct	Upper mainstem streams	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.21–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Requires deep water for travel–pools for summer habitat
Coho	Sep- Jan	Oct–Jan	Small tributaries	Pea to Apple (1.3–9.0 cm)	0.18–1 m	0.08–0.11 m/sec; max is 2.4 m/s	> 8 mg/l	4.4–14°C	Fines (<6.4 mm) make up less than 25% of substrate	Primary target for many sport fisherman
Chum	Nov–Dec	Nov–Dec	Lower mainstem and tributaries	Pea to Orange (0.5–10.2 cm)	13–50 cm; ideal 21 cm	0.21–0.83 m/s; max is 2.4 m/s	> 5 mg/l; above 80% saturation best	7.2–12.8°C	Fines (<6.4 mm) make up less than 25% of substrate	Strong swimmer but doesn't jump
Steelhead - Winter	Nov–May	Jan–May	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Late fish seem to prefer mainstem and large tributary
Steelhead - Summer	May–Jul	Jan–Apr	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Athletic swimmer
Sea Run Cutthroat Trout	Jun–Oct	Dec–Feb	Small headwater tributaries, 1st & 2nd order streams	Pea to Golf Ball (0.5–7.5 cm)	0.01–1m; 10–15 cm best	0.11–0.90 m/s; max is 2.4 m/s	> 5 mg/l	6-17°C; best is 10°C	Fines (<6.4 mm) make up less than 25% of substrate	May spawn more than once

Compiled by Ann Newton, August, 1997. Tillamook Bay National Estuary Project

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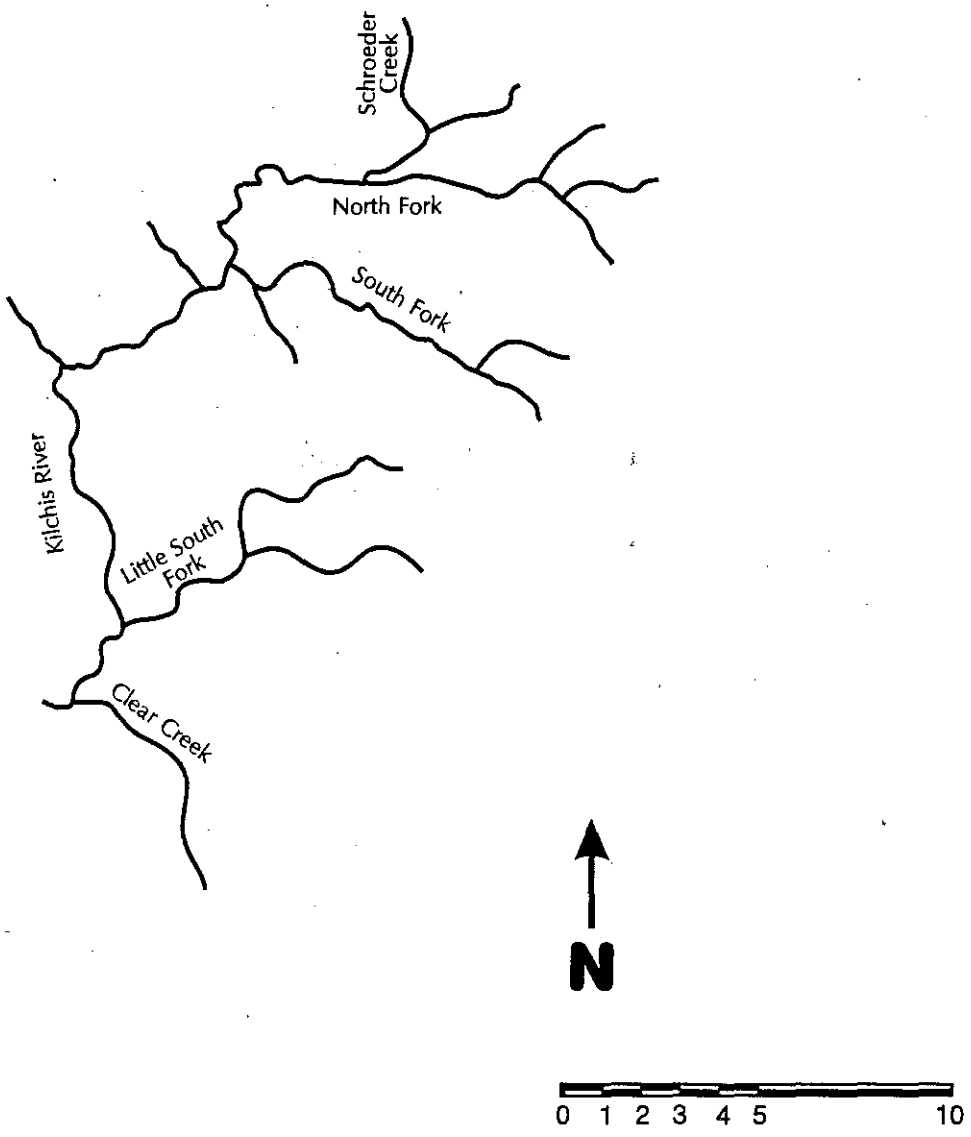
5. Additional thanks to Oregon Department of Fish and Wildlife for comments and suggestions.

Kilchis River



OUTSTANDING RESOURCE

WATER PETITION

for the

Little North Santiam River

OUTSTANDING RESOURCE WATER PETITION
for the
Little North Santiam River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate twenty-six miles of the Little North Santiam River watershed as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. This request includes the Little North Santiam River (from the mouth to the confluence of Battle Axe Creek and Opal Creek at river mile 26) in Township 8 S and Range 4 E-5 E.

The Little North Santiam River originates in the Willamette National Forest and flows into the Santiam River, which flows into the Willamette River. The North Santiam watershed as a whole includes 314,191 acres, and its water yield is 1,920,213 acre feet/year. The Little North Santiam lies within the Willamette Basin, North Santiam Sub Basin.

The Little North Santiam River is located in eastern Marion County. The Little North Santiam watershed comprises 72,157 acres, of which 36,144 acres or 50.1% of the basin is federally-owned and under the jurisdiction of the Forest Service; 13,222 acres or 18.3% of the basin is federally-owned and under the jurisdiction of the Bureau of Land Management (BLM 1992); 20,922 acres or 29% of the basin is privately-held; and 1,869 acres or 2.6% of the basin is owned by the State of Oregon (BLM 1997). Rainfall in the watershed is heavy and produces 302,011 acre feet per year (U.S. Forest Service 1990). Significantly, Congress recently designated 12,800 acres in the Opal Creek drainage at the headwaters of the basin as wilderness and 13,000 acres as a Scenic Recreation Area in the Oregon Resource Conservation Act of 1996, Pub. L. 104-208, title 1, sections 101-110, 110 Stat. 3009. All of these designated lands are under the jurisdiction of the Forest Service.

(2) Unique Character of the Little North Santiam River

The Little North Santiam is unique because it is a primary source of clean water for the mainstem North Santiam River, which provides drinking water for at least 150,000 people, including those in the cities of Salem (diversion at river mile 31), Turner (diversion at river mile 31), and Stayton (diversion at river mile 31) (U.S. Forest Service 1995). The North Santiam provides between seventy-two percent and ninety percent of the municipal water supply for these

towns (U.S. Forest Service 1990). In fact, Congress designated lands in the Opal Creek area in the headwaters of the Little North Santiam as wilderness and scenic recreation areas explicitly "to provide increased protection for an important drinking water source for communities served by the North Santiam River." Pub. L. 104–208, sec. 103(3), 110 Stat. 3009.

The Little North Santiam is unique also because it provides critical habitat, as defined in OAR 340-41-006(40), as a refugia for important anadromous fisheries in the Willamette River basin. The Little North Santiam has no dams and it has no hatcheries. It supports winter steelhead (*Oncorhynchus mykiss*), which is at high risk of extinction and has been petitioned for listing under the federal Endangered Species Act ("ESA"), 61 Fed. Reg. 41541; and spring chinook salmon (*Oncorhynchus tshawytscha*), which is also at high risk of extinction and has been petitioned for listing under the federal ESA, 60 Fed. Reg. 30263. Further, the Little North Santiam supports rainbow trout (*Oncorhynchus mykiss*) and cutthroat trout (*Salmo clarki*), which are state sensitive species (Oregon AFS 1993).

The Little North Santiam River has been designated a Tier 1 Key Watershed (OF-110) by FEMAT. This designation is based upon the important sources of high quality water within the watershed, and the contribution the watershed makes to conserving anadromous salmon, including the link that it provides in a network of watersheds that protect at-risk anadromous fish stocks (FEMAT 1993). The river is one of 139 Tier 1 Key Watersheds which have been identified (FEMAT 1993). As a Key Watershed, the Little North Santiam represents "the best of what is left" (FEMAT 1993)

The Little North Santiam has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Clarke 1997; Li et al. 1995; Oregon AFS 1993). ADA designation indicates the AFS believes that this river should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon" (Li et al. 1995; Oregon AFS 1993). This designation is based upon the following value:

1) *Highly Sensitive*. The Little North Santiam River is a relatively healthy watershed that is highly sensitive to disturbance or cumulative effects of future human uses.

3) *Reference Watershed*. The Little North Santiam is a relatively unaltered and characteristic example of an aquatic ecosystem.

4) *Species Richness*. Relative to other waterbodies in the Willamette River basin, the Little North Santiam has a high number of aquatic species.

5) *Scientific Value*. The Little North Santiam provides key monitoring areas where valuable baseline or long-term data sets exist and where definitive research on the life history/ecology of a species or assemblage has been conducted. In particular, data collected by the City of Salem provides extensive water quality information.

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6) *Connecting Corridor*. The Little North Santiam River is a connecting corridor. A "connecting corridor" is defined as "streams [or] watersheds that link existing protection areas with other important habitats; connect disjunct or potentially disjunct populations in a basin; or connect important habitats needed to support different life history stages for one or more populations [e.g., connect spawning with rearing habitats]." (Oregon AFS 1993).

(3) Beneficial Uses Related to the Unique Character of the Little North Santiam River

The beneficial uses of the Little North Santiam River, which are directly related to the unique character of the waterbodies, include: (1) public and private domestic water supplies; (2) anadromous fish passage; (3) salmonid fish rearing; (4) salmonid fish spawning; (5) resident fish and aquatic life; and (6) fishing (DEQ 1996).

A. Public and private domestic water supplies: the Little North Santiam flows into the North Santiam at river mile 39. As noted, the North Santiam includes diversion points for drinking water for roughly 150,000 people.

B. Anadromous fish passage, salmonid fish rearing, salmonid fish spawning, and resident fish and aquatic life: the Little North Santiam (from the mouth to the confluence of Battle Axe Creek and Opal Creek at river mile 26) supports these beneficial uses as this segment of the river provides critical habitat for the following species (nb: according to the BLM, the first one-half mile downstream of the confluence of the creeks supports neither steelhead nor chinook [BLM 1997]):

1) Winter steelhead (*Oncorhynchus mykiss*): a listing decision under the federal ESA for winter steelhead is due in February 1998. ODFW has designated winter steelhead as a "stock of concern" (ODFW 1992b).

2) Spring chinook salmon (*Oncorhynchus tshawytscha*): a listing decision under the federal ESA for spring chinook salmon is due. The State of Oregon has concluded that "[s]pring chinook in the North . . . Santiam should be given a high priority with respect to future management funding and staffing" (ODFW 1992b).

3) Rainbow trout (*Oncorhynchus mykiss*): the State of Oregon has determined that "[w]illamette basin rainbow trout are currently listed by ODFW as a stock of concern due to insufficient information regarding their status. Rainbow trout should be given a high priority with respect to future population and habitat inventory and monitoring activities in the Willamette basin." (ODFW 1992b).

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4) Cutthroat trout (*Salmo clarki*): the State of Oregon has determined that "[w]illamette basin cutthroat trout are currently listed by ODFW as a stock of concern due to insufficient information regarding their status. Cutthroat trout should be given a high priority with respect to future population and habitat inventory and monitoring activities in the Willamette basin" (ODFW 1992b).

5) Coho salmon (*Oncorhynchus kisutch*); ODFW stocked coho in the Willamette basin in the early 1970s to early 1980s; any coho in the Little North Santiam are part of a remnant and introduced species and do not alone justify designation of the river as an ORW.

C. Salmonid fish rearing, salmonid fish spawning, and resident fish and aquatic life: the Little North Santiam supports these beneficial uses as the river provides critical habitat for the following species:

1) Rainbow trout (*Oncorhynchus mykiss*); the State of Oregon has determined that "[w]illamette basin rainbow trout are currently listed by ODFW as a stock of concern due to insufficient information regarding their status. Rainbow trout should be given a high priority with respect to future population and habitat inventory and monitoring activities in the Willamette basin" (ODFW 1992b).

2) Cutthroat trout (*Salmo clarki*); the State of Oregon has determined that "[w]illamette basin cutthroat trout are currently listed by ODFW as a stock of concern due to insufficient information regarding their status. Cutthroat trout should be given a high priority with respect to future population and habitat inventory and monitoring activities in the Willamette basin" (ODFW 1992b).

D. Fishing: the Little North Santiam supports these fisheries as a beneficial use:

1) Winter steelhead -- "Sport catch of winter steelhead in the Santiam and Calapooia subbasins has remained fairly constant, averaging 1,970 adults with a range of 542 to 3,396 fish during the 1977078 through 1988-89 run years. Approximately 45 percent of the subbasin harvest is from the North Santiam . . ." (ODFW 1992b).

2) Spring chinook -- "Spring chinook provide angling opportunities in May, June, and July. Sport catch in the North and South Santiam rivers has generally increased since 1975 . . . , perhaps due to increasing angler interest. The average annual sport catch during 1977 to 1989 in the Santiam subbasin was 1,724 fish. Average annual sport catch has been

increasing in more recent years. The average annual catch during 1987 to 1989 was 3,640 fish. During 1987-89 the Santiam subbasin had the highest sport catch of spring chinook amount Willamette tributaries above Willamette Falls. The 1981 to 1989 average annual catch for the North and South Santiam was 1,119 and 772 fish, respectively" (ODFW 1992b).

3) Rainbow trout -- Average catch rates for naturally produced and hatchery rainbow trout during 1965-72 were the highest in the Little North Santiam (ODFW 1992b).

4) Cutthroat trout -- 344 cutthroat were harvested in the main stem of the Santiam and North Santiam during 1978 (ODFW 1992b).

(4) Relationship Between the Unique Character and the Water Quality in the Little North Santiam

One of the Little North Santiam's unique characteristics is that it helps provide drinking water for more than 150,000 people. The water quality parameters of concern associated with this unique characteristic include fecal coliform, sediment, and turbidity. The river's other unique character is that it provides relatively good habitat for many at-risk anadromous and resident salmonids. The water quality parameters associated with this unique character include sediment, turbidity, and temperature.

DEQ has not designated any part of the river as "water quality limited" for any parameter. However, DEQ has found that the river has only moderate dissolved oxygen; some bacteria and viruses; periods of low flow; and some sedimentation problems (DEQ [cite]). Further, water temperatures in the lowest part of the watershed can be high in the summer. The BLM estimates that temperatures are above the growth threshold for salmonids and sometimes approach lethal levels (BLM 1997). The streams which likely add to increases in temperature include Fawn, Fish, Sinker, Big, Cougar, Moorhouse, Chamberlain, and Wonder Creeks (Ibid.). The majority of these creeks flow in subwatersheds with predominately privately-owned lands, and some of the lowest canopy cover in the watershed (BLM 1997). The subwatersheds that have large private land ownership also have the greatest road density: up to 5.7 miles per square mile; as opposed to subwatersheds on Forest Service lands, where densities range from 0.4 miles per square mile (Battle Axe Creek) up to only 1.5 miles per square mile (Elkhorn Creek) (BLM 1997).

According to the water quality monitoring conducted by the City of Salem, water quality in the river adjacent to Forest Service lands in the headwaters is excellent. Levels of turbidity and bacteria increase downstream. Monthly grab samples in the lower reaches taken by City of Salem staff show temperatures 20.5, 21, 20.2 in June July and August, 1994, respectively (Schweickert 1997).

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DEQ should fully maintain and protect water quality in the Little North Santiam, so that it may protect the water supply for people and both anadromous and resident salmonids. See OAR § 340-41-026(1)(a)(A) (stating that where existing water quality exceeds those levels necessary to support beneficial uses, that level of water quality should be maintained and protected) (DEQ 1997c). DEQ attempts to meet this standard through water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Winter Steelhead:

Because steelhead utilize multiple stream habitats, migrating between the uppermost reaches of tributaries and large streams, the range of habitat protected must extend to the furthest reaches of all tributaries (RVCG 1997). Steelhead are able to spawn in gradient slopes up to five degrees, with pea to orange sized gravels and temperatures ranging between 45-58 degrees (ODFW 1992a). Steelhead are most productive in complex habitats characterized by large and small wood, and require deep holding pools prior to spawning (ODFW 1992a). Because juveniles spend up to four years in freshwater, they are particularly susceptible to changes in temperature and water flows.

Winter steelhead are native to Santiam subbasin. Actually, winter steelhead in the Santiam subbasin "still provides the majority of winter steelhead production in the Willamette basin" (ODFW 1992b).

2) Chinook Salmon:

Spring chinook generally spawn from August 25 through October 15 within the Willamette River system (ODFW 1992b). Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (Kostow 1995). Chinook prefer a gradient of less than three percent in spawning areas, and because one of the "most critical links for survival of this species" is clean gravels, chinook are particularly affected by increases in fine sediment loads (Kostow 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (Kostow 1995). "Clean, stable spawning gravel, cool freshwater temperatures, and healthy estuarine ecosystems are probably the most critical elements for natural production" of chinook salmon (ODFW 1996). Juvenile chinook require deep riffles, woody debris, and shoreline riparian vegetation for cover and feeding areas (Kostow 1995). Rearing chinook are particularly affected by impacts to lower basin habitat complexity (Kostow 1995).

Spring chinook are the only race of salmon that are native to the Santiam subbasin (ODFW 1992b). "The Santiam subbasin has produced approximately 33 percent

of the naturally produced spring chinook in the Willamette basin above Willamette Falls . . ." (ODFW 1992b).

3) Rainbow Trout:

Rainbow trout are typically found in the warmer, large mainstem and lower tributaries when both rainbow and cutthroat trout are present within one watershed, as in this situation in the North Santiam (ODFW 1992b). Little is known about the habitat requirements for rainbow trout in the North Santiam River.

4) Cutthroat Trout:

When cutthroat and rainbow trout reside together, as they do in parts of the Santiam watershed, "[c]utthroat are more abundant in headwater and tributary streams than rainbow trout." (ODFW 1992b). Further, cutthroat may inhabit relatively isolated stream segments. Isolated populations of cutthroat inhabit areas above natural barriers such as in Opal Creek and Battle Ax Creek in the North Santiam (ODFW 1992b).

The DEQ currently uses numeric criteria to protect the beneficial uses listed above. The numeric criteria in the Willamette River Basin are as follows:

- Dissolved Oxygen:

  From spawning until fry emergence from the gravels, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997a).

- Temperature:

  The temperature standard is 55 degrees Fahrenheit for native salmonid spawning, egg incubation, and fry emergence from the egg and from the gravels in the basin, and 64 degrees Fahrenheit for salmonid fish rearing (DEQ 1997a).

- Turbidity:

  No more than a ten percent cumulative increase in natural stream turbidities shall be allowed (DEQ 1997a).

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- pH:

  Between 6.5-8.5 for the Willamette River Basin (DEQ 1997a).

These numeric criteria, however, may fail to protect and maintain the water quality necessary to protect the salmonids listed above. For example, the temperature standard for the Little North Santiam River is 64 degrees Fahrenheit for salmonid rearing and 55 degrees Fahrenheit for salmonid spawning and incubation (DEQ 1997a). However, it appears that temperatures in the waterbody are often actually lower than the numeric standard. At a sampling station at the bridge at Highway 22, temperatures were 41.9 (3\13\73), 42.8 (12\4\73), and 55.9 (10\6\88) (DEQ 1997e). Petitioners presume that DEQ has more detailed and more recent data. But readings indicate generally better water temperatures than the current temperature standard requires. And these lower temperatures are necessary for beneficial uses: winter steelhead, for example, prefer temperatures ranging from 45-58 degrees Fahrenheit during spawning (ODFW 1992b), and the tailed-frog prefers temperatures ranging from 41-61 degrees Fahrenheit (ODFW 1996).

Further, although DEQ uses numeric criteria almost exclusively to determine whether beneficial uses are being protected, it has also utilized two narrative criteria: habitat modification and flow modification. When using these two criteria to determine whether a waterbody is supporting its beneficial uses, however, DEQ has stated that a waterbody will violate these narrative criteria only when it also violates "an associated numeric water standard" (DEQ 1995). By interpreting a violation of narrative criteria to be wholly dependant upon an associated violation of numeric criteria, DEQ has eliminated much of the protections that narrative criteria offer for beneficial uses.

Therefore, in order to protect the beneficial uses listed in this petition and to reduce risk to the listed species, the EQC has two options. One, rewrite the numeric and narrative criteria so that they actually protect the full suite of habitat requirements necessary to support the beneficial uses listed, as required by 33 U.S.C. § 1313(c)(2) and 40 C.F.R. § 131.3; or two, protect the existing high quality values of the Little North Santiam and Upper North Santiam by designating them as ORWs.

(5) Past and Present Threats to Water Quality of the Little North Santiam

Water quality in the Little North Santiam exhibits relatively typical impacts from historic logging, mining, and roadbuilding in the watershed. Most BLM, state, and private lands have been logged or burned (or both) at least once; forest age classes on these lands range roughly from 0 to 120 years, with the oldest forest stands occurring on BLM lands (BLM 1997). In contrast, Forest Service lands in the watershed appear to be in a significantly more undisturbed condition: a near-majority of these lands have tree stands that range from 120 years to 200 years+ (Ibid.).

Creation of federal wilderness and scenic recreational areas comprising 25,800 acres in the Opal Creek, Battle Axe Creek, Elkhorn Creek, Gold Creek, Henline Creek, Dry Creek, and Cedar Creek subwatersheds should fully protect water quality in these areas. The wilderness designation of 12,000 acres flatly prohibits any new logging or roadbuilding. The scenic recreational area designation means that generally no logging may occur, except for hazard tree removal or to stop fires. Further, no new roads may be built, and the Forest Service is obligated to write a new management plan for the area that will in part evaluate which roads should be obliterated.

Moreover, the 1994 President's Forest Plan, and its ancillary Aquatic Conservation Strategy, dictate what may be done on the 18,760 acres of federal lands in the watershed outside of the wilderness and scenic recreational area boundaries. Specifically, the ACS established "riparian reserves" of an intermediate width in which no logging or roadbuilding may occur before a federal agency issues a "watershed analysis." The BLM is currently writing a watershed analysis for the Little North Santiam; the BLM anticipates a riparian reserve width on perennial streams of a "site potential tree" buffer, which can be at least 200 feet back from the high water mark of the creek (BLM 1997).

A third anticipated new management regime would affect state and private lands. As noted, spring chinook salmon, which inhabit the river from the mouth to roughly river mile 15, have been petitioned for listing under the federal ESA. If the species is listed, or if Governor Kitzhaber persuades the National Marine Fisheries Service to not list spring chinook on the basis that the state can provide adequate regulatory mechanisms to make a listing unnecessary, then, in either case, changes are likely to result to Oregon Forest Practices Act standards to make them more protective of anadromous fisheries. Both the Coastal Salmon Restoration Initiative and NMFS' biological opinion for ongoing implementation of the Act for the transboundary ESU of coho presage such a change.

(6) Impending Threats to the Little North Santiam

Under the Three Basin Rule, codified at OAR 340-41-470, the Little North Santiam is protected more fully than many state waters. The rule generally prohibits new or increased waste discharges, defined as any discharge requiring an NPDES or WPCF permit or 401 certification. OAR 340-41-027(1) & (2). However, the rule is inadequate to fully protect water quality in the Little North Santiam. Most significantly, the rule does not address non-point sources of pollution, which are the primary source of temperature, turbidity, and bacteria problems in the basin. Further, the rule allows discharges from existing facilities (defined as those that existed before January 28, 1994), OAR 340-41-027(2)(b), and allows pre-existing discharge permits to be renewed or traded. OAR 340-41-027 (3) (at this time, however, no individual discharge permits exist for the Little North Santiam [Dicksa 1997]). Last, the rule allows DEQ to issue general discharge permits that apply to the waterbodies (DEQ 1997b).

Three types of anthropogenic activities threaten water quality in the Little North Santiam: logging, mining, roadbuilding, residential development, and certain recreational uses.

As noted, logging and roadbuilding in the watershed has decreased canopy cover, altered riparian corridors, caused sedimentation, and increased turbidity. Many of these water quality impacts are likely to be mitigated by changes in federal law and federal land management. However, at least the BLM intends to continue to allow logging on its lands in the basin. Its preliminary watershed analysis indicates roughly 3117 acres will be in "matrix" lands and, accordingly, will be logged (BLM 1997). Further, as noted, almost one-third of the watershed is privately-owned. These 20,922 acres of private lands are zoned almost exclusively for industrial and non-industrial forestry. One may presume that they will be managed exclusively for continued logging, subject at this time only to the Oregon Forest Practices Act.

For mining, DEQ's general discharge permit for suction dredge placer mining allows instream mining in the mainstem and all tributaries. For recreational activities, the primary component of water quality degradation is bacteria from human wastes.

(7) Special Status Conferred on the Little North Santiam River

The Little North Santiam River has been attributed with the following designation. While this designation reflects the unique characteristics that distinguish the river, it does not provide the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, the EQC alone can establish the missing water quality protection by designating the Little North Santiam as an ORW.

A. The Little North Santiam River has been designated a Tier 1 Key Watershed (OF-110) (FEMAT 1993).

(8) Data Sources

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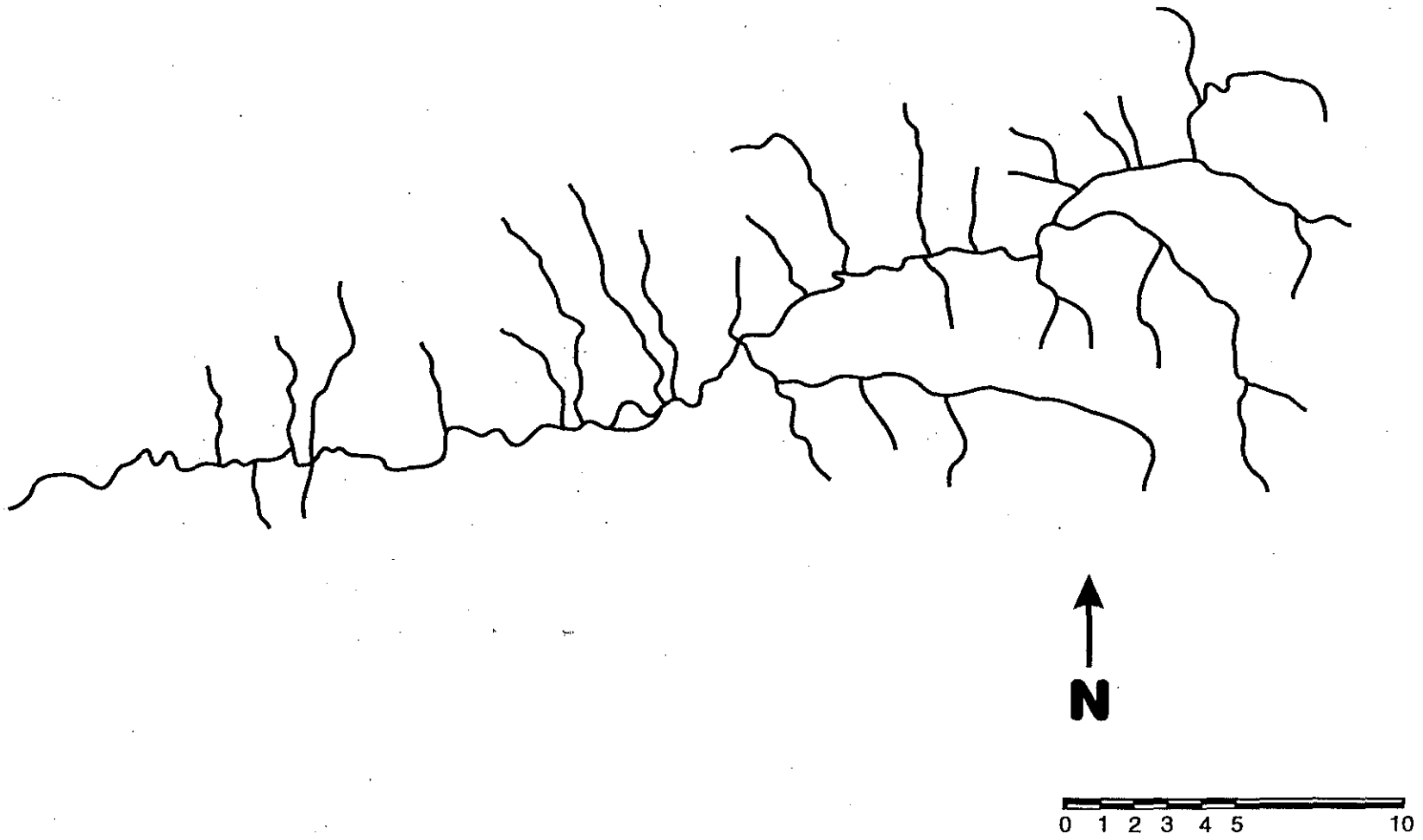
Little North Santiam River



OUTSTANDING RESOURCE

WATER PETITION

for the

North Fork of the John Day River

OUTSTANDING RESOURCE WATER PETITION
for the
North Fork John Day River

Submitted by:
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Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate the North Fork of the John Day ("NFJD") watershed as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy codified at OAR 340-41-026. This petition includes the entire North Fork of the John Day from the headwaters to the confluence with the John Day River in Township 7 S-9 S and Range 26 E-36 E.

The majority (69.7%) of the North Fork of the John Day lies within the Malheur National Forest. The watershed is 149,606 acres in size and is comprised of about 20% late successional old-growth forest, 3% roadless area, and 70% designated wilderness area (the portion within the Malheur Forest). The North Fork of the John Day River falls within the John Day Basin.

(2) Unique Character of the North Fork of the John Day River

The North Fork of the John Day River is unique because it is one of the few remaining streams in the Columbia River Basin that still retains the water quality and habitat characteristics necessary to support a diversity of fish and wildlife species. It has been identified as a "stronghold" watershed, supporting both at-risk and healthy populations of fish and wildlife (Quigley 1997). The NFJD is considered to be a relatively undisturbed and intact system, providing high quality habitat and an important cool water source to the lower portions of the John Day River (Henjum et. al. 1993).

Historically, the North Fork of the John Day was characterized by late-seral multi-layer forestlands and abundant streamside vegetation (Quigley 1997). "[U]pper Columbia Basin flows were driven by snowmelt, with high spring freshets that gradually decreased through the summer to the lowest flows during the winter. Juvenile salmonids historically migrated passively . . . on the high, cool, turbid spring and early summer freshets while undergoing rapid smoltification . . ." (ODFW 1995). Streams were characterized by lush riparian areas, large woody debris, and habitat complexity (ODFW 1995).

However, many factors have led to the decline of these habitat conditions which has led, in turn, to the decline of many of the species dependent on the NFJD. Construction of dams in the 1960's "changed the profile of the rivers into wide pools that have a decreased water velocity and greater summer water temperatures and clarity compared to the original rivers. Operation of

the projects for optimum power production and flood control further changed the hydrograph of the rivers by decreasing spring and summer flows and increasing winter flows" (ODFW 1995). Additionally, increases in timber production, irrigation, mining, and grazing in the John Day Basin have also contributed to the loss of many of the characteristics that fish need to effectively spawn, rear, and migrate (ODFW 1995). Irrigation diversions for agriculture have reduced streamflows to the point where fish populations are becoming increasingly isolated and unable to migrate (ODFW 1995). Gold mining dredging has continued to disrupt stream channels, causing increased sedimentation and loss of deep holding pools, and grazing has removed riparian vegetation throughout the basin (ODFW 1995).

The North Fork of the John Day River, however, has persevered as one of the last remaining healthy streams in the John Day Basin. It provides critical spawning and rearing habitat for the strongest remaining run of native spring chinook in the Columbia Basin, a species which exists in only 28% of its historic range, with 99% of the remaining populations classified as depressed (Lee et al. 1997). Because the majority of native spring chinook in the John Day Basin originate in the North Fork, its maintenance and protection is critical to prevent extinction of spring chinook. The NFJD also provides habitat for the last healthy run of summer steelhead in the Columbia Basin, a species which is threatened or extinct in 75% of its historic range (CSE 1994). Additionally, the North Fork also provides habitat for bull trout, a species which has the most specific habitat requirements of all the salmonids, making it an "indicator" species (AWR 1997). Their presence in the North Fork indicates cool water temperatures, preferential stream size, adequate substrate composition, exceptional cover, and excellent hydraulic complexity. The NFJD also supports imperiled populations of Westslope cutthroat trout and redband trout.

The following is a list of some of the unique attributes of the NFJD River that have been identified in recent studies:

- The Interior Columbia Basin Ecosystem Management Project's Aquatics Team has identified the North Fork John Day as a "stronghold" watershed based primarily on the presence of numerous of the seven "key" salmonid species (Quigley 1997).

- The NFJD has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Oregon AFS 1993). Identification as an ADA means that the AFS found this watershed should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon." The AFS found that the NFJD should be protected at the watershed level based on five values for conservation of aquatic diversity:

    1. *Connecting Corridor.* The NFJD is a connecting corridor between the lower river and the headwaters, and Granite Creek, where salmonid spawning occurs.

    2. *Ecological Function.* The NFJD is a cold water source for the lower river due to its many springs.

    3. *Genetic Refuge.* The NFJD is a genetic refuge for cutthroat trout, bull trout, salmon and steelhead trout. A "genetic refuge" is defined as a watershed with "a

low incidence of exotic species or limited history of hatchery stockings that may be important to protect examples of native aquatic assemblages."

4. *Reference Watershed.* The NFJD is valuable as a reference watershed because it provides an example of an ecosystem that is mostly intact with only minor alterations. It is also a valuable reference site for habitat functions in this ecoregion.

5. *Scientific Value.* The NFJD has value as a monitoring area where valuable baseline or long-term data sets exist (Oregon AFS 1993).

- The AFS supported watershed-level protection for the NFJD because of its belief "that protection/restoration of these minimally disturbed or sensitive areas must receive immediate priority if the state is to maintain its biological options for the future" (Oregon AFS 1993). The AFS recommendation has been supported by the Eastside Scientific Society Panel in its 1993 report on the status of eastside ecosystems (Henjum et. al. 1993).

(3) Beneficial Uses Related to the Unique Character of the North Fork of the John Day River

The following are the recognized beneficial uses of the Kilchis River that are directly related to the unique character of the waterbody: 1) anadromous fish passage; 2) salmonid rearing; 3) salmonid spawning; and 4) resident fish and aquatic life.

Anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life: the North Fork of the John Day River provides critical habitat for the following species:

1) Spring chinook salmon (*Oncorhynchus tshawytscha*): a listing decision under the Federal Endangered Species Act is due in January 1998.

2) Summer steelhead (*Oncorhynchus mykiss gairdneri*): category 1 candidate species under the Federal Endangered Species Act, with a listing decision due December 1998.

3) Bull trout (*Salvelinus confluentus*): proposed for listing as "threatened" under the Federal Endangered Species Act; designated as "critical" on the Oregon sensitive species list (DEQ 1996).

4) Westslope cutthroat trout (*Oncorhynchus clarki lewisi*): petitioned for listing under the Federal Endangered Species Act; designated as "vulnerable" on the Oregon sensitive species list (DEQ 1996).

5) Resident redband trout (*Oncorhynchus mykiss gairdneri*): petitioned for listing

under the Federal Endangered Species Act; designated as "vulnerable" on the Oregon sensitive species list (DEQ 1996).

(4) Relationship Between the Unique Character and the Water Quality of the North Fork of the John Day River

The unique character of the North Fork of the John Day River, its ability to support a diversity of aquatic species, is directly related to the high quality of its water and to the currently intact watershed processes that support that water quality. The Department of Environmental Quality ("DEQ") is charged by statute with the responsibility to fully maintain and protect this level of water quality in order to protect those aquatic species mentioned above. OAR § 340-41-0026(1)(a)(A). The DEQ accomplishes this through the establishment of in-stream water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Chinook Salmon:

Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (ODFW 1995). Chinook prefer a gradient of less than 3% in spawning areas, and because one of the "most critical links for survival of this species" is clean gravel, chinook are particularly affected by increases in fine sediment loads (ODFW 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (ODFW 1995).

Juvenile chinook require deep riffles, woody debris, and shoreline riparian vegetation for cover and feeding areas (ODFW 1995). Rearing chinook are particularly affected by impacts to lower basin habitat complexity (ODFW 1995).

2) Summer Steelhead:

Because steelhead utilize multiple stream habitats, migrating between the uppermost reaches of tributaries and large streams, the range of habitat protected must extend to the furthest reaches of all tributaries (RVCG 1997). Steelhead are able to spawn in gradient slopes up to 5 degrees, with pea to orange sized gravel and temperatures ranging between 45-58 degrees (ODFW 1992). Steelhead are most productive in complex habitats characterized by large and small wood, and require deep holding pools prior to spawning (ODFW 1992). Because juveniles spend up to four years in freshwater, they are particularly susceptible to changes in temperature and water flows.

3) Bull Trout:

Historically, the Columbia River Basin bull trout included both fluvial and resident

critical habitat to the species listed above and should be protected from any degradation through the Tier III nondegradation policy provided by ORW status.

In fact, allowing any degradation of current water quality down to numeric criteria, whether through application of the Department's Tier II antidegradation (socioeconomic balancing) policy for High Quality Waters or outright failure to apply the Tier II antidegradation policy, will seriously jeopardize and likely eliminate some of the existing beneficial uses in the North Fork of the John Day River. For example, DEQ recognizes that bull trout require water temperatures down to 34°F for egg incubation, and as low as 40°F for spawning (DEQ 1995). "[B]ull trout spawning and the initial 1-year juvenile rearing is limited to streams with temperatures about 40°F (4.5°C)" (DEQ 1995).

In order to protect these most sensitive beneficial uses, the only alternative to the ORW designation is for DEQ to actively interpret and apply its narrative criteria in order to prevent further warming of water temperatures and degradation of other water quality parameters. To date, DEQ has not applied its narrative criteria or its mandate to protect beneficial uses as stand-alone components of water quality standards promulgated pursuant to the Clean Water Act. The only exception to this is within DEQ's 303(d) (1) program where it has identified waters that violate water quality standards due to habitat modification and flow modification, both narrative criteria. There, however, DEQ has failed to give full meaning to the narrative criteria by requiring a concurrent violation of numeric criteria in order to justify listing of waterbodies for violating standards (DEQ 1995). In other words, despite some effort to identify and apply narrative criteria to water quality limited waters, DEQ actually relies solely upon its numeric criteria, even where there is evidence of beneficial uses that require higher water quality. For this reason, conferring ORW status on the Salmonberry is the most likely method to preserve the current quality of these exceptional high quality waters and possibly the only viable method of doing so.

This is underscored by the fact that if the Department were to chose to apply its narrative criteria as a method of protecting the existing beneficial uses of the North Fork of the John Day River, it would have to do so by actively applying its Tier II antidegradation policy for High Quality Waters to both point and nonpoint sources of degradation, an approach that does not appear to have been considered in the North Fork of the John Day River or elsewhere in the state. It is undoubtedly a far greater undertaking to institute such a state-wide program than to confer ORW status upon the exceptional waters of the North Fork of the John Day River.

(5) Past and Present Threats to Water Quality in the North Fork of the John Day River

Habitat modifications within the North Fork of the John Day River have historically included changes in channel structure, loss of riparian vegetation, water removal, and flow alteration caused by agricultural development, irrigation withdrawals, cattle grazing, and timber harvest activities (ODFW 1995). These activities have caused serious declines in populations of salmon, redband trout, and Westslope cutthrout trout, and decreased water flows in the summer have fragmented fish populations (ODFW 1995).

The Eastside Forests Scientific Society Panel noted that grazing, irrigation withdrawals, and high temperatures have reduced suitable habitat for bull trout in the North Fork system

(Henjum et. al. 1994). In a September 26, 1997, letter to the Malheur National Forest Supervisor, the District Fish Biologist for the John Day District stated that grazing along tributaries of the John Day River has been so intense that riparian areas are "bare dirt" in some areas. The biologist also witnessed cattle grazing in the Summit Fire burn area, an area supposedly protected from grazing impacts. Critical of the Forest Service's grazing management, the fish biologist had "reservations about the [management process's] effectiveness." Additionally, the Oregon Chapter of the American Fisheries Society has considered the NFJD threatened by mining activity in the wilderness and in the headwaters since 1993.

Despite these past impacts, the water quality of the North Fork of the John Day has remained consistently high, contributing cool water to a watershed that is riddled with temperatures violative of state water quality standards. Preserving the river's water quality and unique characteristics, however, cannot be accomplished without assistance. The protections afforded by ORW designation are a necessary component of achieving this goal.

(6) Impending Threats to the North Fork of the John Day River

The Umatilla National Forest is currently planning to cut 30 million board feet from a 4,200 acre tract of land that drains directly into the North Fork of the John Day River. Fifteen percent of the area has previously been clear-cut, and the new sale (Tower Fire sale) would cut another 30%. The project would require construction of 11 additional miles of road, and maintenance of another 7 miles.

In an area that supports the last remaining genetic strongholds of wild spring chinook and wild summer steelhead in the Columbia Basin, these added stresses cannot be absorbed by the North Fork of the John Day River. Not only would the sale illegally contribute to the Water Quality Limited status of the river, but it would also severely degrade habitat by contributing to increased sediment loads and higher temperatures. Species that depend on the habitat of the NFJD are especially sensitive to these impacts, and in order to protect them, the water quality of the NFJD must be protected from the Tower Fire sale as well as future sales.

(7) Special Status Conferred on the North Fork of the John Day River

The North Fork of the John Day River has been attributed with the following federal designations. While these designations reflect the far-reaching importance of the unique characteristics that distinguish the NFJD watershed, none of these designations provide the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, it is within the Environmental Quality Commission's sole province to accomplish such protection through Outstanding Resource Water designation.

A. Much of the NFJD lies within the John Day Wilderness, a federal wilderness in the Wallowa-Whitman National Forest.

B. The North Fork of the John Day from the headwaters to the confluence with

Camas Creek is designated as a federal Wild and Scenic River. Classification is as follows: 'wild' from the headwaters to the John Day Wilderness boundary; 'recreational' from the wilderness boundary to Trail Creek; 'wild' from Trail Creek to Big Creek; 'scenic' from Big Creek to Texas Bar Creek; and 'recreational' from Texas Bar Creek to confluence with Camas Creek (USFS 1990).

C. The Baker Ranger District of the Wallowa Wittman National Forest and the North Fork Ranger District of the Umatilla National Forest are currently preparing a watershed analysis of the NFJD.

(8) Other Information Relating to the North Fork of the John Day River

The North Fork of the John Day River provides critical habitat which is a vital link to the health and long-term productivity of numerous aquatic species. Ensuring the survival of these species is dependent upon protecting and maintaining existing water quality values and preventing degradation.

As several recent scientific studies have shown, salmonid species, particularly the bull trout, have very specific water quality requirements. Fluctuations in water temperature, suspended sediment loads, or modifications to habitat or stream flow can have both immediately and cumulatively deleterious effects on these species (Spence et al. 1996). Current in-stream water quality standards are simply not sufficient to protect these species from risk.

As dam operations, grazing, and irrigation diversions continue to deplete and degrade waterbodies such as the NFJD, protecting high quality water for the dependent species listed will become increasingly difficult. Designating the NFJD as an Oregon Outstanding Resource Water is necessary in order to protect, not only the ecological integrity of the critical habitat of these species, but also the special water quality values that are essential to the unique characteristics of the North Fork of the John Day River.

(9) Data Sources

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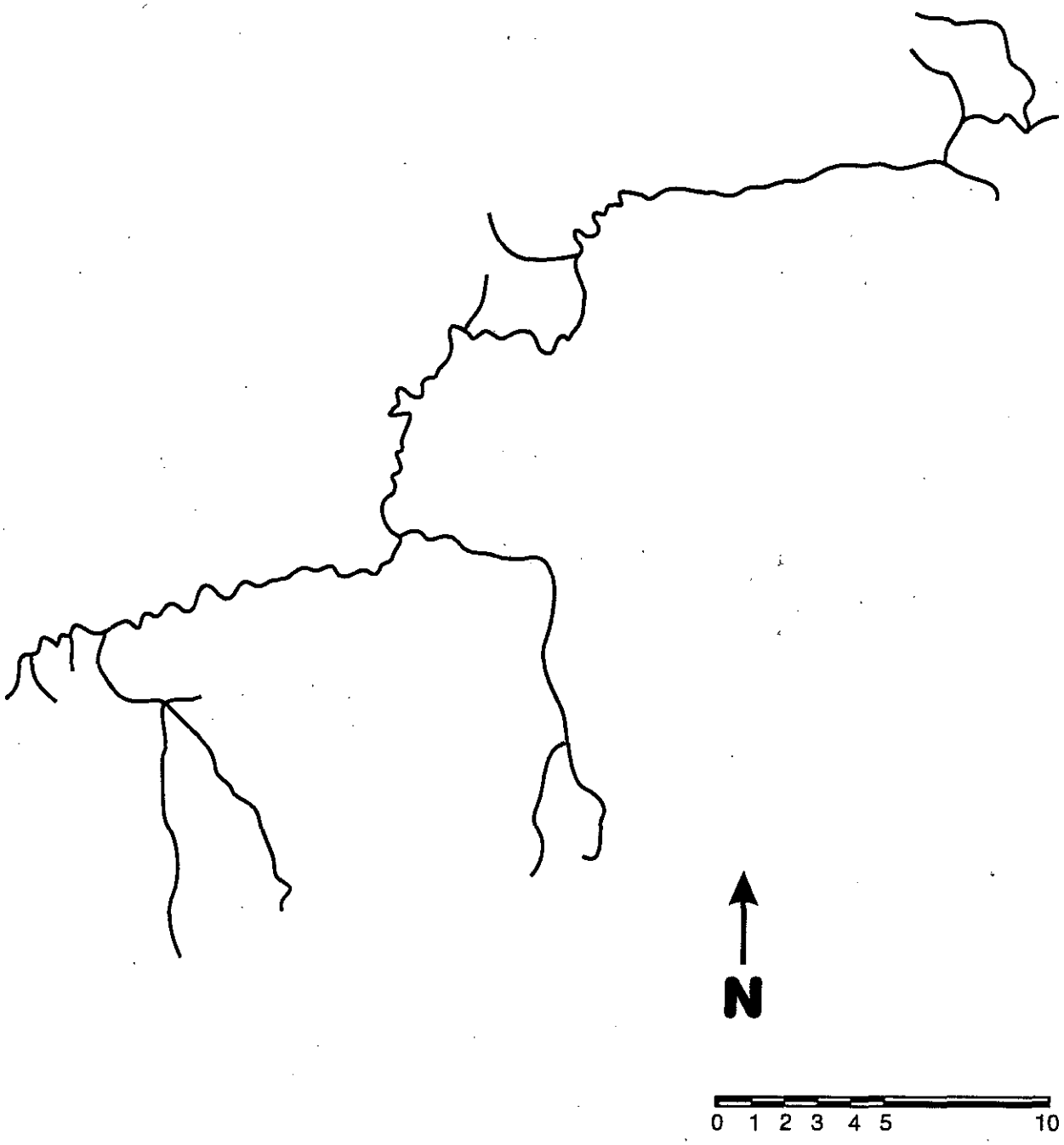
North Fork of the John Day River



OUTSTANDING RESOURCE

WATER PETITION

for the

North Fork of the Trask River

OUTSTANDING RESOURCE WATER PETITION
for the
North Fork of the Trask River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate the North Fork of the Trask River ("NFTR") as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. This petition includes the mainstem (from the headwaters to the confluence of the mainstem of the Trask River, approximately 17 miles in length), Bark Shanty Creek (from the mouth to the headwaters) in Township 1 S-2 S to Range 7 W, Clear Creek (from the mouth to the headwaters) in Township 1 S and Range 7 W, and the Middle Fork of the North Fork (from the mouth to Barney Reservoir) in Township 1 S and Range 6 W. This petition does not include the mainstem of the Trask due to the higher level of human impacts and more degraded habitat conditions.

The North Fork of the Trask River is located in the North Coast Basin and the Tillamook Bay subbasin in the northwestern corner of the state. Eighty percent of the surrounding land is within the Tillamook State Forest and is managed by the Oregon Department of Forestry. Five percent is federal land administered by the Bureau of Land Management Land. The remaining land is privately owned (Huntington, Frissell 1997).

(2) Unique Character of the North Fork of the Trask River

The North Fork of the Trask River is unique because it is one of the last river systems in the North Coast Basin that supports diverse populations of healthy and at-risk fish and wildlife. This unique character is a result of its location within the most extensive, unfragmented forested area in the Oregon Coast Range, a location which provides it with "highly valued aquatic, riparian, and terrestrial resources" (Huntington, Frissell 1997).

Historically, the entire North Coast Basin contained habitat characteristics that were dominated by complex old growth in upland areas and by braided channels and marshlands in lowland areas (ODFW 1995). The forests shaded rivers and provided complex channel structure with large woody debris. This resulted in cool water temperatures, controlled flows, deep pools, and complex bank structure. Minimal erosion occurred, leading to high water quality, low sediment levels, and clean gravel (ODFW 1995). These habitat conditions were ideal for many aquatic species native to the Coast Range. For salmon in particular, these conditions made Tillamook Bay basin the most productive basin on the Oregon Coast (Huntington, Frissell 1997).

However, many factors have led to decline of these habitat conditions which has led, in turn, to the decline of many native coastal species. Activities such as timber harvest, irrigation, urbanization, and agricultural development incrementally and cumulatively have impacted the ecological processes that historically supported the characteristics listed above (ODFW 1995). For example, braided lowland channels have been lost due to channelization. Timber harvest practices have stripped stream banks of their vegetation and removed the large woody debris so important to maintaining complex stream structure and cool water temperatures. Timber harvest on steep, unstable slopes above the streams has increased sediment flows, impeding fish passage and choking critical spawning areas.

Despite the decline in the quality of aquatic habitat, the North Coast basin continues to act as a refuge on the larger landscape. As part of this refuge, the North Fork of the Trask provides critical habitat to numerous healthy and at-risk aquatic species. Because of this unique status, the NFTR contains one of the healthiest populations of wild winter-run steelhead on the Oregon Coast (USCOE 1994) and is one of only five remaining Oregon streams that supports a major summer run of cutthroat trout (OFIC 1993).

Additionally, the "North Fork Trask is the only aquatic diversity area in the Tillamook Basin that contains identified source areas for spring chinook" (DEQ 1994). The North Fork of the Trask also provides habitat for the Columbia seep salamander, the tailed frog, and many other aquatic species that have fairly exacting habitat requirements and are particularly vulnerable to habitat modifications.

The following is a list of some of the unique attributes of the North Fork of the Trask River that have been identified in recent studies.

- The NFTR is a recognized source watershed for spring chinook salmon, fall chinook salmon, and steelhead (Barber et al. 1994), as well as a Core Area for fall and spring chinook spawning and rearing (OCSRI 1997).

- The NFTR supports one of the healthiest native stocks of fall chinook salmon in the state. This stock has been classified as a Level I Healthy Stock by Huntington et al. A Level I classification indicates that the population is at least two-thirds as abundant as would be expected absent human impacts (Huntington, et al. 1996).

- The NFTR watershed has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Oregon AFS 1993). ADA designation indicates that protecting the North Fork of the Trask is "critical" to protecting "diversity in watersheds, aquatic habitats, and indigenous aquatic fauna" (Oregon AFS 1993). The ADA designation is based upon the following three values:

    1) *Connecting Corridor.* The NFTR is a connecting corridor between the mainstem of the Trask River and the headwaters and other tributaries where salmonid spawning and rearing occurs.

2) *Highly Sensitive.* The NFTR is a relatively healthy watershed that may be highly sensitive to disturbance or cumulative effects of future human uses.

3) *Species Richness.* The NFTR is a river with a relatively high number of aquatic species.

- The NFTR has been designated a Tier I Key Watershed (OB-85) by the federal Forest Ecosystem Management Team ("FEMAT"). This designation is based upon the contribution that the watershed makes to anadromous salmonid conservation and the link that it provides in a network of watersheds that contribute to the protection of at-risk fish stocks (FEMAT 1993). At-risk stocks within the Trask River watershed include one stock of spring chinook salmon, two stocks of coho salmon, five stocks of chum salmon, and two stocks of winter steelhead (FEMAT 1993).

(3) Beneficial Uses Related to Unique Character of the North Fork of the Trask River

The following are the recognized beneficial uses of the North Fork of the Trask River that are directly related to the unique character of the waterbody: 1) anadromous fish passage; 2) salmonid rearing; 3) salmonid spawning; 4) resident fish and aquatic life; 5) public and private domestic water supply; and 6) fishing.

A. Anadromous fish passage, salmonid fish rearing and spawning, resident and aquatic life: the North Fork of the Trask provides critical habitat for the following species:

1) Coho salmon (*Oncorhynchus kisutch*): designated as "critical" on the Oregon sensitive species list (ODFW 1996); candidate species under the Federal Endangered Species Act. 61 Fed. Reg. 38011 (July 25, 1995).

2) Chum salmon (*Oncorhynchus keta*): designated as "critical" on the Oregon sensitive species list (ODFW 1996); candidate species under the Federal Endangered Species Act.

3) Winter steelhead (*Oncorhynchus mykiss irideus*): a listing decision under the Federal Endangered Species Act for winter steelhead is due in February 1998.

4) Seagoing cutthroat trout (*Oncorhynchus clarki clarki*): designated as "critical" on the Oregon sensitive species list (ODFW 1996).

5) Fall chinook salmon (*Oncorhynchus tshawytscha*): classified as a Level I Healthy Stock by Huntington et al. A Level I classification refers to populations that are at least two-thirds as abundant as would be expected absent human impacts (Huntington, et al. 1996).

6) Columbia seep salamander (*Rhyacotriton cascadae*): designated as a state sensitive species (ODFW 1996).

7) Tailed frog (*Ascaphus truei*): designated as "vulnerable" on the state sensitive species list (ODFW 1996).

B. Public and private domestic water supply

The NFTR is a municipal drinking water source for the cities of Hillsboro, Forest Grove, Beaverton, and Cherry Grove.

C. Fishing

Tillamook Bay rivers are the second most popular recreational salmon and steelhead fisheries in northwestern Oregon (Radtke 1997). Sportsfishing for trout and steelhead is allowed throughout the North Fork of the Trask during specific dates set by the Oregon Department of Fish and Wildlife.

(4) Relationship Between the Unique Character and the Water Quality of the North Fork of the Trask River

The unique character of the North Fork of the Trask River, its ability to support a diversity of aquatic species, is directly related to the high quality of its water and to the currently intact watershed processes that support that high quality. The Department of Environmental Quality is charged by statute with the responsibility to fully maintain and protect this level of water quality in order to protect those aquatic species mentioned above. OAR § 340-41-0026(1)(a)(A). The DEQ accomplishes this through the establishment of in-stream water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3 which should be supplemented by the attached habitat requirements list published by the Tillamook Bay National Estuary Project. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Chinook Salmon:

Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (ODFW 1995). Chinook prefer a gradient of less than 3% in spawning areas, and because one of the "most critical links for survival of this species" is clean gravel, chinook are particularly affected by increases in fine sediment loads (ODFW 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (ODFW 1995). Chinook prefer temperatures as low as 41°F for incubation, and 45°F for rearing (TBNEP 1997, attached).

Juvenile chinook require deep riffles, woody debris, and shoreline riparian vegetation for cover and feeding areas (ODFW 1995). Rearing chinook are particularly affected by impacts to lower basin habitat complexity (ODFW 1995).

2) Coho Salmon:

Coho are particularly sensitive to loss of long-lasting, complex instream structure, e.g., large wood complexes, flood plains, braided channels, beaver ponds, and lakes (ODFW 1995). In contrast to the larger streams upon which chinook depend, coho require much smaller, low gradient tributaries and side channels for spawning and reproduction (ODFW 1996). Coho require temperatures as low as 40°F for incubation, and 53°F for rearing (TBNEP 1997, attached).

3) Steelhead:

Because steelhead utilize multiple stream habitats, migrating between the uppermost reaches of tributaries and large streams, the range of habitat protected must extend to the furthest reaches of all tributaries (RVCG 1997). Steelhead are able to spawn in gradient slopes up to 5 degrees, with pea to orange sized gravel (ODFW 1992). They require temperatures as low as 40°F for incubation, and 45°F for rearing (TBNEP, 1997, attached). Steelhead are most productive in complex habitats characterized by large and small wood, and require deep holding pools prior to spawning (ODFW 1992). Because juveniles spend up to four years in freshwater, they are particularly susceptible to changes in temperature and water flows.

4) Chum Salmon:

Chum salmon require temperatures as low as 40°F for incubation and 44°F for rearing. Juvenile chum are particularly vulnerable to high sediment levels, with death occurring with as low as 15.8 g/l (TBNEP 1997, attached). Chum appear to be most dependent on the lower portions of stream habitats, where habitat degradation is most likely (ODFW 1996).

5) Coastal Cutthroat Trout:

Coastal cutthroat trout require temperatures as low as 43°F for incubation and 49°F for rearing. Fry and juveniles are dependant upon backwater pools and large woody debris (TBNEP 1997, attached). Coastal cutthroat use estuaries extensively for rearing and before upstream migration (TBNEP 1997).

6) Columbia Seep Salamander:

This salamander requires cold, clear springs and small headwater streams, with temperatures ranging between 48°-52° F (ODFW 1996). Because this species is sensitive to heat and the loss of body moisture, they cannot survive in dry or warm environments. ODFW noted that a reason for the Columbia seep

salamander's sensitive status is that "[h]eadwater stream and spring habitats . . . are not adequately protected" (ODFW 1996).

7) Tailed Frog:

This frog requires cold, fast-flowing permanent streams in forested areas, with temperatures ranging from 41°-61° F (ODFW 1996). "[T]ailed frogs have exacting habitat requirements, including the lowest known temperature requirements, and one of the narrowest temperature tolerances of any of the world's frogs" (ODFW 1996). To meet this low temperature requirement, the tailed frog needs the heavy canopy cover associated with old growth forests (ODFW 1996). DEQ has also recognized the temperature-sensitive nature of the tailed frog, stating that first year tadpoles select water temperatures below 50° F (DEQ 1995).

The DEQ currently uses numeric criteria, almost exclusively, to protect the beneficial uses listed above. The numeric criteria applicable to the North Coast Basin are as follows:

- Dissolved Oxygen: From spawning until fry emergence, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997).

- Temperature: 55°F for salmonid spawning and incubation, and 64°F for salmonid rearing (DEQ 1995).

- Turbidity: No more than a 10% cumulative increase shall be allowed (DEQ 1997).

- pH: Between 6.5 – 8.5 for estuarine and fresh waters (DEQ 1997).

Information suggests that the water quality of the North Fork of the Trask River is significantly higher than current numeric criteria of Oregon's water quality standards and that it provides excellent habitat that should be protected from any degradation through the Tier III nondegradation policy provided by ORW status.

In fact, allowing any degradation of current water quality down to numeric criteria, whether through application of the Department's Tier II antidegradation (socioeconomic balancing) policy for High Quality Waters or outright failure to apply the Tier II antidegradation policy, will seriously jeopardize and likely eliminate some of the existing beneficial uses in the North Fork of the Trask. For example, maintaining water quality in the river higher than current numeric criteria is important because of the presence of the sensitive Columbia seep salamander and the tailed frog in the North Fork of the Trask. These species prefer temperatures of 48°-52° F and 41° - 61° F respectively.

In order to protect these most sensitive beneficial uses, the only alternative to the ORW designation is for DEQ to actively interpret and apply its narrative criteria in order to prevent further warming of water temperatures and degradation of other water quality parameters. To date, DEQ

has not applied its narrative criteria or its mandate to protect beneficial uses as stand-alone components of water quality standards promulgated pursuant to the Clean Water Act. The only exception to this is within DEQ's 303(d)(1) program where it has identified waters that violate water quality standards due to habitat modification and flow modification, both narrative criteria. There, however, DEQ has failed to give full meaning to the narrative criteria by requiring a concurrent violation of numeric criteria in order to justify listing of waterbodies for violating standards (DEQ 1995). In other words, despite some effort to identify and apply narrative criteria to water quality limited waters, DEQ actually relies solely upon its numeric criteria, even where there is evidence of beneficial uses that require higher water quality. For this reason, conferring ORW status on the North Fork of the Trask is the most likely method to preserve the current quality of these exceptional high quality waters and possibly the only viable method of doing so.

This is underscored by the fact that if the Department were to chose to apply its narrative criteria as a method of protecting the existing beneficial uses of the North Fork of the Trask, it would have to do so by actively applying its Tier II antidegradation policy for High Quality Waters to both point and nonpoint sources of degradation, an approach that does not appear to have been considered in the North Fork of the Trask or elsewhere in the state. It is undoubtedly a far greater undertaking to institute such a state-wide program than to confer ORW status upon the exceptional waters of the North Fork of the Trask.

(5) Past and Present Threats to Water Quality in the North Fork of the Trask River

While the North Fork of the Trask River is located within the "most extensive unfragmented forested area in the Oregon Coast Range," (Huntington, Frissell 1997), it is positioned within a river basin characterized by natural geologic instability, steep topography, weathered volcanic soils, and restricted stream channel structure. These attributes make the area highly erosion-prone and at a high risk for mass slope failures. Specifically, the erosion risk within the NFTR watershed has been ranked by the Tillamook Basin National Estuary Project as being moderate to very severe (Nehlsen et al. 1995).

In an area naturally prone to mass soil movement processes, human land use activities such as timber harvesting, grazing, road building, and road maintenance can serve to exacerbate the problem and pose great risk to the aquatic system. This problem was particularly apparent during the 1930s when approximately 65-70% of the NFTR watershed was burned during the "Tillamook Burn." As a result of the burn and associated salvage logging, the area experienced wide-scale loss of streamside vegetation and increased in-stream sediment loads that dramatically impacted the functioning ability of the aquatic system.

Today, the NFTR watershed is in the process of recovering from these stresses, and the majority is under forest cover (Nehlsen et al. 1995). Designating the NFTR as an ORW will protect habitat for healthy populations, as well as allow the imperiled species to recover. Without the designation, the unique qualities of the NFTR remain at risk.

/ / /

(6) Impending Threats

As indicated by the above section, the North Fork of the Trask River is located within an area naturally prone to disturbance regimes that are only exacerbated by human land use activities. The presence of the species listed in this petition, however, is a clear indication that, despite the natural and human related stresses placed on the watershed, the NFTR still retains the water quality and habitat characteristics necessary to support numerous fish and wildlife species. The majority of the species cited within this petition require quite similar habitat requirements: deep pools, clean gravel, cold and clean water, complex channel structure, instream woody debris, and shoreline vegetation. These habitat characteristics, however, may be seriously threatened by the following activities.

The North Fork of the Trask River is located within the Tillamook State Forest which is administered by the Oregon Board of Forestry. The Board of Forestry is currently considering the adoption of an administrative rule which would declare timber production and harvest as the primary purpose for which the lands will be managed. The Board is also developing a Northwest State Forest Plan, which will govern land management within the NFTR watershed. If both the proposed rule and plan are adopted, the water quality of the NFTR will be placed at risk.

The plan calls for extensive management of the forest landscape and will allow logging, associated road building, and maintenance activities. The effects associated with logging practices are well documented, and they include increased solar radiation, decreased supply of large woody debris, erosion of streambanks, increased stream width, decreased stream depth, and higher water temperatures (Spence et al. 1996). These effects severely impact fish and other aquatic species that are dependent on specific habitat characteristics. Specifically, chinook, coho, chum, coastal cutthroat trout, and steelhead require clean gravel and low water temperatures for spawning, and chinook and steelhead are also dependent upon deep holding pools near spawning areas. Potential logging activity will seriously impact these species' abilities to effectively spawn. Additionally, the tailed frog requires water temperatures as low as 41°F, and increased temperatures from logging practices will seriously impair its survival.

This petition, however, provides DEQ with an excellent, albeit narrow, window of opportunity to provide the necessary protections for the NFTR that are currently absent. Without the needed protections, the important habitat characteristics of the NFTR are at high risk of degradation.

(7) Special Status Conferred on the North Fork of the Trask River

The North Fork of the Trask River has been attributed with various federal, state, and local designations. While these designations reflect the far-reaching importance of the unique characteristics that distinguish the North Fork of the Trask, none of these designations provide the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, it is within the Environmental Quality Commission's sole province to accomplish such protection through Outstanding Resource Water designation.

A. The NFTR is a Tier I Key Watershed managed by the Bureau of Land Management (OB-85) (FEMAT 1993. The management plan associated with FEMAT is focused toward achieving biological diversity while attaining economic and social goals. These goals are to be achieved through the adaptive management of various ecosystems.

B. The NFTR is proposed as both a federal Wild and Scenic River and also a State Scenic Waterway (USCOE 1994).

C. Washington County has designated the Trask River as a scenic corridor and has mapped the NFTR and its tributaries as Significant Natural Resources under Goal 5 of the Statewide Planning Goals (USCOE 1994).

D. The NFTR is under the jurisdiction of the CZMA (USCOE 1994).

E. The NFTR is located within the Tillamook Basin, an area the State Department of Agriculture has determined is a high priority basin for the development of an Agricultural Water Quality Management Area Plan pursuant to ORS §§ 568.900-568.933 (OCSRI 1997). The accompanying management plan is scheduled to be completed within four years and fully implemented within ten years (OCSRI 1997). The purpose of the plan will be the "prevention and control of water pollution from agricultural activities and soil erosion" within the management area (OCSRI 1997).

F. The NFTR is located within the Oregon State Coastal Salmon Recovery Plan area and contains critical habitat for coho salmon (OCSRI 1997).

(8) Other Information Related to the North Fork of the Trask River

There are very few watersheds in the North Coast Basin that contain aquatic habitat quality equal to that found in the North Fork of the Trask River. This habitat provides a vital link to the health and long-term productivity of numerous aquatic species. Ensuring the survival of these species is dependent upon protecting and maintaining existing water quality values and preventing degradation.

Additionally, the outstanding attributes of the NFTR directly contribute to the water quality of Tillamook Bay. Preserving the water quality of the NFTR is essential, not only for maintaining the Bay as a healthy aquatic system, but also for preserving the economy of an area so dependent on Tillamook Bay's sustainability.

As several recent scientific studies have shown, salmonid and other aquatic species have very specific water quality requirements. Fluctuations in water temperature, suspended sediment loads, or modifications to habitat or stream flow can have both immediately and cumulatively deleterious effects on these species (Spence et al. 1996). Current in-stream water quality standards are simply not sufficient to protect these species from risk. As the human population

in northern Oregon continues to rapidly grow, protecting high quality waterbodies from fluctuations that jeopardize the health of the species listed will become increasingly difficult. Designating the North Fork of the Trask River as an Oregon Outstanding Resource Water is necessary in order to protect not only the ecological integrity of the critical habitat of these species, but also to protect the special water quality values that are essential to the unique characteristics of the river.

(9) Data Sources

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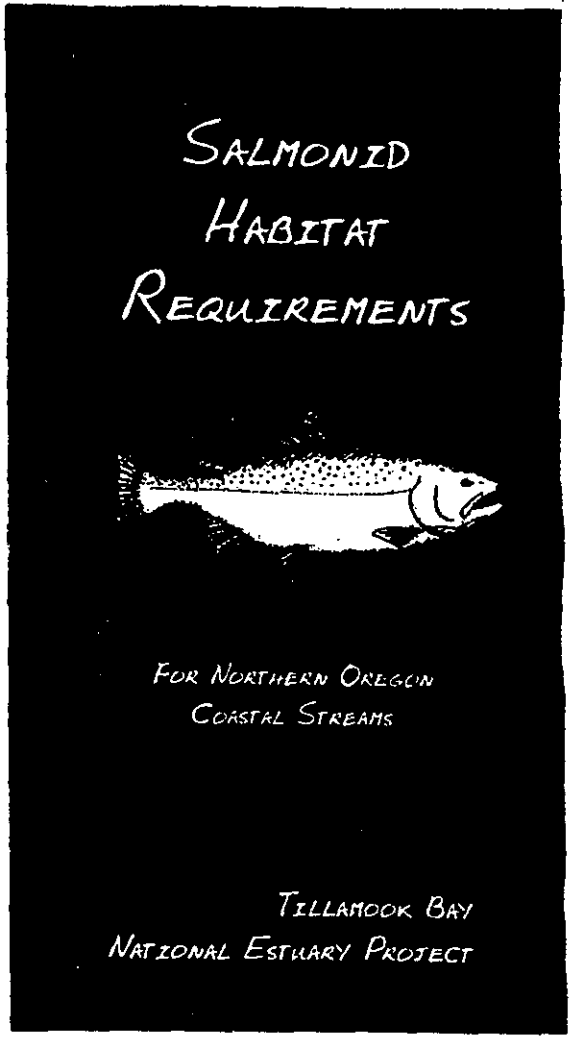
Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Incubation		Rearing						Status
	Incubation Temp.	Fry Emerge	Fry Habitat	Juvenile Habitat	Preferred Temp.	Freshwater Residency Period	Estuary Residency Period	Notes	1996 Status
Chinook - Fall	0.0–20°C; best 5.0–14.4° C	Mar–May	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Estuaries play a vital role in survival of young	Healthy and stable
Chinook - Spring	0.0–20°C; best 5.0–14.4° C	Feb–Mar	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Large body size limits movement over barriers	Depressed
Coho	4.4–13.3°C	Feb–June	Backwater pools and stream edges	Pools in summer, off channel alcoves, ponds, dam pools with complex cover in winter	11.8 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	One year Spring smolt	Move through 2–9 days	Low pH (<5.01) can be lethal to alevins	Listed sensitive on state lists
Chum	4.4–13.3°C	Late Mar–Apr	Move directly into estuary	High sediment levels (15.8–54.9 g/l) will kill juveniles	6.7 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	Hours to a few days, leave quickly Spring smolt	2–32 days	Use estuaries immediately for food and adjustment	Depressed
Steelhead-Winter	4.4–13.3°C	May–June	Stream edges	Pools, riffles, and runs of tributary. streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2 -3 years Spring smolt	Move through in days	Good habitat = small and large wood complexity	Depressed
Steelhead - Summer	4.4–13.3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2–3 years Spring smolt	Move through in days	Summer steelhead require deep cool pools to live in before spawning	Hatchery fish - depressed
Sea Run Cutthroat Trout	6.1–17.2°C	Mar–May	Stream edges and backwater pools, large wood important	Prefer pools but are often displaced by coho or steelhead, low velocity pools and side channels in winter	9.5–12.9°C Growth stops at 20.3°C lethal at 23.0°C	2-4 Years Spring smolt	Used extensively as adults before upstream migration	Rearing in estuary is common	Depressed

Abbreviations used: C - Celsius (0°C = 32°F, 10°C = 50°F, 20°C = 68°F); cm - centimeters (2.54 cm = 1 inch); LWD - large woody debris; m - meters (1 m = 3.3 ft); max - maximum; mg/l - milligrams per liter (2835 mg = 1 ounce, 1 liter = 1.06 quarts); mm - millimeter (25.4 mm = 1 inch); m/s - meters per second.



Habitat

Salmonid populations in the Pacific Northwest have been in decline for many decades. As a result some populations are listed as threatened or endangered species. One of the reasons for their decline is a lack of suitable habitat.

Studies show that salmon require a range of conditions in which to migrate upstream, spawn, and grow. This chart outlines some of those conditions and represents best professional judgement compiled from scientific reports and studies. It is designed to be a reference chart.

Dissolved Oxygen - The oxygen carried in the water is called dissolved oxygen and is required by fish. The amount of dissolved oxygen in the water varies with water temperature. Salmonids, in general, tend to require high levels of dissolved oxygen.

Temperature - In general, colder temperatures are preferred by salmon. Colder water carries more dissolved oxygen and also slows fish metabolism, which allows fish to gain weight more easily and grow to larger sizes.

Velocity - Water velocity needs to be great enough to provide continuous oxygen supply, but slow enough not to wash away eggs and juvenile salmon.

Percent Fines - "Fines" refer to the very small sediments carried by the water. Too much sediment in streams can stop migrations and kill fish by clogging gills and suffocating eggs. Fines prevent fish from getting essential dissolved oxygen.

Depth and Substrate - Salmonids seek good places to make their redds, or nests. Appropriate conditions depend on the size of the gravel in the nest and the depth of water.

For more information about salmon, water quality, or other related topics, contact the National Estuary Project at (503) 322-2222 or visit our web site at:
http://osu.orst.edu/dept/tbaynep/nephome.html

Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Spawning (including upstream migration)									
	Migration	Spawn Timing	Location	Substrate Size	Water Depth	Water Velocity	Dissolved Oxygen	Spawning Water Temp	Percent Fines Tolerable	Notes
Chinook - Fall	Sep–Dec	Oct–Jan	Mainstem and large tributaries	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.1–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Large body size limits movement over barriers
Chinook-Spring	Apr–Jun	Sep–Oct	Upper mainstem streams	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.21–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Require deep water for travel–pools for summer habitat
Coho	Sep- Jan	Oct–Jan	Small tributaries	Pea to Apple (1.3–9.0 cm)	0.18–1 m	0.08–0.11 m/sec; max is 2.4 m/s	> 8 mg/l	4.4–14°C	Fines (<6.4 mm) make up less than 25% of substrate	Primary target for many sport fishermen
Chum	Nov–Dec	Nov–Dec	Lower mainstem and tributaries	Pea to Orange (0.5–10.2 cm)	13–50 cm; ideal 21 cm	0.21–0.83 m/s; max is 2.4 m/s	> 5 mg/l; above 80% saturation best	7.2–12.8°C	Fines (<6.4 mm) make up less than 25% of substrate	Strong swimmer but doesn't jump
Steelhead - Winter	Nov–May	Jan–May	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Late fish seem to prefer mainstem and large tributary
Steelhead - Summer	May–Jul	Jan–Apr	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Athletic swimmer
Sea Run Cutthroat Trout	Jun–Oct	Dec–Feb	Small headwater tributaries, 1st & 2nd order streams	Pea to Golf Ball (0.5–7.5 cm)	0.01–1m; 10–15 cm best	0.11–0.90 m/s; max is 2.4 m/s	> 5 mg/l	6–17°C; best is 10°C	Fines (<6.4 mm) make up less than 25% of substrate	May spawn more than once

Compiled by Ann Newton, August, 1997. Tillamook Bay National Estuary Project

Information compiled from:

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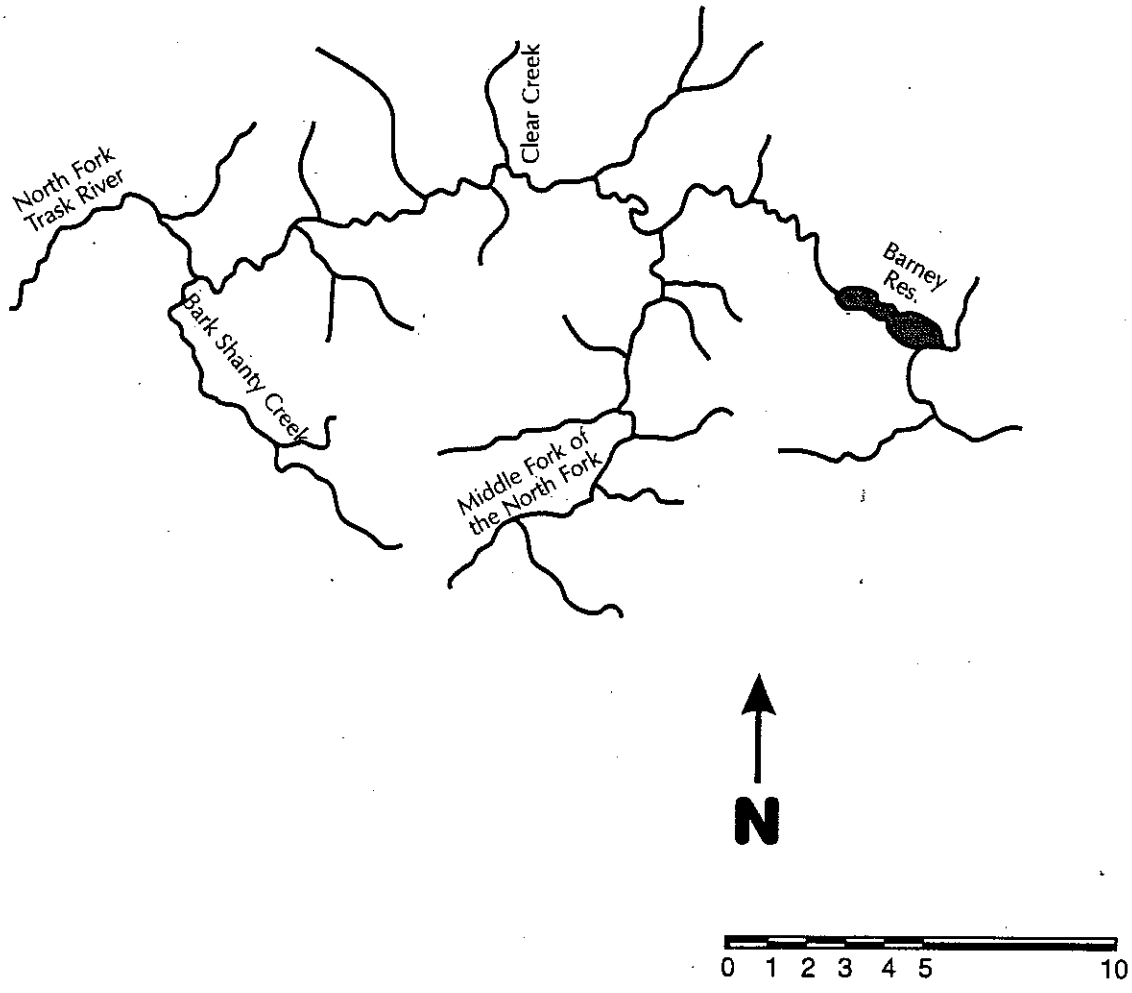
5. Additional thanks to Oregon Department of Fish and Wildlife for comments and suggestions.

North Fork of the Trask River



OUTSTANDING RESOURCE

WATER PETITION

for the

Salmonberry River

OUTSTANDING RESOURCE WATER PETITION
for the
Salmonberry River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate the Salmonberry River watershed as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy codified at OAR 340-41-026. This petition includes the mainstem (from the mouth to the headwaters) in Township 3 N and Range 6 W-8 W, the South Fork (from the mouth to headwaters at river mile 3) in Township 2 N-3 N and Range 7 W, Ripple Creek (from the mouth to headwaters at river mile 2) in Township 2 N-3 N and Range 7 W, Wolf Creek (from the mouth to the headwaters) in Township 2 N-3 N and Range 6 W, and the North Fork (from the mouth to the headwaters) in Township 2 N-3 N and Range 6 W-7 W.

The Salmonberry watershed covers slightly over 44,000 acres, or about 64 square miles (OT 1995). Approximately 60% of the surrounding land lies within both the Tillamook State Forest and the Clatsop State Forests (Huntington, Frissell 1997). The Salmonberry watershed is within the North Coast Basin, and the Nehalem River Sub-basin.

(2) Unique Character of the Salmonberry River

The Salmonberry River is perhaps the crown jewel of North Coast rivers. A tributary of the Nehalem River, this isolated river is nestled amongst steep forested canyons within a watershed that remains relatively undisturbed. The Salmonberry River is unique because it is one of the few watersheds remaining in the North Coast Basin that still retains the water quality and habitat characteristics necessary to support a diversity of fish and wildlife species. These unique characteristics can be attributed largely to the location of the waterbody within the most extensive and unfragmented forested area in the Oregon Coast Range (Huntington, Frissell 1997).

Historically, the entire North Coast Basin contained habitat characteristics that were dominated by complex old growth in upland areas and braided channels and marshlands in lowland areas (ODFW 1995). The forests shaded the rivers and provided complex channel structure with large woody debris. This resulted in cool water temperatures, controlled flows, deep pools, and complex bank structure. Minimal erosion occurred, leading to high water quality, low sediment levels, and clean gravel (ODFW 1995). These habitat conditions were

ideal for many aquatic species native to the Coast Range. For salmon in particular, these conditions made Tillamook Bay basin the most productive basin on the Oregon Coast (Huntington, Frissell 1997).

However, many factors have led to decline of these habitat conditions which has led, in turn, to the decline of many native coastal species. Activities such as timber harvest, irrigation, urbanization, and agricultural development incrementally and cumulatively have impacted the ecological processes that historically supported the characteristics listed above (ODFW 1995). For example, braided lowland channels have been lost due to channelization. Timber harvest practices have stripped stream banks of their vegetation and removed the large woody debris so important to maintaining complex stream structure and cool water temperatures. Timber harvest on steep, unstable slopes above the streams has increased sediment flows, impeding fish passage and choking critical salmon spawning areas.

Despite the decline in aquatic habitat quality throughout the basin, there is a network of watersheds, including the Salmonberry, that are now refuges on the larger landscape and that provide critical habitat to numerous at-risk and healthy aquatic species. For example, the Salmonberry supports an unusually large run of wild winter steelhead, and is one of only seventeen remaining streams in Oregon that provides habitat for this species (OFIC 1993). The Salmonberry also supports one of the healthiest runs of fall chinook in the state (Huntington et al. 1996). Additionally, the Salmonberry River provides habitat to the Columbia seep salamander, the tailed frog, and many other aquatic species that have fairly exacting habitat requirements and are particularly vulnerable to habitat modifications.

Directly contributing to the quality of the Nehalem River, the water quality of the Salmonberry is exceptional. The Department of Environmental Quality has established a bioassessment sampling program on the river because "it is as close to unimpacted as can be found in the coast range" (Downs 1994). The American Fisheries Society ("AFS") identified the Salmonberry as a Reference Watershed, a designation which reflects the relatively unimpacted state of the Salmonberry, and stated that it "must receive immediate priority if the state is to maintain its biological options for the future" (Oregon AFS 1993). Additionally, DEQ has indicated that, with adequate data, the Salmonberry is a very good candidate for ORW designation (Downs 1994).

The following is a list of some of the unique attributes of the Salmonberry River that have been identified in recent studies.

- The Salmonberry River is a source watershed for winter steelhead (Barber 1994) and a Core Area for winter steelhead and fall chinook salmon (OCSRI 1997).

- The Salmonberry River has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society (Oregon AFS 1993). ADA designation indicates that AFS believed that the Salmonberry River should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon." This designation is based upon the following three values:

1) *Genetic Refuge.* The Salmonberry River is a genetic refuge for core populations of fall chinook salmon, winter steelhead, and seagoing cutthroat trout. A "genetic refuge" is defined as a watershed with "a low incidence of exotic species or limited history of hatchery stockings that may be important to protect examples of native aquatic assemblages."

2) *Reference Watershed.* The Salmonberry River is relatively unaltered and characteristic of a particular type of aquatic ecosystem.

3) *Scientific Value.* The Salmonberry River has value as a monitoring area where valuable baseline or long-term data sets exist.

- The Salmonberry River has long been of interest to Oregon Trout, which has spent considerable time and resources in cooperation with the Salmonberry Watershed Coordinating Group, the Department of Environmental Quality, the Oregon Department of Fish and Wildlife, and the STEP Project operated by Marty and Joyce Sherman to develop cooperative conservation strategies for the Salmonberry River. In furtherance of this effort, Oregon Trout has prepared a report called *Watershed Overview: Salmonberry Watershed, Oregon.* Several sections from this report are attached as supporting data.

- Oregon Trout has worked closely with the Oregon Department of Fish and Wildlife to conduct yearly fish surveys (OT 1995). A summary of data collected is contained in the attached documents.

(3) Beneficial Uses Related to Unique Character of the Salmonberry River

The following are the recognized beneficial uses of the Salmonberry River that are directly related to the unique character of the waterbody: 1) anadromous fish passage; 2) salmonid rearing; 3) salmonid spawning; 4) resident fish and aquatic life; and 5) fishing.

A. Anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life; the Salmonberry River provides critical habitat for the following species:

1) Coho salmon (*Oncorhynchus kisutch*): designated as "critical" on the Oregon sensitive species list (ODFW 1996); candidate species under the Federal Endangered Species Act. 61 Fed. Reg. 38011 (July 25, 1995).

2) Spring chinook salmon (*Oncorhynchus tshawytscha*): designated as "critical" on the Oregon sensitive species list (ODFW 1996); candidate species under the Federal Endangered Species Act.

3) Fall chinook salmon (*Oncorhynchus tshawytscha*): classified as a Level I Healthy Stock by Huntington et al. A Level I classification refers to

populations that are at least two-thirds as abundant as would be expected absent human impacts (Huntington, et al. 1996).

4) Winter steelhead (*Oncorhynchus mykiss irideus*): a listing decision under the Federal Endangered Species Act for winter steelhead is due in February 1998.

5) Seagoing and resident cutthroat trout (*Oncorhynchus clarki clarki*): designated as "critical" on the Oregon sensitive species list (ODFW 1996).

6) Columbia seep salamander (*Rhyacotriton cascadae)*: a state sensitive species (ODFW 1996).

7) Tailed frog (*Ascaphus truei*): a vulnerable species on the state sensitive species list (ODFW 1996).

B. Fishing

Sport fishing for steelhead is allowed on the mainstem and tributaries during specific dates set by the Oregon Department of Fish and Wildlife (ODFW 1997).

(4) Relationship Between Unique Character and Water Quality of Salmonberry River

The unique character of the Salmonberry River, its ability to support a diversity of aquatic species, is directly related to the high quality of its water and to the currently intact watershed processes that support that high quality. The Department of Environmental Quality is charged by statute with the responsibility to fully maintain and protect this level of water quality in order to protect those aquatic species mentioned above. OAR § 340-41-0026(1)(a)(A). The DEQ accomplishes this through the establishment of in-stream water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3 which should be supplemented by the attached habitat requirements published by the Tillamook Bay National Estuary Project ("TNEP"). This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Chinook Salmon:

Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (ODFW 1995). Chinook prefer a gradient of less than 3% in spawning areas, and because one of the "most critical links for survival of this species" is clean gravel, chinook are particularly affected by increases in fine sediment loads (ODFW 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (ODFW 1995).

6) Tailed Frog:

This frog requires cold, fast-flowing permanent streams in forested areas, with temperatures ranging from 41° - 61° F (ODFW 1996). "[T]ailed frogs have exacting habitat requirements, including the lowest known temperature requirements, and one of the narrowest temperature tolerances of any of the world's frogs" (ODFW 1996). To meet this low temperature requirement, the tailed frog needs the heavy canopy cover associated with old growth forests (ODFW 1996). DEQ has also recognized the temperature-sensitive nature of the tailed frog, stating that first year tadpoles select water temperatures below 50° F (DEQ 1995).

The DEQ currently uses numeric criteria, almost exclusively, to protect the beneficial uses listed above. The numeric criteria applicable to the North Coast Basin are as follows:

- Dissolved Oxygen: From spawning until fry emergence, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997).

- Temperature: 55°F for salmonid spawning and incubation, and 64°F for salmonid rearing (DEQ 1995).

- Turbidity: No more than a 10% cumulative increase shall be allowed (DEQ 1997).

- pH: Between 6.5 – 8.5 for estuarine and fresh waters (DEQ 1997).

Data show that the water quality of the Salmonberry River is significantly higher than the current numeric criteria of Oregon's water quality standards. For example, results of DEQ sampling in March and April of 1996, show temperatures ranging between 42.4° – 52.3°F (DEQ 1997a). While the petitioners believe that these temperatures are actually warmer than is ideal for many species present in the Salmonberry, such as steelhead that prefer temperatures ranging from 39° - 58° F during spawning and rearing, they are sufficiently cool as to provide excellent habitat that should be protected from any degradation through the Tier III nondegradation policy provided by ORW status.

In fact, allowing any degradation of current water quality down to numeric criteria, whether through application of the Department's Tier II antidegradation (socioeconomic balancing) policy for High Quality Waters or outright failure to apply the Tier II antidegradation policy, will seriously jeopardize and likely eliminate some of the existing beneficial uses in the Salmonberry. For example, maintaining water quality in the river higher than current numeric criteria is important because of the presence of the sensitive Columbia seep salamander and the tailed frog in the Salmonberry River. These species prefer temperatures of 48 - 52° F and 41 - 61° F respectively.

In order to protect these most sensitive beneficial uses, the only alternative to the ORW designation is for DEQ to actively interpret and apply its narrative criteria in order to prevent further warming of water temperatures and degradation of other water quality parameters. To date, DEQ has not applied its narrative criteria or its mandate to protect beneficial uses as stand-alone components of water quality standards promulgated pursuant to the Clean Water Act. The only exception to this is within DEQ's 303(d) (1) program where it has identified waters that violate water quality standards due to habitat modification and flow modification, both narrative criteria. There, however, DEQ has failed to give full meaning to the narrative criteria by requiring a concurrent violation of numeric criteria in order to justify listing of waterbodies for violating standards (DEQ 1995). In other words, despite some effort to identify and apply narrative criteria to water quality limited waters, DEQ actually relies solely upon its numeric criteria, even where there is evidence of beneficial uses that require higher water quality. For this reason, conferring ORW status on the Salmonberry is the most likely method to preserve the current quality of these exceptional high quality waters and possibly the only viable method of doing so.

This is underscored by the fact that if the Department were to chose to apply its narrative criteria as a method of protecting the existing beneficial uses of the Salmonberry River, it would have to do so by actively applying its Tier II antidegradation policy for High Quality Waters to both point and nonpoint sources of degradation, an approach that does not appear to have been considered in the Salmonberry River or elsewhere in the state. It is undoubtedly a far greater undertaking to institute such a state-wide program than to confer ORW status upon the exceptional waters of the Salmonberry River.

(5) Past and Present Threats to Water Quality in the Salmonberry River

While the Salmonberry River is located within the "most extensive unfragmented forested area in the Oregon Coast Range," (Huntington, Frissell 1997), it is positioned within a river basin characterized by natural geologic instability, steep topography, weathered volcanic soils, and restricted stream channel structure. These attributes make the area highly erosion-prone and at a high risk for mass slope failures. Specifically, the erosion risk within the Salmonberry watershed has been ranked by the Tillamook Basin National Estuary Project as being moderate to very severe (Nehlsen et al. 1995).

In an area naturally prone to mass soil movement processes, human land use activities such as timber harvesting, grazing, road building, and road maintenance can serve to exacerbate the problem and pose great risk to the aquatic system. This problem was particularly apparent during the 1930s when approximately 65-70% of the Salmonberry watershed was burned during the "Tillamook Burn." As a result of the burn and associated salvage logging, the area experienced wide-scale loss of streamside vegetation and increased in-stream sediment loads that dramatically impacted the functioning ability of the aquatic system.

Today, the Salmonberry watershed is in the process of recovering from these stresses, and the majority is under forest cover (Nehlsen et al. 1995). Designating the Salmonberry River as an ORW will protect habitat for healthy populations, as well as allow the imperiled species to recover. Without this designation, the unique qualities of the Salmonberry remain at risk.

(6) Impending Threats to the Salmonberry River

As indicated by the above section, the Salmonberry River is located within an area naturally prone to disturbance regimes that are only exacerbated by human land use activities. The presence of the species listed in this petition, however, is a clear indication that, despite the natural and human related stresses placed on the watershed, the Salmonberry still retains the water quality and habitat characteristics necessary to support numerous fish and wildlife species. The majority of the species cited within this petition require quite similar habitat requirements: deep pools, clean gravel, cold and clean water, complex channel structure, instream woody debris, and shoreline vegetation. These habitat characteristics, however, may be seriously threatened by the following activities.

The Salmonberry River is located within the Tillamook State Forest which is administered by the Oregon Board of Forestry and managed by the Oregon Department of Forestry ("ODF") which has been conducting timber harvest operations throughout the forest. In the Salmonberry, ODF has completed one timber sale this year and proposes to conduct another sale later in the year. The proposed sale involves 183 acres, with half of the harvest area on slopes leading directly into the Salmonberry River (Teran 1997). Because the gradient of the slopes within the Salmonberry is moderate to high and has "significant potential to deliver landslide materials to the stream system and salmon habitat" (Huntington, Frissell 1997), the impacts of a 183 acre sale will have tremendous impacts on the ability of the Salmonberry to provide habitat for various at-risk species.

In addition, the Board of Forestry is currently considering the adoption of an administrative rule which would declare timber production and harvest as the primary purpose for which the lands will be managed. The Board is also developing a Northwest State Forest Plan, which will govern land management within the Salmonberry River watershed. If both the proposed rule and plan are adopted, the water quality of the Salmonberry River will be placed at risk.

The plan calls for extensive management of the forest landscape and will allow logging, associated road building, and maintenance activities. The effects associated with logging practices are well documented, and they include increased solar radiation, decreased supply of large woody debris, erosion of streambanks, increased stream width, decreased stream depth, and higher water temperatures (Spence et al. 1996). These effects severely impact fish and other aquatic species that are dependent on specific habitat characteristics. Specifically, chinook, coho, chum, coastal cutthroat trout, and steelhead require clean gravel and low water temperatures for spawning, and chinook and steelhead are also dependent upon deep holding pools near spawning areas. Potential logging activity will seriously impact these species' abilities to effectively spawn. Additionally, the tailed frog requires water temperatures as low as 41°F, and increased temperatures from logging practices will seriously impair its survival.

Finally, the water quality remains at risk from continued sedimentation caused by the railroad and rock quarry operations. These activities impact flow and habitat quality, as well as turbidity and temperature. Because the water quality of the Salmonberry River is currently

threatened by so many activities, preventing degradation requires the comprehensive protections that ORW designation provides. This petition provides DEQ with an excellent, albeit narrow, window of opportunity to provide the necessary protections for the Salmonberry River that are currently absent.

(7) Special Status of the Salmonberry River

The Salmonberry River has been attributed with the following federal, state, and local designations. While these designations reflect the far-reaching importance of the unique characteristics that distinguish the Salmonberry River, none of these designations provide the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, it is within the Environmental Quality Commission's sole province to accomplish such protection through Outstanding Resource Water designation.

A. The Salmonberry River is under the jurisdiction of the CZMA (USCOE 1994).

B. The Salmonberry River is located within the Tillamook Basin which the State Department of Agriculture has determined is a high priority basin for the development of an Agricultural Water Quality Management Area Plan pursuant to ORS §§ 568.900- 568.933 (OCSRI 1997). This plan is scheduled to be completed within four years and fully implemented within ten years (OCSRI 1997). The purpose of the plan will be the "prevention and control of water pollution from agricultural activities and soil erosion" within the management area (OCRSI 1997).

C. The Salmonberry River is located within the Oregon State Coastal Salmon Recovery Plan area and contains critical habitat for the coho and steelhead populations that are the subject of that plan (OCSRI 1997).

D. ODFW is developing a fish management plan for the Salmonberry River.

E. The Salmonberry River is included in the Nehalem Basin Management Plan (OT 1995).

(8) Other Information Concerning the Salmonberry River

There are very few watersheds in the North Coast Basin that contain aquatic habitat quality equal to that found in the Salmonberry River. This habitat provides a vital link to the health and long-term productivity of numerous aquatic species. Ensuring the survival of these species is dependent upon protecting and maintaining existing water quality values and preventing degradation.

Additionally, the outstanding attributes of the Salmonberry River directly contribute to the water quality of Tillamook Bay. Preserving the water quality of the Salmonberry River is

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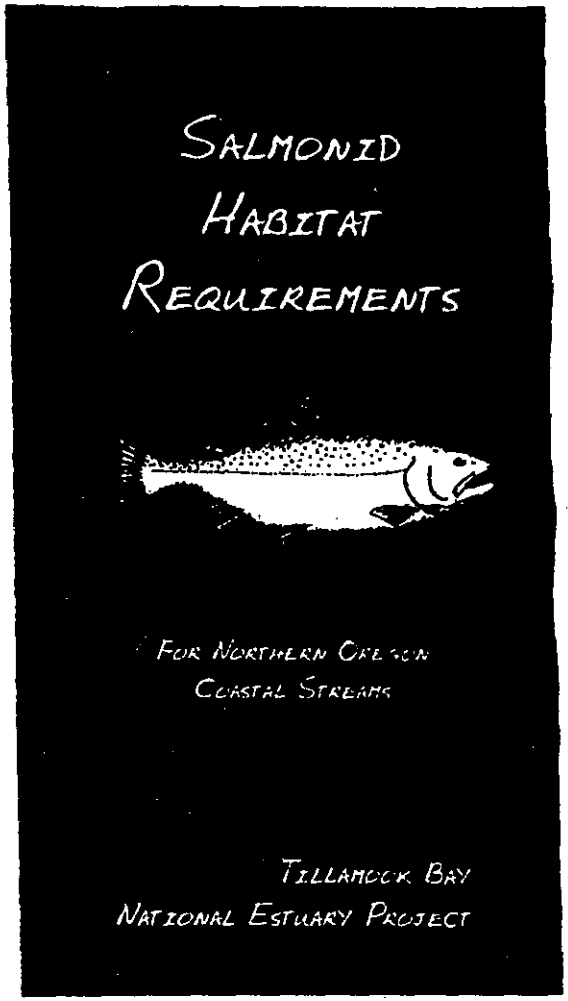
ATTACHMENT A

Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Incubation		Rearing						Status
	Incubation Temp.	Fry Emerge	Fry Habitat	Juvenile Habitat	Preferred Temp.	Freshwater Residency Period	Estuary Residency Period	Notes	1996 Status
Chinook - Fall	0 0–20°C; best 5.0–14.4° C	Mar–May	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Estuaries play a vital role in survival of young	Healthy and stable
Chinook - Spring	0 0–20°C; best 5.0–14.4° C	Feb–Mar	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Large body size limits movement over barriers	Depressed
Coho	4 4–13 3°C	Feb–June	Backwater pools and stream edges	Pools in summer, off channel alcoves, ponds, dam pools with complex cover in winter	11.8 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	One year Spring smolt	Move through 2–9 days	Low pH (<5.01) can be lethal to alevins	Listed sensitive on state lists
Chum	4.4–13.3°C	Late Mar–Apr	Move directly into estuary	High sediment levels (15.8–54.9 g/l) will kill juveniles	6.7 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	Hours to a few days, leave quickly Spring smolt	2–32 days	Use estuaries immediately for food and adjustment	Depressed
Steelhead - Winter	4 4–13.3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2 -3 years Spring smolt	Move through in days	Good habitat = small and large wood complexity	Depressed
Steelhead - Summer	4 4–13 3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2–3 years Spring smolt	Move through in days	Summer steelhead require deep cool pools to live in before spawning	Hatchery fish - depressed
Sea Run Cutthroat Trout	6 1–17 2°C	Mar–May	Stream edges and backwater pools, large wood important	Prefer pools but are often displaced by coho or steelhead, low velocity pools and side channels in winter	9.5–12.9°C Growth stops at 20.3°C lethal at 23.0°C	2-4 Years Spring smolt	Used extensively as adults before upstream migration	Rearing in estuary is common	Depressed

Abbreviations used: C - Celsius (0°C = 32°F, 10°C = 50°F, 20°C = 68°F); cm - centimeters (2 54 cm = 1 inch); LWD - large woody debris; m - meters (1 m = 3.3 ft); max - maximum; mg/l - milligrams per liter (28.35 mg = 1 ounce, 1 liter = 1 06 quarts), mm - millimeter (25 4 mm = 1 inch); m/s - meters per second.



Habitat

Salmonid populations in the Pacific Northwest have been in decline for many decades. As a result some populations are listed as threatened or endangered species. One of the reasons for their decline is a lack of suitable habitat.

Studies show that salmon require a range of conditions in which to migrate upstream, spawn, and grow. This chart outlines some of those conditions and represents best professional judgement compiled from scientific reports and studies. It is designed to be a reference chart.

Dissolved Oxygen - The oxygen carried in the water is called dissolved oxygen and is required by fish. The amount of dissolved oxygen in the water varies with water temperature. Salmonids, in general, tend to require high levels of dissolved oxygen.

Temperature - In general, colder temperatures are preferred by salmon. Colder water carries more dissolved oxygen and also slows fish metabolism, which allows fish to gain weight more easily and grow to larger sizes.

Velocity - Water velocity needs to be great enough to provide continuous oxygen supply, but slow enough not to wash away eggs and juvenile salmon.

Percent Fines - "Fines" refer to the very small sediments carried by the water. Too much sediment in streams can stop migrations and kill fish by clogging gills and suffocating eggs. Fines prevent fish from getting essential dissolved oxygen.

Depth and Substrate - Salmonids seek good places to make their redds, or nests. Appropriate conditions depend on the size of the gravel in the nest and the depth of water.

For more information about salmon, water quality, or other related topics, contact the National Estuary Project at (503) 322-2222 or visit our web site at:
http://osu.orst.edu/dept/tbaynep/nephome.html

Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Spawning (including upstream migration)									
	Migration	Spawn Timing	Location	Substrate Size	Water Depth	Water Velocity	Dissolved Oxygen	Spawning Water Temp	Percent Fines Tolerable	Notes
Chinook - Fall	Sep–Dec	Oct–Jan	Mainstem and large tributaries	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.1–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Large body size limits movement over barriers
Chinook-Spring	Apr–Jun	Sep–Oct	Upper mainstem streams	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.21–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Require deep water for travel–pools for summer habitat
Coho	Sep- Jan	Oct–Jan	Small tributaries	Pea to Apple (1.3–9.0 cm)	0.18–1 m	0.08–0.11 m/sec; max is 2.4 m/s	> 8 mg/l	4.4–14°C	Fines (<6.4 mm) make up less than 25% of substrate	Primary target for many sport fisherman
Chum	Nov–Dec	Nov–Dec	Lower mainstem and tributaries	Pea to Orange (0.5–10.2 cm)	13–50 cm; ideal 21 cm	0.21–0.83 m/s; max is 2.4 m/s	> 5 mg/l; above 80% saturation best	7.2–12.8°C	Fines (<6.4 mm) make up less than 25% of substrate	Strong swimmer but doesn't jump
Steelhead - Winter	Nov–May	Jan–May	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Late fish seem to prefer mainstem and large tributary
Steelhead - Summer	May–Jul	Jan–Apr	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Athletic swimmer
Sea Run Cutthroat Trout	Jun–Oct	Dec–Feb	Small headwater tributaries, 1st & 2nd order streams	Pea to Golf Ball (0.5–7.5 cm)	0.01–1m; 10–15 cm best	0.11–0.90 m/s; max is 2.4 m/s	> 5 mg/l	6-17°C; best is 10°C	Fines (<6.4 mm) make up less than 25% of substrate	May spawn more than once

Compiled by Ann Newton, August, 1997. Tillamook Bay National Estuary Project

Information compiled from:

1. Emmett, R. L., S.L. Stone, S.A.Hinton, and M.E. Monaco. 1991. *Distribution and abundance of fishes and invertebrates in west coast estuaries, Volume II: Species life history summaries.* ELMR Rep. No. 8.
2. Groot, C. and L. Margolis. 1991. *Pacific Salmon Life Histories.* UBC Press, Vancouver, British Columbia.
3. Nicholson, T., J. Nicholas, A. McGie, R. Lindsey, D. Bottom, R. Kaiser, and S. Jacobs. 1992. *Status of Anadromous Salmonids in Oregon Coastal Basins.* Oregon Dept. of Fish and Wildlife. Corvallis, OR.
4. Reiser, D.W. and T.C. Bjornn. 1979. Habitat Requirements of Anadromous Salmonids. *In* W.R. Meehan (editor), *Influence of forest and rangeland management on anadromous fish habitat in western North America,* U.S. Forest Service General Technical Report PNW-96, Pacific Northwest Forest Range Experiment Station, Portland, OR.
5. Additional thanks to Oregon Department of Fish and Wildlife for comments and suggestions.

ATTACHMENT B

Excerpts from Oregon Trout document entitled:

Watershed Overview: Salmonberry Watershed, Oregon

FISH

This section evaluates the health of fish populations and their habitats in the Salmonberry watershed. A summary is presented of available salmonid life history data, population status, population trends, habitat preferences, and habitat conditions and limitations. An extensive information search and literature review provided a great deal of data specific to the Salmonberry and Nehalem rivers, although data gaps do exist. Primary sources of specific information were ODFW information and progress reports, other research and information reports, ODFW stream survey data, and ODFW biologists familiar with these watersheds.

Fishery management for salmonids in the West has reached near crisis levels in recent years. High commercial and recreation demand increased harvest rates, while habitat degradation reduced natural production. Many wild salmon and steelhead stocks are severely depressed or extinct. It is interesting to note that the Salmonberry River is generally considered to have relatively "healthy" fish populations with little or no hatchery supplementation.

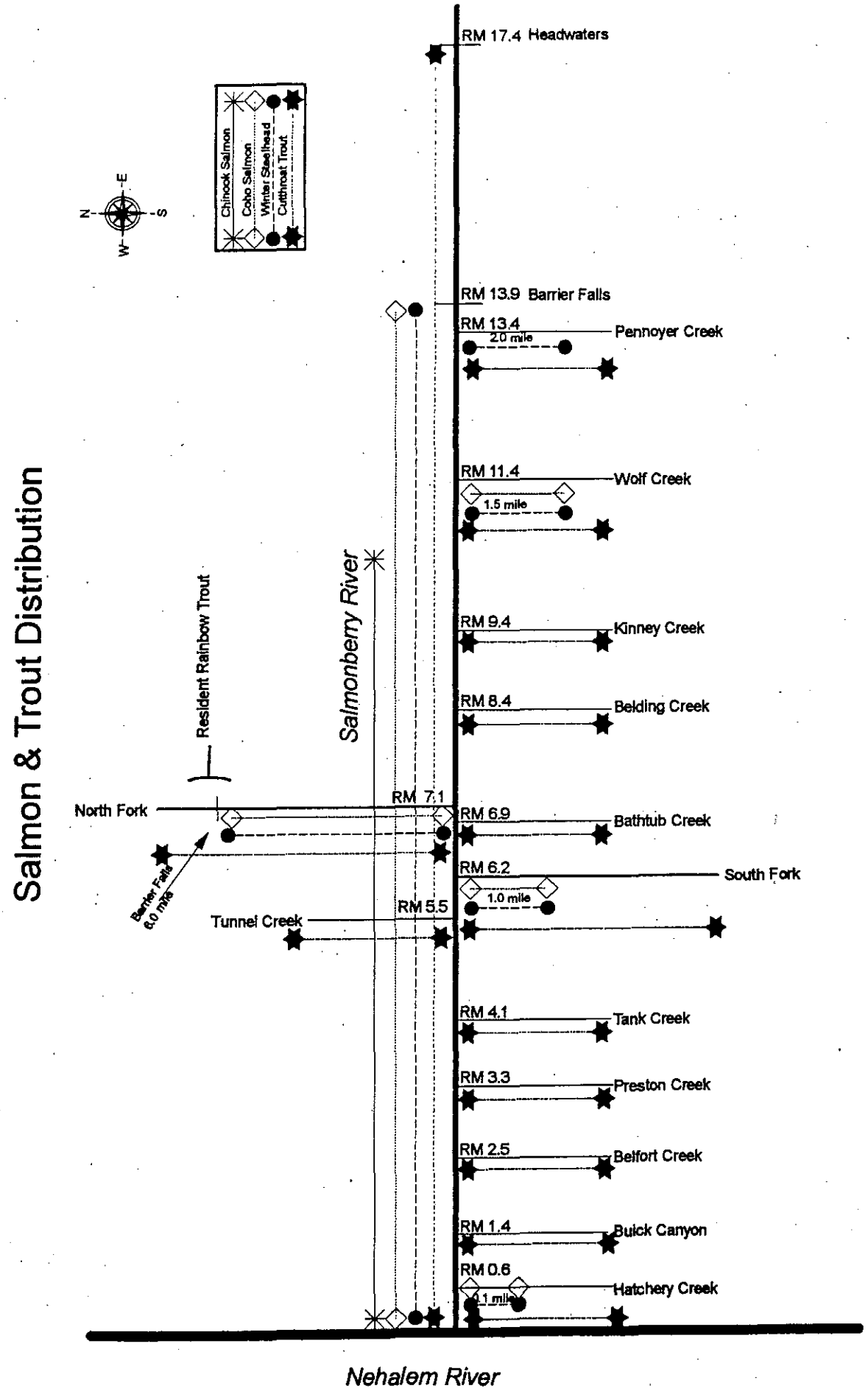
Fish Species

The Salmonberry River basin is known to support fall chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), coastal rainbow trout (*O. mykiss irideus*), and coastal cutthroat trout (*O. clarki clarki*) (Nawa, et al, 1992). The rainbow and cutthroat trout populations include both resident and anadromous (sea-run) forms. A general description of these salmonid species, their life history patterns and riverine habitat requirements, with implications for the Salmonberry basin is provided beginning on page 17. General information, unless otherwise referenced, is from Bell (1991), Emmett, et al (1991), Groot and Margolis (1991), and Nickelson, et al, (1992). Specific information for the Salmonberry River is from Weber (1994).

The figure on the next page provides a schematic representation of the known distribution of salmonids in the Salmonberry River and major tributaries. Differences in distribution between species and within species (resident vs. anadromous) are the result of partitioning the available habitat with compatible life history strategies. This means the fish choose the habitats that best satisfy their needs, in context with other species' use patterns.

As shown, chinook use is limited to the lower mainstem, coho and steelhead use a larger proportion of the mainstem as well as major tributaries. Cutthroat are widely distributed throughout the system and a distinct resident rainbow population exists in the upper North Fork.

In addition to variations (by species) in the areas used, timing of use varies by species and by life stage within each species. In the Salmonberry, anadromous salmonids are present year-round in various stages. Table _ summarizes timing of use (by species and lifestage) of Salmonberry salmonids.



Notes: RM = River Mile on Salmonberry where tributary enters. Distribution is to headwaters unless mileage is indicated. Mileage indicates length of tributary with known distribution of specie.

Sources: Forsberg, 1992; Weber, 1994.

Table __

Life History Periodicity (Timing of Use) Anadromous and Resident Species of Interest
Salmonberry Basin, Oregon

SPECIES LIFE STAGE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CHINOOK SALMON												
ADULT PASSAGE									XXX	XXX	XXX	XXX
SPAWNING										***	***	***
INCUBATION	▓▓▓	▓▓▓								▓▓▓	▓▓▓	▓▓▓
REARING	a/---	---	---	---	---	---	---b/					
COHO SALMON												
ADULT PASSAGE	XXX	XXX							XXX	XXX	XXX	XXX
SPAWNING	***	***								***	***	***
INCUBATION	▓▓▓	▓▓▓	▓▓▓							▓▓▓	▓▓▓	▓▓▓
REARING	---	---	---a/---	---	---	---	b/---	---	---	---	---	---
STEELHEAD TROUT c/												
ADULT PASSAGE	XXX	XXX	XXX	XXX	XXX	XXX	XXX d/				XXX	XXX
SPAWNING	***	***	***	***	***	***						
INCUBATION	▓▓▓	▓▓▓	▓▓▓	▓▓▓	▓▓▓	▓▓▓	▓▓▓					
REARING	---	---	---a/---	---	---	b/---	---	---	---	---	---	---
SEA-RUN CUTTHROAT TROUT e/												
ADULT PASSAGE	XXX	XXX	XXX	XXX d/				XXX	XXX	XXX	XXX	XXX
SPAWNING	***	***	***									***
INCUBATION	▓▓▓	▓▓▓	▓▓▓	▓▓▓	▓▓▓	▓▓▓						▓▓▓
REARING	---	---	---a/---	---	---	b/---	---	---	---	---	---	---

a/ Smolt outmigration typically begins.
b/ Smolt outmigration typically ends.
c/ Spawning, incubation, and rearing times for resident rainbow trout are the same.
d/ Surviving adults return to the ocean.
e/ Spawning, incubation, and rearing times for resident cutthroat trout are the same.

Sources: Weber, 1994; Nickelson, et al, 1992; Bell, 1991.

Chinook Salmon

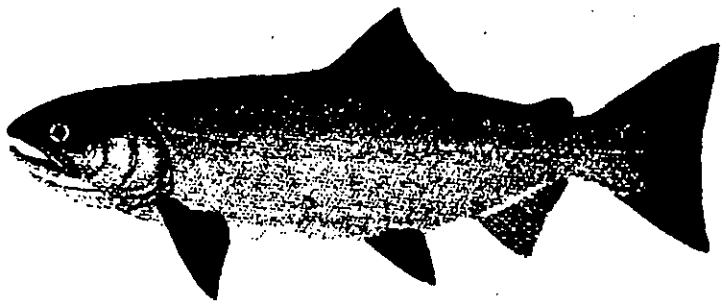
Chinook salmon populations are distinguished by the season of the year in which they return to their natal streams to spawn. Chinook salmon enter Nehalem Bay from July through October, with peak entry during late September. Nicholas and Hankin (1988) believe the run timing of the Nehalem River chinook is so early that there may be separate summer and fall chinook in the system. However, lack of life history data to distinguish between the two possible run types has led biologists to classify Nehalem and Salmonberry chinook stocks as fall-run. This stock is tentatively classified as late- maturing stock, due to the predominance of age five females and low incidence of age two males, when returning to spawn. These stocks are part of the North migrating stock, which spend most of their oceanic life off the coasts of British Columbia and southeast Alaska.

The Salmonberry River has a strong population of wild chinook and is considered a spawning area important to the entire Nehalem River basin. Distribution is limited to the spawning habitat in the lower gradient floodplain flats in the mainstem river. Adult and "jack" (precocious males) chinook enter the Salmonberry beginning in September and spawning occurs from October to December. Pool habitat in proximity to spawning areas provides resting areas until sexual maturation.

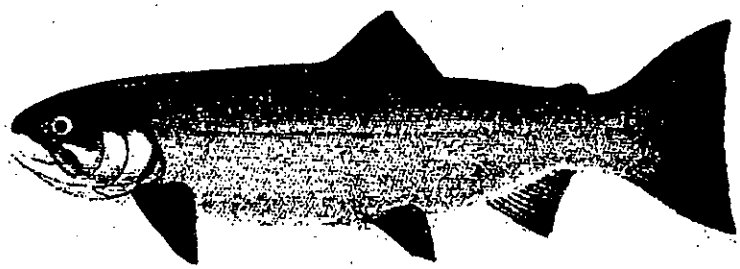
Chinook spawning occurs over a broad range of conditions; depths (0.3-1.2 m), velocities (10-150 cm/s), gravel/cobble size (1.3-10.2 cm ,<25% fines), and water temperature (4-14 °C). The main requirement for successful chinook egg and alevin survival is good intergravel flow to provide a constant rate of $\geq$5.0 mg/l of dissolved oxygen to the incubating eggs and alevins. Chinook have large eggs and a small surface-to-volume ratio, compared to other salmonids. Therefore, chinook are most sensitive to reduced oxygen levels, resulting from water quality degradation, scouring and bedload movement, and sedimentation.

Chinook egg incubation time may range from 33-178 days, depending on dissolved oxygen levels, water temperature, substrate, gradient, and water depth and velocity. Salmonberry chinook fry generally emerge in early spring. Juveniles disperse to rear in the mainstem and gradually move downstream through the spring and early summer to the Nehalem River. Juvenile chinook rear in the Nehalem Bay estuary through the summer and migrate to the ocean in the fall as sub-yearlings. Large, woody debris (LWD) and riparian vegetation is important cover to migrating juveniles.

Land management practices throughout the Salmonberry basin may have a high influence on chinook salmon production both in the Salmonberry River and the Nehalem River. Practices that increase sediment, scouring, bedload movement into pools, increase water temperature (and thereby decrease dissolved oxygen), and limit LWD would degrade Salmonberry spawning and rearing habitat. Depending upon the type and scale of disturbance, Nehalem River chinook production and Nehalem estuary rearing habitat could also be affected.



Coho Salmon



Coho salmon in the Salmonberry River are considered a wild but relatively small population. Specific spawning areas, hatchery stray influences, and production trends are currently unknown.

Coho salmon adults begin entering freshwater in the fall following the first freshets. Adults usually return at age three and are accompanied by age two "jacks". Spawning time is highly variable and is dependent on stream conditions. Coho will hold at the mouth of their natal streams and rivers until suitable flow conditions allow them to migrate upstream. Severe drought conditions may limit spawning until late spring.

Coho spawning in the Salmonberry River generally occurs from November to January in low-gradient floodplain flats and lower-gradient tributary reaches. Incubating eggs and alevins are sensitive to low dissolved oxygen levels. The eggs hatch in 30-55 days, depending on water temperature, and the fry emerge from the gravel in late spring. High sediment levels may hinder emergence, survival and growth of fry.

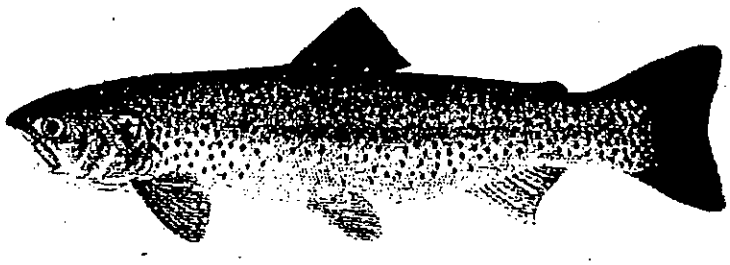
Juvenile coho rear one year in freshwater before migrating to the ocean the following spring. Critical overwinter habitat for rearing coho is typically slack water areas in side channels, backwater pools and beaver ponds. There is a strong association of juvenile coho density with cover in the form of LWD.

Coho salmon production in the Salmonberry River may currently be limited by lack of overwinter habitat and inadequate LWD. They could be further impacted by any upstream land practices which contribute to sedimentation, bedload movement and instability, water quality degradation and limitation of large woody debris inputs.

Coastal Rainbow Trout

Resident rainbow trout in the Salmonberry are limited in distribution to the upper North Fork. This population is considered genetically unique due to isolation above a barrier falls. Confinement of this population to a relatively small area makes protection from catastrophic events critical. Resident rainbow spawning, incubation, and early rearing patterns are very similar to steelhead trout.

Steelhead trout are the sea-run form of Coastal rainbow trout. Juvenile steelhead migrate to the ocean after 1-4 years freshwater rearing and then return as adults 1-4 years later to spawn. Information on migration patterns and distribution of steelhead in the Pacific Ocean is limited. It is known that juvenile steelhead tend to migrate directly offshore rather than along a coastal belt as salmon do. Steelhead have a widespread distribution throughout the Gulf of Alaska and the Aleutian Island area.



Steelhead in the Salmonberry are referred to as winter run, based on the time (November to January) they return to spawn. The Salmonberry River is used by ODFW as the "north coast wild steelhead index stream," since no other north coast streams have stocks that are comprised of greater than 70% wild fish (ODFW, 1986).

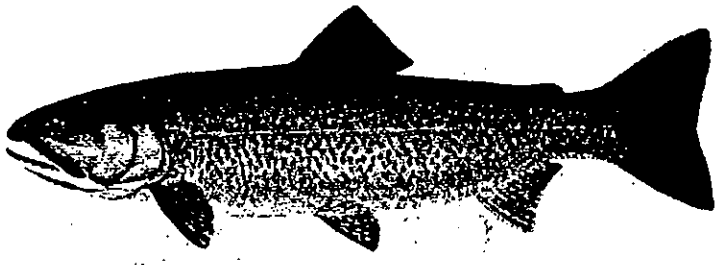
Salmonberry River steelhead populations are strong with minimal hatchery interaction. This population is considered genetically unique, characterized by large size and late spawning time of adults. Biologists theorize that there may be three distinct populations of steelhead within the Salmonberry drainage. A genetic study would be necessary to validate this theory.

Winter steelhead mature during migration and spawning occurs shortly after reaching spawning areas. Spawning in the Salmonberry generally occurs in the mainstem and major tributaries in moderate-gradient areas from January to early June. Surviving adults (kelts) may move back to the ocean and return a year or more later to their natal stream as "repeat spawners," although it is assumed that the percent of repeat spawners in a population is usually low. Steelhead eggs incubate from 35-50 days depending on water temperature and dissolved oxygen concentrations. Fry in the Salmonberry emerge in the summer, most by mid-August. Juvenile steelhead in the Salmonberry utilize high gradient boulder/cobble habitat (usually for two years) before migrating to the ocean in the spring.

Habitat is more accommodating for steelhead than salmon due to more extensive and upstream distribution of spawning areas and juvenile rearing in high-gradient habitat with boulders. Extended juvenile rearing time makes quality and protection of habitat extremely important.

Coastal Cutthroat Trout

The Salmonberry River contains both resident and sea-run populations of cutthroat trout distributed throughout the watershed. Resident forms are located above natural stream barriers. Spawning and incubation timing is similar between the two forms and is dependent on stream temperature and flow conditions. Rearing fish utilize a wide variety of habitats, usually those which are excluded from the other species. Headwater areas and small streams with undercut banks, riparian vegetation and LWD to provide thermal and predator protection are important to rearing fish. The sea-run cutthroat is used as an "indicator specie" to assess environmental degradation (resulting in temperature changes and stream alterations) in headwaters areas.



Sea-run cutthroat trout begin spawning migrations from ocean and estuarine areas to the Salmonberry River in August. Spawning occurs December to March in small first and second-order streams in areas of gentle gradient. The best spawning temperature appears to be 10°C, but spawning and incubation occurs over the range of 6-17°C,

depths $\geq$ 6 cm, velocities 11-72 cm/s and gravel 0.6-10.2 cm in diameter. Incubation time of eggs is 6-7 weeks and fry emerge from the gravel in the spring and early summer. Juveniles rear in fresh water habitat for usually 2-3 years, but may range from 1-6 years and then migrate to sea in the spring.

Sea-run cutthroat remain relatively close to their river of origin. They usually mature the second year of ocean residence and return to natal streams to spawn at age four or five. Kelts generally return to salt water in late March and April, but may utilize estuarine habitat through the summer.

Land management practices in the Salmonberry basin may adversely affect cutthroat trout populations. Headwaters and small streams are highly susceptible to damage from even relatively minor events. Inadequate protection of riparian vegetation zones will result in erosion, loss of pool and undercut bank habitat, limit inputs (and cause loss) of LWD, and increase water temperatures.

Population Status

Studies indicate that production of anadromous salmonids from Oregon coastal river basins has declined from estimated historic (turn of the century) levels, as shown below.

Table_
Historic vs. Current Production Levels
Oregon Coastal Basins

Species	Estimated Historic (1900's) Annual Production Level	Estimated Current Production Level (as percent of historic)
Chinook	300,000-600,000	50-60%
Coho	1-2 million	10%
Steelhead	100,000*	50%
Cutthroat	No information	

* Coquille River and north; 1930's

Source: Nickelson, et al, 1992.

Many native, naturally-spawning anadromous fish stocks along the Pacific Coast are considered by many to be at risk of extinction or of special concern a recent study. Two studies reviewed fish stock status along the Oregon Coast. The results are shown on the following page.

Table _
Status of Native/Wild Anadromous Fish Stocks
Coastal Oregon

Race	Special Concern	Depressed	Unknown	Healthy	Total	"Healthy" as percent of Total
Salmon:						
Spring/Summer Chinook	4	2	1	5	12	42%
Chinook	4	6	8	25	43	53%
Coho	2	41	6	5	54	11%
Chum	11	0	2	10	23	43%
Trout:						
Winter Steelhead	1	19	0	4	24	17%
Summer Steelhead	0	2	0	1	3	33%
Sea-Run Cutthroat	NA	NA	NA	NA	NA	NA
TOTAL	22	70	17	50	159	31%

NA= Not Available

Source: Nickelson, et al, 1992.

As shown, chinook and coho comprise the highest number of native populations remaining on the Oregon Coast. There are far fewer distinct populations of steelhead, chum, and spring/summer chinook. Coho show the largest number of populations that are "depressed" or of "special concern"; fall chinook show the highest number of "healthy" populations.

The Nehalem supports runs of chinook (spring/summer and fall), coho, chum, winter steelhead and sea-run cutthroat. Results of status reviews related to the Nehalem are shown below.

Table _
Status of Native/Wild Anadromous Fish Populations
Nehalem River, Oregon

Race	Nehlsen, et al	Nickelson, et al
Salmon:		
Spring/Summer Chinook	Special Concern	Healthy
Fall Chinook	NA	Healthy
Coho	Moderate Risk of Extinction*	Depressed
Chum	NA	Healthy
Trout:		
Winter Steelhead	NA	Depressed
Sea-Run Cutthroat	Experiencing widespread decline	

* considered to have high probability of intergression with hatchery stocks.
NA = Not Available
Sources: Nehlsen, et al, 1991; Nickelson, et al, 1992.

Conditions on the Salmonberry are summarized below.

Table _
Status of Native/Wild Anadromous Fish Populations
Salmonberry River, Oregon

Race	Nickelson, et al, 1992	Weber, 1994
Salmon:		
Spring/Summer Chinook (may have been Salmonberry run in the past)		
Fall Chinook	Unknown	Strong
Coho	Unknown	Small
Chum	(unlikely to have inhabited the Salmonberry)	
Trout:		
Winter Steelhead	Depressed	Strong
Resident Rainbow	Unknown	Unknown
Sea-run Cutthroat	Unknown	Unknown
Resident Cutthroat	Unknown	Unknown

Sources: Nickelson, et al, 1992; Weber, 1994.

There are several important observations to make regarding the results of these status reviews. First, it is clear that there are major gaps in knowledge regarding the status of many fish populations.

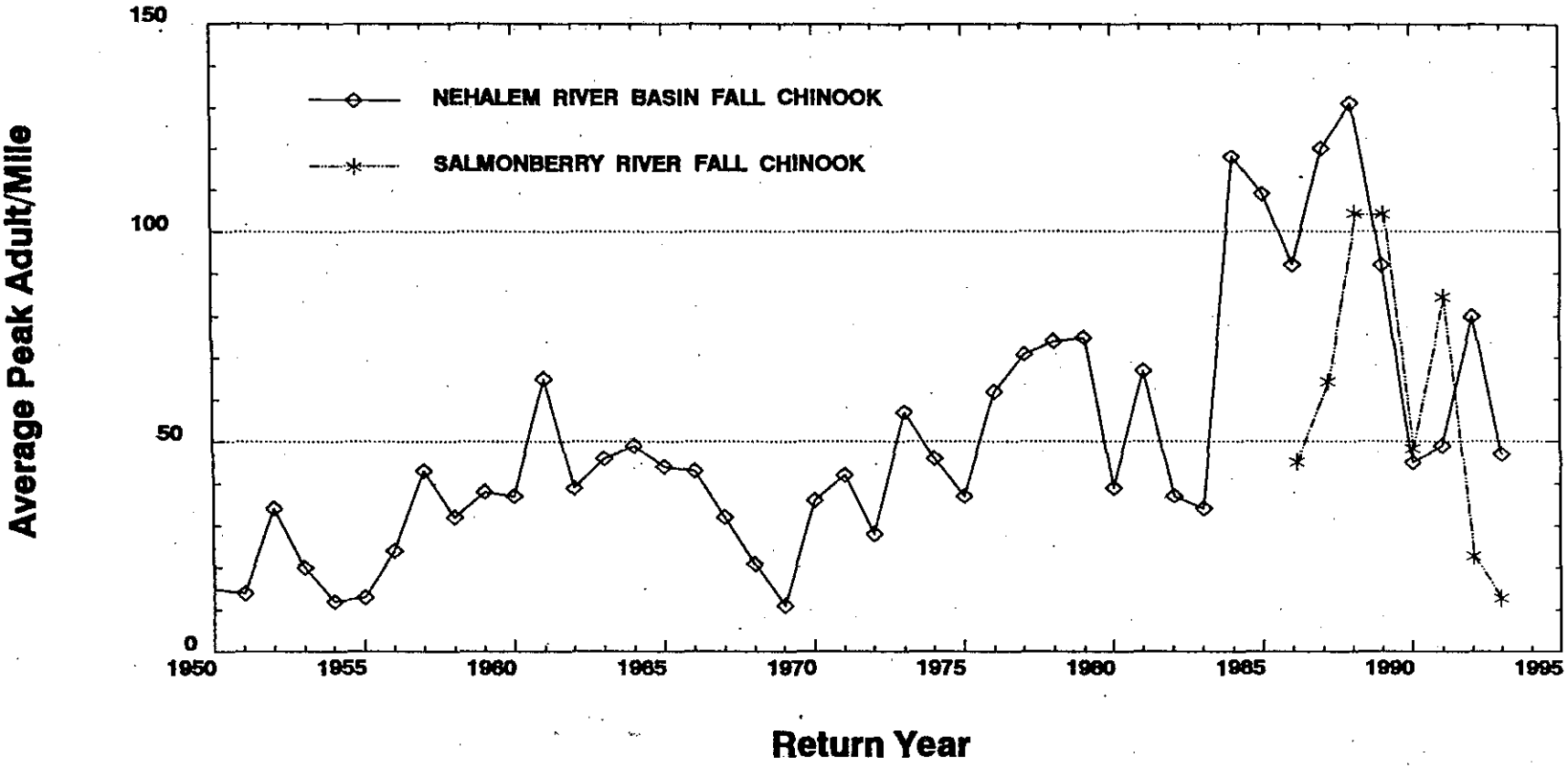
Second, there are differences in opinion and terminology. A notable example is the divergent conclusions regarding the Salmonberry winter steelhead stock ("Depressed" vs. "Strong"). Nickelson, et al, based their conclusion on "punch card" data (reported catch from fishing licenses). Though a reasonable source of data, response rates are often as low as 3-5% , and changes in angling regulations can cause a data shift unrepresentative of reality.

Additional detail on fish population status, by species, is provided below.

Long Term Status Trends

Fall Chinook Salmon. The stocks that make up the Oregon coastal north migrating chinook (which includes the Nehalem River basin fall chinook) are considered to be, generally, healthy (PFMC 1994; Nickelson et al. 1992). Increases in ocean survival, principally off S.E. Alaska and British Columbia (food availability and harvest restrictions), may be the primary cause of the increase (Cooney and Jacobs 1994). As shown in Figure 2, the 44 year trend of the average peak count of adult fall chinook salmon per mile of standard stream survey segment in the Nehalem River basin is increasing. The 44 year average is 50 adults per mile of standard stream survey segment (see figure). A 0.5 mile segment on the mainstem Salmonberry River was added to the Nehalem Basin survey in 1986. No specific techniques have been developed yet to make absolute abundance predictions. Yearly adult spawner escapements are used to reach qualitative expectations (PFMC, 1994).

Nehalem River Basin and Salmonberry River Fall Chinook Density Index 1950-1993



Note: Index expressed as average peak number of adult fall chinook salmon per mile of standard stream survey segment for the Nehalem River basin (1950-1993) (including Salmonberry River). Raw peak numbers for the Salmonberry River (1986-1993) are also shown.

Source: Williams, 1994

Because of a general decline in many west coast salmonid stocks, a comprehensive species status review is underway by the National Marine Fisheries Service (NMFS). This review will assess the status of all stocks of salmon and anadromous trout in Washington, Oregon, Idaho, and California, not just the current ESA-petitioned stocks. The findings for chinook salmon are due in December 1995.

Coho Salmon. The average peak count of Nehalem River basin adult coho salmon per mile of standard stream survey segment from 1950 to 1992 is shown on the next page. The Nehalem River basin coho are part of the Oregon coastal natural (OCN) coho management group. There are no standard survey segments for coho in the Salmonberry River basin. The average peak counts for the Nehalem River basin mirrors those for the OCN coho as a whole. The peak counts declined sharply in the mid-1960's to the mid-1970's, and have remained at low levels since. The OCN average peak count (12) in 1992 was 40% below the 43-year average of 20 adults per mile of standard stream survey segment. The Nehalem River basin average peak count for 1992 (6) was 68% below the 43-year average of 19 adults per mile of standard stream survey segment (Cooney and Jacobs, 1994).

The decline in abundance of OCN coho stocks over the past 23 years is shown in the figure on page 26. Because of the declining abundance and the failure for four consecutive years (1987-1990) for OCN coho to meet the Pacific Fishery Management Council's (PFMC) spawner escapement goal, a stock review was initiated in 1991 (PFMC 1992). The review team identified six major factors contributing to the decline of OCN coho spawner escapements. These relate both to management and productivity, and are listed below.

Management Factors:

* **Overestimation of stock abundance by predictor model.**
* **Inaccurate "expansion" (i.e. estimation) of the spawning population.**
* **Poor seeding of freshwater habitat and unbalanced spawner escapement among the coastal streams.**
* **Methodology to assess stock-specific fishery mortality was not supported by information available on distribution of OCN coho stocks.**

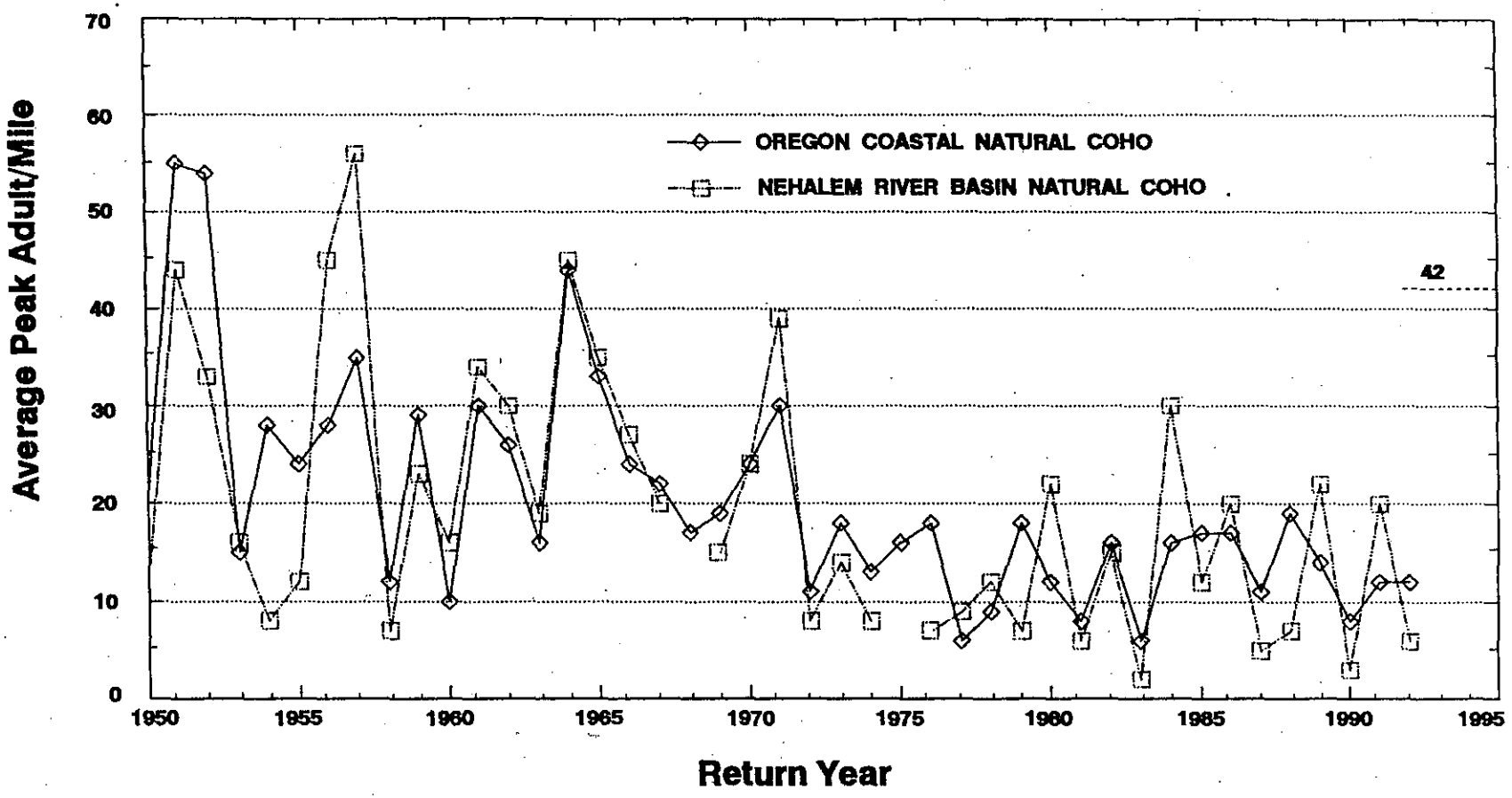
Productivity Factors:

* **Abusive land practices leading to extensive and significant degradation of freshwater habitat.**
* **A 15-year trend of poor ocean conditions.**

Source: PFMC, 1992.

Until an unbiased OCN stock recruitment predictor is developed, an aggregate spawner escapement goal of 42 adult OCN coho per mile of standard stream survey segment, rather than an expanded total number of adults, was set in 1992 (PFMC, 1993). This level was determined to the density needed to achieve necessary spawning escapement coast-wide. As shown in the figure, this escapement level has not been achieved since 1964.

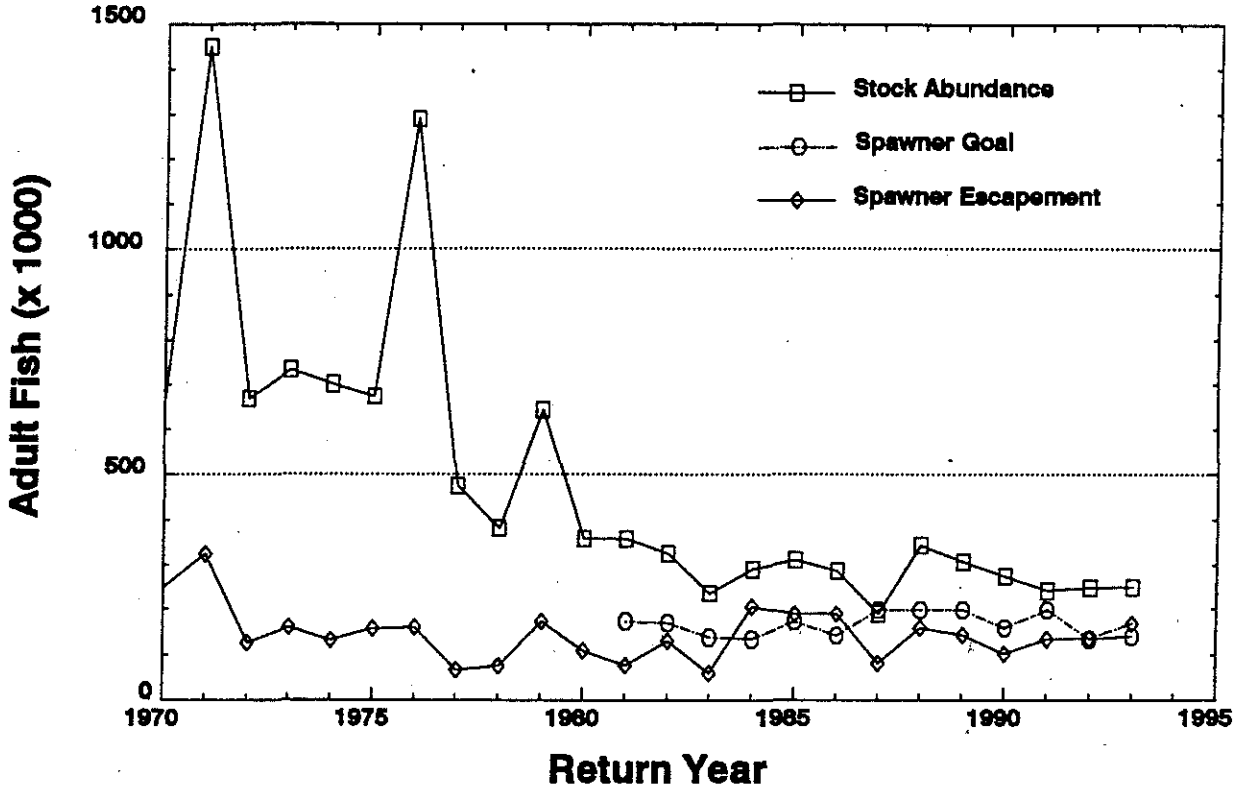
Oregon Coastal & Nehalem River Basin Coho Density Index 1950-1992



Note: Index expressed as average peak count of adults per mile of standard stream survey segement. The "42" line indicates the long-term spawner goal of adult Oregon Coastal Natural Coho spawners per mile of standard stream survey segment, established in December, 1993.

Sources: Cooney and Jacobs, 1994; PFMC, 1994.

Oregon Coastal Natural Coho Stocks
Spawner Escapement & Stock Abundance
1970-1993



Notes:

Stock Abundance = A measure of total number of fish of specific stock in the ocean. (Derived by PFMC).

Spawner Goal = The number of fish desired back to the stream to spawn. (recommended by State.)

Spawner Escapement = The number of adults returning to natal streams to spawn.

Source : PFMC, 1994.

Several researchers have explored density-dependent mortality as an explanation for poor ocean survival. Releasing millions of hatchery smolts to compete with naturally produced smolts in a poor quality ocean habitat may have exceeded the ocean carrying capacity (McGie, 1981; Bottom, et al, 1986; ODFW, 1982).

Based on declining densities of juvenile coho salmon in 1990 and 1991 (see Appendix, Table __) and the absence of coho salmon carcasses in prime spawning areas in 1991, Nawa, et al, (1992) believe coho salmon in the Salmonberry River basin are in danger of extinction.

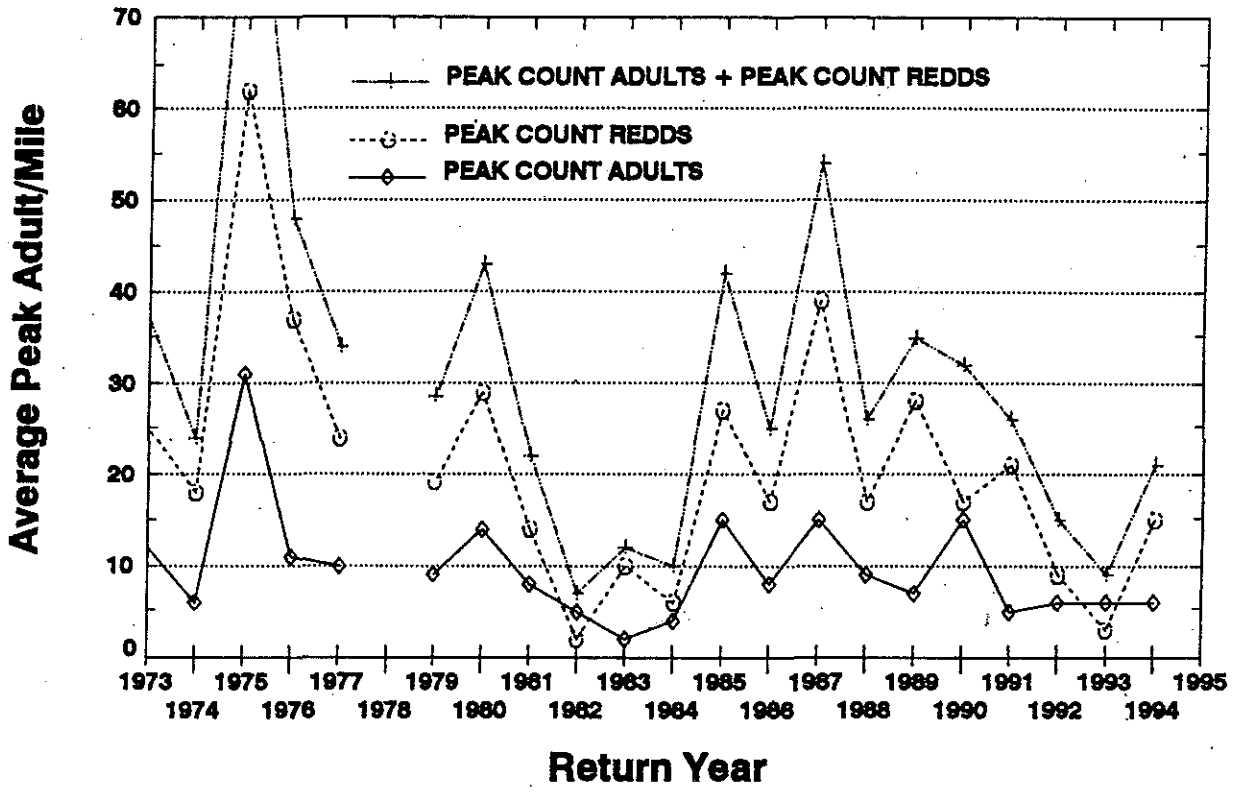
Five stocks of Oregon coho salmon were petitioned for listing as threatened or endangered under the Federal Endangered Species Act (ESA) in July 1993. One stock was an aggregate stock for all rivers from the Nehalem River to the Umpqua River. Another petition to list all West Coast coho (all stocks in Oregon, Washington, Idaho, and California) was submitted in October 1993. The one-year finding (whether listing is warranted) will include finding for the more specific, earlier petition. The findings for coho salmon under the comprehensive species status review were due in October 1994. The NMFS recently announced publicly that the finding will recommend listing of West Coast coho with a variable degree of endangerment for stocks. The NMFS indicated that those stocks farther south (southern Oregon and California) are more endangered than the northerly stocks (northern Oregon and Washington). Exact recommendations will be in the findings to be released.

Winter Steelhead Trout. The Oregon coastal rivers wild steelhead population has declined dramatically this century. As a perspective on the relative historical magnitude of the winter steelhead population in the Nehalem River basin, 1924 commercial steelhead landings from the Nehalem River totalled 68,000 pounds. Declining fish abundance was a concern even then, leading to seasonal restrictions and closures to fishing, and a 1949 total commercial landing of 975 pounds (less than 2% of the 1925 level) (ODFW, 1986). All commercial landings of steelhead were eliminated in Oregon in 1975. To date, no escapement or other numerical goals have been established statewide, as has been done with coho (Nickelson, et al, 1992).

Nickelson et al. (1992) felt that ocean conditions appeared to be an important factor influencing year-to-year variation in abundance of steelhead, but that the decrease in freshwater habitat quality over the past century has without doubt caused a decrease in the production of Oregon coastal wild steelhead. The ODFW Steelhead Management Plan (ODFW, 1986) recognizes the importance of quality habitat. Oregon Administrative Rule (OAR) 635-500-015 begins by stating "The Department recognizes that attrition and degradation of habitat is a serious threat to maintenance of healthy and diversified populations of steelhead. Implementation of state and federal laws for conservation of fish habitat, including those contained in the Wildlife and Commercial Fishing Codes, is essential to sustaining a strong habitat base."

ODFW district biologist Weber (1994) recognizes that a decline in the run of Salmonberry River winter steelhead, especially in the December-January time period, has occurred, but classifies the run as healthy and strong, relative to the condition of runs in other Oregon coastal streams. Weber (1994) referred to the quantity of steelhead juveniles counted in snorkel surveys (see Appendix, Table _-_) and returning numbers of adults and redds counted in agency and volunteer spawning surveys (see figure on next page).

Salmonberry River Winter Steelhead Density Index 1973-1994



Note: Data refers to the Enright "Standard Survey Segment." No surveys were conducted in 1978.

Source: Weber, 1994.

Nawa et al. (1992) concluded from their studies that using the combined value of steelhead redd and adult densities from the Salmonberry River spawner surveys as an index value showed a positive correlation with parr densities 17 months later. Regression analysis indicated that rearing habitat was not saturated until the spawner escapement index of redds + adults exceeded 40 per mile. This would indicate that spawning escapement limits the density of 1+ parr, not the amount of freshwater rearing habitat, as commonly believed (Nawa, et al, 1992). If accurate, then only five of the past 21 years have seen rearing habitat in the Salmonberry River fully saturated. ODFW district biologist Walt Weber believes that winter habitat (e.g. backwater areas, boulders, LWD. etc.) is a limiting factor for smolt production.

West Coast steelhead (all stocks in Oregon, Washington, Idaho, and California) were petitioned for listing as threatened or endangered under ESA in February 1994. The one-year finding is under development and due out in February 1995, which coincides with the findings due for steelhead under the comprehensive species status review.

Resident Rainbow Trout. The status of resident rainbow trout is unknown. It is known that they are currently found in only a small segment of the N. Fk. Salmonberry, primarily above a fish migration barrier approximately at River Mile (RM) 6 (Weber, 1994). This population could be susceptible to a catastrophic event. Nawa, et al, (1992) reported observing what appeared to be rainbow trout while snorkeling between the mouth of the Salmonberry River and the N. Fk. Salmonberry River. They question whether resident rainbow trout might not be found throughout the basin.

Sea-Run Cutthroat Trout. The best sources of long term information on a wild population of sea-run cutthroat trout in Oregon are annual counts over Winchester Dam on the North Umpqua River (Nickelson, et al, 1992). Most other populations of sea-run cutthroat trout lack data to make a quantitative evaluation. This holds true for the Salmonberry River population. Sea-run cutthroat trout in western Oregon were listed at moderate risk of extinction by Nehlsen, et al, (1991). A proposed ruling by the NMFS in July 1994 identified all forms of cutthroat trout in the Umpqua basin as endangered. The findings for sea-run cutthroat under the comprehensive species status review are due in April 1996.

Resident Cutthroat Trout. Resident cutthroat trout are found throughout the Salmonberry River basin, above barriers, and up into headwaters areas (Weber 1994). Their production status is not completely known.

Population Management

The first goal under Oregon's general fish management goals (OAR 635-07-510) directs state fisheries managers "...to prevent the serious depletion of any indigenous fish species through the protection of native ecological communities...such that fish production is sustainable over the long term." The first general policy of the Wild Fish Management Policy (WFMP) (OAR 635-07-527) states that protecting genetic resources of wild fish is a priority "... to assure optimum economic, commercial, recreational, and aesthetic benefits for present and future generations of Oregonians." To accomplish these goals on the Salmonberry River, ODFW uses a variety of management techniques and policies.

Oregon's WFMP directives lead ODFW to evaluate the state's wild fish populations with respect to two criteria to judge if their genetic resources are adequately protected: 1) the number of breeding individuals (at least 300 breeding adults), and 2) the percentage of these fish that are hatchery fish (10% or less, usually). Compliance of the Salmonberry River's wild and naturally spawning salmonid populations with the WFMP is listed in Table __ (Chilcote, et al, 1992).

Table __
Compliance with ODFW "Wild Fish Management Policy"
Salmonberry River Basin, Oregon

STOCK	% HATCHERY 10% or less[1]	POPULATION >300
Fall Chinook Salmon	Yes	Yes
Coho Salmon	Unknown[2]	Unknown
Winter Steelhead Trout	Unknown[3]	Yes
Resident Rainbow Trout	NA	NA
- NF Salmonberry River	Yes	Unknown[4]
Sea-run Cutthroat Trout	Unknown	Unknown
Resident Cutthroat Trout	Yes	Unknown[5]
- NF Salmonberry River	Yes	Unknown[6]
- Wolf Creek	Yes	Unknown[7]
- Pennoyer Creek	Yes	Unknown[8]

NA = No information available.

1 50% or less if the hatchery fish are "genetically similar" to the wild population.
2 Potential hatchery strays into a small wild population may cause non-compliance.
3 Conflicting information on percent hatchery fish; probably <10%.
4 Above falls; population abundance unknown.
5 Upper river above falls.
6 Above 10 foot falls.
7 Above 13 foot falls.
8 Above falls.

Note: Of the total (1,784) salmonid populations identified in Oregon, 9% are in compliance, 1% violate the hatchery requirement, 4% violate the population requirement, 1% violate both and 85% have insufficient information to evaluate compliance.

Source: Chilcote, et, al, 1992.

There are no stocking programs in the Salmonberry River. Steelhead smolts were last stocked in the Nehalem River in the spring of 1994 (Weber, 1994). Early spawning stock was used to minimize the impacts on the Salmonberry River steelhead. No future stocking is planned in the mainstem Nehalem, though hatchery releases from the North Fork Nehalem hatchery will continue. Cutthroat trout were last stocked in the Nehalem River in 1993.

Protective angling regulations have been established to better manage the fish resources. The mainstem Salmonberry River is closed to all fishing from April 1 to May 28. This is to protect downstream migrating smolts and spawning steelhead adults (Weber, 1994). There is a two-fish daily bag limit for salmon, steelhead, and trout, with a 12-inch minimum size restriction for the trout. Since 1992, there has been a complete ban on taking coho salmon and all wild steelhead (non-finclipped steelhead). The required use of barbless hooks began in 1992. Currently, only barbless artificial flies and barbless lures with a single hook may be used from May 28 through October 31. Single barbless hooks must be used during the remaining open period.

In the tributaries to the Salmonberry River all angling for salmon is forbidden. These waters are only open for trout fishing from May 28 through October 31. The 12-inch minimum size and use of barbless artificial flies and barbless hooks applies.

Continuing and ongoing ODFW activities to manage the Salmonberry River basin did include development of a fish management plan for the Salmonberry River, but the status of this objective is currently unknown. Other ODFW planned management activities include; completion of the Nehalem Basin Management Plan, continuation of established inventories of annual steelhead and chinook salmon spawning, investigating coho salmon spawning areas, and investigating resident rainbow trout status (Weber, 1994).

Another ODFW goal is to maintain limited vehicle access to the river (Weber 1994). Currently there are only three vehicle access points: at the mouth of the Salmonberry River, at the mouth of the N.Fk. Salmonberry River (RM 8), and on the Beaverslide/Belding Road (four-wheel drive) at RM 10.

ODFW management ability in ocean waters is limited. The agency sets sportfishing and commercial harvest regulations in ocean waters under state jurisdiction (3 miles out) to reach management goals. Specific local goals must be melded with the larger management goals and obligations of multi-state (PFMC), federal (ESA), and international (US-Canada Salmon Treaty) accords.

Habitat Conditions

Habitat Quality

Habitat quality is of utmost importance to natural salmonid production. The aquatic environment provides materials necessary to perpetuate salmonid populations and the food organisms they consume. Fish production is controlled by the factor (habitat condition) limiting any critical life stage. Assessing the condition of the stream habitat requires an understanding of the basic habitat requirements for all life stages present of each fish specie. The following is a partial list of factors and how they can affect a particular life stage.

Adult Migration

- **Temperature--extremes may delay migration.**
- **Low Dissolved oxygen (DO)--can affect swimming performance and delay migration.**
- **High Turbidity--delays migration and may affect survival to spawning.**
- **Barriers (dams, waterfalls, water velocity)--limit access.**
- **Water quantity--determines access, migration rate.**

Spawning

- **Water quantity--determines quantity of spawning area with suitable conditions**
- **Water quality (temperature, DO, chemical, composition, etc.)--must be in tolerance range.**
- **Substrate (composition, quality, quality)--determines area and success off spawning.**
- **Cover--provides protection from disturbance and predation while maturing**
- **High Turbidity--causes sedimentation of gravel and affects water quality.**

Incubation

- **Water quantity--affects water quality, sedimentation and bedload stability for redds.**
- **Water quality (temperature, DO, chemical composition, etc.)--affects egg survival.**
- **Substrate (composition, quality, porosity)--affects water quality to eggs and redd stability.**
- **Temperature--alters fry emergence timing, warm water accelerates egg development.**
- **Turbidity--affects sedimentation, intergravel flow and water quality to eggs.**

Rearing

- **Water quantity--affects water quality, physical conditions (water depth and velocity), area of rearing habitat and food production.**
- **Water quality (temperature, dissolved oxygen, chemical, etc.)--must be in tolerance range.**
- **Substrate--affects food production, cover and water velocity.**
- **High Turbidity--disrupts feeding (growth), juvenile distribution and food production.**
- **Cover--affects predation, water temperature and food production.**

Coastal watersheds typically lack an adequate snow pack to absorb and store moisture during precipitation from annual precipitation cycles, and later release it slowly to the stream. This results in very dynamic stream systems. Stream flow is very low during dry periods and increases quickly during storm events. Frequent floods wash sediment to the stream, cause debris torrents, remove instream cover and increase scouring and bedload movement. The factors listed above are quickly degraded. Effects are intensified with increased extent and intensity of land use modifications and proximity to the riparian zone.

Habitat surveys

The Oregon Department of Fish and Wildlife, through their "Aquatic Inventory Project", has developed a detailed stream survey methodology for streams in Oregon (Moore, et al, 1993). The purpose is to assess the quantity and quality of aquatic and riparian conditions pertinent to fish. This assessment is used to identify specific areas and parameters limiting salmonid populations in streams. Data collected is also used as baseline information to document changes in quantity and/or quality of stream habitat following land use impacts. Survey information is very detailed and designed for use in a wide variety of systems, with a wide variety of analyses.

Survey crews walk streams measuring and recording detailed parameters. Homogenous stream segments are analyzed as a "reach". Approximately 18 miles (6 reaches) of the mainstem Salmonberry, 8.5 miles (3 reaches) of the North Fork system, and 3.8 miles of three North Fork tributaries were surveyed in summer and fall of 1993. A map showing the completed survey reaches in the Salmonberry watershed is presented on the next page. The Oregon Department of Forestry commissioned surveys of the South Fork in 1994, but data has not yet been compiled. Habitat surveys are generally conducted under low flow summer conditions, even though winter habitat is also critical to salmonids. No winter habitat surveys are planned for the Salmonberry (Moore, 1994).

A tabular summary of the stream survey data collected by reach and parameter is presented in Appendix B, Tables B-__ and B-__. Survey parameters include:

- **reach length**
- **channel form**
- **bank erosion**--% of stream bank eroding
- **pool frequency**--number and %
- **residual pool depth**
- **stream gradient**--% slope of stream
- **land use**
- **stream shading**--% shaded channel
- **substrate composition**
- **riparian and instream wood evaluation**

Appendix B includes descriptive summaries of survey data (Figures B-__ and B-__) and area and distribution of aquatic habitat (Tables B-__ and B-__, and Figures B-__ and B-__).

The lower mainstem Salmonberry River has a narrow valley floor, with moderate to steep "v"-shape. Adjacent vegetation is primarily shrubs, grasses, and forbs. Trees in the riparian zone averaged 75% hardwoods and 25% conifers, with most being 15-50 cm in diameter. Average canopy closure was 72%. Much of the stream is channelized by rip-rap from the adjacent railroad line. Survey crews noted a probable fish migration barrier (a bedrock step 5 meters high, with a 50% slope) about 2.3 miles above Pennoyer Creek (16.2 miles from the mouth). Juvenile salmonids occurred throughout the survey.

The North Fork Salmonberry has a valley floor varying from narrow (with moderate to steep v-shape) in the lower 85% of the stream, to a broad, terrace-constrained stream at the upper end of the survey. Riparian vegetation is primarily shrubs, grasses, and forbs. Trees in the riparian zone averaged 68% hardwoods and 32% conifers, mostly in the 3-50 cm diameter range. Canopy closure averages 74%. Fish were observed well into the upper survey area.

Figure __. Reach map

Habitat Evaluation

Evaluating the results of stream surveys can be difficult without a reference to assess the merit of information collected. ODFW has developed a rating system for important salmonid habitat variables ("benchmarks") to analyze habitat quality. Appendix B (Table B-__) lists the benchmarks and evaluation criteria. Values from the habitat survey summaries are rated by the criteria and designated GOOD, FAIR, or POOR. Table __ lists rating results from the benchmark habitat conditions by reach in the Salmonberry watershed stream surveys.

The aquatic habitat conditions in Salmonberry River mainstem and North Fork survey reaches are principally in GOOD to FAIR condition, especially the percentage and frequency of pools and residual pool depth. Good instream cover exists in the form of boulders and pool depth, however LWD was inferior or lacking. FAIR to GOOD quantities of spawning gravel, with FAIR to GOOD embeddedness (% fines), except mainstem Reach 6, which rated poor with 33% fines (see Appendix B, Table B-__). It is difficult to surmise why riffles in this reach collected fines at this rate, since the channel is high-gradient (3.2%), dominated by fast-moving habitat types (rapid, riffle, and cascade), with very stable banks.

Large woody debris (LWD) rated POOR in both "pieces" and "volume" in the lower four reaches of the mainstem and Reach 1 of the North Fork. The other survey reaches rated FAIR, with only North Fork, Reach 2 and the upper North Fork tributaries being GOOD in both categories. The LWD source is primarily small hardwoods. Large conifers are better source for LWD, due to stability provided by size and slower rate of deterioration.

Riparian conifers are all in the POOR category, and in all but one reach of the mainstem there is none over 35 inches dbh. There is a lack of large, mature timber (50-90 cm dbh) to fall and anchor in the stream. Reach 6 in the mainstem was the only area dominated by mature timber. The general lack of LWD is confirmed by ODFW biologists Weber (1994) and Stauff (1994). Stream bank erosion is low (<25%) throughout the survey reaches as rated by Platts, et al, (1983). Shading of the stream channel was FAIR in the lower three reaches of the mainstem and GOOD in all other survey reaches.

Habitat Influences on Fish Populations

Identification of habitat preferences for salmonid species helps to relate distribution and abundance of fish to measured habitat parameters. This also allows identification of limiting factors for critical life stages of a species. General species preferences for a few habitat parameters were identified by ODFW (1986). Table __ lists specie preference by parameter, and the measured habitat values in the Salmonberry River habitat survey reaches.

Table __
1993 Habitat Evaluation Against ODFW "Benchmarks"
Mainstem and North Fork Salmonberry Rivers, Oregon

	% POOL	POOL FREQ.	RESIDUAL POOL DEPTH	RIFFLE WIDTH/ DEPTH[1]	% FINES IN RIFFLES	% GRAVEL IN RIFFLES	% SHADE	LARGE WOODY DEBRIS PIECES #/100m	LARGE WOODY DEBRIS VOLUME m^3/100m	RIPARIAN CONIFERS #/1000ft >20dbh	RIPARIAN CONIFERS #/1000ft >35dbh
SALMONBERRY RIVER											
MAINSTEM											
REACH 1	G	G	G	P	F	F	F	P	P	P	P
REACH 2	G	G	G	P	F	F	F	P	P	P	P
REACH 3	G	G	G	P	G	G	F	P	P	P	P
REACH 4	F	F	G	P	G	G	G	P	P	P	P
REACH 5	F	F	G	G	G	G	G	F	G	P	P
REACH 6	F	G	G	F	P	F	G	F	F	P	P
NORTH FORK											
REACH 1	G	G	G	F	F	G	G	P	P	P	P
REACH 2	F	F	G	F	G	G	G	G	G	P	P
REACH 3	G	F	G	F	F	G	G	F	F	P	P
N.Fk. TRIBS											
1	F	F	G	-	F	G	G	G	G	P	P
1A	P	P	F	-	F	F	G	G	G	P	P
2	P	-	-	-	-	-	G	G	G	P	P

Notes: G = Good; F = Fair; P = Poor
Riffiw width/depth ratio not applicable to Salmonberry Basin (Moore, 1994)

Sources: Moore, 1994; ODFW, 1993; Averill, 1993.

Table __
General Habitat Preferences, by Species, and Evaluation of Current Conditions
Salmonberry Basin, Oregon

		GRADIENT (%)	% POOLS	INSTREAM COVER	CHANNEL PROFILE	% FINES	MAX.TEMP. (°C)
PREFERRED CONDITIONS							
CHINOOK SALMON		<2	50-100	POOL DEPTH	MODERATELY FLAT	<10	14
COHO SALMON		<3	50-80	WOOD	FLAT	<10	14
STEELHEAD TROUT		>1-5	<50	WOOD & BOULDER	STEEP	<10	13
CUTTHROAT TROUT		1-20	40-60	WOOD & BOULDER	UNDERCUT BANKS	<10	13
SALMONBERRY CURRENT CONDITIONS							
MAINSTEM	REACH						
	1	1.3	43	WOOD*	MOD. TO STEEP, 0.4%⊖	19	12-15☼
	2	1.2	53	WOOD	MOD. TO STEEP, 0%	18	11-12
	3	2.0	36	WOOD	STEEP, 0%	7	11
	4	2.3	20	WOOD	MOD. TO STEEP, 0.2%	9	10
	5	3.2	17	WOOD,POOL	MODERATE, 0.4%	5	9
	6	3.2	30	WOOD,POOL	MODERATE, 2.5%	33	11-13
N.FK.	1	4.9	49	WOOD	MODERATE, 0.1%	10	12
	2	2.7	20	----	STEEP, 0.1%	4	11
	3	1.4	36	WOOD,POOL,BOULDER	FLAT, 1.27%	11	14
N.FK. TRIBS	1	11.2	15	WOOD,POOL	STEEP	23	--
	1A	16.1	8	WOOD,POOL	STEEP	20	--
	2	26.9	0	WOOD,POOL	STEEP	--	--

* Limiting cover type for reach is listed under current conditions.

⊖ Average % bank undercut per reach.

☼ Temperatures measured during summer habitat surveys.

Sources: Bell, 1990; ODFW, 1986; Nickelson, et al, 1992.

Chinook salmon distribution in the Salmonberry River occurs from the mouth to one mile below Wolf Creek, the end of Reach 4. Gradient in Reach 4 is slightly higher than preferred and increases further upstream. Pool percentages are lower than preferred in all reaches except Reach 2. Pool depth for cover becomes limited in Reach 4. The channel profile is steeper than preferred in all reaches and may limit spawning area. Incubating egg and fry survival may be impaired in Reaches 1 and 2 since the % fines parameter exceeds the preferred, although is still in the range of survival <25% (Emmett, et al, 1991). Temperature measured during summer stream surveys ranged slightly higher than preferred.

Coho salmon preferred conditions are not found in many of the reaches throughout the survey reaches. The lack of wood for instream cover is the most obvious limiting factor, since LWD is a very important component of overwinter habitat for coho. (Dolloff, 1986).

Steelhead trout habitat measurements in the survey areas are almost all within the preferred ranges, with the exception of wood for cover and % fines. However, steelhead utilize either wood or boulders for cover, so LWD limitations may not be as critical. North Fork, Reach 2, has all parameters within the preferred range.

Cutthroat trout are able to utilize a wide variety of habitats and are distributed throughout the Salmonberry watershed. Their broad gradient preference allows them to utilize habitat other species cannot. Only North Fork Tributary 2 has too steep of a slope. Cover in the form of wood is limited but, like steelhead, cutthroat are able to utilize boulders. The preferred channel profile, undercut banks is a small percentage of all bank area.

Summary

Salmonid distribution and life history periodicity (timing of use, by life stage) are different between species to best use available habitat. A limiting factor may reduce the survival of any life stage and thus limit production potential. Summer stream surveys were conducted in the Salmonberry mainstem, North Fork, and North Fork tributaries to assess salmonid habitat. Habitat parameters measured in stream surveys were rated using ODFW benchmark criteria. Parameters generally rated GOOD to FAIR, with the exception of LWD and Riparian Conifers which were generally POOR. A lack of large conifers limits inputs of LWD to the stream habitat. Habitat preferences of salmonids were compared with Salmonberry measured habitat parameters to assess distribution and identify limiting factors of each salmonid specie.

Fall chinook populations in the Salmonberry River appear strong. Chinook are limited in distribution to the floodplain flats of the lower mainstem Salmonberry River (below Wolf Creek). Distribution is explained by preferred chinook habitat being in the lower river. Limited freshwater rearing eliminates need to seed headwater areas. Chinook are most sensitive to low intergravel dissolved oxygen during incubation and pool depth for cover.

Land management practices throughout the Salmonberry basin could have a high influence on chinook salmon production both in the Salmonberry River and the Nehalem River. Spawning and rearing habitat could be degraded due to increased sediment, scouring, bedload movement into pools, increased water temperature (and associated decreased dissolved oxygen), and limitations in LWD. Rearing habitat in the Nehalem Bay estuary could be affected in the same manner.

Coho salmon in the Salmonberry River are considered a wild and relatively small population. Specific spawning areas, hatchery stray influences, and production trends are currently unknown. Preferred coho habitat is lacking in all survey reaches in the Salmonberry. Coho salmon production in the Salmonberry River may currently be limited by lack of overwinter habitat and inadequate LWD. They may be further impacted by upstream land practices which contribute to sedimentation, bedload movement and instability, water quality degradation and limitation of large, woody debris inputs.

Resident rainbow trout in the Salmonberry are limited in distribution to the upper North Fork. This population is considered genetically unique due to isolation from a barrier falls. Confinement of this population to a relatively small area makes protection from catastrophic events critical. Spawning, incubation, and early rearing requirements are very similar to steelhead trout.

Salmonberry River steelhead populations are strong with minimal hatchery interaction. This population is considered genetically unique, characterized by large size and late spawning time of adults. Habitat is more resilient for steelhead than salmon due to more extensive and upstream availability of spawning areas, and juvenile ability to rear in high-gradient habitat with boulders. Extended juvenile rearing time makes quality and protection of habitat extremely important.

The Salmonberry River contains both resident and sea-run populations of cutthroat trout distributed throughout the watershed. Resident forms are located above natural stream barriers and in headwater areas. Land management practices in the Salmonberry basin may adversely affect cutthroat trout populations. Headwaters and small streams are highly susceptible to damage from even relatively minor events. Inadequate protection of riparian vegetation zones will result in erosion, loss of pool and undercut bank habitat, limit inputs and cause loss of LWD, and increased water temperatures.

APPENDIX B

SUPPLEMENTAL FISH RESOURCE INFORMATION

This appendix includes more detailed information on the fish resources of the Salmonberry watershed. Information includes:

Table B-1. Population Status Classification Terms Used in Nickelson Study.

Table B-2. Snorkeling Summary for Salmonberry River.

Table B-3. Summary of the 1993 Summer Habitat Inventories in the Salmonberry River Basin.

Figure B-1. Summary Habitat Descriptions, Overall and by Survey Reach, of the Salmonberry River.

Figure B-2. Summary Habitat Descriptions, Overall and by Survey Reach, of the North Fork of the Salmonberry River.

Table B-4. Aquatic Habitat Area and Percent of Wetted Area in Each Reach of the Salmonberry River.

Table B-5. Aquatic Habitat Area and Percent of Wetted Area in Each Reach of the North Fork Salmonberry River.

Figure B-3. Salmonberry River -- Instream Habitat Distribution.

Figure B-4 Salmonberry River -- Instream Habitat Distribution by Reach.

Figure B-5. N. Fork Salmonberry River -- Instream Habitat Distribution.

Figure B-6. N. Fork of the Salmonberry River -- Instream Habitat Distribution by Reach.

Table B-6. Oregon Department of Fish and Wildlife, Aquatic Inventory Project Summer Habitat Benchmarks.

Table B-1
Population Status Classification Terms Used in Nickelson Study, 1992

Populations were classified as HEALTHY if:

1. Available spawning habitat has generally been fully seeded, and

2. Available trends have remained stable or increased over the last 20 years.

Populations were classified as SPECIAL CONCERN if either:

1. The population is probably composed of 300 or fewer spawners, or

2. A substantial risk exists for interbreeding at a level in excess of standards established by ODFW Wild Fish Management Policy between the population and stray hatchery fish.

Populations were classified as DEPRESSED if any of the following have occurred:

1. Available spawning habitat has generally not been fully seeded, or

2. Abundance trends have declined over the last 20 years, or

3. Abundance trends in recent years have been generally below 20-year averages.

Populations were classified as UNKNOWN if there was insufficient data available to judge their status. Additionally, DEPRESSED classifications superseded SPECIAL CONCERN classifications, i.e. some populations classified as depressed may also fit within criteria under the SPECIAL CONCERN classification.

Source: Nickelson, et al, 1992

Table C-2
Summary of Snorkel Survey Results, 1982-1991
Salmonberry River, Oregon

#	REACH LOCATION	SEGMENT CLASS	DISTANCE SNORKELED (m)					WILSON RIVER FLOW (cfs)				
			1982	1983	1986	1990	1991	1982	1983	1986	1990	1991
1	BELOW BUICK CANYON	MAINSTEM COLLUVIAL CANYON	550					80				
2	ABOVE BUICK CANYON	MAINSTEM ALLUVIATED CANYON	687	687	687	687	687	80	344	72	95	100
3	SPEEDER SIDING	MAINSTEM ALLUVIATED CANYON			800					72		
4	BELOW SOUTH FORK	MAINSTEM COLLUVIAL CANYON			650	450	450			72	100	95
5	SOUTH FORK	TRIBUTARY COLLUVIAL CANYON					185					95
6	1 km BELOW NORTH FORK	MAINSTEM BEDROCK CANYON			800	350	350			72	100	97
7	ABOVE NORTH FORK	MAINSTEM COLLUVIAL CANYON			600	279	279			72	100	95
8	ABOVE BEAVERSLIDE BRIDGE	MAINSTEM BEDROCK CANYON			430	361	361			50	103	97
9	VAN FLEET SPUR (NORTH FORK)	TRIBUTARY COLLUVIAL CANYON				205	205				103	97

#	REACH LOCATION	STEELHEAD PARR/km					TROUT FRY/km			CUTTHROAT/km				0 AGE FALL CHINOOK/km				0 AGE COHO/km			
		1982	1983	1986	1990	1991	1983	1990	1991	1982	1986	1990	1991	1982	1986	1990	1991	1982	1986	1990	1991
1	BELOW BUICK CANYON	281								32				7				0			
2	ABOVE BUICK CANYON	116	159	418	(263)	406	(87)		2341	25	29	(4)	4		36	0	12		17	0	0
3	SPEEDER SIDING			510	(52)						21	(22)			91				54		
4	BELOW SOUTH FORK			989	247	604			5447		78	18	47		0	16	27		80	9	0
5	SOUTH FORK								1680				25				0				0
6	1 km BELOW NORTH FORK			1283	649	831			4567		41	11	60		31	0	9		81	0	0
7	ABOVE NORTH FORK			983	645	244		9342	6484		23	6	0		0	0	7		157	1	14
8	ABOVE BEAVERSLIDE BRIDGE			1340	673	416		2126	2901		95	30	23		0	0	0		349	0	91
9	VAN FLEET SPUR (NORTH FORK)				600	254		1307	341			15	0			0	0			0	0
	WEIGHTED AVERAGE	189	159	890	537	477		4310	3534	28	44	17	23	7	31	3	10	0	105	2	15

Note: data in parenthesis are not used to compute weighted averages.

Source: Nawa, et al, 1992.

Table C-2
Summary of Snorkel Survey Results, 1982-1991
Salmonberry River, Oregon

#	REACH LOCATION	SEGMENT CLASS	DISTANCE SNORKELED (m)					WILSON RIVER FLOW (cfs)				
			1982	1983	1986	1990	1991	1982	1983	1986	1990	1991
1	BELOW BUICK CANYON	MAINSTEM COLLUVIAL CANYON	550					80				
2	ABOVE BUICK CANYON	MAINSTEM ALLUVIATED CANYON	687	687	687	687	687	80	344	72	95	100
3	SPEEDER SIDING	MAINSTEM ALLUVIATED CANYON			800					72		
4	BELOW SOUTH FORK	MAINSTEM COLLUVIAL CANYON			650	450	450			72	100	95
5	SOUTH FORK	TRIBUTARY COLLUVIAL CANYON					185					95
6	1 km BELOW NORTH FORK	MAINSTEM BEDROCK CANYON			800	350	350			72	100	97
7	ABOVE NORTH FORK	MAINSTEM COLLUVIAL CANYON			600	279	279			72	100	95
8	ABOVE BEAVERSLIDE BRIDGE	MAINSTEM BEDROCK CANYON			430	361	361			50	103	97
9	VAN FLEET SPUR (NORTH FORK)	TRIBUTARY COLLUVIAL CANYON				205	205				103	97

#	REACH LOCATION	STEELHEAD PARR/km					TROUT FRY/km			CUTTHROAT/km				0 AGE FALL CHINOOK/km				0 AGE COHO/km			
		1982	1983	1986	1990	1991	1983	1990	1991	1982	1986	1990	1991	1982	1986	1990	1991	1982	1986	1990	1991
1	BELOW BUICK CANYON	281								32				7				0			
2	ABOVE BUICK CANYON	116	159	418	(263)	406	(87)		2341	25	29	(4)	4		36	0	12		17	0	0
3	SPEEDER SIDING			510	(52)						21	(22)			91				54		
4	BELOW SOUTH FORK			989	247	604			5447		78	18	47		0	16	27		80	9	0
5	SOUTH FORK								1680				25				0				0
6	1 km BELOW NORTH FORK			1283	649	831			4567		41	11	60		31	0	9		81	0	0
7	ABOVE NORTH FORK			983	645	244		9342	6484		23	6	0		0	0	7		157	1	14
8	ABOVE BEAVERSLIDE BRIDGE			1340	673	416		2126	2901		95	30	23		0	0	0		349	0	91
9	VAN FLEET SPUR (NORTH FORK)				600	254		1307	341			15	0			0	0			0	0
	WEIGHTED AVERAGE	189	159	890	537	477		4310	3534	28	44	17	23	7	31	3	10	0	105	2	15

Note: data in parenthesis are not used to compute weighted averages.

Source: Nawa, et al, 1992.

Table B-3
Summary of the 1993 Summer Habitat Inventories
Salmonberry River Basin, Oregon

STREAM	REACH	LENGTH (mile)	GRADIENT	CHANNEL FORM*	LAND USE**	% SHADE	% BANK EROSION	TEMP °C	% UNDERCUT BANK	% FINES IN RIFFLES	% GRAVEL IN RIFFLES	LARGE BOULDERS #/100m
SALMONBERRY R.	1	3.7[1]	1.3	CH	RR/LT	69	0	12-15	0.4	19	28	52
SALMONBERRY R.	2	1.8[1]	1.2	CH	YT/LT	68	0	11-12	0.0	18	26	22
SALMONBERRY R.	3	2.9[1]	2.0	CH	ST	71	1	11	0.0	7	41	43
SALMONBERRY R.	4	4.3[1]	2.3	CH	ST	80	3	10	0.2	9	38	37
SALMONBERRY R.	5	1.8[2]	3.2	CH	ST	87	11	9	0.4	5	35	28
SALMONBERRY R.	6	2.9[2]	3.2	CH	LT/MT	95	1	11-13	2.5	33	28	42
NF SALMONBERRY R.	1	0.9[1]	4.9	CB	LT	83	0	12	0.1	10	27	47
NF SALMONBERRY R.	2	6.3[2]	2.7	CH	LT	87	1	11	0.1	4	44	49
NF SALMONBERRY R.	3	1.3[2]	1.4	TC	ST	94	1	14	1.3	11	68	0
NF S.R. TRIBUTARY 1	1	2.5[2]	11.2	CH	ST	72	2	--	---	23	40	28
NF S.R. TRIBUTARY 1A	1	0.5[2]	16.1	CH	ST	74	0	--	---	20	15	30
NF S.R. TRIBUTARY 2	1	0.8[2]	26.9	CH	ST	78	0	--	---	--	--	12

* CHANNEL FORM: CB=CONSTRAINED BY BEDROCK, CH=CONSTRAINED BY HILL SLOPE, TC=TERRACE CONSTRAINED

** LAND USE CODES: YT=YOUNG TIMBER, ST=SECOND GROWTH TIMBER, LT=LARGE TIMBER, MT=MATURE TIMBER, RR=RURAL RESIDENTIAL

1 STREAM WIDTH > 12 METERS

2 STREAM WIDTH < 12 METERS

Source: Moore, 1994; ODFW, 1993; Averill, 1993.

Table B-3 (cont.)
Summary of the 1993 Summer Habitat Inventories
Salmonberry River Basin, Oregon

STREAM	REACH	NUMBER POOLS	PERCENT POOLS	CHANNEL WIDTHS/ POOL	RESIDUAL POOL DEPTH (m)	WOOD DEBRIS PIECES #/100m	WOOD DEBRIS VOLUME (m^3)/100m	RIPARIAN TREES #/1000ft	RIPARIAN CONIFERS >20" DBH #/1000ft	RIPARIAN CONIFERS >35" DBH #/1000ft
SALMONBERRY R.	1	45	43	5	1.0	3	4	1244	0	0
SALMONBERRY R.	2	26	53	5	1.1	2	2	1414	37	18
SALMONBERRY R.	3	33	36	7	1.4	1	2	1140	55	0
SALMONBERRY R.	4	50	20	10	1.1	7	13	1170	18	0
SALMONBERRY R.	5	27	17	13	0.6	17	45	1676	61	0
SALMONBERRY R.	6	76	30	7	0.5	15	24	2164	110	0
NF SALMONBERRY R.	1	25	49	3	1.6	1	2	1500	0	0
NF SALMONBERRY R.	2	103	20	10	1.1	21	58	1201	0	0
NF SALMONBERRY R.	3	32	36	11	0.8	15	20	1268	18	0
NF S.R. TRIBUTARY 1	1	41	15	9	0.7	58	126	1414	0	0
NF S.R. TRIBUTARY 1A	1	2	8	92	0.5	88	122	3048	0	0
NF S.R. TRIBUTARY 2	1	0	0	--	---	71	139	6523	0	0

Sources: Moore, 1994; ODFW, 1993; Averill, 1993.

Figure B-1
Summary Habitat Descriptions, Overall and by Survey Reach
Salmonberry River, Oregon

General Description

The survey of the Salmonberry River began at the confluence with the Nehalem River and ended 600 meters (about 0.4 miles) above the Wheeler Pond Road, a total distance of 28,116 meters (about 17.5 miles). The valley floor is narrow with a moderate to steep v-shape. The stream channel is constrained by hillslopes. Streambank stability rates as "excellent" by the criteria set by Platts et al. (1983). Over 80% of the streambank surfaces are covered by vegetation or by boulders and cobble, or is bedrock material. Land use is a mix of rural residential and timber lands (young, second growth, large and mature stands). The average ground cover in the riparian zone includes shrubs (38%) and grasses and forbs (42%). Trees in the riparian zone averaged 75% hardwoods (mostly 15-50 centimeter (cm) diameter) and 25% conifers (mostly 15-50 cm diameter). The average canopy closure was 72%. Much of the stream is channelized by rip-rap from the adjacent Southern Pacific railroad tracks. Access to much of the stream is limited to the railroad tracks. Several ODFW spawning ground surveys are overlapped by the survey and are on major tributaries. Juvenile salmonids were noted throughout the survey. A probable fish migration barrier (a bedrock step 5 meters high and 50% slope) was noted approximately 26,000 meters (about 16.2 miles) from the mouth of the river.

Reach Descriptions

Reach 1: Reach 1 begins at the confluence with the Nehalem River and ends at the confluence of Preston Creek. The distance is 5,962 meters (about 3.7 miles). The valley is narrow with a moderate to steep v-shape. The stream channel is constrained by hillslopes. The average gradient was 1.3%. Scour pools dominated the wetted area of the reach (43%). Riffles and rapids made up 23% and 21%, respectively, of the wetted area habitat. Undercut banks were rare, less than 1% of the banks. Water temperature varied from 54.5°F to 59°F. Bank stability was high. There was no active bank erosion occurring. About 64% of stream banks were vegetation stabilized. Another 15% of the stream banks were non-erodible and 22% were covered with boulder and cobble. Land use is rural residential and large timber. Based on 5 transects, riparian ground cover was 26% shrubs and 64% grass and forbs. Riparian trees were a mixture of 82% hardwoods and 18% conifers mostly in the 3-50 cm diameter. The average canopy closure was 73%.

Reach 2: Reach 2 begins at the confluence of Preston Creek and ends at the confluence of the South Fork Salmonberry River. The distance is 2,915 meters (about 1.8 miles). The valley is narrow with a moderate to steep v-shape. The stream channel is constrained by hillslopes. The average gradient was 1.2%. Scour pools dominated the wetted area of the reach (53%). Riffles and rapids made up 19% and 18%, respectively, of the wetted area habitat. No undercut banks were found. Water temperature varied from 52°F to 54.5°F. Bank stability was high. There was no active bank erosion occurring. Almost 64% of stream banks were non-erodible. Another 25% of the stream banks were vegetation stabilized and 12% were covered by boulder and cobble. Land use is a mix of young and large timber. Based on 4 transects, riparian ground cover was 40% shrubs and 41% grass and forbs. Riparian trees were a mixture of 78% hardwoods and 22% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 62%.

Reach 3: Reach 3 begins at the confluence of S.Fk. Salmonberry River and ends at the confluence of the N.Fk. Salmonberry River. The distance is 4,677 meters (about 2.9 miles). The valley is narrow with a steep v-shape. The stream channel is constrained by hillslopes. The average gradient was 2.0%. Scour pools dominated the wetted area of the reach (36%). Riffles and rapids made up 15% and 30%, respectively, of the wetted area habitat. No undercut banks were found. Water temperature was constant at 52°F. Bank stability was high. There was less than 1% active bank erosion occurring. About 54% of stream banks were non-erodible. Another 19% of the stream banks were vegetation stabilized and 26% were covered by boulder and cobble. Land use is a mix of second growth and large timber. Based on 4 transects, riparian ground cover was 46% shrubs and 18% grass

and forbs. Riparian trees were a mix of 75% hardwoods and 25% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 71%.

Reach 4: Reach 4 begins at the confluence of N.Fk. Salmonberry River and ends at the confluence of Wolf Creek. The distance is 6,978 (about 4.3 miles). The valley is narrow with a moderate to steep v-slope. The stream channel is constrained by hillslopes. The average gradient was 2.3%. Rapids dominated the wetted area habitat (48%), with scour pools and riffles (20% and 17%, respectively) making up most of the remainder reach. Undercut banks were rare, less than 1% of the banks. Water temperature was constant at 50°F. Streambanks are stable, with about 3% active bank erosion occurring. Almost 40% of stream banks were vegetation stabilized. Another 39% of the stream banks were non-erodible and 18% are covered by boulder and cobble. Land use is a mix of second growth and large timber. Based on 7 transects, riparian ground cover was 51% shrubs and 22% grass and forbs. Riparian trees were a mix of 64% hardwoods and 36% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 67%.

Reach 5: Reach 5 begins at the confluence of Wolf Creek and ends at the confluence of Penoyer Creek. The distance is 2,859 meters (about 1.8 miles). The valley is narrow with a moderate v-shape. The stream channel is constrained by hillslopes. The average gradient was 3.2%. Rapids dominated the wetted area habitat (54%), with scour pools and dry habitat units (15% and 16%, respectively) making up most of the remainder reach. Dry habitat units are sections of the stream separating wet habitat units, such as riffles with subsurface flows or portions of side channels separated by large isolated pools. Undercut banks were rare, less than 1% of the banks. Water temperature was constant at 49°F. Streambanks are stable, with about 11% active bank erosion occurring. Almost 49% of stream banks were vegetation stabilized. Another 23% of the stream banks were non-erodible and 17% were covered by boulder and cobble. Land use is second growth timber. Based on 2 transects, riparian ground cover was 43% shrubs and 42% grass and forbs. Riparian trees were a mix of 84% hardwoods and 16% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 75%.

Reach 6: Reach 6 begins at the confluence of Penoyer Creek and ends about 600 meters (0.4 miles) above Wheeler Pond Road. The distance is 4,643 meters (about 2.9 miles). The valley is narrow with a moderate v-shape. The stream channel is constrained by hillslopes. The average gradient was 3.2%. Rapids dominated the wetted area habitat (30%), with riffles and cascades (19% and 17%, respectively) making up the remainder of the faster moving wet habitat. All pools made up 28% of the wetted area habitat. Undercut banks were uncommon, only 2.5% of the banks. Water temperature varied from 52°F to 55.5°F. Streambanks are stable, with about 1% active bank erosion occurring. About 78% of stream banks were vegetation stabilized. Another 12% of the stream banks were non-erodible and about 9% were covered by boulder and cobble. Land use is a mix of large and mature timber. Based on 8 transects, riparian ground cover was 19% shrubs and 70% grass and forbs. Riparian trees were a mix of 74% hardwoods and 26% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 85%.

Source; ODFW,1993.

Table B-3 (cont.)
Summary of the 1993 Summer Habitat Inventories
Salmonberry River Basin, Oregon

STREAM	REACH	NUMBER POOLS	PERCENT POOLS	CHANNEL WIDTHS/ POOL	RESIDUAL POOL DEPTH (m)	WOOD DEBRIS		RIPARIAN TREES	RIPARIAN CONIFERS	
						PIECES #/100m	VOLUME (m^3)/100m	#/1000ft	>20" DBH #/1000ft	>35" DBH #/1000ft
SALMONBERRY R.	1	45	43	5	1.0	3	4	1244	0	0
SALMONBERRY R.	2	26	53	5	1.1	2	2	1414	37	18
SALMONBERRY R.	3	33	36	7	1.4	1	2	1140	55	0
SALMONBERRY R.	4	50	20	10	1.1	7	13	1170	18	0
SALMONBERRY R.	5	27	17	13	0.6	17	45	1676	61	0
SALMONBERRY R.	6	76	30	7	0.5	15	24	2164	110	0
NF SALMONBERRY R.	1	25	49	3	1.6	1	2	1500	0	0
NF SALMONBERRY R.	2	103	20	10	1.1	21	58	1201	0	0
NF SALMONBERRY R.	3	32	36	11	0.8	15	20	1268	18	0
NF S.R. TRIBUTARY 1	1	41	15	9	0.7	58	126	1414	0	0
NF S.R. TRIBUTARY 1A	1	2	8	92	0.5	88	122	3048	0	0
NF S.R. TRIBUTARY 2	1	0	0	--	---	71	139	6523	0	0

Sources: Moore, 1994; ODFW, 1993; Averill, 1993.

and forbs. Riparian trees were a mix of 75% hardwoods and 25% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 71%.

Reach 4: Reach 4 begins at the confluence of N.Fk. Salmonberry River and ends at the confluence of Wolf Creek. The distance is 6,978 (about 4.3 miles). The valley is narrow with a moderate to steep v-slope. The stream channel is constrained by hillslopes. The average gradient was 2.3%. Rapids dominated the wetted area habitat (48%), with scour pools and riffles (20% and 17%, respectively) making up most of the remainder reach. Undercut banks were rare, less than 1% of the banks. Water temperature was constant at 50°F. Streambanks are stable, with about 3% active bank erosion occurring. Almost 40% of stream banks were vegetation stabilized. Another 39% of the stream banks were non-erodible and 18% are covered by boulder and cobble. Land use is a mix of second growth and large timber. Based on 7 transects, riparian ground cover was 51% shrubs and 22% grass and forbs. Riparian trees were a mix of 64% hardwoods and 36% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 67%.

Reach 5: Reach 5 begins at the confluence of Wolf Creek and ends at the confluence of Penoyer Creek. The distance is 2,859 meters (about 1.8 miles). The valley is narrow with a moderate v-shape. The stream channel is constrained by hillslopes. The average gradient was 3.2%. Rapids dominated the wetted area habitat (54%), with scour pools and dry habitat units (15% and 16%, respectively) making up most of the remainder reach. Dry habitat units are sections of the stream separating wet habitat units, such as riffles with subsurface flows or portions of side channels separated by large isolated pools. Undercut banks were rare, less than 1% of the banks. Water temperature was constant at 49°F. Streambanks are stable, with about 11% active bank erosion occurring. Almost 49% of stream banks were vegetation stabilized. Another 23% of the stream banks were non-erodible and 17% were covered by boulder and cobble. Land use is second growth timber. Based on 2 transects, riparian ground cover was 43% shrubs and 42% grass and forbs. Riparian trees were a mix of 84% hardwoods and 16% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 75%.

Reach 6: Reach 6 begins at the confluence of Penoyer Creek and ends about 600 meters (0.4 miles) above Wheeler Pond Road. The distance is 4,643 meters (about 2.9 miles). The valley is narrow with a moderate v-shape. The stream channel is constrained by hillslopes. The average gradient was 3.2%. Rapids dominated the wetted area habitat (30%), with riffles and cascades (19% and 17%, respectively) making up the remainder of the faster moving wet habitat. All pools made up 28% of the wetted area habitat. Undercut banks were uncommon, only 2.5% of the banks. Water temperature varied from 52°F to 55.5°F. Streambanks are stable, with about 1% active bank erosion occurring. About 78% of stream banks were vegetation stabilized. Another 12% of the stream banks were non-erodible and about 9% were covered by boulder and cobble. Land use is a mix of large and mature timber. Based on 8 transects, riparian ground cover was 19% shrubs and 70% grass and forbs. Riparian trees were a mix of 74% hardwoods and 26% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 85%.

Source; ODFW,1993.

Figure B-2
Summary Habitat Descriptions, Overall and by Survey Reach
North Fork Salmonberry River, Oregon

General Description

The N.Fk. Salmonberry River survey began at the confluence of the N.Fk. Salmonberry River and the Salmonberry River and ended 13,709 meters (about 8.5 miles) upstream at a road crossing near Camp Olsen. The valley floor varies from narrow with moderate to steep v-shape in the lower 85% of the stream, to broad and a terrace constrained stream at the upper end of the survey. Streambank stability rates as "excellent" by the criteria set by Platts et al. (1983). Over 80% of the streambank surfaces are covered by vegetation or by boulders and cobble, or is bedrock material. Land use is a mix of second growth and large timber. The average ground cover in the riparian zone includes shrubs (29%) and grasses and forbs (57%). Trees in the riparian zone averaged 68% hardwoods and 32% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 74%. Access to much of the stream is limited to the system of old logging roads. Several ODFW spawning ground surveys are overlapped by this survey. Fish were observed well into the upper survey area.

Reach Description

Reach 1: Reach 1 begins at the confluence with the Salmonberry River and ends 1,533 meters (about 1 mile) upstream when the steep bedrock canyon ends. The valley is narrow with a moderate v-shape. The stream channel is constrained by bedrock. The average gradient was 4.9%. Rapids and scour pool habitat types (37% and 49%, respectively) dominated the wetted area of the reach. Undercut banks were rare, less than 1% of the banks. Water temperature was constant at 53.5°F. Bank stability was high. There was no active bank erosion occurring. Almost 90% of stream banks were non-erodible. Land use is large timber. Based on 4 transects, riparian ground cover was 6% shrubs and 62% grass and forbs. Riparian trees were a mixture of 93% hardwoods and 7% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 69%.

Reach 2: Reach 2 begins 1,533 meters from the mouth of the N.Fk. Salmonberry River (where the steep bedrock canyon ends) and continues for 10,156 meters (about 6.3 miles) upstream, where the valley begins to broaden. The valley is narrow with steep v-shape. The stream channel is constrained by hillslopes. The average gradient was 2.7%. Rapids, scour pools, glide and riffle habitat types (38%, 19%, 17% and 16% respectively) dominated the wetted area of the reach. Undercut banks were rare, less than 1% of the banks. Water temperature was constant at 52°F. Streambanks are stable, with 1% active bank erosion occurring. Almost 46% of stream banks were non-erodible. Another 44% of the stream banks were vegetation stabilized. A massive debris jam was located about 5,000 meters (3.1 miles) into the reach. Land use is large timber. Land use is large timber. Based on 12 transects, riparian ground cover was 33% shrubs and 55% grass and forbs. Riparian trees were a mixture of 67% hardwoods and 33% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 70%.

Reach 3: Reach 3 begins 11,689 meters (about 7.3 miles) from the mouth of the N.Fk. Salmonberry River (where the valley begins to broaden) and continues for 2,020 meters (about 1.3 miles) upstream at a road crossing near Camp Olsen. The valley is broad. The stream channel is constrained by terraces. The average gradient was 1.4%. Slower moving habitat types such as backwater and dammed pools, scour pools and glides (13%, 22% and 34% respectively) dominated the wetted area of the reach. Riffles made up 19% of the wetted area habitat. Undercut banks were uncommon, only 1.3% of the banks. Water temperature was constant at 57°F. Bank stability was high. There was less than 1% active bank erosion occurring. Almost 96% of stream banks were vegetation stabilized. Another 4% of the stream banks were non-erodible. Land use is second growth timber. Based on 4 transects, riparian ground cover was 24% shrubs and 63% grass and forbs. Riparian trees were a mixture of 58% hardwoods and 42% conifers mostly in the 3-50 cm diameter range. The average canopy closure was 95%.

Source: Averill, 1993.

Table B-4
Aquatic Habitat Area and Percent of Wetted Area, By Reach
Salmonberry River, Oregon

HABITAT GROUP	Reach 1 Wetted Area		Reach 2 Wetted Area		Reach 3 Wetted Area	
	m²	Percent	m²	Percent	m²	Percent
Dammed & Backwater Pools	0	0.0	16	0.0	132	0.2
Scour Pools	39942	43.4	20169	52.7	22382	35.9
Glides	7584	8.2	2620	6.9	5122	8.2
Riffles	21479	23.4	7227	18.9	9298	14.9
Rapids	19405	21.1	7055	18.4	18887	30.3
Cascades	702	0.8	737	1.9	5424	8.7
Step/Falls	1358	1.5	424	1.1	1094	1.8
Dry	1487	1.6	0	0.0	0	0.0
TOTAL	91957	100.0	38248	100.0	62339	100.0

HABITAT GROUP	Reach 4 Wetted Area		Reach 5 Wetted Area		Reach 6 Wetted Area	
	m²	Percent	m²	Percent	m²	Percent
Dammed & Backwater Pools	179	0.3	211	1.5	2530	12.0
Scour Pools	12444	20.2	2106	15.2	3299	15.7
Glides	4990	8.1	402	2.9	658	3.1
Riffles	10371	16.8	67	0.5	3937	18.7
Rapids	29682	48.1	7539	54.3	6450	30.7
Cascades	1805	2.9	1290	9.3	3586	17.0
Step/Falls	1245	2.0	35	0.3	316	1.5
Dry	1025	1.7	2223	16.0	263	1.3
TOTAL	61741	100.0	13873	100.0	21039	100.0

HABITAT GROUP	TOTAL Wetted Area	
	m²	Percent
Dammed & Backwater Pools	3068	1.1
Scour Pools	100342	34.7
Glides	21376	7.4
Riffles	52379	18.1
Rapids	89018	30.8
Cascades	13544	4.7
Step/Falls	4472	1.5
Dry	4998	1.7
TOTAL	289197	100.0

Source: ODFW Aquatic Inventory Project, 1993.

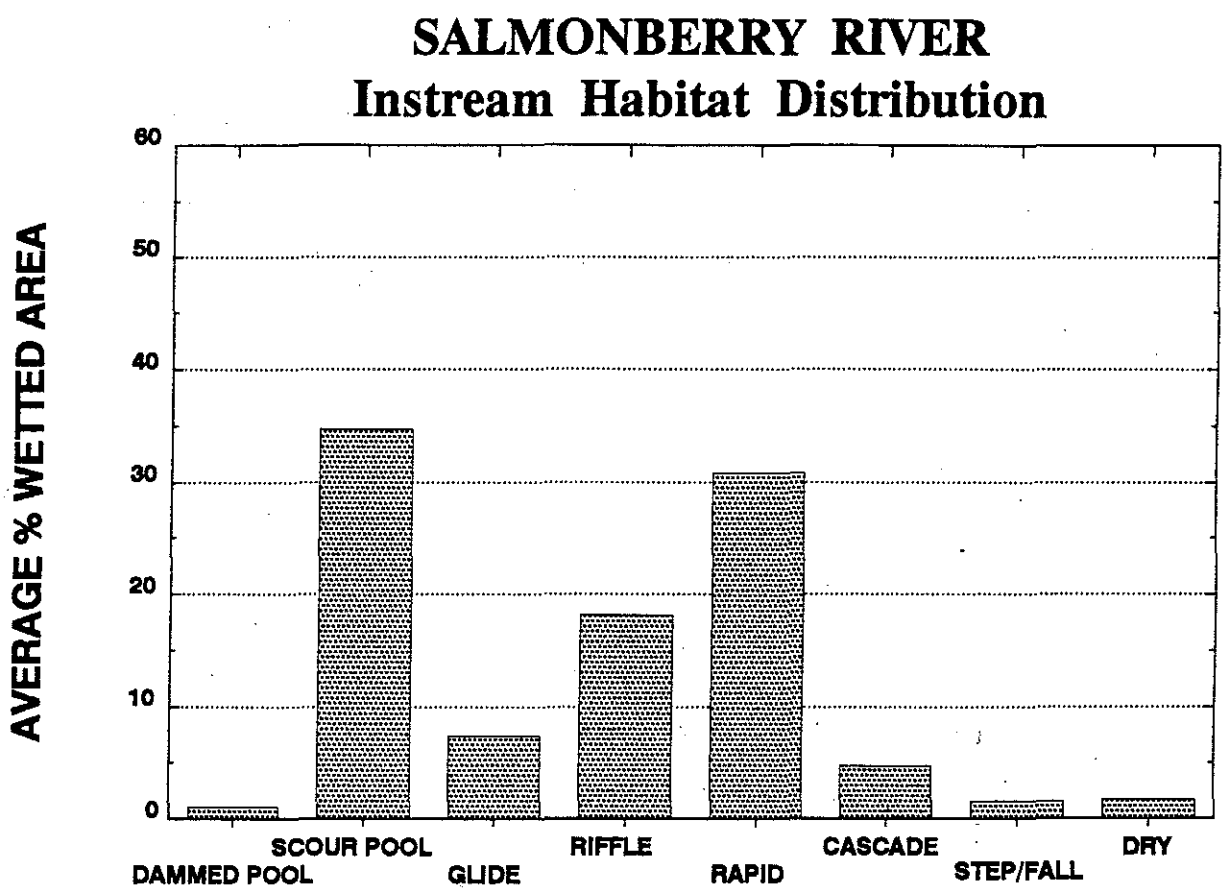
Table B-5
Aquatic Habitat Area and Percent of Wetted Area, by Reach
North Fork Salmonberry River, Oregon

HABITAT GROUP	Reach 1 Wetted Area		Reach 2 Wetted Area		Reach 3 Wetted Area	
	m^2	Percent	m^2	Percent	m^2	Percent
Dammed & Backwater Pools	37	0.3	592	1.0	849	13.3
Scour Pools	6237	48.5	11095	18.6	1425	22.4
Glides	858	6.7	10325	17.3	2178	34.2
Riffles	856	6.7	9683	16.2	1223	19.2
Rapids	4711	36.6	22801	38.2	472	7.4
Cascades	42	0.3	5024	8.4	0	0.0
Step/Falls	130	1.0	161	0.3	28	0.4
Small Streams	0	0.0	0	0.0	191	3.0
Dry	0	0.0	0	0.0	0	0.0
TOTAL	12871	100.0	59681	100.0	6366	100.0

HABITAT GROUP	TOTAL Wetted Area	
	m^2	Percent
Dammed & Backwater Pools	1478	1.9
Scour Pools	18757	23.8
Glides	13361	16.9
Riffles	11762	14.9
Rapids	27984	35.5
Cascades	5066	6.4
Step/Falls	319	0.4
Small Streams	191	0.2
Dry	0	0.0
TOTAL	78918	100.0

Source: ODFW Aquatic Inventory Project Report, 1993.

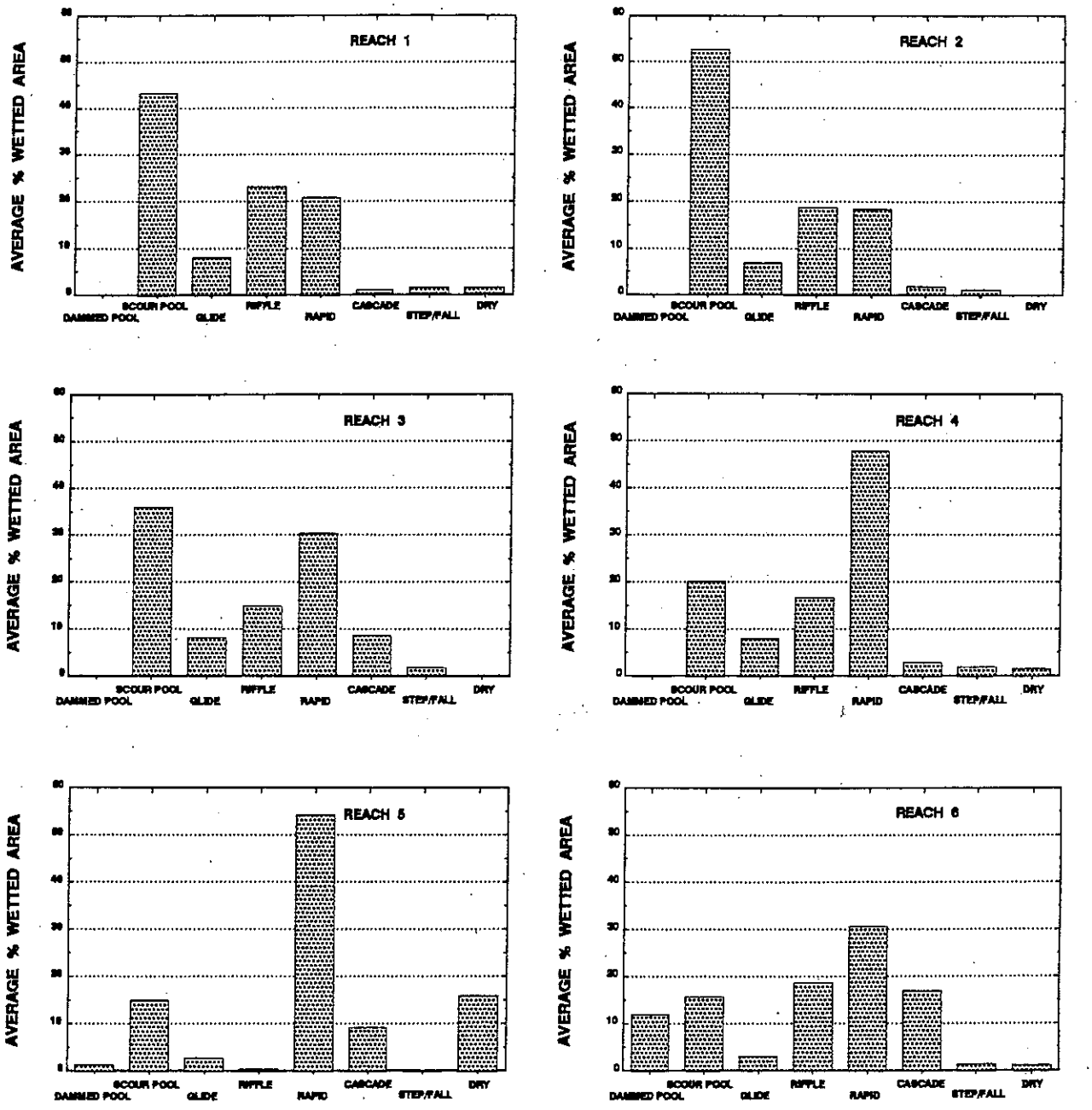
Figure B-3
Instream Habitat Distribution
Salmonberry River, Oregon



Note: Measured as percentage of wetted area.

Source: ODFW, 1993.

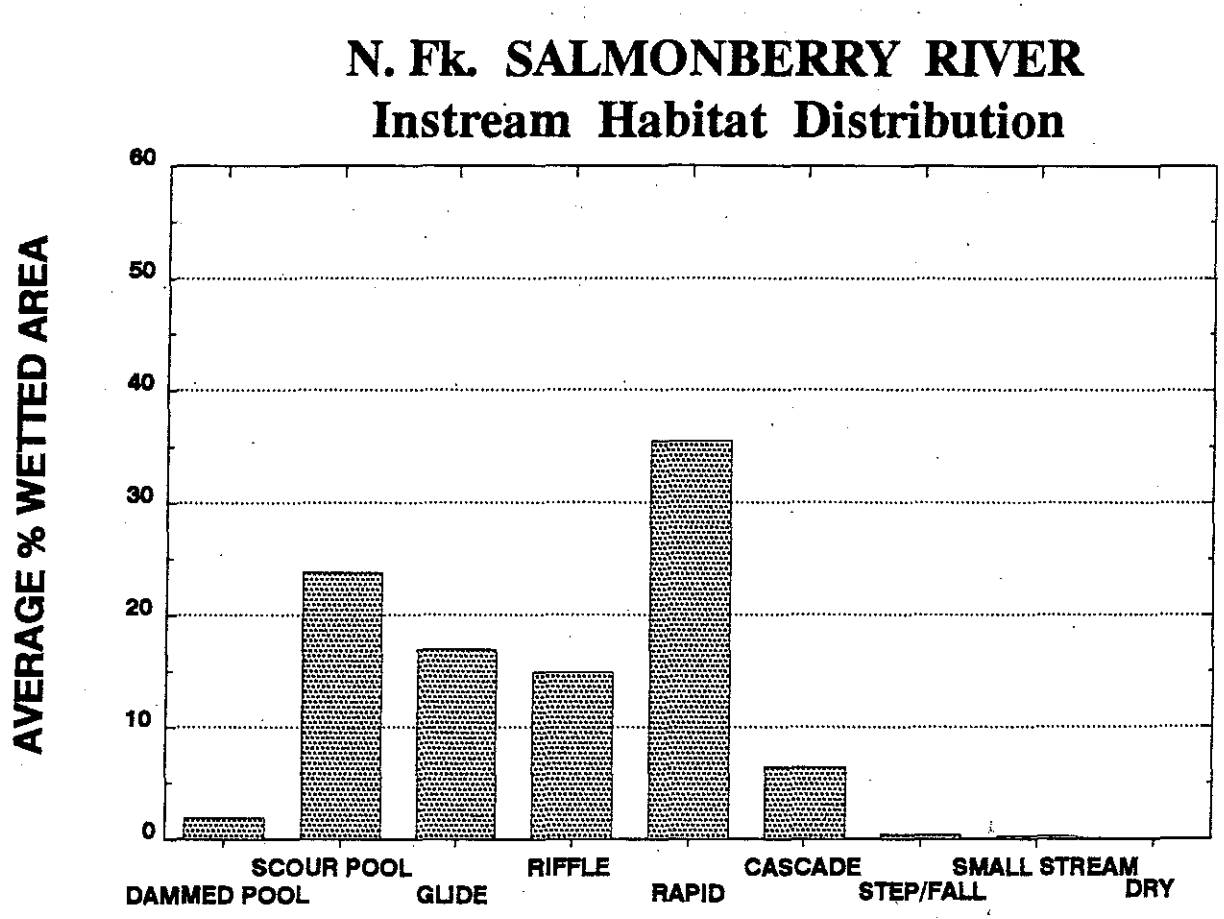
Figure B-4
Instream Habitat Distribution, by Reach
Salmonberry River, Oregon



Note: Measured as percentage of wetted area

Source: ODFW, 1993.

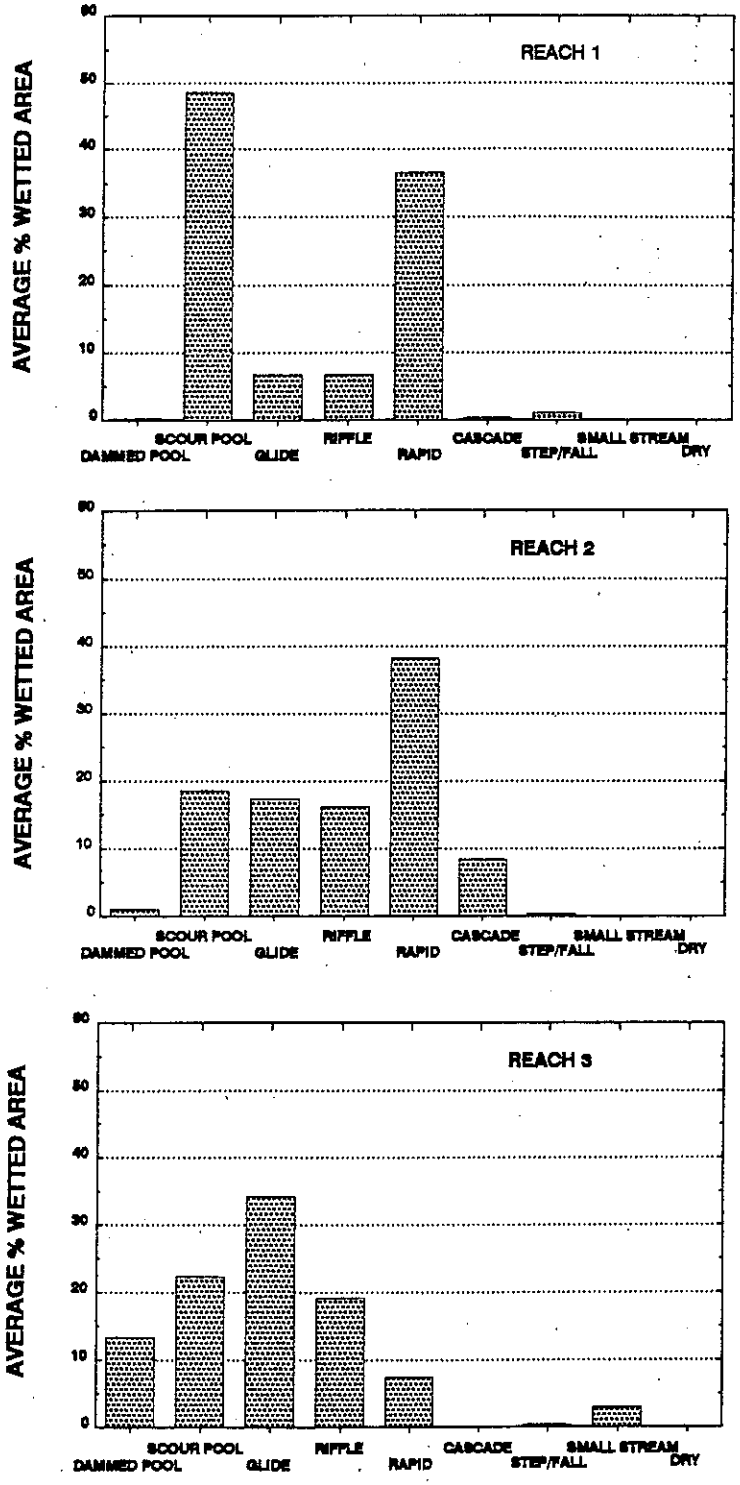
Figure B-5
Instream Habitat Distribution
North Fork Salmonberry River, Oregon



Note: Measured as percentage of wetted area.

Source: Averill, 1993.

Figure B-6
Instream Habitat Distribution, by Reach
North Fork Salmonberry River, Oregon



Note: Measured as percentage of wetted area.

Source: Averill, 1993.

Table B-6
ODFW Summer Habitat "Benchmarks"

	POOR	GOOD
POOLS		
POOL AREA (%)	<10	>35
POOL FREQUENCY (Channel Widths)	>20	<8
RESIDUAL POOL DEPTH		
LOW GRADIENT - SMALL	<0.2	>0.5
HIGH GRADIENT - LARGE	<0.5	>1.0
RIFFLES		
WIDTH/DEPTH RATIO		
EASTSIDE	>30	<10
WESTSIDE	>30	<15
SILT-SAND-ORGANICS (% AREA)		
NORTHWEST/COLUMBIA	>25	<10
NORTHEAST	>20	<8
CENTRAL/SOUTHEAST	>25	<12
SOUTHWEST	>15	<5
GRAVEL (% AREA)	<15	>35
SHADE (Reach Average, Percent)		
STREAM WIDTH <12 METERS		
WESTSIDE	<70	>75
NORTHEAST	<60	>70
CENTRAL/SOUTHEAST	<40	>50
STREAM WIDTH >12 METERS		
WESTSIDE	<55	>60
NORTHEAST	<40	>60
CENTRAL/SOUTHEAST	<30	>40
LARGE WOODY DEBRIS (15cm x 3m minimum piece size)		
PIECES/100m STREAM LENGTH	<10	>20
VOLUME (m^3)/100m STREAM LENGTH	<20	>30
RIPARIAN CONIFERS (30m from both sides of channel)		
NUMBER > 20in dbh/1000ft STREAM LENGTH	<150	>300
NUMBER > 35in dbh/1000ft STREAM LENGTH	<75	>200

Source: Moore, 1994.

Table A-1
THE SALMONBERRY AREA THROUGH TIME

Pre-15,000 BC:

Saddle Mountain serves as refuge during the early Ice Age. Plants and animals survive here that are eliminated at lower elevations.

15,000-4,000 BC:

Continental glaciers retreat. Coastal climate shifts from cool and moist to warm and dry (due to more remote influence of glacation), then experiences accelerated warming. Earliest signs of human habitation are 9,000 BC in Lower Columbia area and 8,000 BC in the Willamette Valley.

600 AD:

Earliest known habitation of North Oregon Coast. Period structures include remains of a cedar house constructed on a beach terrace.

1,400-1800s:

Clatsop Indians (a division of Chinook) inhabit the Oregon coast from the Columbia River south approximately 30 miles. Nehalem Indians (of the Tillamook) inhabit coast from the southern boundary of Clatsop south for 40-miles including Nehalem River and Bay.

1670s: As told by Indians living in the Nehalem Valley at the time, sailors from a beeswax transport ship wreck off the Coast and bury "treasure" on the slopes of Neah-Kah-Nie Mountain.

1770s: Spanish explorer, Heceta, sights the mouth of the Columbia, but travels on. Assistant to George Vancouver is first to explore and map the lower 100 miles of the Columbia River. Robert Gray (a fur trader from Boston) is first American to explore the lower Columbia.

1780s: Small pox epidemic occurs in Oregon country, decimating a large proportion of the native population. Maritime fur trade is active, with traders bartering with Clatsop and Chinook Indians for furs. Mariners create first "maps" of the Oregon coast and record encounters with Indian natives.

1800s: Lewis and Clark travel cross-continent recording information about resources, natives, navigatibility and terrain.

1820s: Hudson's Bay Company becomes owner of Fort Astoria. Many of those attracted to Oregon's fur trade settle in the area, beginning Oregon's agricultural industry.

1830s: Disease epidemics (thought by many to be malaria) sweep through Oregon, including Lower Columbia and Oregon coastal areas. Missionaries travel west and send back glowing reports of Oregon weather and resources.

1840s: Oregon Treaty gives the U.S. sovereignty over Oregon country. Many Indian bands cede land to the U.S. government. Emigration to the Oregon country is steady; 3,000 cross the Oregon Trail in 1845. Saddle Mountain is named by Wilkes (The Indian name for the mountain was Swallalahoost. Legend tells of a great chief killed by enemies becoming an eagle and creating thunder and lightning here).

1850s: Indian treaty completed with the U.S.. Most tribes have ceded lands to the U.S. government and are being relocated to reservations. "Coast" (Siletz) reservation set up intended to house Willamette Valley, North Coast and Southwest Oregon Indians. The original reservation extended from the Salmon River south to Alsea, and from the Coast Range crest west to the sea. (Future years saw removal of large tracts of land from the reservation; less than four percent of the original extent remained by the late 19th century). The decade saw steady arrivals of overland emigrants to Oregon, primarily to the interior valley.

Table A-1 (cont.)
THE SALMONBERRY AREA THROUGH TIME

1850s (cont.):
White settlement begins in the Tillamook area. Tillamook County is created by territorial legislature. Connections to the interior include a treacherous trail around Neahkahnie Mountain, or a route directly east along the Nestucca River. Preston's "Map of Oregon" shows the Salmonberry "Creek" in the Coast Range. Wilson River is renamed (from Georgie or Georgia River), in honor of the "father" of the County's dairy industry.

1860s: Civil war begins. The U.S. Army withdraws experienced soldiers from coastal forts.

1870s: Many white families move into the Tillamook area; some via the coast trail, most via the Trask River Road. Homesteads are "stump farms" from which families eke out a living, supplementing incomes by peeling cascara bark, picking foxglove for medicinal sales or cutting ferns to sell to urban florists.

1890s: Wilson River Toll (Wagon) Road constructed as a mail and freight route for homesteaders between Gale's Creek and Tillamook. Cheese factories bring some economic stability to the Oregon coastal area.

1900s: T.B. Potter begins developing "Bayocean" including 4000 lots, hotel, recreation center/natatorium, docks, railroads, telephone system and boat transport to Portland. Wilson River Toll Road is closed over a toll dispute. Logging and sawmilling come to Tillamook Bay. Planning begins for the Pacific Navigation Railway (PN&R) (known by those involved in constructing it as the "Punk, Nasty and Rotten" line due to the difficulties of constructing this route; 9 tunnels and 11 river crossings in the Salmonberry alone). PN&R line is sold to Southern Pacific. Foresters conduct the Salmonberry's first official timber cruise.

1910s: Southern Pacific's "Tillamook Branch" rail line becomes operational. The Salmonberry section is the northernmost of SP's system. Marketed as the "Sun Break Special", the rail route along the Salmonberry brings tourists from interior valleys to coastal vacation spots. Logging camps and/or small mills begin to spring up at nearly every siding and many logging railroads are extended into the woods from the main Tillamook Branch. Stops along the Salmonberry included: Salmonberry, Buick, Belfort, Preston, Killen, Enright, Creekside, Edwards, Belding, Mayo, Hillburn and Cochran. The town of Timber supported a roundhouse, hotel, bar, restaurant, store, rooming house and repair center.

1920s: Salmonberry post office is established. Several logging camps and timbering operations thrive in the Salmonberry. Enright consists of residences, a cookhouse, train depot, train turntable, a depot, and two logging spurs. Cochran contains the Wheeler mill, a turntable, living quarters and four different harvesting spurs.

1930s: Heavy logging in the Salmonberry starts to decline, as the depression sets in.

1932: Logging practices ignite vegetation in the Wolf Creek drainage and the resulting "Salmonberry-Cochran" fire burns _acres (_percent) of the Salmonberry drainage. Cochran, then a flourishing lumber town, is completely destroyed by fire. The "Cox" fire burns _acres near_.

1933: Logging operations in Gales Creek ignite the first fire of the "Tillamook Burn" which consumes 240,000 acres. Considered at the time to be the "worst fire in logging history" the fire "blew up" on August 24 resulting in ashes falling on ships 500 miles at sea, two feet of ashes on beaches as distant as 30 miles, firebrands dropping in Forest Grove and smoke carried as far inland as Reno, Nevada.

Table A-1 (cont.)
THE SALMONBERRY AREA THROUGH TIME

1930s (cont.):
Salvage operations are undertaken in almost every drainage burned by the 1932 and 1933 fires. Trans-Coast Range highways are built and passenger traffic on trains starts to decline leading to mixed (passenger/forest products) trains. The "Little Baldwin" trestle collapses in the Salmonberry, killing five, and is rebuilt in nine days.

Tillamook County predicts loss of half its total tax revenues due to timber lost in the burn. Over 125,000 acres of Burn area is considered "unsalvageable" and abandoned to the County. Remaining areas are "salvaged" with a focus on trees/snags 24" in diameter and larger.

1940s: Wilson River Highway replaces Toll Road. Hangars are built in Tillamook to house the blimp squadron formed in response to threat are submarines in early WWII. Regional logging activity is accelerated to supply wood for the war effort. A Japanese plane drops incendiary bombs in the Tillamook Burn area. This decade saw major roadbuilding activity and snag harvest on State Forest lands.

1945: Logging practices ignite vegetation in the North Fork Salmonberry drainage. The "Salmonberry Fire" burns _ acres to the south and west eventually meeting the "Wilson Fire" burning from the south. The Salmonberry fire destroyed logging camps and damaged train tunnels and trestles.

Salvage logging operations become the mainstay of the Tillamook Branch Railroad. State aquisitions of tax-foreclosed lands begins. The rehabilitation program is inaugurated in 1949, including a constitutional amendment authorizing a bonding program to fund Burn rehabilitation. Roger's Peak is named for Nelson S. Rogers, Oregon State Forester from 1940-1949, who played a prominent role in the rehabilitation of the Tillamook Burn.

1950s: Intensive salvage logging hampers early reforestation efforts. An inmate camp is established on the South Fork Wilson River; crews provide labor for Burn rehabilitation efforts. "Snag free" corridors #7 and #8 are constructed along the southern edge of the Salmonberry drainage (Buck Mountain and east). Passenger service is discontinued on Tillamook Branch line. Ocean currents turn Bayocean peninsula into an island. Fire break harvests, roadbuilding, reforestation and fire hazard reduction efforts are in full swing throughout the Burn area. Civic groups, garden clubs, scout troops and school groups participate in tree planting in the Burn area. Agencies first use of helicopters for aerial seeding. Demand for timber begins to wane as the post-war building boom stabilizes. Mills in Tillamook, Garibaldi and Banks begin to receive logs by truck, and railroad emphasis shifts from raw logs to finished lumber, then wood chips. Cochran rail turntable is removed.

1960s: Last house in Bayocean washes into the sea. Reforestation efforts wind down in the late 60s, and recreation uses and demands lead to construction of several "forest camps" in the Burn area. Tillamook blimp hangars become shelters for sawmill operations.

1970s: State conducts last large salvage sale of Tillamook Burn snags. Tillamook State Forest dedicated by Governor Tom McCall. Construction of Forest Camps continues. Tillamook Burn reforestation efforts are complete, covering 325 square miles and using 72 million seedlings.

1980s: Smaller mills in outlying areas are forced to close or consolidate because of changing economic conditions resulting in fewer shippers and a decrease in railroad traffic. Southern Pacific notes intent to lease, sell or abandon the Tillamook branch line. Commercial thinning of reforested Burn area begins.

Table A-1 (cont.)
THE SALMONBERRY AREA THROUGH TIME

1990s: The State Legislature passes HB 2501, directing the preparation of a comprehensive recreation management plan for the Tillamook State Forest. Rail line from Scheffiin to Tillamook is sold to the Port of Tillamook Bay. Oregon Department of Forestry initiates two-year planning effort to develop a management plan for the Northwest State Forests (Tillamook, Clatsop, and Santiam).

Sources: McCeshney 1969; McArthur, 1974; Minor, et al, 1980; Austin, 1987; Northwest Rail Museum, 1990; Frick, 1994: Balfour, 1994.

APPENDIX C

SUPPLEMENTAL WILDLIFE INFORMATION

Table C-1 lists wildlife species that might occur within the Salmonberry watershed under various (existing and potential) habitat conditions (not based on actual sightings). Listed are the ODFW species identification code, common name, scientific name, ODFW management status, and types of habitats likely to be used.

Table C-1
Expected Wildlife Species
Salmonberry Watershed

SPECIES' COMMON NAME	SPECIES' SCIENTIFIC NAME	ODFW STATUS	HABITATS
NORTHWESTERN SALAMANDER	AMBYSTOMA GRACILE	UNCLASSIFIED	AQUATIC TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
...NG-TOED SALAMANDER	AMBYSTOMA MACRODACTYLUM		UNCLASSIFIED AQUATIC TERRESTRIAL RIPARIAN
COPE'S GIANT SALAMANDER	DICAMPTODON COPEI	STATE SENS. - CRITICAL NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
PACIFIC GIANT SALAMANDER	DICAMPTODON TENEBROSUS	UNCLASSIFIED	AQUATIC TERRESTRIAL RIPARIAN
	FOSSORIAL		OLD GROWTH-COAST RANGE
OLYMPIC SALAMANDER	RHYACOTRITON OLYMPICUS	STATE SENS. - VULNERABLE NONGAME-PROTECTED	AQUATIC TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
CLOUDED SALAMANDER	ANEIDES FERREUS	STATE SENS. - CRITICAL NONGAME-PROTECTED	TERRESTRIAL OLD GROWTH-COAST RANGE
ENSATINA	ENSATINA ESCHSCHOLTZII	UNCLASSIFIED	TERRESTRIAL FOSSORIAL OLD GROWTH-COAST RANGE
DUNN SALAMANDER	PLETHODON DUNNI	UNCLASSIFIED	TERRESTRIAL OLD GROWTH-COAST RANGE
...ED-BACKED SALAMANDER	PLETHODON VEHICULUM	UNCLASSIFIED	TERRESTRIAL OLD GROWTH-COAST RANGE

ROUGH-SKINNED NEWT	TARICHA GRANULOSA	UNCLASSIFIED	AQUATIC TERRESTRIAL RIPARIAN FOSSORIAL OLD GROWTH-COAST RANGE
W. TOAD	BUFO BOREAS	UNCLASSIFIED	AQUATIC TERRESTRIAL RIPARIAN FOSSORIAL
PACIFIC TREEFROG	PSEUDACRIS REGILLA	UNCLASSIFIED	AQUATIC TERRESTRIAL RIPARIAN FOSSORIAL
TAILED FROG	ASCAPHUS TRUEI	STATE SENS. - VULNERABLE NONGAME-PROTECTED	AQUATIC TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
RED-LEGGED FROG	RANA AURORA	FEDERAL CATEGORY 2 STATE SENS. - UNDET. NONGAME-PROTECTED	AQUATIC TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
BULLFROG	RANA CATESBEIANA	GAME (CONSUMPTIVE RECREAT.) INTRODUCED	AQUATIC RIPARIAN
SPOTTED FROG	RANA PRETIOSA	FEDERAL CATEGORY 2 STATE SENS. - CRITICAL NONGAME-PROTECTED	AQUATIC TERRESTRIAL RIPARIAN
W. POND TURTLE	CLEMMYS MARMORATA	FEDERAL CATEGORY 2 STATE SENS. - CRITICAL NONGAME-PROTECTED	AQUATIC TERRESTRIAL RIPARIAN
N. ALLIGATOR LIZARD	ELGARIA COERULEA	UNCLASSIFIED	TERRESTRIAL
W. SKINK EUMECES	SKILTONIANUS	UNCLASSIFIED FOSSORIAL	TERRESTRIAL
RUBBER BOA		CHARINA BOTTAE	UNCLASSIFIED TERRESTRIAL FOSSORIAL
RACER	COLUBER CONSTRICTOR	UNCLASSIFIED	TERRESTRIAL FOSSORIAL
SHARPTAIL SNAKE	CONTIA TENUIS	STATE SENS. - CRITICAL NONGAME-PROTECTED	TERRESTRIAL RIPARIAN FOSSORIAL
GOPHER SNAKE	PITUOPHIS MELANOLEUCUS	UNCLASSIFIED	TERRESTRIAL FOSSORIAL
W. TERRESTRIAL GARTER SNAKE	THAMNOPHIS ELEGANS	UNCLASSIFIED	TERRESTRIAL RIPARIAN
NORTHWESTERN GARTER SNAKE	THAMNOPHIS ORDINOIDES	UNCLASSIFIED	AQUATIC TERRESTRIAL RIPARIAN

COMMON GARTER SNAKE	THAMNOPHIS SIRTALIS	UNCLASSIFIED	TERRESTRIAL RIPARIAN
MARBLED MURRELET	BRACHYRAMPHUS MARMORATUS		FEDERAL CATEGORY 2 AQUATIC
		STATE SENS. - CRITICAL FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL OLD GROWTH-COAST RANGE
BLUE GROUSE	DENDRAGAPUS OBSCURUS	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL OLD GROWTH-COAST RANGE
RUFFED GROUSE	BONASA UMBELLUS	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
CALIFORNIA QUAIL	CALLIPEPLA CALIFORNICA	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN
MOUNTAIN QUAIL	OREORTYX PICTUS	FEDERAL CATEGORY 2 GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL
COMMON MERGANSER	MERGUS MERGANSER	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL RIPARIAN
HOODED MERGANSER	LOPHODYTES CUCULLATUS	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL RIPARIAN
MALLARD	ANAS PLATYRHYNCHOS	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL RIPARIAN
GADWALL	ANAS STREPERA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
AMERICAN WIGEON	ANAS AMERICANA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
GREEN-WINGED TEAL	ANAS CRECCA	GAME (CONSUMPTIVE RECREAT.) FEDERAL MIGRATORY	AQUATIC TERRESTRIAL
BLUE-WINGED TEAL	ANAS DISCORS	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
CINNAMON TEAL	ANAS CYANOPTERA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
N. SHOVELER	ANAS CLYPEATA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL

N. PINTAIL	ANAS ACUTA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
WOOD DUCK	AIX SPONSA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL RIPARIAN
BARROW'S GOLDENEYE	BUCEPHALA ISLANDICA	STATE SENS.-PERIPHERAL/RARE FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
BUFFLEHEAD	BUCEPHALA ALBEOLA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	STATE SENS.-PERIPHERAL/RARE AQUATIC TERRESTRIAL
HARLEQUIN DUCK	HISTRIONICUS HISTRIONICUS	FEDERAL CATEGORY 2 STATE SENS.-PERIPHERAL/RARE FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL RIPARIAN
RUDDY DUCK	OXYURA JAMAICENSIS	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
CANADA GOOSE	BRANTA CANADENSIS	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL RIPARIAN
GREAT BLUE HERON	ARDEA HERODIAS	FEDERAL MIGRATORY NONGAME-PROTECTED	AQUATIC TERRESTRIAL RIPARIAN
GREAT EGRET	CASMERODIUS ALBUS	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
SNOWY EGRET	EGRETTA THULA	FEDERAL MIGRATORY NONGAME-PROTECTED STATE SENS. - VULNERABLE	AQUATIC TERRESTRIAL RIPARIAN
GREEN-BACKED HERON	BUTORIDES STRIATUS	FEDERAL MIGRATORY NONGAME-PROTECTED	RIPARIAN AQUATIC
BLACK-CROWNED NIGHT HERON	NYCTICORAX NYCTICORAX	FEDERAL MIGRATORY NONGAME-PROTECTED	AQUATIC RIPARIAN
AMERICAN COOT	FULICA AMERICANA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL
WILSON'S PHALAROPE	PHALAROPUS TRICOLOR	FEDERAL MIGRATORY NONGAME-PROTECTED	AQUATIC TERRESTRIAL
COMMON SNIPE	CAPELLA GALLINAGO	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	AQUATIC TERRESTRIAL

KILLDEER	CHARADRIUS VOCIFERUS	FEDERAL MIGRATORY NONGAME-PROTECTED	AQUATIC TERRESTRIAL
BAND-TAILED PIGEON	COLUMBA FASCIATA	FEDERAL MIGRATORY GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
MOURNING DOVE	ZENAIDA MACROURA	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN
TURKEY VULTURE	CATHARTES AURA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
BLACK-SHOULDERED KITE	ELANUS CAERULEUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
N. HARRIER	CIRCUS CYANEUS	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL
SHARP-SHINNED HAWK	ACCIPITER STRIATUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
COOPER'S HAWK	ACCIPITER COOPERII	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
N. GOSHAWK		ACCIPITER GENTILIS STATE SENS. - CRITICAL FEDERAL MIGRATORY	NONGAME-PROTECTED TERRESTRIAL RIPARIAN
RED-TAILED HAWK	BUTEO JAMAICENSIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
ROUGH-LEGGED HAWK	BUTEO LAGOPUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
FERRUGINOUS HAWK	BUTEO REGALIS	FEDERAL CATEGORY 2 STATE SENS. - CRITICAL NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
GOLDEN EAGLE	AQUILA CHRYSAETOS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
BALD EAGLE		HALIAEETUS LEUCOCEPHALUS STATE THREATENED FEDERAL MIGRATORY NONGAME-PROTECTED	FEDERAL THREATENED AQUATIC TERRESTRIAL RIPARIAN
GYRFALCON		FALCO RUSTICOLUS FEDERAL MIGRATORY	NONGAME-PROTECT. TERRESTRIAL
PRAIRIE FALCON	FALCO MEXICANUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
PEREGRINE FALCON	FALCO PEREGRINUS	FEDERAL ENDANGERED STATE ENDANGERED FEDERAL MIGRATORY NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL

MERLIN	FALCO COLUMBARIUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
AMERICAN KESTREL	FALCO SPARVERIUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
OSPREY	PANDION HALIAETUS	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
BARN OWL	TYTO ALBA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
LONG-EARED OWL	ASIO OTUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
SHORT-EARED OWL	ASIO FLAMMEUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
SPOTTED OWL	STRIX OCCIDENTALIS	FEDERAL MIGRATORY FEDERAL THREATENED STATE THREATENED NONGAME-PROTECTED	TERRESTRIAL OLD GROWTH-COAST RANGE
N. SAW-WHET OWL	AEGOLIUS ACADICUS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
W. SCREECH-OWL	OTUS KENNICOTTII	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
GREAT-HORNED OWL	BUBO VIRGINIANUS NONGAME-PROTECTED	FEDERAL MIGRATORY RIPARIAN	TERRESTRIAL
PYGMY OWL	GLAUCIDIUM GNOMA	FEDERAL MIGRATORY NONGAME-PROTECTED STATE SENS. - UNDET.	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
BELTED KINGFISHER	CERYLE ALCYON	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC RIPARIAN FOSSORIAL
HAIRY WOODPECKER	PICOIDES VILLOSUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
DOWNY WOODPECKER	PICOIDES PUBESCENS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
RED-BREASTED SAPSUCKER	SPHYRAPICUS RUBER	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
PILEATED WOODPECKER	DRYOCOPUS PILEATUS	NONGAME-PROTECTED FEDERAL MIGRATORY STATE SENS. - CRITICAL	TERRESTRIAL OLD GROWTH-COAST RANGE
N. FLICKER COLAPTES AURATUS	NONGAME-PROTECTED	TERRESTRIAL FEDERAL MIGRATORY	RIPARIAN OLD GROWTH-COAST RANGE
COMMON NIGHTHAWK	CHORDEILES MINOR	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN

BLACK SWIFT	CYPSELOIDES NIGER	STATE SENS.-PERIPHERAL/RARE NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
VAUX'S SWIFT	CHAETURA VAUXI	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
BLACK-CHINNED HUMMINGBIRD	ARCHILOCHUS ALEXANDRI	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
COSTA'S HUMMINGBIRD	CALYPTE COSTAE	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
ANNA'S HUMMINGBIRD	CALYPTE ANNA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
RUFOUS HUMMINGBIRD	SELASPHORUS RUFUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
ALLEN'S HUMMINGBIRD	SELASPHORUS SASIN	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
CALLIOPE HUMMINGBIRD	STELLULA CALLIOPE	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
EASTERN KINGBIRD	TYRANNUS TYRANNUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
W. KINGBIRD	TYRANNUS VERTICALIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
-THROATED FLYCATCHER	MYIARCHUS CINERASCENS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
SAY'S PHOEBE	SAYORNIS SAYA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
BLACK PHOEBE	SAYORNIS NIGRICANS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
OLIVE-SIDED FLYCATCHER	CONTOPUS BOREALIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL OLD GROWTH-COAST RANGE
WOOD-PEWEE		CONTOPUS SORDIDULUS FEDERAL MIGRATORY	NONGAME-PROTECTED TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
PACIFIC-SLOPE FLYCATCHER	EMPIDONAX DIFFICILIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
WILLOW FLYCATCHER	EMPIDONAX TRAILLII	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
ALDER FLYCATCHER	EMPIDONAX ALNORUM	FEDERAL MIGRATORY NONGAME-PROTECTED	RIPARIAN
HAMMOND'S FLYCATCHER	EMPIDONAX HAMMONDII	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL OLD GROWTH-COAST RANGE
'KY FLYCATCHER	EMPIDONAX OBERHOLSERI	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN

FOX SPARROW	PASSERELLA ILIACA	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
RUFOUS-SIDED TOWHEE	PIPILO ERYTHROPHTHALMUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
ROSE-BREASTED GROSBEAK	PHEUCTICUS LUDOVICIANUS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
BLACK-HEADED GROSBEAK	PHEUCTICUS MELANOCEPHALUS	NONGAME-PROTECTED	FEDERAL MIGRATORYTERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
LAZULI BUNTING	PASSERINA AMOENA	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
W. TANAGER	PIRANGA LUDOVICIANA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
PURPLE MARTIN	PROGNE SUBIS	NONGAME-PROTECTED FEDERAL SENS. STATE SENS. - CRITICAL FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
CLIFF SWALLOW	HIRUNDO PYRRHONOTA	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
BARN SWALLOW	HIRUNDO RUSTICA	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
TREE SWALLOW	TACHYCINETA BICOLOR	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
VIOLET-GREEN SWALLOW	TACHYCINETA THALASSINA	NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
BANK SWALLOW	RIPARIA RIPARIA	STATE SENS. - UNDET. NONGAME-PROTECTED FEDERAL MIGRATORY	AQUATIC TERRESTRIAL RIPARIAN
N. ROUGH-WINGED SWALLOW	STELGIDOPTERYX SERRIPENNIS	FEDERAL MIGRATORY	NONGAME-PROTECTEDAQUATIC TERRESTRIAL RIPARIAN
BOHEMIAN WAXWING	BOMBYCILLA GARRULUS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
CEDAR WAXWING	BOMBYCILLA CEDRORUM	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
N. SHRIKE	LANIUS EXCUBITOR	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
LOGGERHEAD SHRIKE	LANIUS LUDOVICIANUS	FEDERAL CATEGORY 2 FEDERAL SENS. FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL
J-EYED VIREO	VIREO OLIVACEOUS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN

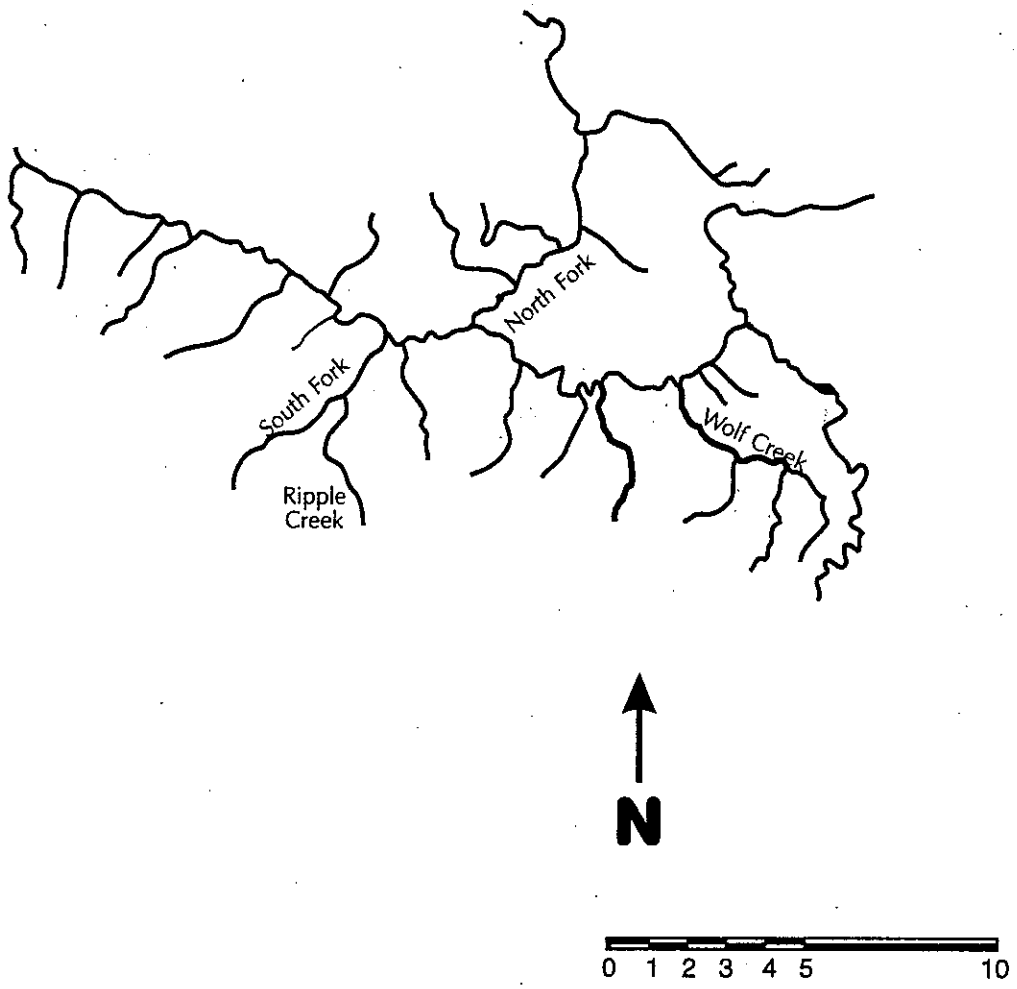
WARBLING VIREO	VIREO GILVUS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
SOLITARY VIREO	VIREO SOLITARIUS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
HUTTON'S VIREO	VIREO HUTTONI	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL OLD GROWTH-COAST RANGE
BLACK-AND-WHITE WARBLER	MNIOTILTA VARIA	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
NASHVILLE WARBLER	VERMIVORA RUFICAPILLA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
ORANGE-CROWNED WARBLER	VERMIVORA CELATA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
TENNESSEE WARBLER	VERMIVORA PEREGRINA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
YELLOW WARBLER	DENDROICA PETECHIA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
BLACK-THROATED BLUE WARBLER	DENDROICA CAERULESCENS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
YELLOW-RUMPED WARBLER	DENDROICA CORONATA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
MAGNOLIA WARBLER	DENDROICA MAGNOLIA	NONGAME-PROTECTED FEDERAL MIGRATORY	RIPARIAN
TOWNSEND'S WARBLER	DENDROICA TOWNSENDI	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
HERMIT WARBLER	DENDROICA OCCIDENTALIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL OLD GROWTH-COAST RANGE
OVENBIRD	SEIURUS AUROCAPILLUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
N. WATERTHRUSH	SEIURUS NOVEBORACENSIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
MACGILLIVRAY'S WARBLER	OPORORNIS TOLMIEI	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
COMMON YELLOWTHROAT	GEOTHLYPIS TRICHAS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
YELLOW-BREASTED CHAT	ICTERIA VIRENS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
WILSON'S WARBLER	WILSONIA PUSILLA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
ERICAN REDSTART	SETOPHAGA RUTICILLA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN

HOUSE SPARROW	PASSER DOMESTICUS	UNCLASSIFIED	TERRESTRIAL
AMERICAN PIPIT	ANTHUS RUBESCENS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
SAGE THRASHER	OREOSCOPTES MONTANUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL
N. MOCKINGBIRD	MIMUS POLYGLOTTOS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN
BROWN THRASHER	TOXOSTOMA RUFUM	NONGAME-PROTECTED FEDERAL MIGRATORY	RIPARIAN
BEWICK'S WREN	THRYOMANES BEWICKII	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
HOUSE WREN		TROGLODYTES AEDON TERRESTRIAL FEDERAL MIGRATORY	NONGAME-PROTECTED RIPARIAN OLD GROWTH-COAST RANGE
WINTER WREN	TROGLODYTES TROGLODYTES	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
MARSH WREN		CISTOTHORUS PALUSTRIS FEDERAL MIGRATORY	NONGAME-PROTECTEDAQUATIC TERRESTRIAL
BROWN CREEPER	CERTHIA AMERICANA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
WHITE-BREASTED NUTHATCH	SITTA CAROLINENSIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
RED-BREASTED NUTHATCH	SITTA CANADENSIS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL OLD GROWTH-COAST RANGE
BLACK-CAPPED CHICKADEE	PARUS ATRICAPILLUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
MOUNTAIN CHICKADEE	PARUS GAMBELI	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
CHESTNUT-BACKED CHICKADEE	PARUS RUFESCENS	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
WRENTIT	CHAMAEA FASCIATA	FEDERAL MIGRATORY NONGAME-PROTECTED	TERRESTRIAL OLD GROWTH-COAST RANGE
BUSHTIT	PSALTRIPARUS MINIMUS	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN
GOLDEN-CROWNED KINGLET	REGULUS SATRAPA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE
RUBY-CROWNED KINGLET	REGULUS CALENDULA	NONGAME-PROTECTED FEDERAL MIGRATORY	TERRESTRIAL RIPARIAN OLD GROWTH-COAST RANGE

DOUGLAS' SQUIRREL	TAMIASCIURUS DOUGLASII	NONGAME-PROTECTED	TERRESTRIAL FOSSORIAL
N. FLYING SQUIRREL	GLAUCOMYS SABRINUS	NONGAME-PROTECTED	TERRESTRIAL RIPARIAN FOSSORIAL OLD GROWTH-COAST RANGE
W. POCKET GOPHER	THOMOMYS MAZAMA	FEDERAL CATEGORY 2	TERRESTRIAL RIPARIAN FOSSORIAL
CAMAS POCKET GOPHER	THOMOMYS BULBIVORUS	UNCLASSIFIED	TERRESTRIAL FOSSORIAL
BEAVER	CASTOR CANADENSIS TERRESTRIAL	FURBEARER	AQUATIC RIPARIAN
DEER MOUSE		PEROMYSCUS MANICULATUS	UNCLASSIFIEDTERRESTRIAL RIPARIAN FOSSORIAL OLD GROWTH-COAST RANGE
BUSHY-TAILED WOODRAT	NEOTOMA CINEREA	UNCLASSIFIED	TERRESTRIAL RIPARIAN
W. RED-BACKED VOLE	CLETHRIONOMYS CALIFORNICUS		UNCLASSIFIEDTERRESTRIAL OLD GROWTH-COAST RANGE
WHITE-FOOTED VOLE	PHENACOMYS ALBIPES	FEDERAL CATEGORY 2 STATE SENS.-PERIPHERAL/RARE NONGAME-PROTECTED	TERRESTRIAL RIPARIAN FOSSORIAL
RED TREE VOLE	PHENACOMYS LONGICAUDUS	UNCLASSIFIED	TERRESTRIAL OLD GROWTH-COAST RANGE
GRAY-TAILED VOLE	MICROTUS CANICAUDUS	UNCLASSIFIED	TERRESTRIAL FOSSORIAL
TOWNSEND'S VOLE	MICROTUS TOWNSENDII	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
LONG-TAILED VOLE	MICROTUS LONGICAUDUS	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
CREEPING VOLE	MICROTUS OREGONI	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
MUSKRAT	ONDATRA ZIBETHICUS	FURBEARER TERRESTRIAL	AQUATIC RIPARIAN
PACIFIC JUMPING MOUSE	ZAPUS TRINOTATUS	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
COYOTE	CANIS LATRANS	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL

RED FOX	VULPES VULPES	FURBEARER INTRODUCED	TERRESTRIAL RIPARIAN FOSSORIAL
GRAY FOX	UROCYON CINEREOARGENTEUS		FURBEARERTERRESTRIAL RIPARIAN FOSSORIAL
BLACK BEAR		URSUS AMERICANUS RECREAT.)	GAME (CONSUMPTIVE TERRESTRIAL RIPARIAN FOSSORIAL
RACCOON	PROCYON LOTOR	FURBEARER	TERRESTRIAL RIPARIAN
ERMINE	MUSTELA ERMINEA	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
LONG-TAILED WEASEL	MUSTELA FRENATA	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
MINK	MUSTELA VISON	FURBEARER	TERRESTRIAL RIPARIAN FOSSORIAL
W. SPOTTED SKUNK	SPILOGALE GRACILIS	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
STRIPED SKUNK	MEPHITIS MEPHITIS	UNCLASSIFIED	TERRESTRIAL RIPARIAN FOSSORIAL
RIVER OTTER	LUTRA CANADENSIS	FURBEARER	TERRESTRIAL RIPARIAN FOSSORIAL
MOUNTAIN LION	FELIS CONCOLOR	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN
BOBCAT	FELIS RUFUS	FURBEARER	TERRESTRIAL RIPARIAN
ELK	CERVUS ELAPHUS	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN
BLACK-TAILED DEER	ODOCOILEUS HEMIONUS	GAME (CONSUMPTIVE RECREAT.)	TERRESTRIAL RIPARIAN

Salmonberry River



OUTSTANDING RESOURCE

WATER PETITION

for the

Steamboat Creek Watershed

(4) Relationship Between the Unique Character and the Water Quality of the Steamboat Creek Watershed

The unique character of the Steamboat Creek watershed, its ability to support a diversity of aquatic species, is directly related to its high water quality and to the currently intact watershed processes that support that high quality. The Department of Environmental Quality ("DEQ") is charged by statute with the responsibility to fully maintain and protect this level of water quality in order to protect those aquatic species mentioned above. OAR § 340-41-0026(1)(a)(A). The DEQ accomplishes this through the establishment of in-stream water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3 which should be supplemented by the attached habitat requirements published by the Tillamook Bay National Estuary Project. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Chinook Salmon:

Spawning adults require deep pools in close proximity to spawning areas where they hold and mature for several months before spawning (ODFW 1995). Chinook prefer a gradient of less than 3% in spawning areas, and because one of the "most critical links for survival of this species" is clean gravels, chinook are particularly affected by increases in fine sediment loads (ODFW 1995; ODFW 1996). Additionally, "[h]abitat alterations that affect the abundance, stability and accessibility of mainstem gravel bars impact all chinook" (ODFW 1995). Chinook prefer temperatures as low as 41°F for incubation, and 45°F for rearing (TBNEP 1997, attached).

Juvenile chinook require deep riffles, woody debris, and shoreline riparian vegetation for cover and feeding areas (ODFW 1995). Rearing chinook are particularly affected by impacts to lower basin habitat complexity (ODFW 1995).

2) Coho Salmon:

Coho are particularly sensitive to loss of long-lasting, complex instream structure, e.g., large wood complexes, flood plains, braided channels, beaver ponds, and lakes (ODFW 1995). In contrast to the larger streams upon which chinook depend, coho require much smaller, low gradient tributaries and side channels for spawning and reproduction (ODFW 1996). Coho require temperatures as low as 40°F for incubation, and 53°F for rearing (TBNEP 1997, attached).

3) Steelhead/Rainbow Trout:

Because steelhead utilize multiple stream habitats, migrating between the uppermost reaches of tributaries and large streams, the range of habitat protected must extend to the furthest reaches of all tributaries (RVCG 1997). Steelhead are able to spawn in gradient slopes up to 5 degrees, with pea to orange sized gravels (ODFW 1992). They require temperatures as low as 40°F for incubation, and

45°F for rearing (TBNEP, 1997, attached). Steelhead are most productive in complex habitats characterized by large and small wood, and require deep holding pools prior to spawning (ODFW 1992). Because juveniles spend up to four years in freshwater, they are particularly susceptible to changes in temperature and water flows.

4) Coastal Cutthroat Trout:

Coastal cutthroat trout require temperatures as low as 43°F for incubation and 49°F for rearing. Fry and juveniles are dependant upon backwater pools and large woody debris (TBNEP 1997, attached). Coastal cutthroat use estuaries extensively for rearing and before upstream migration (TBNEP 1997).

5) Columbia Seep Salamander:

This salamander requires cold, clear springs and small headwater streams, with temperatures ranging between 48°-52° F (ODFW 1996). Because this species is sensitive to heat and the loss of body moisture, they cannot survive in dry or warm environments. ODFW noted that a reason for the Columbia seep salamander's sensitive status is that "[h]eadwater stream and spring habitats . . . are not adequately protected" (ODFW 1996).

6) Tailed Frog:

This frog requires cold, fast-flowing permanent streams in forested areas, with temperatures ranging from 41°-61° F (ODFW 1996). "[T]ailed frogs have exacting habitat requirements, including the lowest known temperature requirements, and one of the narrowest temperature tolerances of any of the world's frogs" (ODFW 1996). To meet this low temperature requirement, the tailed frog needs the heavy canopy cover associated with old growth forests (ODFW 1996). DEQ has also recognized the temperature-sensitive nature of the tailed frog, stating that first year tadpoles select water temperatures below 50° F (DEQ 1995).

The DEQ currently uses numeric criteria, almost exclusively, to protect the beneficial uses listed above. The numeric criteria applicable to the Umpqua Basin are as follows:

- Dissolved Oxygen: From spawning until fry emergence, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997).

- Temperature: 55°F for salmonid spawning and incubation, and 64°F for salmonid rearing (DEQ 1995).

- Turbidity: No more than a 10% cumulative increase shall be allowed (DEQ 1997).

- pH: Between 6.5 – 8.5 for estuarine and fresh waters (DEQ 1997).

Information suggests that the water quality of the Steamboat Creek portion of the watershed is significantly higher than current numeric criteria of Oregon's water quality standards. Information, from DEQ's 303(d)(1) list, also suggests that the water quality of the Canton Creek portion of the watershed has been more extensively impacted from land-use activities. However, both subwatersheds provide critical habitat to the species listed above and should be protected from any degradation through the Tier III nondegradation policy provided by ORW status.

In fact, allowing any degradation of current water quality down to numeric criteria, whether through application of the Department's Tier II antidegradation (socioeconomic balancing) policy for High Quality Waters or outright failure to apply the Tier II antidegradation policy, will seriously jeopardize and likely eliminate some of the existing beneficial uses in the Steamboat Creek watershed. For example, maintaining water quality in the river higher than current numeric criteria is important because of the presence of the sensitive Columbia seep salamander and the tailed frog in Steamboat Creek. These species prefer temperatures of 48°-52° F and 41° - 61° F respectively.

In order to protect these most sensitive beneficial uses, the only alternative to the ORW designation is for DEQ to actively interpret and apply its narrative criteria in order to prevent further warming of water temperatures and degradation of other water quality parameters. To date, DEQ has not applied its narrative criteria or its mandate to protect beneficial uses as stand-alone components of water quality standards promulgated pursuant to the Clean Water Act. The only exception to this is within DEQ's 303(d)(1) program where it has identified waters that violate water quality standards due to habitat modification and flow modification, both narrative criteria. There, however, DEQ has failed to give full meaning to the narrative criteria by requiring a concurrent violation of numeric criteria in order to justify listing of waterbodies for violating standards (DEQ 1995). In other words, despite some effort to identify and apply narrative criteria to water quality limited waters, DEQ actually relies solely upon its numeric criteria, even where there is evidence of beneficial uses that require higher water quality. For this reason, conferring ORW status on the Steamboat Creek watershed is the most likely method to preserve the current quality of these exceptional high quality waters and possibly the only viable method of doing so.

This is underscored by the fact that if the Department were to chose to apply its narrative criteria as a method of protecting the existing beneficial uses of the Steamboat Creek watershed, it would have to do so by actively applying its Tier II antidegradation policy for High Quality Waters to both point and nonpoint sources of degradation, an approach that does not appear to have been considered in the Steamboat Creek watershed or elsewhere in the state. It is undoubtedly a far greater undertaking to institute such a state-wide program than to confer ORW status upon the exceptional waters of the Steamboat Creek watershed.

(5) Past and Present Threats to Water Quality in the Steamboat Creek Watershed

Until the late 1980s, federal forest land management required little streamcourse protection buffers. Consequently, large areas within the Steamboat Creek watershed were subjected to timber harvest activity that removed riparian vegetation and damaged stream channels. The majority of current erosional problems within the watershed are attributed to

either prior road construction and maintenance or harvest activities. In the upper watershed, over 90% of landslides are attributed to forest land management. These slides lack large woody debris that are healthy for stream channels, and instead contribute both fine and course sediments to the stream channels. Consequently, management practices have led to simplified riparian and aquatic habitat and general losses in species diversity in the upper watershed (Brady et al. 1997).

Notwithstanding these historic erosional and habitat simplification problems, the Steamboat Creek watershed has proven very resilient, supporting some of the most sensitive fish and aquatic species of the Pacific Northwest with its remarkable water quality. Protecting the Steamboat Creek watershed as an ORW is the only method currently available for ensuring that its high water quality is maintained.

(6) Impending Threats to the Steamboat Creek Watershed

There are currently 90 active mining claims in the upper watershed of Steamboat Creek (Brady et al. 1997). The majority of the mining activity is hard rock mining that takes place away from the stream, but 15 placer mining claims exist throughout the upper watershed, directly impacting the stream channel. Placer mining causes increased sedimentation and damages streambank vegetation, leading, in turn, to wider and shallower streams and higher water temperatures. These effects may have severe impacts on coho, chinook, steelhead, and cutthroat trout, as mining activities eliminate the clean gravels, low temperatures, and deep pools necessary for successful spawning (Brady et al. 1997).

Threats of logging activities within portions of the watershed also threaten its ecological integrity. The effects of logging on water quality parameters such as temperature, dissolved oxygen, turbidity, pH, sedimentation, flow modification, and habitat modification are potentially severe, impacting numerous aquatic species that are dependent upon the unique characteristics of the Steamboat Creek watershed. The tailed frog is particularly sensitive to changes in water temperatures, requiring temperatures as low as 41°F. If logging occurs in the watershed, it is likely to remove the protective canopy that secures low water temperatures, and the survival of the tailed frog and numerous other species is severely threatened. Protecting the Steamboat Creek watershed as an ORW will ensure that these sensitive species are protected.

A portion of the Steamboat Creek watershed currently possesses somewhat heightened protections from the negative impacts associated with mining and other damaging management practices through its status as both a Late Successional Reserve and a Tier I Key Watershed. These designations are the result of federal ownership, and are less subject to continued degradation than the portion within the Canton Creek sub-basin which is in private timber company ownership.

ORW designation is critical to the protection of the outstanding water quality of the Steamboat Creek watershed. While the watershed has generally absorbed past impacts, continued mining and logging practices are likely to destroy the vital link that Steamboat Creek provides for salmonids and other aquatic life.

(7) Special Status Conferred on the Steamboat Creek Watershed

The Steamboat Creek watershed has been attributed with numerous federal and state special designations, reflecting the watershed's far-reaching importance as biologically diverse habitat with unique characteristics. Some of these designations have associated management plans specially designed to support each particular designation.

A. These designations evidence both the river's special qualities and also the need for a comprehensive management plan to ensure their protection.

B. The Steamboat Creek Watershed lies within a Tier I Key Watershed (OU-90) and a Late Successional Reserve as designated under the Northwest Forest Plan (FEMAT 1993). The LSR designation indicates that this watershed "represents a strong network of existing old forests that are retained in their natural condition" (FEMAT 1993).

C. Watershed analysis is currently being conducted by the USFS and the USBLM on all sub-basins within the Steamboat Creek watershed (NURD 1997).

D. Steamboat Creek is under study for potential addition to the Wild and Scenic Rivers System (USFS 1990).

E. The Steamboat Creek watershed is located within the Umpqua Basin which the State Department of Agriculture has determined is a high priority basin for the development of an Agricultural Water Quality Management Area Plan pursuant to ORS §§ 568.900- 568.933 (OCSRI 1997). This plan is scheduled to be completed within four years and fully implemented within ten years (OCSRI 1997). The purpose of the plan will be the "prevention and control of water pollution from agricultural activities and soil erosion" within the management area (OCSRI 1997).

F. The Steamboat Creek watershed contains the Umpqua cutthroat trout, a federal endangered species. 61 Fed. Reg. 41514 (Aug. 9, 1996). This watershed will likely be included in designated critical habitat for the species under section 4 of the ESA, and incorporated into a species recovery plan.

G. The Steamboat Creek watershed is located within the Oregon State Coastal Salmon Recovery Plan area and contains critical habitat for coho salmon (OCSRI 1997).

(8) Other Information Related to the Steamboat Creek Watershed

There are very few watersheds remaining in the Umpqua Basin that contain aquatic habitat equal to that found in the Steamboat Creek watershed. This habitat provides a vital link to the health and long-term productivity of numerous aquatic species, including two particularly

healthy and several at-risk aquatic species. Ensuring the survival of these species is dependent upon protecting and maintaining existing water quality parameters and preventing any level of degradation.

As several recent scientific studies have shown, steelhead, salmonid, and other aquatic species have very specific water quality requirements. Fluctuations in water temperature, suspended sediment loads, or modifications to habitat or stream flow can have both immediately and cumulatively deleterious effects on these species (Spence et al. 1996). The human population in northern Oregon is growing rapidly and protecting high quality waterbodies from fluctuations that jeopardize the health of the species listed will become increasingly difficult. Designating the waterways within the Steamboat Creek watershed as an Oregon Outstanding Resource Water is necessary to protect not only the ecological integrity of the critical habitat of these species, but also the special water quality values that are essential to the unique characteristics of the Steamboat Creek watershed.

(9) Data Sources

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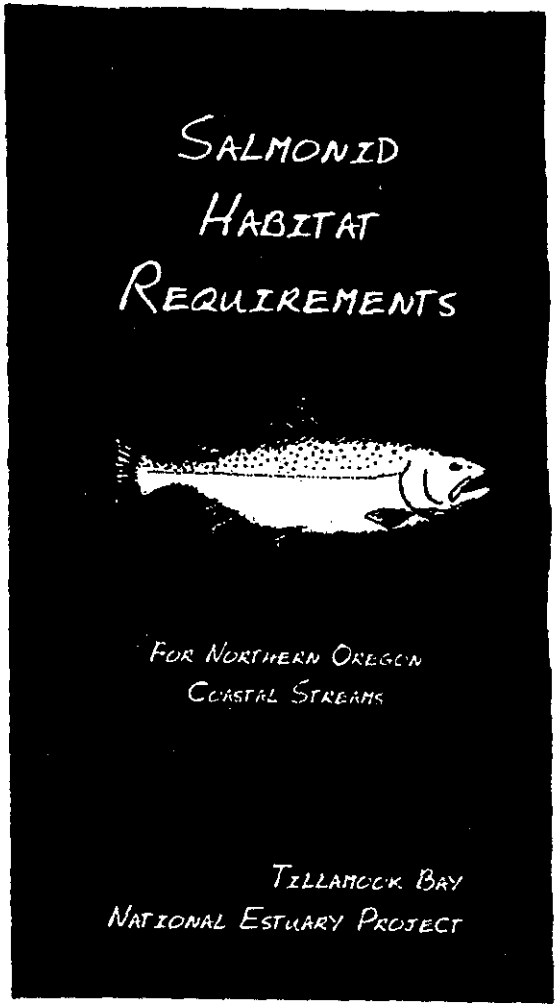
Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Incubation		Rearing						Status
	Incubation Temp.	Fry Emerge	Fry Habitat	Juvenile Habitat	Preferred Temp.	Freshwater Residency Period	Estuary Residency Period	Notes	1996 Status
Chinook - Fall	0.0–20°C; best 5.0–14.4° C	Mar–May	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Estuaries play a vital role in survival of young	Healthy and stable
Chinook - Spring	0.0–20°C; best 5.0–14.4° C	Feb–Mar	Stream; river edges	Deeper water in main river channel	7.3–14.6°C Growth stops at 20.3°C lethal at 25.2°C	Days to 2 or 3 months Fall smolt	Extensive; 5-6 months April–Oct	Large body size limits movement over barriers	Depressed
Coho	4.4–13.3°C	Feb–June	Backwater pools and stream edges	Pools in summer, off channel alcoves, ponds, dam pools with complex cover in winter	11.8 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	One year Spring smolt	Move through 2–9 days	Low pH (<5.01) can be lethal to alevins	Listed sensitive on state lists
Chum	4.4–13.3°C	Late Mar–Apr	Move directly into estuary	High sediment levels (15.8–54.9 g/l) will kill juveniles	6.7 - 14.6°C Growth stops at 20.3°C lethal at 25.8°C	Hours to a few days, leave quickly Spring smolt	2–32 days	Use estuaries immediately for food and adjustment	Depressed
Steelhead - Winter	4.4–13.3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2 -3 years Spring smolt	Move through in days	Good habitat = small and large wood complexity	Depressed
Steelhead - Summer	4.4 - 13.3°C	May–June	Stream edges	Pools, riffles, and runs of tributary streams, complex habitat with LWD preferred .	7.3–14.6°C Growth stops at 20.3°C lethal at 24.1°C	2–3 years Spring smolt	Move through in days	Summer steelhead require deep cool pools to live in before spawning	Hatchery fish - depressed
Sea Run Cutthroat Trout	8.1 - 17.2°C	Mar–May	Stream edges and backwater pools, large wood important	Prefer pools but are often displaced by coho or steelhead, low velocity pools and side channels in winter	9.5–12.9°C Growth stops at 20.3°C lethal at 23.0°C	2-4 Years Spring smolt	Used extensively as adults before upstream migration	Rearing in estuary is common	Depressed

Abbreviations used: C - Celsius (0°C = 32°F, 10°C = 50°F, 20°C = 68°F); cm - centimeters (2.54 cm = 1 inch); LWD - large woody debris; m - meters (1 m = 3.3 ft); max - maximum; mg/l - milligrams per liter (28.35 mg = 1 ounce, 1 liter = 1.06 quarts); mm - millimeter (25.4 mm = 1 inch); m/s - meters per second.



Habitat

Salmonid populations in the Pacific Northwest have been in decline for many decades. As a result some populations are listed as threatened or endangered species. One of the reasons for their decline is a lack of suitable habitat.

Studies show that salmon require a range of conditions in which to migrate upstream, spawn, and grow. This chart outlines some of those conditions and represents best professional judgement compiled from scientific reports and studies. It is designed to be a reference chart.

Dissolved Oxygen - The oxygen carried in the water is called dissolved oxygen and is required by fish. The amount of dissolved oxygen in the water varies with water temperature. Salmonids, in general, tend to require high levels of dissolved oxygen.

Temperature - In general, colder temperatures are preferred by salmon. Colder water carries more dissolved oxygen and also slows fish metabolism, which allows fish to gain weight more easily and grow to larger sizes.

Velocity - Water velocity needs to be great enough to provide continuous oxygen supply, but slow enough not to wash away eggs and juvenile salmon.

Percent Fines - "Fines" refer to the very small sediments carried by the water. Too much sediment in streams can stop migrations and kill fish by clogging gills and suffocating eggs. Fines prevent fish from getting essential dissolved oxygen.

Depth and Substrate - Salmonids seek good places to make their redds, or nests. Appropriate conditions depend on the size of the gravel in the nest and the depth of water.

For more information about salmon, water quality, or other related topics, contact the National Estuary Project at (503) 322-2222 or visit our web site at:
http://osu.orst.edu/dept/tbaynep/nephome.html

Salmonid Habitat Requirements
Northern Oregon Coastal Streams

	Spawning (including upstream migration)									
	Migration	Spawn Timing	Location	Substrate Size	Water Depth	Water Velocity	Dissolved Oxygen	Spawning Water Temp	Percent Fines Tolerable	Notes
Chinook - Fall	Sep–Dec	Oct–Jan	Mainstem and large tributaries	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.1–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Large body size limits movement over barriers
Chinook - Spring	Apr–Jun	Sep–Oct	Upper mainstem streams	Pea to Orange (1.3–10.2 cm)	Extremely variable 0.05–7 m	0.21–1.5 m/s; max is 2.4 m/s	> 5 mg/l	5.6–13.9°C	Fines (<6.4 mm) make up less than 25% of substrate	Require deep water for travel–pools for summer habitat
Coho	Sep- Jan	Oct–Jan	Small tributaries	Pea to Apple (1.3–9.0 cm)	0.18–1 m	0.08–0.11 m/sec; max is 2.4 m/s	> 8 mg/l	4.4–14°C	Fines (<6.4 mm) make up less than 25% of substrate	Primary target for many sport fisherman
Chum	Nov–Dec	Nov–Dec	Lower mainstem and tributaries	Pea to Orange (0.5–10.2 cm)	13–50 cm; ideal 21 cm	0.21–0.83 m/s; max is 2.4 m/s	> 5 mg/l; above 80% saturation best	7.2–12.8°C	Fines (<6.4 mm) make up less than 25% of substrate	Strong swimmer but doesn't jump
Steelhead - Winter	Nov–May	Jan–May	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Late fish seem to prefer mainstem and large tributary
Steelhead - Summer	May–Jul	Jan–Apr	Small tributaries with moderate gradient	Pea to Apple (0.5–9.0 cm)	> 18 cm	<2.4 m/s	> 5 mg/l	3.9–9.4°C	Fines (<6.4 mm) make up less than 25% of substrate	Athletic swimmer
Sea Run Cutthroat Trout	Jun–Oct	Dec–Feb	Small headwater tributaries, 1st & 2nd order streams	Pea to Golf Ball (0.5–7.5 cm)	0.01–1m; 10–15 cm best	0.11–0.90 m/s; max is 2.4 m/s	> 5 mg/l	6-17°C; best is 10°C	Fines (<6.4 mm) make up less than 25% of substrate	May spawn more than once

Compiled by Ann Newton, August, 1997. Tillamook Bay National Estuary Project

Information compiled from;

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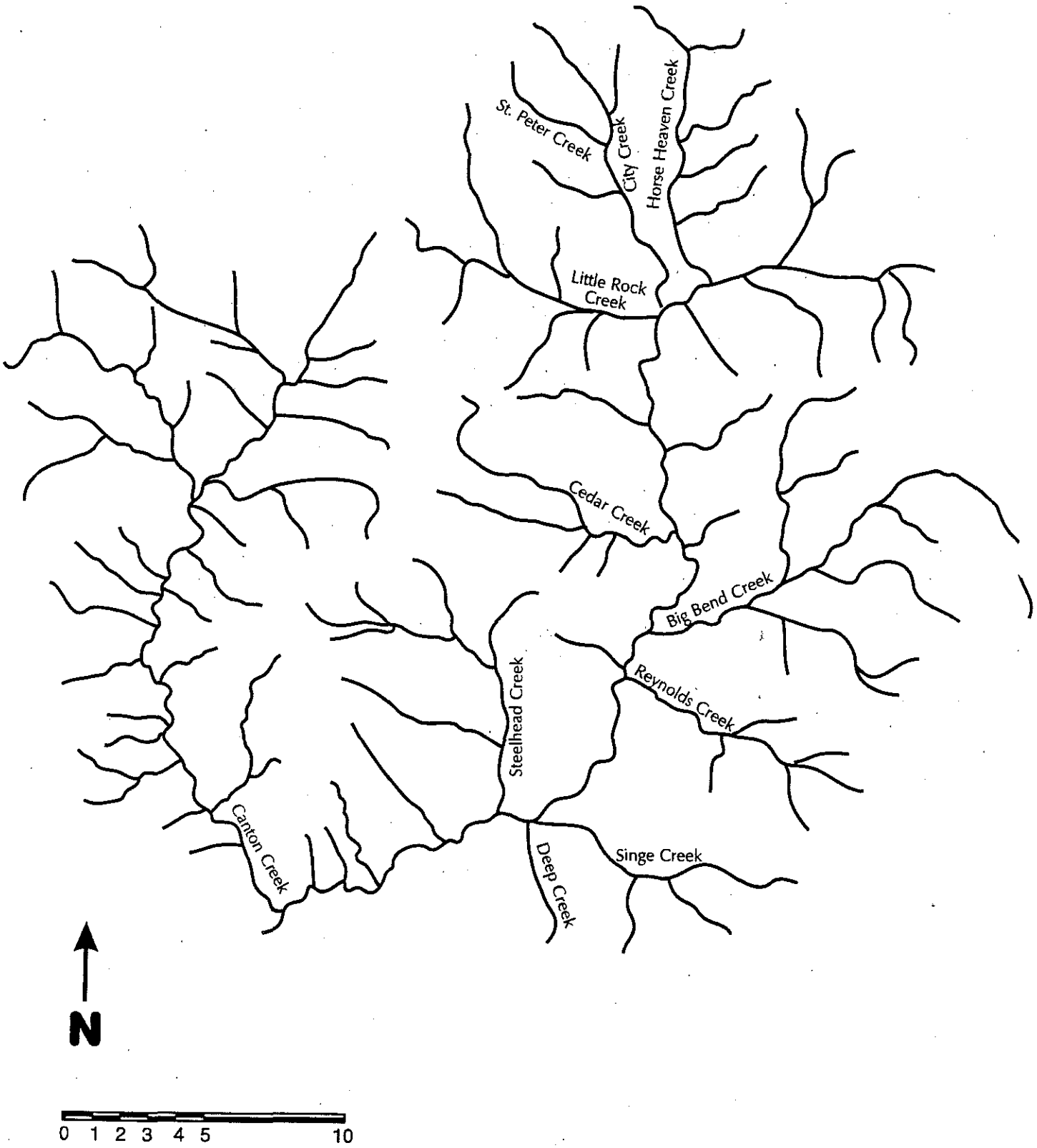
5. Additional thanks to Oregon Department of Fish and Wildlife for comments and suggestions.

Steamboat Creek



OUTSTANDING RESOURCE

WATER PETITION

for the

Upper North Santiam River

OUTSTANDING RESOURCE WATER PETITION
for the
Upper North Santiam River

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate a thirty-five mile stream segment in the Upper North Santiam River watershed as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. This request includes the Upper North Santiam River (from river mile 69 to river mile 104) in Township 10 S-13 S and Range 5 E-7 E.

The Upper North Santiam originates in the Willamette National Forest and flows into the Santiam River, which flows into the Willamette River. The North Santiam watershed as a whole includes 314,191 acres, and its water yield is 1,920,213 acre feet/year. These tributaries of the North Santiam River lie within the Willamette Basin, North Santiam Sub Basin.

The Upper North Santiam is located in northeastern Linn and eastern Marion Counties. Its watershed comprises 28% of the North Santiam River basin as a whole, and the watershed has the basin's highest elevations and the highest precipitation -- 65" to 100" annually. Of the 137,280 acres in the Upper North Santiam basin, 128,453 acres or 93% of the basin is federally-owned and under the jurisdiction of the Forest Service; 9,467 acres or 7% of the basin is privately-held. The Upper North Santiam has a high stream density: varying from 3.3 streams per square mile in the Marion watershed to 5.3 streams per square mile in the Bugaboo watershed (U.S. Forest Service 1995).

(2) Unique Character of the Upper North Santiam River

The Upper North Santiam is a primary source of community drinking water for people in Salem (diversion at river mile 31), Stayton (diversion at river mile 31), Lyons (diversion at river mile 38), Mehama (diversion at river mile 38), Mill City (diversion at river mile 45), and Gates (diversion at river mile 50) (U.S. Forest Service 1990); as well as Idanha (diversion at river mile 60) and the unincorporated community of Marion Forks (diversion right near Idanha) (U.S. Forest Service 1995).

The Big Cliff dam at river mile 50 prevents anadromous fish species from reaching historic habitat in the Upper North Santiam River (Big Cliff is the reregulating dam downstream of the

Detroit Dam). Nevertheless, the Upper North Santiam is unique also because it provides critical habitat, as defined in OAR 340-41-006(40), for rainbow trout (*Oncorhynchus mykiss*), and for cutthroat trout (*Salmo clarki*), which are state sensitive species (AFS 1993).

The Upper North Santiam River has been designated a Tier 2 Key Watershed (OF-110) by FEMAT. This designation is based upon the important sources of high quality water within the watershed (FEMAT 1993). The Upper North Santiam is one of twenty-three Tier 2 Key Watersheds which have been identified (FEMAT 1993). As a Key Watershed, the Upper North Santiam represents "the best of what is left" (FEMAT 1993).

The Upper North Santiam River has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Clarke 1997; Li et al. 1995; Oregon AFS 1993). ADA designation indicates that the AFS believes that these rivers should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon" (Li et al. 1995; Oregon AFS 1993). This designation is based upon the following value:

1) *Highly Sensitive*. The Upper North Santiam River is a relatively healthy watershed that is highly sensitive to disturbance or cumulative effects of future human uses.

(3) Beneficial Uses Related to the Unique Character of the Upper North Santiam River

The beneficial uses of the Upper North Santiam River, which are directly related to the unique character of the waterbody, include: (1) public and private domestic water supplies; (2) salmonid fish rearing; (3) salmonid fish spawning; (4) resident fish and aquatic life; (5) fishing (DEQ 1996).

A. Public and private domestic water supplies: the Upper North Santiam flows into the North Santiam River, which supports this beneficial use for more than 150,000 people.

B. Salmonid fish rearing, salmonid fish spawning, and resident fish and aquatic life: the Upper North Santiam supports these fish species:

1) Rainbow trout (*Oncorhynchus mykiss*); the State of Oregon has determined that "[w]illamette basin rainbow trout are currently listed by ODFW as a stock of concern due to insufficient information regarding their status. Rainbow trout should be given a high priority with respect to future population and habitat inventory and monitoring activities in the Willamette basin" (ODFW 1992b).

2) Cutthroat trout (*Salmo clarki*); the State of Oregon has determined that "[w]illamette basin cutthroat trout are currently listed by ODFW as a stock of concern due to insufficient information regarding their status. Cutthroat

trout should be given a high priority with respect to future population and habitat inventory and monitoring activities in the Willamette basin" ODFW 1992b).

A. Fishing: the Upper North Santiam supports these fisheries as a beneficial use:

1) Rainbow trout - Average catch rates for naturally produced and hatchery rainbow trout during 1965-72 were the highest in the North Santiam basin (ODFW 1992b).

2) Cutthroat trout -- 344 cutthroat were harvested in the mainstem of the Santiam and North Santiam during 1978 (ODFW 1992b).

(4) Relationship Between the Unique Character and the Water Quality of the Upper North Santiam River

The Upper North Santiam's unique character is that it is a primary source of drinking water for more than 150,000 people. The water quality parameters associated with this unique character include fecal coliform, sediment, and turbidity. This waterbody's other unique character is that it provides relatively good habitat for many at-risk resident salmonids. The numeric water quality parameters associated with this unique character include sediment, turbidity, and temperature.

The Upper North Santiam appears to have excellent water temperatures to support resident salmonids. In 1995, the Forest Service reported:

> Water quality within the North Santiam watershed appears to be high. No specific quality data other than temperature was available for the North Santiam River. Tributary streams, which provide domestic water to municipalities, have recorded high water quality. Records currently show that since 1950, the mainstem has an average temperature of 15 degrees Celsius for the month of July. Maximum temperatures for the station reach 19 degrees Celsius in August. These temperatures are moderated by inflow and riparian vegetation growth. . . .
>
> Tributaries at all levels through the watershed are important in maintaining cool water temperatures for fish production and downstream water quality. Most of the cool water sources within the U.N. [Upper North] Santiam watershed are the result of ground water. Numerous cool water sources are present. The geology of the area provides permeable layers (glacial material) that cover less permeable layers (basalt lava flows). The main river canyon dissects these layers and allows surface water to appear as springs. All are important, due to the special habitats that they create and their temperature moderation potential.
>
> (U.S. Forest Service 1995).

Apart from temperature, the Forest Service asserts that the Upper North Santiam has "very little management[-]induced sediment moving through the system" (U.S. Forest Service 1995). However, the system experienced significant sedimentation after heavy rains in February, 1996. Thereafter, hundreds of clearcut slopes failed in the Pacific Northwest and the Santiam basin specifically, sending tons of sediments into adjacent streams (Weaver 1996). One reason that water quality is vulnerable to high sedimentation levels is that the watershed includes areas of fine collodial clay deposits (Schweickert 1997). The Forest Service attributes turbidity from such clays in the Upper North Santiam primarily to a glacier on Mt. Jefferson (U.S. Forest Service 1995). Regardless, the cumulative impact of turbidity in the North Santiam has negatively impacted beneficial uses, as manifested in the repeated shut-down in diversions from the North Santiam that would otherwise provide drinking water for people in the City of Salem and other towns.

DEQ should fully maintain and protect water quality in the Upper North Santiam so that it may protect the water supply for people and resident salmonids in the waterbodies. See OAR § 340-41-026(1)(a)(A) (stating that where existing water quality exceeds those levels necessary to support beneficial uses, that level of water quality should be maintained and protected) (DEQ 1997c). DEQ attempts to meet this standard through water quality standards that include both narrative and numeric criteria. The following is a list of habitat characteristics required by each of the species listed in Section 3. This list will follow with a discussion of the relationship between existing in-stream water quality standards and these habitat requirements.

1) Rainbow Trout:

Rainbow trout are typically found in the warmer, large mainstem and lower tributaries when both rainbow and cutthroat trout are present within one watershed, as in this situation in the North Santiam (ODFW 1992b). Little is known about the habitat requirements for rainbow trout in the North Santiam River.

2) Cutthroat Trout:

When cutthroat and rainbow trout reside together, as in the Upper North Santiam, "[c]utthroat are more abundant in headwater and tributary streams than rainbow trout" (ODFW 1992b). Further, cutthroat may inhabit relatively isolated stream segments (ODFW 1992b).

The DEQ currently uses numeric criteria to protect the beneficial uses listed above. The numeric criteria in the Willamette River Basin are as follows:

- Dissolved Oxygen:

From spawning until fry emergence from the gravel, the dissolved oxygen levels shall not be less than 11.0 mg/l, or 9.0 mg/l if the minimum intergravel dissolved

oxygen median is 8.0 mg/l or greater. Spatial median dissolved oxygen shall not fall below 6.0 mg/l (DEQ 1997a).

- Temperature:

  The temperature standard is 55 degrees Fahrenheit for native salmonid spawning, egg incubation, and fry emergence from the egg and from the gravel in the basin, and 64 degrees Fahrenheit for salmonid fish rearing (DEQ 1997a).

- Turbidity:

  No more than a ten percent cumulative increase in natural stream turbidities shall be allowed (DEQ 1997a).

- pH:

  Between 6.5-8.5 for the Willamette River Basin (DEQ 1997a).

These numeric criteria, however, may fail to protect and maintain the water quality necessary to protect the salmonids listed above. For example, the temperature standard for the Upper North Santiam is 64 degrees Fahrenheit for salmonid rearing and 55 degrees Fahrenheit for salmonid spawning and incubation (DEQ 1997a). However, it appears that temperatures in the two waterbodies are often actually lower than the numeric standard.

For the Upper North Santiam, at a sampling station at Coopers Ridge Road, recent readings were 42.8 (4\23\96), 59.0 (7\31\96), 54.0 (8\27\96), 41.9 (4\30\97), 55.0 (7\2\97), and 64.4 (8\25\97) (DEQ 1997e). Petitioners presume that DEQ has more detailed and more recent data. But readings indicate generally better water temperatures than the current temperature standard requires. And these lower temperatures are necessary for beneficial uses: winter steelhead, for example, prefer temperatures ranging from 45-58 degrees Fahrenheit during spawning (ODFW 1992b), and the tailed-frog prefers temperatures ranging from 41-61 degrees Fahrenheit (ODFW 1996).

Further, although DEQ uses numeric criteria almost exclusively to determine whether beneficial uses are being protected, it has also utilized two narrative criteria: habitat modification and flow modification. When using these two criteria to determine whether a waterbody is supporting its beneficial uses, however, DEQ has stated that a waterbody will violate these narrative criteria only when it also violates "an associated numeric water standard" (DEQ 1995). By interpreting a violation of narrative criteria to be wholly dependant upon an associated violation of numeric criteria, DEQ has eliminated much of the protections that narrative criteria offer for beneficial uses.

Therefore, in order to protect the beneficial uses listed in this petition and to reduce risk to the listed species, the EQC has two options. One, rewrite the numeric and narrative criteria so

that they actually protect the full suite of habitat requirements necessary to support the beneficial uses listed, as required by 33 U.S.C. § 1313(c)(2) and 40 C.F.R. § 131.3; or two, protect the existing high quality values of the Upper North Santiam by designating it as an ORW.

(5) Past and Present Threats to Water Quality in the Upper North Santiam River

The Upper North Santiam basin is densely-roaded. On Forest Service lands alone, 400 miles of roads exist. Roads generally can impact water quality by displacing riparian vegetation, modifying hillslope drainage patterns, increase the drainage network (influencing the timing and magnitude of peak flows), and may include channelization. In the Upper North Santiam basin, many roads were built before 1985 and exhibit sidecast fills and poor drainage, which can cause sedimentation. Some roads – primarily in the areas of Cabin Creek, Parkett and Buck Creeks, and Straight Creek, were built on unstable landforms. Further, roughly 50 of the 400 miles in the basin have a surface of dirt or primitive materials that are more prone to failure. Last, corrugated metal pipes were used as culverts and other drainage structures; many of the pipes installed over the past 40 years are nearing or have already exceeded their design life. As they fail, sedimentation will increase (U.S. Forest Service 1995). Further, "[d]ue to the lack of structure within the North Santiam system [due to logging], any release of material, as in a debris slide, will travel downstream a greater distance than historically" (U.S. Forest Service 1995).

Despite these facts, and the Forest Service's admission that (1) it has never performed an inventory and risk analysis of roads in the basin to determine if they would withstand a 100-year storm event, and (2) it lacks sufficient funds to perform such upgrades anyway, the Forest Service has concluded that "preliminary knowledge of the area does not indicate a substantial need [for decommissioning roads or], particularly for obliteration (U.S. Forest Service 1995). However, the Forest Service has announced plans to reconstruct or obliterate roughly 24.8 miles in the watershed, including in calendar year 1998, 4.5 miles of Blowout (how apt!) Road # 10 (U.S. Forest Service 1997).

(6) Impending Threats to the Upper North Santiam River

The cumulative effects of new logging and roadbuilding – considering the legacy conditions of extensive clearcuts and roads built to lower standards - continue to threaten water quality in the Upper North Santiam River.

Under the Three Basin Rule, codified at OAR 340-41-470, the Upper North Santiam is protected more fully than many state waters. The rule generally prohibits new or increased waste discharges, defined as any discharge requiring an NPDES or WPCF permit or 401 certification. OAR 340-41-027(1) & (2). However, the rule is inadequate to fully protect water quality in the Upper North Santiam. Most significantly, the rule does not address non-point sources of pollution, which appear to be the primary source of the recurrent turbidity problem in the basin. Further, the rule allows discharges from existing facilities (defined as those that existed before

January 28, 1994), OAR 340-41-027(2)(b), and allows pre-existing discharge permits to be renewed or traded. OAR 340-41-027 (3) (at this time, however, no discharge permits (apart from the permits for the ODFW hatcheries) have been issued for the waterbody [Dicksa 1997]). Last, the rule allows DEQ to issue general discharge permits that apply to the waterbodies (DEQ 1997b).

For the Upper North Santiam basin, the Forest Service has identified 32,168 acres in a "matrix" classification in which "programmed harvest", i.e., logging and roadbuilding, may occur (U.S. Forest Service 1995). And additional acres that the agency has designated as "late successional reserves" and "riparian reserves" and in which ostensibly "no harvest" may occur may nonetheless be logged, because the Forest Service does not finally place any trees in such special areas off-limits to logging unless and until it has evaluated a site-specific proposed land use, i.e., a timber sale.

Further, recreational activities on the river and reservoirs threatens water quality. Recreational activities, including camping, boating on the Detroit Reservoir, and recreational mining have contributed to bacteria and turbidity. Moreover, Highway 22, which is both two and four lanes, runs directly beside the river, contributing to increased runoff.

(7) Special Status Conferred on the Upper North Santiam River

The Upper North Santiam River has been designated as follows. While this designation reflects the unique characteristics that distinguish the Upper North Santiam River, it does not provide the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, the EQC alone can establish the missing water quality protection by designating the Upper North Santiam as an ORW.

A. The Upper North Santiam River has been deemed a Tier 2 Key Watershed (OF-110) (FEMAT 1993).

(8) Other Information Relating to the Upper North Santiam River

The U.S. Forest Service, Army Corps of Engineers, and the City of Salem are jointly implementing a water quality monitoring plan which monitors the river for temperature, flow, bacteria, dissolved oxygen, pH, metals, and turbidity. There appears to be no technical limitation with designating the North Santiam as an ORW, because a non-degradation status will protect its outstanding values.

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OUTSTANDING RESOURCE WATER PETITION
for
Waldo Lake

Submitted by:
Oregon Trout, The National Wildlife Federation, and
Northwest Environmental Advocates

December 15, 1997

(1) Identification

Petitioners request that the Oregon Environmental Quality Commission ("EQC") designate Waldo Lake as an Outstanding Resource Water ("ORW") pursuant to Oregon's Anti-Degradation Policy, codified at OAR 340-41-026. Waldo Lake is located in the eastern portion of Lane County in the central Oregon Cascade Mountains. The lake is surrounded entirely by federal public lands under the jurisdiction of the U.S. Forest Service, Willamette National Forest.

Waldo Lake sits in a basin, a 10,000 year-old glaciated depression enclosed by end and lateral moraines, which includes approximately 18,000 acres. The area of the lake is 6,420 acres with a surface elevation of 5,414 feet, and it reaches 420 feet at its maximum depth, making it the second largest natural and second deepest lake in Oregon (U.S. Forest Service 1997). Waldo Lake lies in Township 21 S, Range 6 E, and is in the Willamette River Basin.

The Waldo Wilderness borders the lake to the north, south, and west. To the east and south, the Forest Service has designated 6,470 acres as "Dispersed Recreation--Semi-primitive Nonmotorized" and roughly 1,000 acres as "Semi-Primitive — Motorized." The nonmotorized designation closed the area to motorized use and logging. The motorized designation leaves the lands open to vehicular access and use but also allows no logging.

(1) Unique Character of Waldo Lake

Waldo Lake is one of the purest large bodies of water in the world. Its uniqueness is "world class" (U.S. Forest Service 1997). The lake's unique characteristics are its clarity and color, which are the result of its ultra-oligotrophic nature (DEQ 1995a). Compared to other world-class ultra-oligotrophic lakes, including Biakal Lake, Crater Lake, and Lake Tahoe (which has been designated ORW), "[s]pecific conductance of Waldo Lake is one to two orders of magnitude less than that of the other three; total solids one order of magnitude less. Numbers of phytoplankton and rates of primary productivity are likewise significantly lower in Waldo . . ." (Malueg 1972).

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Waldo Lake's unique characteristics are due to the lake's unusual water chemistry, which equals that of distilled water and supports little to no plant or animal life. In fact, the lake contains the lowest levels of phytoplankton and zooplankton in reported data. However, some mosses have been found to grow at depths of 400 feet, further evidence of the superior clarity of the water, which allows light to penetrate to that depth (Larson 1997).

Waldo Lake has been identified as an "Aquatic Diversity Area" ("ADA") by the American Fisheries Society ("AFS") (Clarke 1997; Li et al. 1995; Oregon AFS 1993). ADA designation indicates the AFS believes Waldo Lake should be protected as part of a statewide "strategy for protecting indigenous aquatic fauna of Oregon" (Li et al. 1995; Oregon AFS 1993). This designation is based upon the following three values:

1) *Genetic Refuge*. A "genetic refuge" is defined as a watershed with "a low incidence of exotic species or limited history of hatchery stocking that may be important to protect examples of native aquatic assemblages." Waldo Lake is located in an area of the Lower Willamette River Basin, which is a genetic refuge for core populations of cutthroat trout (*Salmo clarki*) and rainbow trout (*Oncorhynchus mykiss*), remnant populations of tailed frog (*Ascaphus truei*), and populations of bull trout (*Salvelinus confluentus*) and pacific giant salamander.

2) *Highly Sensitive*. Waldo Lake is in a relatively healthy watershed which is highly sensitive to disturbance or cumulative effects of future human uses due to the low watershed to lake area ratio and due to the limited amount of nutrient inputs that are naturally added to the lake. Ultra-oligotrophic lakes are by nature extremely sensitive to even very small additions of nutrients.

3) *Reference Watershed*. Waldo Lake is a relatively unaltered and characteristic example of an aquatic ecosystem (Oregon AFS 1993).

Waldo Lake supports wildlife such as bear, deer, and bald eagles (Swanson 1997). The aesthetic quality of the lake and surrounding area are pristine. The clarity of the water provides views to depths of 100 feet of the lake, and there are no logging or other extractive resource uses of lands visible from any vantage point in the viewshed of the lake (Swanson 1997).

(2) Beneficial Uses Related to the Unique Character of Waldo Lake

The recognized beneficial uses of Waldo Lake, which are directly related to the unique character of the waterbody include the following: (1) aquatic life; (2) aesthetic quality; (3) resident fish; (4) wildlife; (5) fishing; (6) boating, primarily sailing and canoeing; and (7) water contact recreation (DEQ 1997b). Primary uses of the lake and basin also include dispersed hiking and camping. Hunting is a beneficial use of the basin, as opposed to the lake itself (hunters do not

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shoot at or from the lake), however, the lake is an integral part of the basin. Rainbow trout (which are native to the area), brook trout (*Salvelinus fontinalis*), kokanee trout (*Oncorhynchus nerka*), and landlock sockeye salmon have been found in the lake (Swanson 1997).

A. Aquatic life, resident fish, and fishing: DEQ has found that "despite its ultra-oligotrophic nature, fish in [Waldo Lake] were successfully reproducing and were in extremely good condition" (Newell 1997) (emphasis added). Waldo Lake supports these beneficial uses as the lake provides critical habitat for the following species:

1) Bull trout (*Salvelinus confluentus*), which are federally-listed as "Category 1" candidate species. Bull trout are also designated as "critical" on the Oregon sensitive species list (ODFW 1996). "Critical" is defined as "species for which listing as threatened or endangered is pending, or those for which listing as threatened or endangered may be appropriate if immediate conservation actions are not taken. Also considered critical are some peripheral species which are at risk throughout their range and some disjunct population" (ODFW 1996). Bull trout are listed on the Oregon sensitive species list because of "[d]ecline in habitat, range, number of populations, and population connectivity" (ODFW 1996).

   On June 13, 1997, the U.S. Fish and Wildlife Service issued a proposed rule to list bull trout in the Columbia River basin (as well as other areas of the species' historic range) as a threatened species under the federal ESA. 62 Fed. Reg. 32268 (June 13, 1997). The Service has until June, 1988, to make a final determination on the proposed rule.

2) Tailed frog (*Ascaphus truei*), which are designated as "vulnerable" on the Oregon sensitive species list (ODFW 1996). "Vulnerable" is defined as "[s]pecies for which listing as threatened or endangered is not believed to be imminent and can be avoided through continued or expanded use of adequate protective measures and monitoring. In some cases, populations are sustainable and protective measures are being implemented; in others, populations may be declining and improved protective measures are needed to maintain sustainable populations over time" (ODFW 1996). Tailed frog are listed on the sensitive species list because of their decline in population numbers (ODFW 1996).

3) Cutthroat trout (*Salmo clarki*).

4) Rainbow trout (*Oncorhynchus mykiss*): Rainbow are most commonly found in waterbodies that are inaccessible to anadromous fish (Kostow 1995). Freshwater habitat degradation that affects water quality in turn affects rainbow trout. Favorable rainbow habitat is "structurally complex

with large instream wood, flood plains, beaver ponds, braided channels, and coastal marshes and bogs" (Kostow 1995). However, human activities, including logging and road construction, have altered these ecosystems, by removing components that were essential to rainbow trout production, and had the most widespread impact on the populations (Kostow 1995).

5) Brook trout (latin): Historically, Waldo Lake was stocked with brook trout. In 1991, the Waldo Wilderness Council sued ODFW, asserting that stocking had added nutrients to the lake and thereby harmed water quality, and that the stocking therefore required a pollution discharge permit from DEQ. Subsequently, ODFW suspended stocking for five years, and it currently has no plans to resume stocking (U.S. Forest Service 1997). Nonetheless, the Forest Service has concluded that brook trout appear to be able to successfully survive and reproduce in Waldo Lake (Ibid.).

B. Wildlife: Waldo Lake supports this beneficial use as the lake provides habitat for the following species:

1) Bald eagle (*Haliaeetus leucocephalus)*, which are listed as "threatened" under both the state and federal Endangered Species Acts. Bald eagles are listed as threatened because of "[h]abitat loss through liquidation of late-successional/old-growth forests and trees, recreational developments, and other human activities; shooting; abnormally low reproduction caused by contaminants, including DDE (a metabolite of DDT), PCBs, and dioxin; lead poisoning; exposure to poisons used in pest control activities; power line electrocutions; and collisions" (ODFW 1996).

C. Water Contact Recreation: Waldo Lake supports this beneficial use as it provides for:

1) Swimming (in the summer) is a popular use of Waldo Lake. Moreover, most boat use is by canoe, kayak, or sailboat, all of which (depending on one's level of skill) involve frequent contact with water (U.S. Forest Service 1997). Motorized boats are currently allowed on Waldo Lake.

(4) Relationship Between the Unique Character and the Water Quality of Waldo Lake

Waldo Lake's unique characteristics, color and clarity, are both directly related to water quality. The water quality parameters affecting the special water quality values that are vital to the unique character of Waldo Lake are turbidity and the size and distribution of suspended particles (DEQ 1995a).

- Turbidity:

  No more than a ten percent cumulative increase in natural stream turbidities shall be allowed (DEQ 1997a).

- pH:

  Between 7.0-8.5 for the Columbia River, 6.5-8.5 for all other basin waters (except Cascade lakes), and 6.0-8.5 for Cascade lakes above 3,000 feet altitude (DEQ 1997a).

Although DEQ uses numeric criteria almost exclusively to determine whether beneficial uses are being protected, it has also utilized two narrative criteria: habitat modification and flow modification. When using these two criteria to determine whether a waterbody is supporting its beneficial uses, however, DEQ has stated that a waterbody will violate these narrative criteria only when it also violates "an associated numeric water standard" (DEQ 1995b). By interpreting a violation of narrative criteria to be wholly dependant upon an associated violation of numeric criteria, DEQ has eliminated much of the protections that narrative criteria offer for beneficial uses.

Therefore, in order to protect the beneficial uses listed in this petition and to reduce risk to the listed species, the EQC is provided by law with two options. One, rewrite the numeric and narrative criteria so that they actually protect the full suite of habitat requirements necessary to support the beneficial uses listed, as required by 33 U.S.C. § 1313(c)(2) and 40 C.F.R. § 131.3; or two, protect the existing high quality values of Waldo Lake by designating it as an ORW.

(5) Past and Present Threats to Water Quality in Waldo Lake

DEQ has found that the "limnological data are adequate to establish the water quality parameters of concern" for Waldo Lake (DEQ 1995a). Despite its relatively pristine water quality, DEQ has expressed serious concern about water quality in Waldo Lake. "[C]omparisons of the data through time do show one significant change . . . . Measures of productivity in the lake have increased an order of magnitude between 1970 and 1990. Zooplankton abundance has also increased between 10 and 100 fold over a similar time period . . . , these increases are extremely large and warrant concern that the lake is being unduly impacted" (DEQ 1997e). Increased sediment, turbidity, motor oil, and nutrient loading would have a direct impact on the color and clarity of the water, by encouraging plant growth and increasing suspended particles.

Similarly, the Forest Service has found:

> [T]here is direct evidence which indicates a change in the limnology of Waldo Lake since 1966. Changes in the zooplankton data indicate: 1) zooplankton have become many more times abundant; 2) species composition has entirely changed; 3) some taxa, particularly

> larger-bodied zooplankters have apparently disappeared; 4) diversity has decreased, particularly amoung [sic] rotifers. In addition, there has been a 20-fold decrease in primary productivity of phytoplankton since 1969, with less blue light transmitted to deeper regions of the lake. This reduction in blue light in the deep water benthic zone[,] combined with an increase in late-water alkalinity[,] may have created a less favorable environment for benthic plants and associated biota. Studies have indicated the importance of benthic productivity in Waldo Lake associated with the lake's internal nutrient supply being tied up in these benthic plants. Recent evidence suggests a decline in at least some benthic plants and organisms which depend on them for food and habitat.
>
> (U.S. Forest Service 1997).

These changes are likely due to activities that the Forest Service itself has allowed. In 1971, Waldo Lake experienced 18,700 visitor use days. Relatively poor road access prevented a greater number of visitors. However, after the Forest Service built a paved road leading directly to the lake, visitor use soared dramatically: in 1992, the lake experienced 144,000 visitor days (DEQ 1997e). In addition to permitting increased recreational use, the road contributed to increased surface runoff.

Currently, Waldo Lake supports three major campgrounds equipped for large recreational vehicles, and forty-five to fifty dispersed camping sites. To accommodate visitors, the Forest Service has constructed sixteen pit toilets, eleven "comfort stations" (i.e., flush toilets on septic systems), and two recreational vehicle "dump" stations (U.S. Forest Service 1997). Incredibly, the two dump stations are the only dump stations in the Willamette National Forest (Newell 1997). Most of the pit toilets are located next to comfort stations, to handle overflow. But two are isolated and near the lake; one is on Rhododendron Island in the lake itself, and too close to the shore (Ibid.; U.S. Forest Service). The eleven comfort stations all have adjacent drainfields, and seven of the eleven stations are within 300 feet of the lake (Ibid.).

The pit toilets and comfort station drainfields at these sites are likely leaching; the drainfields, for example, are generally twenty-five years old or older (Newell 1997). These sources contribute nutrients to the lake and threaten water quality. "The soils around Waldo Lake are extremely porous, so nutrients from the on-site systems are likely leaching into the lake" (DEQ 1997e). Science has not established any one source of increased nutrient loading. The cumulative effects of campground recreation, fire management, and dispersed camping are also likely threats to water quality.

(6) Impending Threats to Waldo Lake

Motorboats and campgrounds, especially the pit toilets and septic systems, continue to threaten water quality by causing increased levels of nutrients, sediment, motor oil, and turbidity.

DEQ previously identified "human waste as an important management consideration" for

Waldo Lake, and recommended that the Forest Service replace the pit toilets with vaulted toilets, close camping sites with pit toilets too close to the lake shore, evaluate other camping sites for impacts, and modify future management of septic systems (DEQ 1997a).

As noted, motorboats comprise a relatively small minority of boats that use Waldo Lake, fourth in number behind canoes, kayaks, and sailboats (U.S. Forest Service 1997). Nonetheless, motorboats are permitted on the lake. And ninety-five percent of the motorboats on the lake operate with two-stroke engines, which burn a mixture of gasoline and oil incompletely, and discharge both. Although DEQ recently found that "[n]o impacts from gasoline powered boats have been documented" on Waldo (DEQ 1997e), in fact, no specific studies aimed at testing specifically for motor boat pollution have been performed. Significantly, the regional governing body for Tahoe Lake in California and Nevada, which is an ORW, found that two stroke engines significantly degrade water quality, and it banned boats with the engines from Tahoe beginning in 1999. DEQ has recognized that "[i]t is possible that maintaining the water quality values in Waldo Lake would require the eventual curtailment of motorized boat activity" (DEQ 1995).

The Forest Service has prepared a "Water Quality Strategy" for Waldo Lake, which is currently being implemented in part. However, the strategy fails to adequately protect the lake: under the strategy, problems concerning leaching pit toilets and septic systems are only "under study," with removal and replacement by vault toilets contingent upon the results of the study (U.S. Forest Service 1997). Effects from motor boats are also "under study," and long-term recommendations by the Forest Service are merely to develop and implement a comprehensive water quality monitoring plan, and not to remove boat access (U.S. Forest Service 1997).

(7) Special Status Conferred on Waldo Lake

Waldo Lake has been attributed with the following designations. While these designations reflect the unique characteristics that distinguish Waldo Lake, none provides the comprehensive oversight and management planning necessary to fully protect these characteristics. Significantly, the Environmental Quality Commission ("EQC") alone can establish the missing water quality protection by designating Waldo Lake as an ORW.

A. Waldo Lake is a state scenic waterway, which gives it priority status for nomination as an ORW (DEQ 1997d). The Oregon Legislature enacted the state scenic waterways program in part specifically to "preserve the natural setting and water quality of [Waldo L]ake and such rivers" as are designated under the act. ORS 390.815.

(8) Other Information Related to Waldo Lake

DEQ identified Waldo Lake as a potential ORW in its 305(b) Report in 1992. In 1995, DEQ internally recommended Waldo Lake to the EQC for ORW designation, calling the lake a "logical choice" for such status (DEQ 1995a). DEQ found that no technical limitation on

designating Waldo Lake as an ORW, and DEQ stated that applying nondegradation status to the lake will maintain its outstanding values. The EQC reportedly chose to not give Waldo Lake (or any other water body) status as an ORW, on the ground that an DEQ needed to create an ORW designation policy first (DEQ 1997e). In 1997, DEQ summarized this history, and characterized Waldo Lake as "an excellent and likely candidate for [ORW] classification" (Newell 1997).

(9) Data Sources

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/ / /

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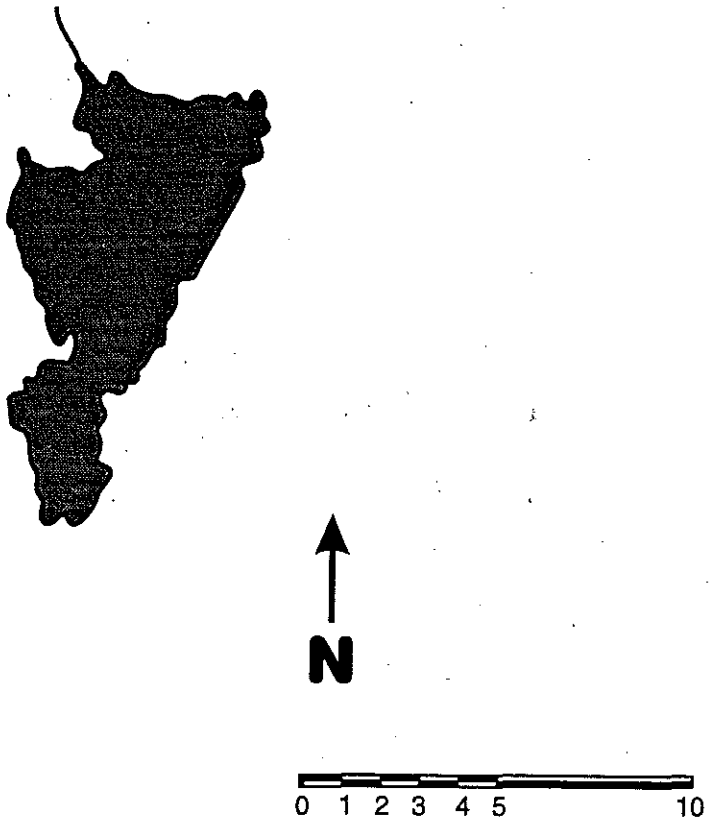
Waldo Lake



Environmental Quality Commission

☐ Rule Adoption Item
☒ Action Item
☐ Information Item

Agenda Item B
January 9, 1998, Meeting

Title Approval of Tax Credits

Summary

Staff recommends the approval of tax credits as follows:

0	**Pollution Prevention**			**$**	**-**
2	**Pollution Control**			**$**	**498,332**
0		Air	$ -		
0		Noise	$ -		
2		Field Burning	$ 498,332		
0		Water	$ -		
0		USTs	$ -		
0	**Plastic Recycling**			**$**	**-**
2	**Total Tax Credits**			**$**	**498,332**

Approve the two tax credit applications represented in Attachment A of the staff report.

Margaret Vandehey — Report Author
Helen Lottridge — Division Administrator
Langdon Marsh — Director

Accommodations for disabilities are available upon request by contacting Public Affairs Office at (503) 229-5317 (voice) or (503) 229-6993 (TDD).

State of Oregon

Department of Environmental Quality Memorandum

Date: January 8, 1998

To: Environmental Quality Commission

From: Langdon Marsh, Director

Subject: Agenda Item F, January 9, 1998
Approval of Tax Credit Applications Deferred December 30, 1997

Statement of the Need for Action

This report presents the Department's response to the Commission's request regarding two field burning Pollution Control Facility Tax Credits. These tax credits were presented for approval on December 30, 1997, but deferred until January 9, 1998.

Applications for Approval

A summary of the tax credits presented for approval are presented below. Review Reports and the requested documentation are presented in Attachment A of this staff report.

Applications for Pollution Control Facilities Tax Credit

App. #	Applicant	Description of Facility	Certified Cost	Percent Allocable	Certificate Value
	Field Burning				
4890	Dean McKay Farms, Inc.	New Farm equipment, 8870 John Deere Tractor, John Deere 995 HC 8 Bottom Plow, 4430 Ford Tractor, Two 515 Holland Baler, 14' rear Flail & 15' rear Flail.	$249,836	86%	$ 107,429
4891	Mark McKay Farms, Inc.	New Farm Equipment, 8400 John Deere Tractor, John Deere Chisel Plow, 4430 Ford Tractor, Allen Rakes, 585 Holland Baler, 1095 Holland Stacker.	$248,496	88%	$ 109,338
	2	**Field Burning**	**$498,332**		**$216,768**
	2	**Pollution Control**	**$498,332**		**$216,768**

Background and Discussion of Issues

The Commission asked the Department to clarify several facts regarding applications number 4890 and number 4091.

1. The claimed cost of each facility is just under $250,000. The cost has not been adjusted to avoid the Department's independent accountant's review as verified by the invoices included with the respective Review Reports presented in Attachment A.

2. The applicant's names are Dean McKay Farms, Inc., and Mark McKay Farms, Inc. Their addresses are 19172 and 19393; both on French Prairie Road NE in St. Paul. They are a sixth-generation agricultural family in the Willamette Valley.

   Each of the McKay brothers inherited equal acreage from their father and therefore, the 1000 acres owned by each is identical.

   Their businesses are completely separate.

3. Both applicants purchased Ford 4430 tractors and various similar implements that are similar. No piece of equipment is claimed twice. The tractors have separate identification number as shown on the invoices in Attachment A.

4. Both applicants provided a written statement (Attachment A) of the use of their implements to show that the equipment claimed was not excessive for the purpose of removing acreage from field burning. The usage is reflected in the Annual Operating Hours section of the Review Report.

Conclusions

The recommendations for action on the attached applications are consistent with statutory provisions and administrative rules related to the pollution control, pollution prevention and reclaimed plastic product tax credit programs.

Recommendation for Commission Action

Approve issuance of tax credit certificates for the applications presented in Attachment A of the staff report.

Intended Follow-up Actions

Notify applicants and the Department of Revenue of Environmental Quality Commission actions.

Attachments

A. Pollution Control Tax Credit Application Review Reports for Approval

Reference Documents (available upon request)

1. ORS 468.150 through 468.190.
2. OAR 340-16-100 through 340-16-125.
3. OAR 340-16-005 through 340-16-050.
4. ORS 468.925 through 468.965.
5. OAR 340-17-010 through 340-17-055.

Approved:

Section:

Division:

Report Prepared By: Margaret Vandehey
Phone: (503) 229-6878
Date Prepared: January 8, 1998

Taxshare\eqc\9801_deq.doc

Attachment A

State of Oregon
Department of Agriculture

TAX RELIEF APPLICATION REVIEW REPORT

1. Applicant

Dean McKay Farms, Inc.
19172 French Prairie Road NE
St. Paul OR 97137

The applicant owns and operates a grass seed farm operation in Marion County, Oregon.

Application was made for tax credit for air pollution control equipment.

2. Description of Claimed Facility

The equipment described in this application is located at 19224 French Prairie Road NE, St. Paul, Oregon. The equipment is owned by the applicant.

(2) New Holland balers	$ 54,000
(2) Rear's Flails	$ 27,406
John Deere 995 8 bottom plow	$ 12,430
Ford 4430 tractor	$ 32,500
John Deere 8870 tractor	$ 123,500

Claimed equipment cost: $249,836
(Accountant's Certification was provided.)

3. Description of Farm Operation Plan to Reduce Open Field Burning.

The applicant has 1,000 acres of perennial grass seed under cultivation. In the past, the applicant open burned as many acres as the weather and smoke management program permitted. Some acreage was baled each year with the stacks of baled straw often burned.

As the applicants moved away from burning they turned more toward custom balers to remove the bulk straw. The applicant's alternatives to open field burning and stack burning has evolved to a bale and flail/plow operation.

To be able to have more control over straw removal and field preparation the applicant has purchased the listed equipment.

4. Procedural Requirements

The equipment is governed by ORS 468.150 through 468.190, and by OAR Chapter 340, Division 16. The equipment has met all statutory deadlines in that:

Purchase of the equipment was substantially completed on October 30, 1997. The application was submitted on November 25, 1997; and the application for final certification was found to be complete on December 11, 1997. The application was filed within two years of substantial completion of the equipment.

5. Evaluation of Application

a. The equipment is eligible under ORS 468.150 because the equipment is an approved alternative method for field sanitation and straw utilization and disposal that reduces a substantial quantity of air pollution. This reduction is accomplished by reduction of air contaminants, defined in ORS 468A.005; by reducing the maximum acreage to be open burned in the Willamette Valley as required in OAR 340-26-013; and, the facility's qualification as a "pollution control facility", defined in OAR 340-16-025(2)(f) A): "Equipment, facilities, and land for gathering, densifying, processing, handling, storing, transporting and incorporating grass straw or straw based products which will result in reduction of open field burning."

b. Eligible Cost Findings

In determining the percent of the pollution control equipment cost allocable to pollution control, the following factors from ORS 468.190 have been considered and analyzed as indicated:

1. The extent to which the equipment is used to recover and convert waste products into a salable or usable commodity.

   Some of the equipment promotes the conversion of a waste product (straw) into a salable commodity by providing removal from the fields.

2. The estimated annual percent return on the investment in the equipment.

   There is no annual percent return on the investment as applicant claims no gross annual income.

3. The alternative methods, equipment and costs for achieving the same pollution control objective.

   The method chosen is an accepted method for reduction of air pollution. The method is one of the least costly, most effective methods of reducing air pollution.

4. Any related savings or increase in costs which occur or may occur as a result of the purchase of the equipment.

   There is an increase in operating costs of $37,475.40 to annually maintain and operate the equipment. These costs were considered in the return on investment calculation.

5. Any other factors which are relevant in establishing the portion of the actual cost of the equipment properly allocable to the prevention, control or reduction of air pollution.

The established average annual operating hours for tractors is set at 450 hours. To obtain a total percent allocable, the annual operating hours per implement, per tractor used in reducing acreage open field burned is as follows:

FORD 4430 85hp TRACTOR

Implement	# acres	implement capacity	annual operating hours
baler	500	4	125
rake	500	5	100
flail	500	5	100
Total annual operating hours			325

The total annual operating hours of 325 divided by the average annual operating hours of 450 produces a percent allocable of 72%.

8870 JOHN DEERE 225hp TRACTOR

Implement	# acres	implement capacity	annual operating hours
Chisel plow	1,000	7	143
Disc	500	7	71
8 bottom plow	500	7	71
Harrow & roll	500	7	71
Total annual operating hours			356

The total annual operating hours of 356 divided by the average annual operating hours of 450 produces a percent allocable of 79%.

Equipment	Claimed cost	Percent allocable	Cost allocable
New Holland Balers	$ 54,000	100%	$ 54,000
Rear's flails	$ 27,406	100%	$ 27,406
JD 995 8 bottom plow	$ 12,430	100%	$ 12,430
JD 8870 tractor	$123,500	79%	$ 97,565
Ford 4430 tractor	$ 32,500	72%	$ 23,400
TOTAL	$249,836	86%	$214,801

The actual cost of the equipment properly allocable to pollution control as determined by using these factors is 86%.

6. Summation

a. The equipment was constructed in accordance with all regulatory deadlines.

b. The equipment is eligible under ORS 468.150 as an approved alternative method for field sanitation and straw utilization and disposal that reduces a substantial quantity of air pollution as defined in ORS 468A.005

c. The equipment complies with DEQ statutes and rules.

d. The portion of the equipment that is properly allocable to pollution control is 86%.

7. The Department of Agriculture's Recommendation

Based upon these findings, it is recommended that a Pollution Control Facility Certificate bearing the cost of $249,836, with 86% allocated to pollution control, be issued for the equipment claimed in Tax Credit Application Number TC-4890.

Jim Britton, Manager
Smoke Management Program
Natural Resources Division
Oregon Department of Agriculture
(503) 986-4701
FAX: (503) 986-4730

JB/rc
Thu, Jan 8, 1998

FORD NEW HOLLAND

SALEM FORD NEW HOLLAND, INC.
3593 SILVERTON ROAD N.E.
SALEM, OREGON 97305
(503) 364-2241 • (800) 255-5597 (In OR)

Quote to: Dean McKay Farm INC Date 12-27-95

St. Paul, OR

Phone # Fax 633-4058 Quote Good Thru: 12-29-95

QTY.	DESCRIPTION	MODEL	CATALOG NO.	SERIAL NO.	UNIT PRICE	AMOUNT
1	Mid. Engine DR	515				$
	3 Tie Baler					
	– oiler					
	– lights					
	– H.D. Knotters w/Fan					
	– Steering Kit					
	– Setup Field ready + Field start					
					List	$43,122.00
				Net Price w/Low APR		$37,000.00

ITEM DESCRIPTION	MAKE	MODEL	SERIAL NO.	SUB-TOTAL	$

TOTAL TRADE-IN ALLOWANCE $	LESS AMOUNT OWED $	- NET TRADE IN ALLOWANCE	(
		SALES TAX	
		RECORDING OR FILING FEES	
$37,000.00 one Baler		SUB TOTAL	$
($3700.00) Down		CASH RECEIVED	(
$33,300.00 Balance		AMOUNT FINANCE	

Low APR 1.9% (3 annual)
Payments $11,524.44 each

NEW HOLLAND

Corvallis Ford New Holland, Inc.
2625 S.E. Third St., P.O. Box 776
Corvallis, Oregon 97339
(541)
(503) 757-8112

INVOICE

No. 405

SOLD TO: Deric McKay Farms Inc.

DATE: 4-14-97

Fax 503 753 4058
Office 503 753 4052

QTY	DESCRIPTION	MODEL	CATALOG NO.	SERIAL NO.	UNIT PRICE	AMOUNT
1	Baler	515		559019		$ 17,000.00

COMPLETE THIS SECTION FOR TRADE-INS

ITEM DESCRIPTION	MAKE	MODEL	SERIAL NO

SUB TOTAL	$ 17,000 00
FREIGHT	
ASSEMBLY & HANDLING	
EXCISE TAX	
TOTAL PRICE OF GOODS	
NET TRADE-IN ALLOWANCE	( )
SALES TAX	
RECORDING OR FILING FEES	
SUB TOTAL	$ 17,000 00
LESS: PURCHASE CONTRACT PRINCIPLE AMOUNT FINANCED	( )
CASH RECEIVED	17,000 00
*CHARGED TO YOUR ACCOUNT	$

TOTAL TRADE-IN ALLOWANCE $ LESS AMOUNT OWING $

THE BUYER REPRESENTS THAT HE/SHE OWNS THE ABOVE TRADE-INS FREE AND CLEAR OF ANY ENCUMBRANCE EXCEPT THAT INDICATED PAYABLE TO:

STATEMENT CONCERNING WARRANTIES

Except for express written warranties made by manufacturers of goods, THERE ARE NO WARRANTIES, EXPRESS, STATUTORY, OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS; WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. NOTE, HOWEVER, THAT SOME STATES DO NOT PERMIT LIMITATIONS OR EXCLUSIONS OF IMPLIED WARRANTIES, SO THESE LIMITATIONS MAY NOT APPLY. No warranty whatsoever is made on any used, secondhand, altered, or rebuilt goods; such goods are sold "AS IS".

"TERMS": —net cash due on the first of the month following purchase. A FINANCE CHARGE (in the United States), SERVICE CHARGE (in Canada), is computed by a "periodic rate" of 1-1/2% per month on the unpaid balance. This is an ANNUAL PERCENTAGE RATE of 18%, or at the highest rate permitted by law, applied to the previous unpaid balance after deducting current payments or credits as shown hereon. No FINANCE/SERVICE CHARGE will be assessed if the computed amount of the FINANCE/SERVICE CHARGE is less than $1.00. This FINANCE CHARGE or SERVICE CHARGE is computed at an ANNUAL PERCENTAGE RATE of 18% or at the highest rate permitted by law in all states or provinces except:

	Per Month	Per annum
Connecticut	1.25%	15.00%
Minnesota	1.0%	12.00%
New Mexico	1.0%	12.00%
Ohio	1.0%	12.00%
Pennsylvania	1.25%	15.00%
Washington	1.0%	12.00%

Title to the goods shall remain in the seller and the seller's assigns until the unpaid balance of the price has been fully paid.

BUYER'S SIGNATURE

FORD NEW HOLLAND REPRESENTATIVE

01/07/98 17:53 ☎503 986 4730 NATURAL RESOURCE ⌀007

Phone 633-4111
St. Paul
223-6752
Portland
362-0136
Salem

NO. 02425

ERNST HARDWARE CO.

20179 MAIN ST. N.E. – P.O. BOX 38
ST. PAUL, OREGON 97137

JOHN DEERE

CUSTOMER NO. 06619

SALESMAN [signature]

SOLD TO: Dean McKay Farms Inc
19772 French Pr Rd
St Paul OR 97137

PURCHASE AGREEMENT

Title to merchandise listed below is retained by Ernst Hardware until purchase price has been paid in full. Failure to pay purchase price within 45 days shall be a default and Ernst Hardware shall have right to repossess merchandise as well as all other rights contained in ORS CH'S 72 & 79.

DATE 2-17-96

QUAN.	B/O	PART/STOCK NUMBER	DESCRIPTION	PRICE UNIT	PRICE TOTAL	OFFICE USE ONLY
		B03577	Rakes 14 ft. w/ Garlic fluffer ⇒	"	14656.00	
			1418 Rotary cutter		(5250.00)	

Thank You

TERMS: [signature]

TOTAL ▶ 9406

Terms Net Cash. All accounts due and payable 10th of month following purchase.
1½% per month (18% annual percentage rate) will be added from 1st of month following purchase on over due accounts. MINIMUM SERVICE CHARGE 50¢.

URCHASER AGREES TO THE TERMS HEREOF: RECEIVED BY PURCHASER X

ANY WARRANTIES ON THE PARTS AND OR ACCESSORIES SOLD HEREBY ARE THOSE MADE BY THE MANUFACTURER. THE SELLER, ERNST HARDWARE COMPANY HEREBY EXPRESSLY DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR THE PARTICULAR PURPOSE.

Customer Purchase Order for John Deere Products

1026…

CUSTOMER'S NAME (FIRST, MIDDLE, LAST): … Farm INC

DATE OF ORDER: 1-15-96 | COMPANY UNIT | DEALER ORDER NO. | DEALER ACCOUNT NO. 7857

CASH SALE | LEASE | TIME SALE | LISOC. SEC. | IRS NO. | EIN NO. | PURCHASER SALES TAX EXEMPT. NO.

SELLER'S NAME & ADDRESS: Lenon Implement Co. 2175 N. Pacific HWY Woodburn, OR 97071 (503) 981-1052

STREET OR RR | TOWN | STATE | ZIP CODE | COUNTY | PURCHASER ACCT. | PHONE NUMBER

CUSTOMER'S NAME - Second Signer

STREET OR RR | TOWN | STATE | ZIP CODE

CUSTOMER IS: ☒ Business ☐ Individual | CPP: ☐ Accepted ☐ Rejected | ADD CUSTOMER NAME TO MAIL LIST: CP (Check only one box) Residential ☐H Commercial ☐C Part time Farmer ☐F | AG ☒A

(We) the undersigned, hereby order from you the Product described below, to be delivered as shown below. This order is subject to your ability to obtain such Product from the manufacturer and you shall be under no liability if delivery of the Product is delayed or prevented due to labor disturbances, transportation difficulties, or other reason beyond your control. The price shown below is subject to your receipt of the Product prior to any change in price by the manufacturer. It is also subject to any new or increased taxes imposed upon the sale of the Product after the date of this order.

QTY	PRODUCT (Give Model, Size & Description) (Hours of Use)	PRODUCT IDENTIFICATION NO.	DELIVERED CASH PRICE (Or Total Lease Payments)
	Rears 15" Pak-Chopper		12,750.00
	RCH 15 … 946		
	w/ Hardface Kit		
	3/4" Cylinder		
	(2) 1/2" x … hydraulic hoses		
	1/2 x 15		
	… Delivery		

(We) agree to sell, transfer and convey the following item(s) at or prior to the time of delivery of the above Product, … to be applied against the cash price. Such item(s) shall be free and clear of all security agreements, liens, … at the time of transfer to you. The following is a description and the price to be allowed for each item.

1. TOTAL CASH PRICE

QTY	DESCRIPTION OF TRADE-IN	PRODUCT IDENTIFICATION NO.	AMOUNT
	Lathrop 20' Flail 240BP-SHE	01-M-1-57	<10,000.00>
	Hydraulic transport (and)		
	Constant Velocity PTO, Hardsurface Knives		
	200 HP Gearbox		

PURCHASER TYPE (Check One) | MARKET USE (Check One) Agriculture: ☐ 17 General Utility ☐ 18 Livestock/Feedlot/Dairy ☒ 19 Row Crop/Small Grain ☐ Specialty Crop; Rental & Lease Companies: ☐ 97 Deere Dealer ☐ 98 Independent ☐ 99 Undefined Govt. Use; Utility Companies: ☐ 82 Gas/Water/Electric ☐ 81 Telephone | Other: ☐ 41 Building & Housing Construction ☐ 71 Airports ☐ 94 Golf Courses ☐ 92 Highway Mowing ☐ 95 Institutions (schools/churches/hosp.) ☐ 93 Nursery/Landscape ☐ 87 Parks & Cemeteries ☐ 89 Residential ☐ 84 Sanitary Landfill/Refuse ☐ 74 Railroads ☐ 49 Highways & Streets ☐ 43 Sewer & Water

2. TOTAL TRADE-IN ALLOWANCE
3. BALANCE
4. SALES TAX
5. SUB-TOTAL
6. CASH WITH ORDER
7. BALANCE DUE

IMPORTANT WARRANTY NOTICE: The John Deere warranty applicable to new John Deere product(s) is printed on the back side of this document. There is no warranty on used products. The new product warranty is part of this contract. Please read it carefully. **YOUR RIGHTS AND REMEDIES PERTAINING TO THIS PURCHASE ARE LIMITED AS SET FORTH IN THE WARRANTY AND THIS CONTRACT. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS ARE NOT MADE AND ARE EXCLUDED UNLESS SPECIFICALLY PROVIDED IN THE JOHN DEERE WARRANTY.**

ACKNOWLEDGEMENTS - I (We) promise to pay the balance due (line 7) shown above in cash, or to execute a Time Sale Agreement (Retail Installment Contract), a Lease Agreement, for the purchase price of the Product, plus additional charges shown thereon or execute a Lease Agreement, on or before delivery of the Product ordered herein. Despite physical delivery of the Product, title shall remain in the seller until one of the foregoing is accomplished.

Customer Signature: [signature]

Accepted By ______ (Authorized Signature of Seller)

Date Accepted ______ Salesman Jim

DELIVERY ACKNOWLEDGEMENT | DELIVERED ON: | WARRANTY BEGINS: | SIGNATURE: (DEALER)

Customer Purchase Order for John Deere Products

1104777

CUSTOMER'S NAME - First Signer (First, Middle Initial, Last)	Dean McKay Farms
DATE OF ORDER	9/30/96
DEALER ACCOUNT NO.	0688
STREET OR RR	19772 French Pr. Rd
SELLER'S NAME & ADDRESS	Ernst Hardware Co, PO Box 38, St Paul OR 97137
TOWN	St. Paul
STATE	OR
ZIP CODE	97137
COUNTY	Marion
PHONE NUMBER	5036337405
CUSTOMER'S NAME - Second Signer	
STREET OR RR	
TOWN / STATE / ZIP CODE	

CUSTOMER IS: Business / Individual — APP: Accepted / Rejected

ADD CUSTOMER NAME TO MAIL LIST — CP (Check only one box): Residential H, Commercial C, Part-Time Farmer F — AG: A

I (We), the undersigned, hereby order from you the Product described below, to be delivered as shown below. This order is subject to your ability to obtain such Product from the manufacturer and you shall be under no liability if delivery of the Product is delayed or prevented due to labor disturbances, transportation difficulties, or for any reason beyond your control. The price shown below is subject to your receipt of the Product prior to any change in price by the manufacturer. It is also subject to any new or increased taxes imposed upon the sale of the Product after the date of this order.

QTY.	NEW	USED	RENTAL	DEMO	PRODUCT (Give Model, Size & Description) (Hours of Use)	PRODUCT IDENTIFICATION NO.	DELIVERED CASH PRICE (Or Total Lease Payments)
1	X				995 Plow	N00995X001149	12430

SAFETY live with it

I (We) offer to sell, transfer, and convey the following item(s) at or prior to the time of delivery of the above Product, as "trade-in" to be applied against the cash price. Such item(s) shall be free and clear of all security agreements, liens, and encumbrances at the time of transfer to you. The following is a description and the price to be allowed for each item:

1. TOTAL CASH PRICE: 12430

QTY.	DESCRIPTION OF TRADE-IN	PRODUCT IDENTIFICATION NO.	AMOUNT
1	Lowis 8 Bottom Switch	SN 1160	8500

PURCHASER TYPE (Check One)
Private: 1 Commercial; 8 Residential; 9 Farm
Other: 2 Federal Govt.; 3 State/Province; 4 County; 5 City/Town/Village; 6 Armed Forces; 7 National Account

MARKET USE (Check One)
Agriculture: 17 General Utility; 13 Livestock/Feedlot/Dairy; 15 Row Crop/Small Grain; 16 Specialty Crop
Rental & Lease Companies: 97 Deere Dealer; 96 Independent; 98 Undefined Govt. Use
Utility Companies: 82 Gas/Water/Electric; 81 Telephone
Other: 41 Building & Housing Construction; 71 Airports; 94 Golf Courses; 92 Highway Mowing; 95 Institutions (schools/churches/hosp.); 93 Nursery/Landscape; 87 Parks & Cemeteries; 89 Residential; 84 Sanitary Landfill/Refuse; 74 Railroads; 48 Highways & Streets; 49 Sewer & Water

2. TOTAL TRADE-IN ALLOWANCE	
3. BALANCE	
4. SALES TAX	
5. SUB-TOTAL	
6. CASH WITH ORDER	
7. BALANCE DUE	3930

IMPORTANT WARRANTY NOTICE: The John Deere warranty applicable to new John Deere product(s) is printed on the back side of this document. There is no warranty on used products. The new product warranty is part of this contract. Please read it carefully. **YOUR RIGHTS AND REMEDIES PERTAINING TO THIS PURCHASE ARE LIMITED AS SET FORTH IN THE WARRANTY AND THIS CONTRACT. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS ARE NOT MADE AND ARE EXCLUDED UNLESS SPECIFICALLY PROVIDED IN THE JOHN DEERE WARRANTY.**

ACKNOWLEDGEMENTS - I (We) promise to pay the balance due (line 7) shown above in cash, or to execute a Time Sale Agreement (Retail Installment Contract), or a Loan Agreement, for the purchase price of the Product, plus additional charges shown thereon or execute a Lease Agreement, on or before delivery of the Product ordered herein. Despite physical delivery of the Product, title shall remain in the seller until one of the foregoing is accomplished.

Customer's Signature: Dean McKay Farms, Inc by [signature]

Accepted By: [signature] (Authorized Signature of Dealer)

Customer's Signature: [signature]

Date Accepted: — Salesman: [signature]

DELIVERY ACKNOWLEDGEMENT	DELIVERED ON:	WARRANTY BEGINS	SIGNATURE (DEALER)
		9-30-96	[signature]

DF-2085 Stock (Eff. 08-93) (Reprint 08-97) Printed in U.S.A.

CUSTOMER COPY

NEW HOLLAND

SALEM FORD NEW HOLLAND, INC.
3593 SILVERTON ROAD N.E.
SALEM, OREGON 97305
(503) 364-2241 • (800) 255-5597 (in OR)

"Our priorities are simple: your confidence, your satisfaction . . . your trust."

Quote to: Dean McKay Farms, Inc. Date: 10-31-96

St Paul OR 97137

Phone # Fax 633-4058 Quote Good Thru: _____

QTY.	DESCRIPTION	MODEL	CATALOG NO.	SERIAL NO.	UNIT PRICE	AMOUNT
						$
1	Ford 70 hp new tractor w/cab & 4wd - Horizontal Exhaust			w/1.9%		32500 00

COMPLETE THIS SECTION FOR TRADE-INS					
ITEM DESCRIPTION	MAKE	MODEL	SERIAL NO.	SUB-TOTAL	$32500 00
TOTAL TRADE-IN ALLOWANCE $		LESS AMOUNT OWED $		- NET TRADE IN ALLOWANCE	(
				SALES TAX	
				RECORDING OR FILING FEES	
				SUB TOTAL	$
				CASH RECEIVED	(
				AMOUNT FINANCE	

1.9% = 36 mos.
3.9% = 48 "
4.9% = 62 "

AGRICULTURAL New	AGRICULTURAL Used	COMMERCIAL USE New	COMMERCIAL USE Used	DLR ACCT. NO.	DEALER PHONE NUMBER	APPLICATION DATE	CONTRACT NO.
A X	B	K	N	688	503 633-4111	24NOV95	930856830 0

SELLER'S NAME & ADDRESS

ERNST HARDWARE CO 20179 MAIN ST PO 38 ST PAUL OR 97137

BUYER'S (DEBTOR'S) NAME (Last Name First) & MAILING ADDRESS (Including County & Zip)	BUYER'S (DEBTOR'S) NAME (Last Name First) & MAILING ADDRESS (Including Zip)
DEAN MCKAY FARMS INC 19172 FRENCH PRAIRIE RD NE ST PAUL 047 OR 97137	

BUYER'S (DEBTOR'S) PHONE NO.	BUYER (DEBTOR) RESIDES IN (County, State)	BUYER (DEBTOR) AGREES TO KEEP GOODS IN (County,St.)	PLACE OF FILING (Town & State)
503 633-4057	047 OR	047 OR	SEC. OF STATE

BUYER'S SOC. SEC. NO. (First Signer) OR TAX NO.	TYPE OF BUSINESS Prop.	Partner	Corp.	NAME & TITLE OF SIGNING OFFICER (If Corporation)
930-85-6830			X	DEAN MCKAY OFFICER

PROMISE TO PAY INSTALLMENTS: Having been quoted both a time price including finance charges and a lesser cash price, I have chosen to pay you the time price for the equipment described below. In addition to pa the down payment, I promise to pay you the TOTAL OF PAYMENTS as in line 8 below, in MONTHLY INSTALLMENTS and/or INSTALLMENTS OTHER THAN MONTHLY as shown below with such adjustments in the amo of the last installment or number of installments and in the TOTAL OF PAYMENTS as may be necessary to reflect a change in the ANNUAL PERCENTAGE RATE of the FINANCE CHARGE as described below. If more t one person signs this agreement as "Debtor", we will each be responsible for all amounts due under this agreement. I agree that I have received the Goods. I represent that the Goods are being purchased for a busin commercial or agricultural purpose.

TRADE-IN: I agree I am selling the item(s) listed in the TRADE-IN section below to you in trade and promise that they are not subject to any security interest, *lien or other* claims. Their value is to be applied against the t sale price.

PARTIES: In this agreement the words "I", "me", and "my" mean the persons, whether one or more, who sign it as "Debtor(s)" (who is also known as "Buyer(s)"). The words "you" and "your" refer to the Seller (wh also known as the "Secured Party") or to anyone the Seller assigns this agreement to, and will mean Deere & Company if it purchases this agreement. The Seller identified above is making the disclosures contained in agreement.

QTY.	New Used	MFR.	MODEL	GOODS (Equipment)	PRODUCT IDENTIFICATION NO.	DELIVERED CASH PRIC
1	N	JD	8870	TRACTOR	RW8870H003185	123500 00
						123500 00

	QTY.	MFR.	MODEL	DESCRIPTION OF TRADE-IN (From Purchase Order)	PRODUCT IDENTIFICATION NO.	AMOUNT
TRADE-IN DATA	1	JD	8760	TRACTOR/24 SPEED	RW8760H002613	81700 00
CASH DOWN PAYMENT: 00					TOTAL TRADE-IN	81700 00

INSTALLMENTS OTHER THAN MONTHLY Amount Financed	No. Of Mos.	When Payments Are Due	Amount Of Payments	MONTHLY INSTALLMENTS No. Of Payments	Amount Of Each Payment	First Payment Due Date
41820 00	9	01DEC96	16536 15			
28545 81	21	01DEC97	16536 15			
14978 42	33	01DEC98	16536 15			
				Payments are due each successive month on the same day of the month as the first payment except as follows:		
41820 00	◄ TOTALS ►		49608 15	DATE FINANCE CHARGE BEGINS:	01 MAR 96	

ITEMIZATION OF THE AMOUNT FINANCED

SALES TAX Paid to Govt. Agencies		00
CASH PRICE (Including Tax)	1	123500 00
TOTAL DOWN PAYMENT Sum of Trade-In & Cash Down Payment	2	81700 00
UNPAID BALANCE OF CASH PRICE The amount credited to my account with you.	3	41800 00
OFFICIAL FEES (Paid To Public Officials)	4	20 00
INSURANCE Credit Life and/or Physical Damage (Paid to Insurance Companies)	5	00
AMOUNT FINANCED (Lines 3, 4 & 5) The amount of credit provided to me.	6	41820 00
ESTIMATED FINANCE CHARGE (Based on line 8) The dollar amount the credit will cost the Borrower(s).	7	7788 15
ESTIMATED TOTAL OF PAYMENTS (Lines 6 & 7) The amount the Borrower(s) will have paid after having made all payments as scheduled.	8	49608 15
VARIABLE RATE ADDITIVE:		1 65 %
CURRENT ANNUAL PERCENTAGE RATE The cost of the Borrower(s) credit as a yearly rate if the base rate does not change.		10 40 %
MAXIMUM CONTRACT RATE:		N/A %
ESTIMATED TOTAL SALE PRICE (lines 1, 4, 5 & 7) The total cost of the purchase being financed, including the Down Payment shown above.		131308 15

Note: The Annual Percentage Rate (APR) may increase during the term of this transaction if the Citibank base rate (defined below) increases. Any resulting increase in the Total of Payments will take the form of a larger amount due on the last maturing installment, or as an additional installment(s). EXAMPLE: If the amount financed was $10,000 at 15 percent APR for 48 months and the rate increased to 18 percent APR in the 25th month, the final payment would increase by: $236.08 if Monthly Payment contract; $264.15 if Semi-Annual Payment contract; $292.97 if Annual Payment contract.

SECURITY AGREEMENT: To secure the indebtedness evidenced by this contract I hereby grant to Seller a Security Interest in the Goods described above (which term includes items, if any, listed as "security" or "additional security") and all parts and accessories now or hereafter incorporated in or on such Goods by way of addition, accession or replacement. I also grant you a security interest in all insurance proceeds and refunds of insurance premiums financed hereunder.

ADDITIONAL CONTRACT INFORMATION: See the front and back of this agreement for additional information and terms regarding non-payment, default, the right to demand immediate payment, and prepayment refunds.

PREPAYMENT REFUND: I may prepay the full outstanding balance due under this agreement at any time before my payments are due and will get a refund of earned finance charge.

FINANCE CHARGE AND INSTALLMENT COMPUTATION: The Finance Charge shall be imposed on an actuarial basis on the unpaid balance of the Amount Financed, using an Annual Percentage Rate determined each month as provided in this paragraph (the "Contract Rate"). The unpaid balance of the Amount Financed shall be reduced by that portion of each installment not allocated to earned Finance Charge. The Contract Rate shall be equal to: (a) the "Citibank" base rate (the annual percentage rate of interest announced publicly from time to time by Citibank, N.A., in New York, New York as the base rate it uses in determining the rate of interest it charges on loans) which was in effect at the close of business on the 15th day of the preceding month, plus the Variable Rate Additive shown at right, or (b) the highest rate permitted by applicable state or federal law whichever is less. The Contract Rate will not exceed the rate, if any, shown at right as the MAXIMUM CONTRACT RATE. The estimated Finance Charge, Total of Payments and Total Sale Price shown above are based upon an Annual Percentage Rate equal to the Contract Rate (without regard to rate limi

Dear Mr. Britton

I would like to explain the use of My 4430 Ford tractor. It is used on the straw baler and also on the V-bakes in the Summer Months.

I also have a 8870 John Deere tractor that is used in the preparing and taking out of perrial grass fields.

The use of these tractors are very important to us because of ~~tractor~~ weather related problems in the Willamette Valley. Basicalley our short working periods between rain.

I have four other tractors big and small that handle all the other actiries on our farm.

Dean McKay Farms, Inc.
by Dean A. McKay

1-5-98

Dear Mr. Bilton

I would like to explain the process in which we rotate our perennial grass fields in and out of production. First we start with a heavy offset disk followed by chisel plowing at two different angles and the plowing of the field. Then it is leveled with a heavy harrow and set to plant.

Dean McKay Farms, Inc.
by Dean A. McKay

1-5-98

State of Oregon
Department of Agriculture

TAX RELIEF APPLICATION REVIEW REPORT

1. Applicant

Mark McKay Farms, Inc.
19393 French Prairie Road NE
St. Paul OR 97137

The applicant owns and operates a grass seed farm operation in Marion County, Oregon.

Application was made for tax credit for air pollution control equipment.

2. Description of Claimed Facility

The equipment described in this application is located at 19224 French Prairie Road NE, St. Paul, Oregon. The equipment is owned by the applicant.

Allen Rakes	$ 11,300
John Deere Chisel plow	$ 15,890
Ford 4430 tractor	$ 30,750
New Holland 1095 stacker	$ 40,750
New Holland 585 baler	$ 47,431
John Deere 8400 tractor	$102,375

Claimed equipment cost: $248,496
(Accountant's Certification was provided.)

3. Description of Farm Operation Plan to Reduce Open Field Burning.

The applicant has 1,000 acres of perennial grass seed under cultivation. In the past, the applicant open burned as many acres as the weather and smoke management program permitted. Some acreage was baled each year with the stacks of baled straw often burned.

As the applicants moved away from burning they turned more toward custom balers to remove the bulk straw. The applicant's alternatives to open field burning and stack burning has evolved to a bale and flail/plow operation.

To be able to have more control over straw removal and field preparation the applicant has purchased the listed equipment.

4. Procedural Requirements

The equipment is governed by ORS 468.150 through 468.190, and by OAR Chapter 340, Division 16. The equipment has met all statutory deadlines in that:

Purchase of the equipment was substantially completed on October 30, 1997. The application was submitted on November 25, 1997; and the application for final certification was found to be complete on December 11, 1997. The application was filed within two years of substantial completion of the equipment.

5. Evaluation of Application

a. The equipment is eligible under ORS 468.150 because the equipment is an approved alternative method for field sanitation and straw utilization and disposal that reduces a substantial quantity of air pollution. This reduction is accomplished by reduction of air contaminants, defined in ORS 468A.005; by reducing the maximum acreage to be open burned in the Willamette Valley as required in OAR 340-26-013; and, the facility's qualification as a "pollution control facility", defined in OAR 340-16-025(2)(f) A): "Equipment, facilities, and land for gathering, densifying, processing, handling, storing, transporting and incorporating grass straw or straw based products which will result in reduction of open field burning."

b. Eligible Cost Findings

In determining the percent of the pollution control equipment cost allocable to pollution control, the following factors from ORS 468.190 have been considered and analyzed as indicated:

1. The extent to which the equipment is used to recover and convert waste products into a salable or usable commodity.

   Some of the equipment promotes the conversion of a waste product (straw) into a salable commodity by providing removal from the fields.

2. The estimated annual percent return on the investment in the equipment.

   There is no annual percent return on the investment as applicant claims no gross annual income.

3. The alternative methods, equipment and costs for achieving the same pollution control objective.

   The method chosen is an accepted method for reduction of air pollution. The method is one of the least costly, most effective methods of reducing air pollution.

4. Any related savings or increase in costs which occur or may occur as a result of the purchase of the equipment.

   There is an increase in operating costs of $37,274.40 to annually maintain and operate the equipment. These costs were considered in the return on investment calculation.

5. Any other factors which are relevant in establishing the portion of the actual cost of the equipment properly allocable to the prevention, control or reduction of air pollution.

The established average annual operating hours for tractors is set at 450 hours. To obtain a total percent allocable, the annual operating hours per implement, per tractor used in reducing acreage open field burned is as follows:

FORD 4430 85hp TRACTOR

Implement	# acres	implement capacity	annual operating hours
baler	500	4	125
rake	500	5	100
flail	500	5	100
Total annual operating hours			325

The total annual operating hours of 325 divided by the average annual operating hours of 450 produces a percent allocable of 72%.

8870 JOHN DEERE 225hp TRACTOR

Implement	# acres	implement capacity	annual operating hours
Chisel plow	1,000	7	143
Disc	500	7	71
8 bottom plow	500	7	71
Harrow & roll	500	7	71
Total annual operating hours			356

The total annual operating hours of 356 divided by the average annual operating hours of 450 produces a percent allocable of 79%.

Equipment	Claimed cost	Percent allocable	Cost allocable
Allen rakes	$ 11,300	100%	$ 11,300
John Deere chisel plow	$ 15,890	100%	$ 15,890
New Holland 1095 stacker	$ 40,750	100%	$ 40,750
New Holland 585 baler	$ 47,431	100%	$ 47,431
John Deere 8400 tractor	$ 102,375	79%	$ 80,876
Ford 4430 tractor	$ 30,750	72%	$ 22,140
TOTAL	$ 248,496	88%	$218,387

The actual cost of the equipment properly allocable to pollution control as determined by using these factors is 88%.

6. Summation

a. The equipment was constructed in accordance with all regulatory deadlines.

b. The equipment is eligible under ORS 468.150 as an approved alternative method for field sanitation and straw utilization and disposal that reduces a substantial quantity of air pollution as defined in ORS 468A.005

c. The equipment complies with DEQ statutes and rules.

d. The portion of the equipment that is properly allocable to pollution control is 97%.

7. The Department of Agriculture's Recommendation

Based upon these findings, it is recommended that a Pollution Control Facility Certificate bearing the cost of $248,496, with 88% allocated to pollution control, be issued for the equipment claimed in Tax Credit Application Number TC-4891.

Jim Britton, Manager
Smoke Management Program
Natural Resources Division
Oregon Department of Agriculture
(503) 986-4701
FAX: (503) 986-4730

JB/rc
Thu, Jan 8, 1998

Phone 633-4111
St. Paul
223-6752
Portland
362-0136
Salem

ERNST HARDWARE CO.

NO. 02434

20179 MAIN ST. N.E. – P.O. BOX 38
ST. PAUL, OREGON 97137

JOHN DEERE

CUSTOMER NO. 06618.

SALESMAN [illegible] 1

SOLD TO MARK MCKAY Acres
19393 French Pr Rd.
ST PAUL OR 97137

PURCHASE AGREEMENT

Title to merchandise listed below is retained by Ernst Hardware until purchase price has been paid in full. Failure to pay purchase price within 45 days shall be a default and Ernst Hardware shall have right to repossess merchandise as well as all other rights contained in ORS CH'S 72 & 79.

DATE 06-10-97

QUAN.	B/O	PART/STOCK NUMBER	DESCRIPTION	PRICE UNIT	PRICE TOTAL	OFFICE USE ONLY
1		60888	Allen 8827 Rake		11300.00	
			SN- 36927.			

TERMS;

TOTAL ▶ 11300.00

Terms Net Cash. All accounts due and payable 10th of month following purchase.
1½% per month (18% annual percentage rate) will be added from 1st of month following purchase on over due accounts. MINIMUM SERVICE CHARGE 50¢.

PURCHASER AGREES TO THE TERMS HEREOF: RECEIVED BY PURCHASER X [signature]

ANY WARRANTIES ON THE PARTS AND OR ACCESSORIES SOLD HEREBY ARE THOSE MADE BY THE MANUFACTURER, THE SELLER, ERNST HARDWARE COMPANY HEREBY EXPRESSLY DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR THE PARTICULAR PURPOSE.

Phone 633-4111
St. Paul
223-6752
Portland
362-0136
Salem

ERNST HARDWARE CO.

20179 MAIN ST. N.E. – P.O. BOX 38
ST. PAUL, OREGON 97137

NO. U2440

JOHN DEERE

CUSTOMER NO. 06618.

SALESMAN [signature]

SOLD TO Mark McKay Farms
St Paul. Or.

PURCHASE AGREEMENT

Title to merchandise listed below is retained by Ernst Hardware until purchase price has been paid in full. Failure to pay purchase price within 45 days shall be a default and Ernst Hardware shall have right to repossess merchandise as well as all other rights contained in ORS CH'S 72 & 79.

DATE 04-21-97.

QUAN.	B/O	PART/STOCK NUMBER	DESCRIPTION	PRICE UNIT	PRICE TOTAL	OFFICE USE ONLY
1		10880.	680 Chisel Plow –			
			27 foot No Se No Pts.		15890.00	
			SN – 001680 –			

TERMS:

15890.00

TOTAL ▶

Terms Net Cash. All accounts due and payable 10th of month following purchase.
1½% per month (18% annual percentage rate) will be added from 1st of month following purchase on over due accounts. MINIMUM SERVICE CHARGE 50¢.

PURCHASER AGREES TO THE TERMS HEREOF: RECEIVED BY PURCHASER X [signature]

ANY WARRANTIES ON THE PARTS AND OR ACCESSORIES SOLD HEREBY ARE THOSE MADE BY THE MANUFACTURER. THE SELLER, ERNST HARDWARE COMPANY HEREBY EXPRESSLY DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR THE PARTICULAR PURPOSE.

NEW HOLLAND

SALEM FORD NEW HOLLAND, INC.
3593 SILVERTON ROAD N.E.
SALEM, OREGON 97305
(503) 364-2241 • (800) 255-5597 (In OR)

"Our priorities are simple: your confidence, your satisfaction . . . your trust."

Quote to: Mark McKay Farms, Inc

Date 10-30-96

St. Paul OR

Phone # Fax 633-4058

Quote Good Thru: 10-30-96

QTY.	DESCRIPTION	MODEL	CATALOG NO.	SERIAL NO.	UNIT PRICE	AMOUNT
1	Ford 70 hp Tractor	4630	TK 960181			$
	- 4wd	Rental Rate	157 hours			
	- cab w/ air					
	- 380/70R28 + 250/80R18 Tires					
	- Horizontal Exhaust					
	- Radio					
	- 12x12 Trans					
	- 540/1000 PTO					
			96 Rate 4.9%			
			36 mo			30,750.00

ITEM DESCRIPTION	MAKE	MODEL	SERIAL NO.		
				SUB-TOTAL	$
TOTAL TRADE-IN ALLOWANCE $		LESS AMOUNT OWED $		- NET TRADE IN ALLOWANCE	(
				SALES TAX	
				RECORDING OR FILING FEES	
				SUB TOTAL	$
				CASH RECEIVED	(
				AMOUNT FINANCE	

BOR Rate
1.9% = 36 mo
3.9% = 48 "
5.9% = 62 "

Thanks
Roy

SALEM FORD NEW HOLLAND, INC.
P.O. BOX 17310
SALEM, OREGON 97305
(503) 364-2241 • (800) 255-5597 (In OR)

NEW HOLLAND

☐ DEMONSTRATION ☐ QUOTATION
☐ LEASE ☑ ORDER

TERMS SUBJECT TO MANAGEMENT APPROVAL ______

No. 004645

SOLD TO: Mark McKay Farms / M McKay (Mc)
19393 French Prairie Rd
St Paul, Oregon 97137

SHIP TO: SAME

Mckay Home 792-3493

ORDER DATE: 10-31-96
DATE PROMISED: ______
SHIP VIA: ______

SALESMAN	CUSTOMER'S ORDER NO.	BY	PHONE	TERMS: CREDIT SUBJECT TO APPROVAL
Ron Russell			McKay 633-4057	

STOCK NO.	QTY.	MODEL	SERIAL NO.	DESCRIPTION	PRICE
	1	1095	590657	NH SP Bale Wagon	
				- 160 hp Diesel Engine	
				- Auto Trans	
				- Radio	
				- Serviced	
				Net Cash Price	81,500.00

LEASE TERMS: DAY: WEEK: MONTH:

SPECIAL INSTRUCTIONS:

BILL OF SALE FOR PROPERTY TAKEN IN TRADE
For value received I/we hereby bargain and sell, grant and deliver unto SALEM FORD NEW HOLLAND, INC.

	SERIAL NO.	AMOUNT
1 - N.H. #1085 Bale Wagon		$49,000.00
S/N 553367		
Hours 2158		
Miles 12,741		

I HEREBY CERTIFY THAT THERE IS NO LIEN, CLAIM, DEBT, MORTGAGE, OR INCUMBRANCE OF ANY KIND AGAINST THIS PROPERTY EXCEPT AS NOTED ABOVE.

SIGNED [signature] TITLE ______

PURCHASE PRICE	81,500.00
SALES TAX	—
TOTAL PURCHASE PRICE	81,500.00
CASH DOWN PAYMENT	
TRADE IN ALLOWANCE	$49,000.00
PAY OFF AMT.	
NET AMT OF TRADE IN	
TOTAL DOWN	49,000.00
BALANCE DUE	32,500.00

FINANCE THROUGH: ______
WARRANTY: ______
PMT. (EST.) ______ PER MONTH X ______ MONTH

BUYER'S TERMS AND CONDITIONS OUTLINED ON THE BACK OF THIS FORM ARE A PART OF THIS AGREEMENT, SAME AS IF THEY WERE PRINTED ABOVE MY SIGNATURE.

RECEIVED BY [signature] DATE 10-31-96 BY Ron Russell TITLE Sales

$40,750 claimed by applicant

Corvallis Ford New Holland, Inc.
2625 S.E. Third St., P.O. Box 776
Corvallis, Oregon 97339 (503) 757-8112

NEW HOLLAND

INVOIC

Nº 41

SOLD TO: Mark McKay
19893 French Prairie Road NE
St Paul, Oregon 97137

DATE 10-30-97

QTY.	DESCRIPTION	MODEL	CATALOG NO.	SERIAL NO.	UNIT PRICE	AMOUNT
1	NH Baler	565	565SB-20			$ 47431 00

COMPLETE THIS SECTION FOR TRADE-INS

ITEM DESCRIPTION	MAKE	MODEL	SERIAL NO

SUB TOTAL	$ 47,431 00
FREIGHT	-0-
ASSEMBLY & HANDLING	-0-
EXCISE TAX	-0-
TOTAL PRICE OF GOODS	47,431 00
- NET TRADE-IN ALLOWANCE	(-0-)
SALES TAX	-0-
RECORDING OR FILING FEES	10 00
SUB TOTAL	$ 47441 00
LESS: PURCHASE CONTRACT PRINCIPLE AMOUNT FINANCED	(38,400 00)
CASH RECEIVED	9,041 00
*CHARGED TO YOUR ACCOUNT	$

TOTAL TRADE-IN ALLOWANCE $ LESS AMOUNT OWING $

THE BUYER REPRESENTS THAT HE/SHE OWNS THE ABOVE TRADE-INS FREE AND CLEAR OF ANY ENCUMBRANCE EXCEPT THAT INDICATED PAYABLE TO:

STATEMENT CONCERNING WARRANTIES

Except for express written warranties made by manufacturers of goods, THERE ARE NO WARRANTIES, EXPRESS, STATUTORY, OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. NOTE, HOWEVER, THAT SOME STATES DO NOT PERMIT LIMITATIONS OR EXCLUSIONS OF IMPLIED WARRANTIES, SO THESE LIMITATIONS MAY NOT APPLY. No warranty whatsoever is made on any used, secondhand, altered, or rebuilt goods; such goods are sold "AS IS".

"TERMS" —net cash due on the first of the month following purchase. A FINANCE CHARGE (in the United States), SERVICE CHARGE (in Canada), is computed by a "periodic rate" of 1-1/2% per month on the unpaid balance. This is an ANNUAL PERCENTAGE RATE of 18%, or at the highest rate permitted by law, applied to the previous unpaid balance after deducting current payments or credits as shown hereon. No FINANCE/SERVICE CHARGE will be assessed if the computed amount of the FINANCE/SERVICE CHARGE is less than $1.00. This FINANCE CHARGE or SERVICE CHARGE is computed at an ANNUAL PERCENTAGE RATE of 18% or at the highest rate permitted by law in all states or provinces except: _____

	Per Month	Per Annum
Connecticut	1.25%	15.00%
Minnesota	1.0%	12.00%
New Mexico	1.5%	18.00%
Ohio	1.0%	12.00%
Pennsylvania	1.25%	15.00%
Washington	1.0%	12.00%

1% APR for 3 years

BUYER'S SIGNATURE Mark H. McKay FORD NEW HOLLAND REPRESENTATIVE

Title to the goods shall remain in the seller and the seller's assigns until the unpaid balance of the price has been fully paid.

Customer Purchase Order for John Deere Products

11047780

CUSTOMER'S NAME - First Signer (First, Middle Initial, Last)	DATE OF ORDER	COMPANY UNIT	DEALER ORDER NO.	DEALER ACCOUNT NO.
MCKAY JACOB	9/30/96			0688
SECOND LINE OF OWNER NAME	CASH SALE / LEASE / TIME SALE	SOC. SEC. / IRS NO. / EIN NO.	PURCHASER SALES TAX EXEMPT. NO.	
MARK MCKAY FARMS	☒ / ☐ / ☐			
STREET OR RR	SELLER'S NAME & ADDRESS			
19399 French Prairie Rd	FROST Hardware			
TOWN / STATE / ZIP CODE	PO Box 38			
St PAUL OR				
COUNTY / PURCHASER ACCT. / PHONE NUMBER	St PAUL 97137			
MARION 503-633-4057				
CUSTOMER'S NAME - Second Signer				
STREET OR RR	CUSTOMER IS / CPP	ADD CUSTOMER NAME TO MAIL LIST		
	☒ Business ☐ Individual / ☐ Accepted ☐ Rejected	CP (Check only one box): Residential ☐H Commercial ☐C Part-Time Farmer ☐F / AG ☐A		
TOWN / STATE / ZIP CODE				

I (We), the undersigned, hereby order from you the Product described below, to be delivered as shown below. This order is subject to your ability to obtain such Product from the manufacturer and you shall be under no liability if delivery of the Product is delayed or prevented due to labor disturbances, transportation difficulties, or for any reason beyond your control. The price shown below is subject to your receipt of the Product prior to any change in price by the manufacturer. It is also subject to any new or increased taxes imposed upon the sale of the Product after the date of this order.

QTY.	NEW	DEMO	USED	CERTIFIED	PRODUCT (Give Model, Size & Description) (Hours of Use)	PRODUCT IDENTIFICATION NO.	DELIVERED CASH PRICE (Or Total Lease Payments)
1	X				8400 MF Tractor MFWD 3-Remotes 18.7gpm 710/70R 38 Duals	RW8400P007624	102375 00

I (We) offer to sell, transfer, and convey the following item(s) at or prior to the time of delivery of the above Product, "trade-in" to be applied against the cash price. Such item(s) shall be free and clear of all security agreements, liens, encumbrances at the time of transfer to you. The following is a description and the price to be allowed for each item:

QTY.	DESCRIPTION OF TRADE-IN	PRODUCT IDENTIFICATION NO.	AMOUNT
1	JDeere 4960 MFWD Tractor	RW4960P003215	75500 00

1. TOTAL CASH PRICE	102375 00
2. TOTAL TRADE-IN ALLOWANCE	
3. BALANCE	
4. SALES TAX	
5. SUB-TOTAL	
6. CASH WITH ORDER	26875 00
7. BALANCE DUE	

PURCHASER TYPE (Check One)
Private
☐ 1 Commercial
☐ 8 Residential
☐ 9 Farm
Other
☐ 2 Federal Govt.
☐ 3 State/Province
☐ 4 County
☐ 5 City/Town/Village
☐ 6 Armed Forces
☐ 7 National Account

MARKET USE (Check One)
Agriculture
☐ 17 General Utility
☐ 13 Livestock/Feedlot/Dairy
☐ 15 Row Crop/Small Grain
☐ 16 Specialty Crop
Rental & Lease Companies
☐ 97 Deere Dealer
☐ 96 Independent
☐ 98 Undefined Govt. Use
Utility Companies
☐ 82 Gas/Water/Electric
☐ 81 Telephone

Other
☐ 41 Building & Housing Construction
☐ 71 Airports
☐ 94 Golf Courses
☐ 92 Highway Mowing
☐ 95 Institutions (schools/churches/hosp.)
☐ 93 Nursery/Landscape
☐ 87 Parks & Cemeteries
☐ 69 Residential
☐ 84 Sanitary Landfill/Refuse
☐ 74 Railroads
☐ 49 Highways & Streets
☐ 43 Sewer & Water

IMPORTANT WARRANTY NOTICE: The John Deere warranty applicable to new John Deere product(s) is printed on the back side of this document. There is no warranty on used products. The new product warranty is part of this contract. Please read it carefully. **YOUR RIGHTS AND REMEDIES PERTAINING TO THIS PURCHASE ARE LIMITED AS SET FORTH IN THE WARRANTY AND THIS CONTRACT. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS ARE NOT MADE AND ARE EXCLUDED UNLESS SPECIFICALLY PROVIDED IN THE JOHN DEERE WARRANTY.**

ACKNOWLEDGEMENTS - I (We) promise to pay the balance due (line 7) shown above in cash, or to execute a Time Sale Agreement (Retail Installment Contract), or a Loan Agreement, for the purchase price of the Product, plus additional charges shown thereon or execute a Lease Agreement, on or before delivery of the Product ordered herein. Despite physical delivery of the Product, title shall remain in the seller until one of the foregoing is accomplished.

Customer's Signature: Mark A McKay

Accepted By: RW Frost (Authorized Signature & Title)

Date Accepted: _____ Salesman: _____

DELIVERY ACKNOWLEDGEMENT ►	DELIVERED ON:	WARRANTY BEGINS	SIGNATURE: (DEALER)

DF-2065 Stock (Eff. 06-96) (Reprint 05-97) Printed in U.S.A.

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1/5/98

Dear, Mr. Brittan

ON my Farm I use My 4430 Ford tracta to pull my bailer & Rakes During my Straw removel Season. And I use my 8400 John Deere for my feild Work after harvast is over. I also have 3 - other tractors that I use for my row crop Part of my Farm. And the reason for all my equipment is to get things done in a timly Manner, because of the Short Season we have in the Willamette Valley.

Mark A. Mc

1/5/98

Dear, Mr Britton

When using my equip to work the Soil, I work it in the manner of disking (2) Chisel plowing, tilling & Plowing. And than I come back with a Drag Harrow & Culti:packer to Level & Smoth the ground for Seeding. I do this in a rotation @ very year on 500 Acre of Land.

Mr. A. Mc

State of Oregon
Department of Environmental Quality

Memorandum

Date: January 9, 1998

To: Environmental Quality Commissioners

From: Langdon Marsh

Subject: Director's Report

Sanitary District Problems Under Review

Agency staff have followed up with Lincoln County about on-site sewage treatment problems within the Carmel Foulweather Sanitary District north of Newport between Yaquina Head and Cape Foulweather. As you heard last month, there are system failures. Lincoln County puts that current system failure rate at about 11 percent. The remainder of the on-site systems are considered in compliance.

The County does have the authority to require repairs. We discussed our concerns with Lincoln County officials, and are working with them to resolve the issue. We also have the authority to require repairs.

We do not have authority to compel sewer hookups. While such hookups may be the best long term solution to the problem, our focus now is working with the county, district and other interested parties to repair or replace existing, failed systems.

Coordination of state agencies governing growth

The Governor's Office is making "quality development" and better coordination of state activities related to growth a key initiative. Five agencies - EDD, ODOT, HCS, DLCD and DEQ - are working together on several efforts related to this objective. The directors of these agencies have been working together as the "Community Solutions Team" for several years, and have demonstrated the effectiveness of close planning on several projects. Current efforts are intended to "institutionalize" practices found to be most effective.

A workshop in December brought together regional representatives from all agencies to allow them to meet and prepare strategies for better coordination. The agencies plan to give aid preferentially to local governments that show the best approaches to balancing housing, jobs, transportation and environmental considerations.

As an aside – you have probably heard that Rep. Bob Repine has been appointed as the new Housing director. I will look forward to working with him in this new capacity.

9th Annual Environmental Cleanup Report Completed

The cleanup program has completed, as required by statute, its annual report to the Commission, the Governor and the Legislature. We have not planned to make a formal presentation of the report's contents. If you find you'd like more information, we'd be happy to add this to a future agenda.

This year's report looks back at 10 years of hazardous substance and UST cleanups since the passage of the state's cleanup law in 1987. As you know, cleanups have changed significantly over the years. Most notably, cleanups are done increasingly on a voluntary basis and our cleanup decisions are more risk-based. The report also reports on cleanup accomplishments of the 1997 fiscal year and describes goals for the current year.

EPA and States Call for Corps Action on Columbia

Last month I joined as co-signer of a letter, along with Chuck Clarke of Region 10 EPA and Tom Fitzsimmons of the Washington Dept. of Ecology, to General Griffin, commander of the Corps of Engineers division office in Portland. We asked the Corps to submit plans for dealing with Columbia and Snake River water quality problems related to temperature and dissolved gas. We asked for a response by March 15 of this year.

Specifically we seek information on:

- Actions at dams to ensure compliance with standards for total dissolved gas;
- Actions to eliminate, to the extent possible, dam impacts on water temperature;
- Milestones for completion of related operational and structural modifications;
- A compliance schedule with intermediate milestone dates and;
- Budgetary needs to make alterations to comply with the Clean Water Act.

Governor Kitzhaber likewise recognizes the importance of the Columbia Basin and the Corps role in river management. To enhance Oregon's effectiveness in this complex arena, he has appointed Joyce Cohen to help coordinate Columbia Basin water quality activities. We will be providing office space for Joyce on the 10th floor of DEQ headquarters and are delighted to have her with us. Her enormous experience with State, Regional and National issues will be of great help in resolving some of the long standing institutional problems affecting water quality in the basin.

Water Quality and Fish Initiatives Highlight Mid December

Two, back-to-back events in mid December led by Governor Kitzhaber focused public attention on key water quality issues and the role of DEQ in dealing with those issues. On December 17, the Governor received the report of the Willamette River Taskforce. He appointed this 22-member group in June, 1996, and DEQ has provided staff support for taskforce activities.

The report identified several issues related to water quality, such as impacts of non-point source runoff, and made recommendations for followup action. The Governor has handed the advisory report to his natural resource agencies to review the taskforce work and determine what actions we can take to implement the recommendations. That process has started within DEQ and will accelerate over the next several weeks.

On December 18, the Governor held a news conference to formally hand over the Oregon Plan Steelhead Supplement to the National Marine Fisheries Service Regional Director. We have copies of the executive summary here today and can provide more specific information on specific DEQ measures within the plan.

Generally, our commitments are similar to those already contained in the original Oregon Plan for coho salmon restoration except expanded geographically to reflect the broader steelhead range. NMFS is expected to make a final listing decision for several population groups of steelhead in February. There have been initial discussions about funding this additional work, but no decisions yet on how much money might be available within this budget period. We will know more after the Governor's steelhead funding package goes to the E-board later this month.

Neil Mullane To Take Reins At NW Region

The retirement of Tom Bispham as NW Regional Administrator next month is an occasion none of us, with the possible exception of Tom himself, look forward to. If there is a bright side, however, it is that his replacement will be Neil Mullane. Neil's skills with people, both as manager and communicator, are outstanding. He will bring continuity to the leadership transition at NW Region while contributing his own special abilities and range of experience.

Neil has been the Water Quality Source Control Section manager at NWR since 1994, and has manager experience that dates back to 1986 when he started as Water Quality Planning Section manager. He actually started with DEQ in 1976 as the agency's first, full-time hydro-geologist. While we think of Neil as a surface water permit expert now, he also has worked extensively on groundwater issues, including groundwater assessment for siting of the Arlington Hazardous Waste Disposal facility; and non-point source issues such as assessing Forest Practice Act rules compliance with the Clean Water Act.

Finally, I have decided to leave Neil as the Administrator for agency enforcement work. While we might make a few changes in the current approach, I have confidence in Neil and see no reason to change a system that has worked well. We are now aggressively recruiting to fill the Enforcement Manager position, since Van Kollias is also retiring in February. I will speak more about the other fine people retiring from DEQ at the next EQC meeting.