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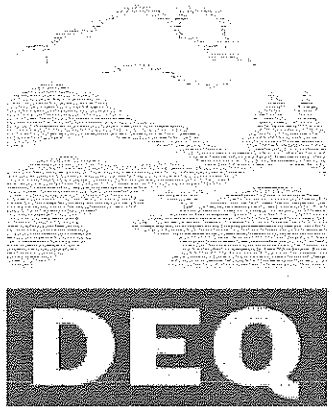
OREGON STATE SANITARY AUTHORITY MEETING MATERIALS



State of Oregon
Department of Environmental Quality

AGENDA

STATE SANITARY AUTHORITY HEARING AND MEETING

10:00 a.m., May 23, 1967

Room 36, State Office Building, Portland

PUBLIC HEARING

A. Public Hearing regarding Standards of Quality for Public Waters of Oregon

BUSINESS MEETING

B. Minutes of 114th meeting (April 25, 1967)

C. Project plans for April 1967

D. Statement of Associated Oregon Industries regarding Wigwam burner problem

E. Review of Water Quality Standards testimony

OSSH-WPC
5/22/67-50

MINUTES OF THE 115th MEETING

of the

Oregon State Sanitary Authority

May 23, 1967

The 115th meeting of the Oregon State Sanitary Authority was called to order by Governor Tom McCall, Chairman at 2:05 p.m., May 23, 1967, in Room 36, State Office Building, Portland, Oregon. The members and staff present were: Governor Tom McCall, Chairman; Chris L. Wheeler, Herman P. Meierjurgen, Edward C. Harms, Jr., Dr. C.A. Jenike, B.A. McPhillips and Joseph W. Smith, Members; Kenneth H. Spies, Secretary; John O. Denman, Legal Advisor; H.M. Patterson and H.E. Milliken, Assistant Chief Engineers; Harold W. Merryman, Leo L. Baton, Fred M. Bolton, and J.A. Jensen, District Engineers; Dr. Warren C. Westgarth, Laboratory Director; H.W. McKenzie, Associate Engineer; Don McHarness and James Sheetz, Assistant Sanitary Engineers.

The meeting was preceded by a public hearing which began at 10:00 a.m. and ended at 12:10 p.m. regarding Standards of Quality for Public Waters of Oregon.

MINUTES:

It was MOVED by Mr. Harms, seconded by Mr. Wheeler, and carried that the minutes of the April 25, 1967 meeting be approved.

PROJECT PLANS:

It was MOVED by Mr. McPhillips, seconded by Mr. Meierjurgen, and carried that the action taken on the following 23 project plans and engineering reports for water pollution control and 3 project plans for air quality control for the month of April 1967, be approved:

Water Pollution Control

Date	Location	Project	Action
4/3/67	Port Orford	Add. #1 & 2, Rev. Plans & Specs.	Prov. app.
4/3/67	Tigard	Engineering Report	Prov. app.
4/3/67	Ontario	Engineering Report - Collection	Prov. app.
4/4/67	Springfield	S. 71st Street Lateral	Prov. app.
4/4/67	Gladstone	Clayton Way Sewer	Prov. app.
4/4/67	Roseburg	Sakura Yama Subd.	Prov. app.
4/5/67	Gresham	N.E. Bell Street Sewer	Prov. app.
4/6/67	Medford	Sewer extensions	Prov. app.
4/6/67	Springfield	Sewer S-80-66	Prov. app.
4/7/67	Winston	Tumlin Avenue Sewer	Prov. app.
4/7/67	West Linn	Parsons Avenue Add. Sewer	Prov. app.
4/10/67	Sherwood	Gleneagle Subd. Sewer	Prov. app.
4/11/67	Beaverton	S.E. Cressmore Drive	Prov. app.
4/11/67	Estacada	H-S-3-S-E Laterals H-I-N, H-I-S	Prov. app.
4/13/67	Sublimity	Prel. Engineering Sewerage Rept.	Approved
4/17/67	Gresham	S.E. Burnside Sewer	Prov. app.
4/17/67	Sheridan	STP Expansion Study	Approved
4/19/67	Fairway Estates	Lateral A	Prov. app.
4/19/67	S. Suburban S.D.	Pine Grove School Lateral	Prov. app.
4/21/67	Oak Hills	Townhouse Complex Sewer	Prov. app.
4/25/67	Gresham	Cleveland & Section Line Sewer	Prov. app.
4/27/67	Sweet Home	N. 12th Ave. San. Sewer	Prov. app.
4/27/67	Tigard	Panorama #II	Prov. app.

Date	Location	Project	Action
4/14/67	Columbia County	Nuclear Power Plant Considerations	No action necessary Under consideration
4/20/67	Washington County	Review of Proposed County Air Pollution Ordinance	Comments submitted
4/26/67	Clackamas County	Publishers' Paper Co. Waste Pulp Incinerator	Under consideration

WATER QUALITY STANDARDS:

The Chairman reported that at the public hearing held during the forenoon, considerable additional testimony had been received from the Fish and Game Commissions, from industry, from irrigators and from others, and consequently the Authority and its staff should evaluate this and see what parts of it, if any, ought to be reflected in the final rules that are to be sent on to Secretary Udall on or before the 30th of June. He said there would be a special meeting of the Sanitary Authority early in June to reconsider the rules in case there are any changes that ought to be made.

WIGWAM BURNER CONTROL:

The Chairman stated that the Associated Oregon Industries had prepared a statement of its program to reduce air pollution from operation of wigwam burners.

Mr. Robert Olinger then read the statement, a copy of which has been made a part of the Authority's permanent files. He stated that industry is supporting passage of H.B. 1376. Governor McCall pointed out it had passed the Senate yesterday and that he would sign it when it came across his desk.

Governor McCall then suggested that the statement be discussed. He said that it is a considerably more detailed statement and had more hope in

it than the one received on April 25. He referred to the second paragraph on the last page of the statement in regard to areas where there is a dense concentration of mills, and it is recommended that these mills collectively either through committees or other means continue to study and work toward alternative methods of disposal and not rely entirely on the research to be conducted at Oregon State University. He said the gentlemen from Los Angeles, who had conferred with him a few weeks ago, had indicated from their studies that there was a chance for some centralization in areas where there is a congestion of burners and that there could be some abatement through joint effort. He then asked the Secretary if it would be possible for him and his staff to work with Mr. Olinger in regard to joint action in the Eugene-Springfield and Medford areas, and was assured that it would be possible. He said there were many who were complying but the 65% who were not should be closed down or forced to cooperate.

Mr. Wheeler stated that it seemed possible that two or more mills close together could combine their loadings and burn in one burner instead of two or three.

Mr. McPhillips then asked Mr. Olinger how much cooperation could be expected from his organization and the sawmill operators in doing their own policing on this. He said the Authority does not have the staff now to go around and check all these mills.

Mr. Olinger assured Mr. McPhillips that the Associated Oregon Industries and this committee that has been formed would work very closely with the Authority.

Governor McCall mentioned that there will be about four million dollars in the emergency board fund and that if necessary it might be possible to train someone with an engineering background to assist in this survey and to finance it with funds from the emergency board.

Mr. Meierjurgen stated that he believed that construction of sanitary landfills or stockpiling for agricultural mulch would be ways of disposing of wood waste without burning it.

Mr. Olinger stated that maybe incineration would not be the answer to the problem and that perhaps a sanitary landfill, stockpiling or even hauling it back to the woods would be the feasible thing to do.

Governor McCall then suggested that this matter be left for the staff to work on and take up at the next meeting which would be within a week or so.

Mr. Steve McQueen of Medford asked to make a statement in regard to his mill in the Medford area. He said he had definitely looked into the matter of merchandising agricultural bark, and had made experiments in shipping it by carload bulk to the Los Angeles area and the Bay area. He said they even have gone so far as to put it in bags and shipping it in carloads and each of these proposals had been a flop financially. He claimed that if there is a large population that can use this mulch then it might be economically feasible; but if it has to be hauled any distance, a person cannot get the cost out of it. Even though one pays a good price for a sack of mulch at the corner grocery store, it doesn't necessarily mean that the mills are making a big profit.

Mr. Harms asked the Chairman if he knew if freight rates still affected the mills unfavorably, to which he said he was unfamiliar with the rates and that he had not heard of any large shipments of bark going out of the Eugene area.

Mr. McKenzie said that a revised rate had been received as far south as Arizona. He said he was not aware of what the rate was or to what extent it applied to shipment.

Mr. McQueen stated he was sure that a request from the Governor's office might help in getting reduced rates for shipping of bark at a lumber rate.

Mr. Patterson stated that he would like to keep the staff in the field as much as possible and that they would have some sort of check or inspection sheet for each mill that would show what each mill is doing in the way of complying. In this way they could concentrate on the areas on the map where conditions are worst and get at the problem sources.

The meeting adjourned at 2:30 p.m.

Respectfully submitted,

Kenneth H. Spies

Kenneth H. Spies
Secretary
State Sanitary Authority

OREGON FOREST INDUSTRIES PROGRAM TO REDUCE AIR POLLUTION FROM OPERATION OF WIGWAM BURNERS

PRESENTED TO STATE SANITARY AUTHORITY, MAY 23, 1967

Mr. Chairman and members of the Authority, my name is Robert Olinger, I am employed by Associated Oregon Industries. I appear before you today as spokesman for the Forest Products Industry Committee formed in January of this year to study ways and means of combating the wigwam burner problem.

As we stated at the April 25, 1967, meeting of the Authority, engineering standards for design of incinerators or burners to handle and burn emission-free the large volumes of wood residue in plants all over the state are non-existent. Much concentrated research must be done in this area of wood waste disposal. The industry and research organizations need time to develop alternate means of disposal or a refined method of incineration. At Governor McCall's request the committee has given considerable thought to an interim procedure for reducing the amount of air contaminants put out by the burner while the research and development is carried out.

Industry recognizes the problems of smoke emission from operation of wigwam burners and has been attempting to find a practical solution to this problem by individual research and experimentation. In spite of improvement achieved during recent years, it is apparent that the problem is far from being solved. Therefore, industry desires to continue its cooperative approach to the problem with the State Sanitary Authority and suggest the following program as a method of implementing further progress toward air quality improvement:

I. Accelerated and Concentrated Research

It is quite obvious that the research and experimentation

carried on by individual plants has not nor will it solve the problem. The problem is too complex, and thus, will need a concerted and concentrated approach to be successful. Such research will need to encompass alternate methods of wood waste disposal such as;

1. Incineration in modern facilities at a mill or a collection site.
2. Power generation (some analysis of this already has been made).
3. Construction of sanitary landfills at a mill or collection site.
4. Bark removal in the forest plus incineration at millsite.
5. Use on farms as agricultural mulch, highway cutbanks for stabilization, or for open stockpiling for horticultural and other uses.
6. Return unused residue to the forests via backhauls by modified log trucks.

Other alternatives will be developed for the initial consideration for research.

Also the effect of further utilization of present waste must be considered in any long range planning.

Industry therefore is supporting passage of H. B. 1376 which will provide funds to the Forest Products Laboratory at Oregon State University to carry out such research. Industry is thus willing to impose upon itself an additional tax on the harvest of timber to provide funds for this project.

II. Application for Variance - Short Range

Industry recognizes that because of wood waste characteristics, proximity to markets, geographical locations, size

of plant, and many other variables, the need and ability to conform to present emission standards varies greatly. At the present time, depending upon these variables individual plants cannot at all times dispose of enormous quantities of wood waste by burning without violating emission standards.

Therefore, it is proposed that those plants located in critical areas of the state who cannot operate within present discharge standards, apply to the State Sanitary Authority for conditional variances which would be granted on the basis of conditions applicable at each individual plant. Each individual application should show proof of efforts toward attempting to better his burning practices. Such a plan would place the burden of applying for variance and complying with reasonable standards of operation, as may be required by the SSA, on the individual operation.

Certain operating standards would need to be devised as a basis for SSA engineers to evaluate each situation. Such standards must be flexible enough to fit the varying conditions of each plant's burner problem. It is recognized that such a plan would not eliminate smoke emission, but would most certainly improve the situation while waiting for research progress to provide the ultimate solution.

The following items would be included in setting up guides for applicable standards:

1. Housekeeping
2. Repair and maintenance
3. Daily records of operation
4. Burner operation assigned to specific employees
5. Reasonable adequacy of equipment
6. General attitude and past performance of cooperation with SSA.

The variance could be set up for a specific period of time at each operation and depend upon the amount of effort that operator contributes to fulfilling the recommendations of the SSA.

In areas where there is a dense concentration of mills, it is recommended that these mills collectively either through committees or other means continue to study and work toward alternate methods of disposal and not rely entirely on the research to be conducted at OSU.

Industry feels that any plant not recongizing a responsibility to reasonably cooperate with the SSA in an attempt to improve air quality conditions should not have the protection of a conditional variance, and if found to be in violation, should be cited accordingly.

Project Plans

During the month of April, 1967, the following 23 sets of project plans and engineering reports were received and the action taken as indicated by the Water Pollution Control Section:

Date	Location	Project	Action
4/3/67	Port Orford	Add. #1 & 2, Rev. Plans & Specs.	Prov. app.
4/3/67	Tigard	Engineering Report	Prov. app.
4/3/67	Ontario	Engineering Report - Collection	Prov. app.
4/4/67	Springfield	S. 71st Street Lateral	Prov. app.
4/4/67	Gladstone	Clayton Way Sewer	Prov. app.
4/4/67	Roseburg	Sakura Yama Subd.	Prov. app.
4/5/67	Gresham	N. E. Bell Street Sewer	Prov. app.
4/6/67	Medford	Sewer extensions	Prov. app.
4/6/67	Springfield	Sewer S-80-66	Prov. app.
4/7/67	Winston	Tumlin Avenue Sewer	Prov. app.
4/7/67	West Linn	Parsons Avenue Add. Sewer	Prov. app.
4/10/67	Sherwood	Gleneagle Subd. Sewer	Prov. app.
4/11/67	Beaverton	S. E. Cressmore Drive	Prov. app.
4/11/67	Estacada	H-S-J-S-E Laterals H-I-N, H-I-S	Prov. app.
4/13/67	Sublimity	Prel. Engineering Sewerage Rept.	Approved
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4/17/67	Sheridan	STP Expansion Study	Approved
4/19/67	Fairway Estates	Lateral A	Prov. app.
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4/21/67	Oak Hills	Townhouse Complex Sewer	Prov. app.
4/25/67	Gresham	Cleveland & Section Line Sewer	Prov. app.
4/27/67	Sweet Home	N. 12th Ave. San. Sewer	Prov. app.
4/27/67	Tigard	Panorama #II	Prov. app.

PROJECT PLANS AND REPORTS

The following plans or reports were received and processed by the Air Quality Control staff during the month of April 1967:

Date	Location	Project	Action
14	Columbia County	Nuclear Power Plant Considerations	No action necessary Under consideration
20	Washington Co.	Review of Proposed County Air Pollution Ordinance	Comments submitted
26	Clackamas Co.	Publishers' Paper Co. Waste Pulp Incinerator	Under consideration

PUBLIC HEARING

May 23, 1967

Introduction

This public hearing is being held today pursuant to the requirements of ORS 449.086, of ORS Chapter 183 (the Administrative Procedures Act), and of Oregon Administrative Rules, Chapter 334, Division 3, pertaining to the State Sanitary Authority. It is for the purpose of receiving testimony or statements from all parties, including Federal, State and local agencies, political subdivisions, public and private organizations and any individuals having an interest in the matter of Standards of Quality for the Public Waters of Oregon and the Disposal Therein of Sewage and Industrial Wastes.

Following this hearing, the Sanitary Authority will adopt minimum general water quality standards for all waters of the State and special water quality standards for the public waters of (1) Goose Lake in Lake County, (2) the main stem of the Klamath River, (3) Multnomah Channel and the main stem of the Willamette River, (4) the main stem of the Columbia River forming the boundary between Oregon and Washington, (5) the main stem of the Grande Ronde River, (6) the main stem of the Walla Walla River, (7) the main stem of the Snake River in and adjacent to Oregon, and (8) the Marine and Estuarine Waters of Oregon.

The primary purpose of adopting such standards is to protect the beneficial uses that presently are being or in the future are expected to be made of the State's public waters.

Mr. Spies, Secretary of the Authority, will now present the standards that are proposed for adoption.

Statement by Secretary

The State Sanitary Authority first adopted general water quality standards for all public waters of Oregon in November 1947. In December 1960, those general standards were codified by the Secretary of State as administrative rules and were published as Division 1, Subdivision 1 of Chapter 334 of the Oregon Administrative Rules. It is now proposed that these original general water quality standards be revised and that for certain interstate and other waters they be supplemented by special water quality standards.

During the past seven months, eleven public hearings have been held throughout the State by the Sanitary Authority relative to the proposed special water quality standards. These hearings, the dates held and the waters involved were as follows:

Lakeview	October 4, 1966	Goose Lake
Enterprise	October 26, 1966	Grande Ronde River
Milton-Freewater	October 27, 1966	Walla Walla River
Ontario	November 10, 1966	Snake River
The Dalles	November 29, 1966	Columbia River
Portland	November 30, 1966	Columbia River
Klamath Falls	December 15, 1966	Klamath River
Coos Bay	January 4, 1967	South Coast
Newport	January 5, 1967	Middle Coast
Tillamook	January 6, 1967	North Coast
Portland	March 23, 1967	Multnomah Channel and Willamette River

The transcripts covering these preliminary hearings have been distributed to and read by the Sanitary Authority members. The statements and testimony contained therein have been fully considered in the development of the standards being proposed today for final adoption.

With regard to the original general water quality standards, it is proposed that the following revisions be made:

Repeal OAR 11-005 pertaining to definitions and in its place adopt OAR 11-006 which reads as follows:

(Proposed)

OREGON ADMINISTRATIVE RULES

STATE SANITARY AUTHORITY

Division 1

WATER POLLUTION

Subdivision 1

STANDARDS OF QUALITY FOR PUBLIC WATERS OF OREGON and Disposal Therein of Sewage and Industrial Wastes

May 1967

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(Proposed)

OREGON ADMINISTRATIVE RULES

STATE SANITARY AUTHORITY

Division 1

WATER POLLUTION

Subdivision 1

STANDARDS OF QUALITY FOR PUBLIC WATERS OF OREGON

and Disposal Therein of Sewage and Industrial Wastes

May 1967

STATUTORY AUTHORITY: ORS 449.080; 449.086

11-005 (Repeal)

11-006 DEFINITIONS. As used in this subdivision unless otherwise required by context:

(1) "Sewage" means the water-carried human or animal waste from residences, buildings, industrial establishments or other places together with such ground water infiltration and surface water as may be present. The admixture with sewage as above defined of industrial wastes or wastes, as defined in subsections (2) and (3) of this section, shall also be considered "sewage" within the meaning of this division.

(2) "Industrial waste" means any liquid, gaseous, radioactive or solid waste substance or a combination thereof resulting from any process of industry, manufacturing, trade or business, or from the development or recovery of any natural resources.

(3) "Wastes" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive, or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

(4) "Pollution" means such ~~contamination or other~~ alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state which either by itself or in connection with any other substance present, will ~~or can reasonably be expected to~~ or can create a public nuisance or render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.

(5) "Waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

(6) "Marine waters" means all oceanic, offshore waters outside of estuaries or bays and within the territorial limits of the state of Oregon.

(7) "Estuarine waters" means all mixed fresh and oceanic waters in estuaries or bays from the point of oceanic water intrusion inland to a line connecting the outermost points of the headlands or protective jetties.

(8) "Standard" or "standards" means such measure of quality or purity for any waters in relation to their reasonable and necessary use as may be established by the Sanitary Authority pursuant to ORS Chapter 449.

(9) "Fish and other aquatic life" means all beneficial fishes, crustacea, mollusks, plankton, higher aquatic plants, and waterfowl.

11-008 HIGHEST AND BEST PRACTICABLE TREATMENT AND CONTROL REQUIRED. Notwithstanding the general and special water quality standards contained in this subdivision, where a higher standard can be achieved, the highest and best practicable treatment and/or control of wastes, activities and flows shall be provided so as to maintain dissolved oxygen at the highest desirable levels and overall water quality as good as possible, and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious factors at the lowest desirable levels.

11-010 (Repeal)

11-011 RESTRICTIONS ON THE DISCHARGE OF SEWAGE AND INDUSTRIAL WASTES AND HUMAN ACTIVITIES WHICH AFFECT WATER QUALITY IN THE WATERS OF THE STATE. No wastes shall be discharged and no activities shall be conducted such that said wastes or activities either alone or in combination with other wastes or activities will violate or can reasonably be expected to violate, any of the general or special water quality standards contained in this subdivision.

11-015 MAINTENANCE OF STANDARDS OF QUALITY. (1) The degree of sewage or waste treatment required to restore and maintain the ~~above~~ standards of quality shall be determined in each instance by the State Sanitary Authority and shall be based upon the following:

(a) The uses which are or may likely be made of the receiving stream.

(b) The size and nature of flow of the receiving stream.

(c) The quantity and quality of the sewage or wastes to be treated, and

(d) The presence or absence of other sources of pollution on the same watershed.

(2) At its discretion, the State Sanitary Authority may require chlorination or equally efficient disinfection of sewage and waste treatment plant effluents wherever and whenever the discharge of unchlorinated effluents shall or may affect the quality of water used for public or domestic water supplies, irrigation, shellfish growing areas, or swimming and recreational areas.

11-016 GENERAL WATER QUALITY STANDARDS. The following General Water Quality Standards shall apply as minimum standards to all waters of the state except where they are clearly superseded by Special Water Quality Standards applicable to specifically designated waters of the state.

No wastes shall be discharged and no activities shall be conducted* which either alone or in combination with other wastes or activities will cause in any waters of the state:

1) The dissolved oxygen content of surface waters to be less than five (5) milligrams per liter unless specified otherwise by special standard.

2) The hydrogen-ion concentration (pH) of the waters to be outside the range of 6.5 to 8.5 unless specified otherwise by special standard.

3) The liberation of dissolved gases, such as carbon-dioxide, hydrogen sulfide or any other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such waters.

4) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation or industry.

* Underlined portions in this section indicate substantive changes and/or additions to existing general water quality standards.

5) The creation of tastes, odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish.

6) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation or industry.

7) Objectionable discoloration, turbidity, scum, oily sleek or floating solids, or coat the aquatic life with oil films.

8) Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propagation, or be otherwise injurious to public health.

9) Aesthetic conditions offensive to the human senses of sight, taste, smell or touch.

10) Radioisotope concentrations to exceed Maximum Permissible Concentrations (MPC's) in drinking water, edible fishes or shellfishes, wildlife, irrigated crops, livestock and dairy products or pose an external radiation hazard.

11-019 BENEFICIAL USES OF WATERS TO BE PROTECTED BY SPECIAL WATER QUALITY STANDARDS. The Special water quality standards contained in this subdivision are adopted for the purpose of protecting, together with pertinent general water quality standards, the beneficial uses of specified waters of the state as set forth in Table A (page 23) and to conserve the waste assimilative capacity of the

waters so as to accommodate maximum development and utilization of the resources of the state.

11-020 (Repeal)

11-021 SPECIAL WATER QUALITY STANDARDS FOR PUBLIC WATERS OF GOOSE LAKE IN LAKE COUNTY. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of Goose Lake:

1) Dissolved Oxygen (DO)

DO concentrations to be less than 7 milligrams per liter.

2) Organisms of the Coliform Group Where Associated with Fecal Sources

(MPN or equivalent MF using a representative number of samples)

Average concentrations of coliform bacteria to exceed 1000 per 100 ml, with 20% of samples not to exceed 2400 per 100 ml.

3) Hydrogen Ion Concentration (pH)

pH values to be outside the range of 7.5 to 9.5.

4) Temperature

Daily average temperatures to exceed 70° F. or the daily mean ambient air temperature, whichever is greater.

11-023 SPECIAL WATER QUALITY STANDARDS FOR PUBLIC WATERS OF THE MAIN STEM KLAMATH RIVER. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of the Klamath River:

1) Dissolved Oxygen (DO)

(a) (Main stem Klamath River from Klamath Lake to John C. Boyle Power Diversion Dam located approximately 7 river miles above the Oregon-California border)

DO concentrations of surface waters to be less than 5 milligrams per liter unless caused by natural conditions.

(b) (Main stem Klamath River from John C. Boyle Power Diversion Dam to Oregon-California border)

DO concentrations to be less than 7 milligrams per liter.

2) Organisms of the Coliform Group Where Associated with Fecal Sources (MPN or equivalent MF using a representative number of samples)

Average concentrations of coliform bacteria to exceed 1000 per 100 ml, with 20% of samples not to exceed 2400 per 100 ml.

3) Turbidity (Jackson Turbidity Units, JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

4) Temperature

Any measurable increase when river temperatures are 72° F. or above, or more than 2° F. cumulative increase when river temperatures are 70° F. or less.

5) Dissolved Chemical Substances

(Main stem Klamath River at the Oregon-California border)

Conductivity to exceed 400 micromhos at 77° F.

6) Hydrogen Ion Concentration (pH)

pH values to be outside the range of 7.0 to 9.0.

11-025 SPECIAL WATER QUALITY STANDARDS FOR THE PUBLIC WATERS OF MULTNOMAH CHANNEL AND THE MAIN STEM WILLAMETTE RIVER. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of Multnomah Channel or the Willamette River:

1) Dissolved Oxygen (DO)

(a) (Multnomah Channel and main stem Willamette River from mouth to the Willamette Falls at Oregon City, river mile 26.6)

DO concentrations to be less than 5 milligrams per liter.

(b) (Main stem Willamette River from the Willamette Falls to Newberg, river mile 50)

DO concentrations to be less than 6 milligrams per liter.

(c) (Main stem Willamette River from Newberg to Salem, river mile 85)

DO concentrations to be less than 7 milligrams per liter.

(d) (Main stem Willamette River from Salem to confluence of Coast and Middle Forks, river mile 187)

DO concentrations to be less than 90% of saturation.

2) Organisms of the Coliform Group Where Associated with Fecal Sources (MPN or equivalent MF using a representative number of samples)

Average concentrations of coliform bacteria to exceed 1000 per 100 ml, with 20% of samples not to exceed 2400 per 100 ml.

3) Turbidity (Jackson Turbidity Units, JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

4) Temperature

(a) (Multnomah Channel and main stem Willamette River from mouth to Newberg, river mile 50.)

Any measurable increase when river temperatures are 70° F. or above, or more than 2° F. increase when river temperatures are 68° F. or less.

(b) (Main stem Willamette River from Newberg to confluence of Coast and Middle Forks, river mile 187)

Any measurable increase when river temperatures are 64° F. or above,or more than 2° F. increase when the river temperatures are 62° F. or less.

5) Dissolved Chemical Substances

Guide concentrations listed below to be exceeded except as may be specifically authorized by the Sanitary Authority upon such conditions as it may deem necessary to carry out

the general intent of Section 11-008 of this subdivision and to protect the beneficial uses set forth in Table A.

	mg/l
Arsenic (As)	0.01
Barium (Ba)	1.0
Boron (Bo)	0.5
Cadmium (Cd)	0.01
Chloride (Cl)	25.
Chromium (Cr)	0.05
Copper (Cu)	0.005
Cyanide (CN)	0.01
Fluoride (F)	1.0
Iron (Fe)	0.1
Lead (Pb)	0.05
Manganese (Mn)	0.05
Phenols (totals)	0.001
Total dissolved solids	100.
Zinc (Zn)	0.1
Heavy metals (Totals including Cu, Pb, Zn, and others of non-specific designation)	0.5

11-027 SPECIAL WATER QUALITY STANDARDS FOR THE PUBLIC WATERS OF THE MAIN STEM OF THE COLUMBIA RIVER FROM THE EASTERN OREGON-WASHINGTON BORDER WESTWARD TO THE PACIFIC OCEAN. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of the Columbia River:

1) Dissolved Oxygen (DO)

DO concentrations to be less than 90% of saturation.

2) Organisms of the Coliform Group where Associated with Fecal Sources

(MPN or equivalent MF using a representative number of samples)

(a) (From the eastern Oregon-Washington boundary downstream to the Interstate Highway 5 bridge between Vancouver, Washington, and Portland, Oregon)

Average concentrations of coliform bacteria to exceed 240 per 100 milliliters or to exceed this value in more than 20 percent of the samples.

(b) (From the Interstate Highway 5 bridge between Vancouver, Washington, and Portland, Oregon, to the mouth)

Average concentrations of coliform bacteria to exceed 1000 per 100 milliliters, with 20 percent of the samples not to exceed 2400 per 100 milliliters.

3) Turbidity (Jackson Turbidity Units, JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

4) Hydrogen-Ion Concentration

pH values to fall outside the range of 7.0 to 8.5.

5) Temperature

Any measurable increase when river temperatures are 68° F. or above, or more than 2° F. increase when river temperatures are 66° F. or less.

6) Dissolved Chemical Substances

(Above the zone of marine water intrusion, approximate river mile 40)

Guide concentrations listed below to be exceeded except as may be specifically authorized by the Sanitary Authority upon such conditions as it may deem necessary to carry out the general intent of Section 11-008 of this subdivision and to protect the beneficial uses set forth in Table A.

	mg/l
Arsenic (As)	0.01
Barium (Ba)	1.0
Boron (Bo)	0.5
Cadmium (Cd)	0.01
Chloride (Cl)	30.
Chromium (Cr)	0.05
Copper (Cu)	0.005
Cyanide (CN)	0.01
Fluoride (F)	1.0
Iron (Fe)	0.1
Lead (Pb)	0.05
Manganese (Mn)	0.05
Phenols (totals)	0.001
Total dissolved solids	200.
Zinc (Zn)	0.1
Heavy metals (Totals including Cu, Pb, Zn, and others of non-specific designation)	0.5

Same except

11-029 SPECIAL WATER QUALITY STANDARDS FOR THE PUBLIC WATERS OF THE MAIN STEM OF THE GRANDE RONDE RIVER. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of the Grande Ronde River:

1) Dissolved Oxygen (DO)

DO concentrations to be less than 75% of saturation at seasonal low or less than 95% of saturation in spawning areas during spawning, hatching, and fry stages of salmonid fishes.

2) Organisms of the Coliform Group where Associated with Fecal Sources (MPN or equivalent MF using a representative number of samples)

Average concentrations of coliform bacteria to exceed 1000 per 100 milliliters, with 20% of these samples not to exceed 2400 per 100 milliliters.

3) Turbidity (Jackson Turbidity Units, JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

4) Temperature

Any measurable increase when river temperatures are 68° F. or above, or more than 2° F. increase when river temperatures are 66° F. or less.

5) Dissolved Chemical Substances

Guide concentrations listed below to be exceeded except as may be specifically authorized by the Sanitary Authority upon such conditions as it may deem necessary to carry out the general intent of Section 11-008 of this subdivision and to protect the beneficial uses set forth in Table A.

	mg/1
Arsenic (As)	0.01
Barium (Ba)	1.0
Boron (Bo)	0.5
Cadmium (Cd)	0.01
Chloride (Cl)	25.
Chromium (Cr)	0.05
Copper (Cu)	0.005
Cyanide (CN)	0.01
Fluoride (F)	1.0
Iron (Fe)	0.1
Lead (Pb)	0.05
Manganese (Mn)	0.05
Phenols (totals)	0.001
Total dissolved solids	200.
Zinc (Zn)	0.1
Heavy metals (Totals including Cu, Pb, Zn, and others of non-specific designation)	0.5

Some except

11-031 WATER QUALITY STANDARDS FOR THE PUBLIC WATERS OF THE MAIN STEM OF THE WALLA WALLA RIVER. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of the Walla Walla River:

1) Dissolved Oxygen (DO)

DO concentrations to be less than 75% of saturation at seasonal low or less than 95% of saturation in spawning areas during spawning, hatching, and fry stages of salmonid fishes.

2) Organisms of the Coliform Group where Associated with Fecal Sources (MPN or equivalent MF using a representative number of samples)

Average concentrations of coliform bacteria to exceed 1000 per 100 milliliters, with 20% of these samples not to exceed 2400 per 100 milliliters.

3) Turbidity (Jackson Turbidity Units, JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

4) Temperature

Any measurable increase when river temperatures are 68° F. or above, or more than 2° F. increase when river temperatures are 66° F. or less.

5) Dissolved Chemical Substances

Guide concentrations listed below to be exceeded except as may be specifically authorized by the Sanitary Authority upon such conditions as it may deem necessary to carry out the general intent of Section 11-008 of this subdivision and to protect the beneficial uses set forth in Table A.

	mg/l
Arsenic (As)	0.01
Barium (Ba)	1.0
Boron (Bo)	0.5
Cadmium (Cd)	0.01
Chloride (Cl)	25.
Chromium (Cr)	0.05
Copper (Cu)	0.005
Cyanide (CN)	0.01
Fluoride (F)	1.0
Iron (Fe)	0.1
Lead (Pb)	0.05
Manganese (Mn)	0.05
Phenols (totals)	0.001
Total dissolved solids	200.
Zinc (Zn)	0.1
Heavy metals (Totals including Cu, Pb, Zn, and others of non-specific designation)	0.5

11-033 WATER QUALITY STANDARDS FOR THE MAIN STEM OF THE SNAKE RIVER IN AND ADJACENT TO OREGON. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of the Snake River:

1) Dissolved Oxygen (DO)

DO concentrations of surface waters to be less than 75% of saturation at seasonal low or less than 95% of saturation in spawning areas during spawning, hatching, and fry stages of salmonid fishes.

2) Organisms of the Coliform Group where Associated with Fecal Sources (MPN or equivalent MF using a representative number of samples)

Average concentrations of coliform bacteria to exceed 1000 per 100 ml, with 20% of samples not to exceed 2400 per 100 ml.

3) Turbidity (Jackson Turbidity Units, JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

4) Temperature

Any measurable increase when river temperatures are 70° F. or above, or more than 2° F. increase when river temperatures are 68° F. or less.

5) Dissolved Chemical Substances

Guide concentrations listed below to be exceeded except as may be specifically authorized by the Sanitary Authority upon such conditions as it may deem necessary to carry out the general intent of Section 11-008 of this subdivision and to protect the beneficial uses set forth in Table A.

	mg/l
Arsenic (As)	0.01
Barium (Ba)	1.0
Boron (Bo)	0.5
Cadmium (Cd)	0.01
Chloride (Cl)	50.
Chromium (Cr)	0.05
Copper (Cu)	0.005
Cyanide (CN)	0.01
Fluoride (F)	1.0
Iron (Fe)	0.1
Lead (Pb)	0.05
Manganese (Mn)	0.05
Phenols (totals)	0.001
Total dissolved solids	750.
Zinc (Zn)	0.1
Heavy metals (Totals including Cu, Pb, Zn, and others of non-specific designation)	0.5

Spec. 1 except

6) Hydrogen-Ion Concentration (pH)

pH values to fall outside the range of 7.0 to 9.0.

11-100 WATER QUALITY STANDARDS FOR THE MARINE AND ESTUARINE WATERS OF OREGON (excluding estuarine waters of the Columbia River). The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 11-016, except where this section imposes a conflicting requirement with the provisions of Section 11-016, this section shall govern.

No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in marine or estuarine waters:

1) Dissolved Oxygen (DO)

(Outside of zones of upwelled marine waters naturally deficient in DO)

DO concentrations to be less than 5 milligrams per liter for estuarine waters, or less than saturation concentrations for marine waters.

2) Organisms of the Coliform Group

(MPN or equivalent MF using a representative number of samples)

(a) (For marine and shellfish growing waters)

The median concentration of coliform bacteria of sewage origin to exceed 70 per 100 milliliters.

(b) (For estuarine waters other than in shellfish growing areas)

Average concentrations of coliform bacteria, where associated with fecal sources, to exceed 240 per 100 ml or to exceed this value in more than 20% of samples.

3) Hydrogen Ion Concentration (pH)

pH values to be outside the range of 7.0 and 8.5 over shellfish growing areas.

4) Turbidity (Jackson Turbidity Units JTU)

Turbidities to exceed 5 JTU above natural background values except for certain short-term activities which may be specifically authorized by the Sanitary Authority under such conditions as it may prescribe and which are necessary to accommodate essential dredging or construction where turbidities in excess of this standard are unavoidable.

5) Temperature

Any significant increase above natural background temperatures, or water temperatures to be altered to a degree which creates or can reasonably be expected to create an adverse effect on fish or other aquatic life.

Table A

BENEFICIAL USES TO BE PROTECTED

	Domestic Waste Supply (1)	Industrial Water Supply (1)	Irrigation	Livestock Watering	Anadromous Fish Passage	Salmonid Fish Rearing	Salmonid Fish Spawning	Resident fish and other Aquatic life	Hunting and Wildlife	Fishing	Water Skiing & Swimming	Pleasure Boating	Aesthetic Qualities
GOOSE LAKE				X		X		X	X	X	X	X	X
GRANDE RONDE RIVER	X	X	X	X	X	X	X	X	X	X	X	X	X
WALLA WALLA RIVER	X	X	X	X	X	X	X	X	X	X	X	X	X
SNAKE RIVER	X	X	X	X	X(2)	X	X	X	X	X	X	X	X
COLUMBIA RIVER	X	X	X	X	X	X	X	X	X	X	X	X	X
KLAMATH RIVER													
(Klamath Lake to J. C. Boyle Power Dam)	X(3)	X	X	X				X	X	X	X	X	X
(J. C. Boyle Power Dam to California Border)	X(3)	X	X	X		X	X	X	X	X	X	X	X
WILLAMETTE RIVER													
(Mouth to Willamette Falls incl. Mult. Channel)	X(4)	X	X	X	X			X	X	X	X(5)	X	X
(Willamette Falls to Newberg)	X	X	X	X	X	X		X	X	X	X	X	X
(Newberg to Salem)	X	X	X	X	X	X	X	X	X	X	X	X	X
(Salem to Coast Fork)	X	X	X	X	X	X	X	X	X	X	X	X	X
MARINE AND ESTUARINE		X			X	X		X	X	X	X	X	X

(1) With adequate pre-treatment
(2) Up to Oxbow Dam (River mile 273)
(3) By agreement of Klamath Compact Commission
(4) If no better source is reasonably attainable
(5) Not to conflict with commercial activities in Portland Harbor

The Implementation Plan

To supplement the water quality standards an implementation plan has been developed setting forth in detail the facilities or actions needed to achieve compliance with the standards, a time schedule for such compliance, the controls and surveillance to be used in measuring compliance, and the measures to be taken for ensuring compliance.

Facilities Needed

For domestic and municipal sewage the plan calls for a minimum of secondary treatment, or equivalent, equal to 85% removal of 5-day BOD and suspended solids, plus effective chlorination. The deadlines specified for installation of new or improved secondary sewage treatment works, or equivalent, are as follows:

July 1967 — 7 communities

Banks	Hubbard	Laurelwood Academy
Cottage Grove	Independence	Manbrin Gardens
Harrisburg		

December 1967 — 1 community

Tillamook Airport

January 1968 — 1 community

Fanno Creek (Multnomah County)

July 1968 — 7 communities

Junction City	Merrill	Sheridan
Klamath Falls Airport	Monroe	Tillamook
Malin		

August 1968 — 1 community

Albany

September 1968 5 communities

Canby	Grand Ronde	Oakridge
Dallas	Mill City	

December 1968 4 communities

Uplands S.D.	Reedsport
Garibaldi	Bandon

January 1969 1 community

Hillsboro

May 1969 1 community

Wallowa

December 1969 2 communities

Nehalem
Wheeler

May 1970 1 community

Nyssa

July 1970 1 community

Toledo

December 1970 1 community

Astoria

July 1972 20 communities

Arlington	Florence	Rainier
Brookings	Gold Beach	Seaside
Bunker Hill S.D.	Gresham	St. Helens
Coos Bay	Hood River	The Dalles
Coquille	North Bend	Umatilla
Eastside	Portland	Waldport
Empire	Portland Airport	

Of these 53 communities, 7 already have secondary sewage treatment but need improvements or enlargements (Canby, Dallas, Fanno Creek, Hillsboro, Klamath Falls Airport, Laurelwood Academy and Uplands S.D.), 5 have intermediate treatment (Albany, Merrill, Seaside, Sheridan and Tillamook),

33 have only primary treatment, and 8 have no treatment at the present time (Astoria, Bandon, Mill City, Monroe, Nehalem, Reedsport, Tillamook Airport and Wheeler).

Nine of these 53 projects are already under construction.

Other required sewerage works projects included in the implementation plan are completion by city of Portland of its interception system by December 1968, installation of pump station improvements by the city of Gladstone by September 1967, connection of west area to Salem city sewerage system by September 1969, and provision of chlorination for lagoon system overflows at La Grande, Ontario, South Suburban S.D., Taft and Vale by May 1969.

For industrial wastes the implementation plan includes the following:

1) Improved waste treatment or disposal for 3 plants by October 1967:

   Amalgamated Sugar Co., Nyssa
   Ore-Ida Foods, Inc., Ontario
   Wah Chang Corp., Albany

2) Secondary treatment or equivalent by May 1968 for 9 plants:

   Brown and Company, Corvallis
   Crown Zellerbach Corp., Lebanon
   Evans Products Co., Corvallis
   Jefferson Woolen Mill, Jefferson
   Klamath Tallow Co., Klamath Falls
   Tillamook County Creamery Assn., Tillamook
   Tillamook Cheese & Dairy Assn., Tillamook
   Weyerhaeuser Co., Klamath Falls
   Western Kraft Corp., Albany

3) Revised waste disposal facilities for Boise Cascade Particle Board plant at Island City by January 1968 and pretreatment of cannery wastes at Silverton by July 1968.

4) Study and development of alternative methods of treatment or disposal for log pond overflow and/or glue wastes for 18 sawmill and plywood operations:

Barker Willamette Lumber Co., Eugene
Bohemia Lumber Co., Culp Creek
Coos Head Timber Co., Coos Bay
Davidson Industries, Inc., Mapleton
Georgia Pacific Corp., Coos Bay
Georgia Pacific Corp., Junction City
Georgia Pacific Corp., Springfield
Hines Lumber Co., Westfir
International Paper Co., Veneta
Menasha Corp. Plywood Div., North Bend
Natron Plywood Co., Lane County
U.S. Plywood Corp., Lebanon
U.S. Plywood Corp., Mapleton
U.S. Plywood Corp., Willamina
Vancouver Plywood Co., Albany
Western Veneer and Plywood Co., Lebanon
Weyerhaeuser Co. Lumber and Plywood, Springfield
Willamette Valley Lumber Co., Dallas

5) Connection to city sewers for 24 plants:

Alpenrose Dairy, Multnomah County
Dickinson Company, Multnomah County
Les' Poultry, McMinnville
West Foods, Inc., Salem
Portland area - 20 plants
- Air Reduction Co.
- Cargill, Inc.
- Chevron Asphalt Co.
- Chipman Chemical Co.
- Dreyfus Louis Corp.
- Dulien Steel
- Gunderson Brothers Engineering Corp.
- Linnton Plywood
- McCormick & Baxter
- Mobil Oil Co.
- M.P. Kirk & Sons
- Pabco
- Pennsalt Corp.
- Peavy Grain Co.
- Reimann & McKenney
- Richfield Oil Co.
- Shell Oil Company
- Standard Oil Company
- Tidewater Oil Company
- Union Oil Company

6) Special studies are to be made to determine waste treatment needs for 9 plants:

Coos Head Timber Co., Empire (SWL disposal)
Forest Fiber Products Co., Forest Grove
Oregon Metallurgical Co., Albany
Pacific Carbide, Portland
Pacific Meat Co., Portland
Portland Rendering Co., Portland
Springfield Slaughter Plant, Springfield
Steen Brothers Meat Co., Albany
Union Carbide, Portland

7) For specific pulp mills:

a) Boise Cascade Corporation, Salem. Primary treatment of all wastes by December 1967. Chemical recovery and secondary treatment or equivalent control by July 1972. During critical stream flow period (June 1 - November 1) oxygen demand of total mill load not to exceed 10,000 pounds per day.

b) Coos Head Timber Co., Empire. Primary treatment or equivalent by May 1968.

c) Crown Zellerbach Corporation, West Linn. Reduce year round total mill load equal to chemical recovery and secondary treatment or equivalent control by June 1968.

d) Georgia Pacific Corporation, Toledo. Primary treatment of white water and all wastes discharged to Yaquina River by May 1969.

e) Publishers Paper Co., Newberg. Chemical recovery and secondary treatment or equivalent control of total mill wastes by July 1972. During critical stream flow period (June 1 - November 1) oxygen demand of total mill load not to exceed 15,000 pounds per day.

f) Publishers Paper Co., Oregon City. Primary treatment of all wastes by December 1, 1967. Reduce load equal to chemical recovery and secondary treatment or equivalent control during critical stream flow period (June 1 - November 1) by June 1, 1968 and year round by June 1970.

In addition to detailing the aforementioned sewage and waste treatment or disposal facilities that are or will be needed for control of existing sources of pollution, the implementation plan also outlines control programs for pollution caused by (a) combined sewer overflows, (b) agricultural wastewaters, (c) watercraft and marinas, (d) land erosion, (e) mine drainage and (f) miscellaneous problems.

The plan also calls for increased surveillance or monitoring of both water quality in the streams and of the pollution loads being discharged. The river monitoring stations are listed for the individual basins.

Based on the results of the surveillance activities, there will be periodic upgrading of treatment requirements for all waste sources as needed to accommodate additional growth and development without degradation of water quality.

As required by ORS 449.395, plans and specifications for all waste treatment and disposal facilities will be reviewed and approved prior to construction to ensure their adequacy.

If the mandatory permit system currently under consideration by the 1967 Legislative Assembly is approved, after January 1, 1968 a permit will have to be obtained from the State Sanitary Authority by any person before he can (a) discharge into the waters of the state any sewage or waste effluent, (b) construct or operate any new or improved municipal or domestic

sewerage system, disposal system or treatment works, (c) increase in volume or strength any wastes in excess of the permissive discharges specified under an existing permit, (d) construct, operate or conduct any industrial, commercial or other establishment or activity, the operation or conduct of which would cause an increase in the discharge of wastes or which would cause pollution of the waters of the state, or (e) construct or use any new outlet for the discharge of any wastes into the waters of the state.

In any case of failure to obtain voluntary cooperation, appropriate action will be taken to enforce compliance with the requirements of Chapter 449 Oregon Revised Statutes and the water quality standards and other administrative rules of the Sanitary Authority pertaining to water pollution control.

In conclusion, it is suggested that at this point in this hearing a motion be adopted to the effect that all evidence and views presented at the 11 previous hearings and as contained in the transcripts for said hearings which have been distributed to and read by the Sanitary Authority members be incorporated by reference into the proceedings of this May 23, 1967 hearing.

IMPLEMENTATION AND ENFORCEMENT PLAN

FOR THE PUBLIC WATERS OF THE

STATE OF OREGON

May 1967

OREGON STATE SANITARY AUTHORITY
1400 S. W. Fifth Avenue
Portland, Oregon 97201

Implementation and Enforcement Plan for the Public

Waters of the State of Oregon

OREGON STATE SANITARY AUTHORITY

May 1967

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IMPLEMENTATION AND ENFORCEMENT PLAN
FOR THE PUBLIC WATERS OF THE STATE OF OREGON
May 1967

The following implementation and enforcement plans for the public waters of the State of Oregon have been formulated as supplementary material to the Oregon Administrative Rules of the State Sanitary Authority entitled "Standards of Quality for Public Waters of Oregon and Disposal Therein of Sewage and Industrial Wastes" May 1967. Tentative Water Quality Standards with partial implementation plans, rationale for standards, maps and other supporting data as published in preparation for hearings held on individual areas have received widespread distribution and contain much of the basic data used for this plan. Hearing transcripts have been reviewed and pertinent information from them is incorporated in this report. Copies of tentative standards, hearing transcripts and other background data for review are on file in the offices of the Oregon State Sanitary Authority in Portland.

1. Water Uses. Various water uses require different water quality and these uses must be considered along with standards. In the State of Oregon beneficial uses of water have been defined in the law creating the Oregon State Water Resources Board. (ORS 536.300) "The board shall proceed as rapidly as possible to study existing water resources of this state; means and methods of conserving and augmenting such water resources; existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife and fish life uses and for pollution abatement, all of which are declared to be beneficial uses, and all other related subjects, including drainage and reclamation."

In Table A of the "Standards of Quality for Public Waters of Oregon" the beneficial uses that are to be protected for both present and future are listed for Goose Lake, Grande Ronde River, Walla Walla River, Snake River, Columbia River, Klamath River, Willamette River and the marine and estuarine waters of the State.

2. Present Compliance with Standards

Generally the interstate waters included in this report are in compliance with the Standards that have been set for these waters. Interstate waters that are not specifically mentioned in this report conform with the general water quality standards of the State. Table 1 indicates the status of the waters of the State.

Table 1.

Compliance of Oregon Streams with Proposed Standards

Body of Water	Compliance	Non-Compliance	Remarks
Goose Lake	x		Need longer period of record
Grande Ronde River	x		
Walla Walla River	x		Practically no summer flow
Snake River		x	Need data on nutrients and algal problems
Columbia River		x	Some slime problem. MPN high during part of year
Klamath River (Lake to Boyle Power Dam)		x	Nutrient and algal problem
(Boyle Power Dam to Calif. Border)	x		
Willamette River (Mouth to Willamette Falls including Multn. Channel)		x	Summer DO deficiencies, Benthal deposits, slime

(Table 1 - continued)

(Table 1 - continued)

Body of Water	Compliance	Non-Compliance	Remarks
(Willamette Falls to Newberg)	x		MPN high
(Newberg to Salem)	x		
(Salem to Coast Fork)	x		
Marine and Estuarine		x	MPN high in shellfish areas

3. Location of Basins to which Standards Apply

The tentative water quality standards published as prehearing documents for each of the basins contain maps which show the boundaries of the basin, the major streams within the basin, the major cities and pertinent demographic data to characterize the area. Because these were published with area-wide distribution, they are not reproduced for this report.

4. Significant Municipal and Industrial Wastes

Tables 2-a through 2-h enumerate the major waste sources contributing to each of the streams included in this report. The tables show the source of waste (both municipal and industrial), the receiving stream, the river mile of the effluent, the type of waste involved, present treatment and disposal of industrial and sanitary wastes, reporting and the action needed, if any, for compliance with proposed standards. Because of constantly changing conditions of loading, flows, and other parameters, finite values for population equivalent have been left out in most instances. Annual reports and other publications of the Oregon State Sanitary Authority detail this information on a periodic basis.

Legend for Tables 2-A through 2H

Abbreviations used in tables

OSSA	Oregon State Sanitary Authority
FWPCA	Federal Water Pollution Control Administration
ST	Septic tank
DF	Drainfield
AD	Aerobic digestion
Cl	Chlorination

Numbers used in tables

Action for Municipalities of the Willamette Basin

(1) Injunctive action filed in Polk County Circuit Court, 12/19/66

(2) Seven private properties conncected to private sewer. Program under way to abate private discharges. No progress by city for providing municipal sewerage system.

(3) A portion of the area (industrial and domestic) is connected to area storm sewers. Program under way to collect and pump area wastes to Portland sewage treatment plant.

General Treatment, Studies or Other Action

(4) Study requested by OSSA of FWPCA Water Laboratory, Corvallis, Oregon, to determine the effects of log storage and handling practices and to recommend possible alternate procedures.

(5) Study in progress by FWPCA Water Laboratory, Corvallis to recommend methods of treatment or disposal of glue wastes.

(6) Secondary treatment of sewage wastes by July 1972.

(7) Application has been filed for 702 planning funds from HUD. Engineering plans under way for small segment of study area.

(8) Monthly reports needed.

TABLE 2A

SIGNIFICANT WASTE SOURCES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

KLAMATH RIVER

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Chiloquin	Williamson River	10.0	Domestic sewage	Secondary treatment (trickling filter and chlorination)	--	Improved operation (8)
Modoc Lumber Co.	Upper Klamath Lake		Log storage and handling	None		Continued surveillance
City of Klamath Falls	Lake Ewauna	251.0	Domestic sewage	Secondary treatment (trickling filter and chlorination)	--	Continued surveillance
South Suburban San. District	Lake Ewauna	250.0	Domestic sewage	Secondary treatment (4 cell lagoon)	--	Chlorination of lagoon overflow by May 1969 and continued surveillance (8)
Klamath Tallow Co. (Klamath Falls)	Klamath River	249.5	Rendering wastes	None	ST, DF	Secondary treatment by May 1968 (engineering study underway)
T. P. Packing Co. (Klamath Falls)	Klamath River	248.0	Slaughterhouse wastes	Land disposal	ST, DF	Continued surveillance

TABLE 2A (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Klamath Lumber Co. (Klamath Falls)	Klamath River	248.0	Log storage and handling	None	ST, DF	Continued surveillance and study
Klamath Plywood (Klamath Falls)	Klamath River	247.5	Log storage and glue wastes	None	ST, DF	Continued surveillance and study
Weyerhaeuser Co. (Klamath Falls)	Klamath River	246.5	Hardboard mill wastes	Secondary treatment (2 cell settling pond)	ST	Secondary treatment of domestic & industrial wastes by May 1968 (8)
City of Malin	Drainage ditch to Tule Lake		Domestic sewage	Primary treatment with sand filter	--	Improved secondary treatment and chlorination by July 1968 (8)
Bonanza School	Lost River		Domestic sewage	Aerobic digestion and chlorination	--	Continued surveillance (8)
Kingsley Field Airbase (Klamath Falls)	Lost River Diversion Canal	9	Domestic sewage	Secondary treatment (Activated sludge and chlorination)	--	Expansion of present facilities (construction to start in 1967)
City of Merrill	Lost River		Domestic sewage	Intermediate trickling filter	--	Secondary treatment and chlorination by July 1968. (8)

TABLE 2B

MAJOR SOURCES OF DOMESTIC SEWAGE

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

WILLAMETTE RIVER BASIN

May 1967

Location	River Mile	Population Served	Presen Treatment	Needed Action
Albany	119	16,000	Intermediate	Secondary treatment by August 1968. (Financing arranged, plans submitted)
Banks	29-46-17	350	Primary	Secondary treatment by July 1967. (Under construction) (8)
Canby	34	2,600	Secondary	Plant expansion by September 1968. Planning of improvements, requested 8-29-66)
Cottage Grove	187-21	5,100	Primary	Secondary treatment by July 1967. (Under construction)
Dallas	89-12	8,000	Secondary	Plant expansion by September 1968. (Plans being prepared)
Fanno Creek	29-9-7.3	20,500	Secondary	Plant expansion by January 1968. (Under construction)
Gladstone	25-0.5	4,821	Pumped to Oregon City sewage treatment plant	Improvements to pump station by Sept. 1967. (Plans submitted, financing arranged)
Grand Ronde	55-11-47-1	100	Septic Tank	Secondary treatment by September 1968 (under litigation) (1)

TABLE 2B (Continued)

Location	River Mile	Population Served	Present Treatment	Needed Action
Harrisburg	161	936	Primary	Secondary treatment by July 1967. (under construction)
Hillsboro	29-45	11,000	Secondary and Primary land disposal	Expansion by January 1969 (bonds voted, engineering underway)
Hubbard	36-1-5-5	300	Septic tank	Sewers and secondary treatment by July 1967 (under construction)
Independence	96	2,100	Primary	Secondary treatment by July 1967 (under construction)
Junction City	164.3	2,000	Primary	Secondary treatment by July 1968 (under construction)
Laurelwood Academy	29-64-4	370	Secondary	Plant improvements by July 1967 (under construction)
Manbrin Gardens	82	700	Primary	Connect to Salem system by July 1967 (under construction)
McMinnville	55-11-3	8,500	Secondary	Continued surveillance
Mill City	109-47	1,350	No sewers (2)	Sewers and secondary treatment by September 1968 (2)
Monroe	145.9-6.7	375	None	Secondary treatment by July 1968 (bonds voted, plans being prepared)

TABLE 2B (Continued)

Location	River Mile	Population Served	Present Treatment	Needed Action
Oakridge	187-41.5	2,300	Primary	Secondary treatment by September 1968
Portland (NW)	7	7,500	(3)	Lateral sewers, interceptors & pump station by Jan. 1968 (under construction)
Salem (Westside)	80.5	150	Septic tank	Connect to Salem system by September 1969 (area plan)
Sheridan	55-11-30	1,800	Intermediate	Secondary treatment by July 1968 (planning of improvements requested 8-29-66)
Silverton	36-1-35.3	3,950	Secondary	Pre-treatment of industrial waste by July 1968 (engineering study)
Uplands San. Dist.	29-39-5-4-4.6	750	Secondary	Plant improvements (engineering report by July 1967, connection to master system by December 1968)

TABLE 2C

MAJOR SOURCES OF INDUSTRIAL WASTES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

WILLAMETTE RIVER BASIN

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Weyerhaeuser Company Lumber and plywood	Coast Fork	187-24	Glue wastes and log pond overflow	Discharge to log pond	ST, DF	(4)(5)
Bohemia Lumber Co.	Row River (Culp Creek)	187-21-16	Glue wastes and log pond overflow	Waste through 400-yard settling ditch	ST, DF	(4)(5)
Hines Lumber Co. (Westfir)	N. Fork of Middle Fork Willamette	187-37-2	Glue wastes and log pond (in river)	None	ST, DF	(4)(5)
Springfield Slaughter Plant	Willamette	184	Slaughterhouse wastes	Screening and holding pond		Study by OSSA to determine adequacy of treatment.
Wildish Sand and Gravel Co.	Willamette	184	Gravel removal and process wash water	10-acre holding pond for silt removal and gravel removal operations confined to areas inside berms (provides adequate interim control).	ST, DF	Permanent waste control facilities for all waste waters by June 1967.

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Natron Plywood	Willamette	184	Glue wastes	50' x 50' lagoon with discharge to slough 1.5 miles from main Willamette	ST, DF	(5)
Georgia Pacific Co. (Springfield)	Willamette	184	Glue wastes and log pond overflow	Glue wastes to city	City	(4)(5)
Weyerhaeuser Corp. (Springfield)	McKenzie	172-15	Kraft mill wastes and log pond discharge	Settling ponds, aerated lagoon, land disposal, aerated log pond	City	Continued surveillance
Georgia Pacific Corp. (Junction City)	Willamette	164	Glue wastes	Settling channels to Flat Creek	ST, DF	(5)
Barker-Willamette Lumber Co.	Amazon Creek	146	Glue wastes	Disposal field	ST, DF	(5)
International Paper Company	Long Tom	146-30	Glue wastes and log pond overflow	Settling tank to Noel Creek	ST, DF	(4)(5)
Evans Products Co. (Corvallis)	Willamette	132	Hardboard plant wastes battery separator plant wastes	Primary settling pond	ST, DF	Secondary treatment or equivalent control of all waste discharges by May 1968 (engineering study underway)(8)

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Brown and Company (Corvallis)	Willamette	132	Process water from re-pulping of newsprint for production of bituminous pipe	None	ST, DF	Secondary treatment or equivalent control of waste discharges by May 1968 (plans underway for development of completely closed system)
Vancouver Plywood Corp. (Albany)	Calapooya	120-3	Glue wastes	Waste washed to storm drain	City	(5)
Steen Bros. Meat Co.	Calapooya	120-1	Slaughterhouse wastes	Septic tank and drainfield	ST, DF	Study by OSSA to determine adequacy of present facilities.
Oregon Metallurgical Co. (Albany)	Willamette	119	Zirconium processing	pH adjustment, discharge to Oak Cr.	ST, DF	OSSA study to determine needs (have retained engineering consultant to design treatment and control facilities for proposed expansion) (8)
Wah Chang Corp. (Albany)	Willamette	119	Process water from production of rare earth metals	pH adjustment and chemical sludge removal	ST, DF	Program approved by OSSA for improved control of toxic waste discharges and chemical sludge handling by October 1967 (engineering plans underway and equipment on order)(8)

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Western Kraft Corp. (Albany)	Willamette	117	Kraft mill wastes	Primary sedimentation	ST, DF	Secondary treatment or equivalent control of total mill wastes by May 1968.
Crown Zellerbach Corp. (Lebanon)	South Santiam	109-12-17	Sulfite mill wastes and linerboard production wastes	Primary sedimentation. Evaporation of SWL and burning or by-production recovery	City	Secondary treatment or equivalent control of total mill wastes by May 1968.
U.S. Plywood Corp. (Lebanon)	South Santiam	109-12-17	Glue wastes and log pond overflow	None	ST, Cl to log pond	(4)(5)
Western Veneer Plywood (Lebanon)	South Santiam	109-12-17	Glue wastes	Settling tank to log pond		(5)
Jefferson Woolen Mill	Morgan Creek	109-9-1.5	Dye and wool fibers	None	ST, DF	Secondary treatment or equivalent control by May 1968.
Willamette Valley Lumber (Dallas)	Ask Creek to Rickreall Cr.	88-13	Glue wastes and log pond overflow	Glue wastes to city sewer	City	(4)(5)
Boise Cascade Corp. (Salem)	Willamette	85	Sulfite mill wastes	Storage of all SWL during summer months	City	Primary settling facilities under construction. Chemical recovery and secondary treatment or equivalent control by July 1972.

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
U.S. Plywood (Willamina)	South Yamhill	55-11-43	Glue wastes	None	ST, DF	(5)
Les' Poultry (McMinnville)	North Yamhill	55-11-5	Poultry slaughterhouse wastes	Septic tank and inadequate land disposal	ST, DF	Connection to city sewer
Publishers Paper Co. (Newberg)	Willamette	50	Sulfite mill wastes	Primary sedimentation year-round and storage of SWL during low flow months (June 1-November 1)	City	Chemical recovery and secondary treatment or equivalent control of total mill wastes by July 1972.
Butler Farms (formerly Phillips Bros.)	Pudding	36-1-36-14-9	Silage wastes	Collection ponds and irrigation	ST, DF	Continued surveillance
West Food Co. (Salem)	Pudding	36-1-36-14-8	Mushroom growing and processing water	Lagoon and land irrigation	ST, DF	Connect to city sewer (engineering study underway)
Birds Eye Div., General Foods (Woodburn)	Pudding	36-1-25	Fruit and vegetable processing	Screens, pre-aeration, oxidation lagoons, land disposal	City	Continued surveillance
Forest Fiber Products	Scoggins Cr.	29-62-4	Hardboard mill wastes	Primary settling, land disposal during low flow months	ST, DF	OSSA study to determine adequacy of existing facilities during summer 1967.

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Arrow Meat Co. (Cornelius)	Council Creek	29-45-4-3	Slaughterhouse wastes	Screening, grease removal, blood removal, land disposal low flow	ST, DF	Continued surveillance
Tektronix (Beaverton)	Beaverton Cr.	29-38-5-5	Metal plating	pH adjustment, chemical treatment, settling and oxidation lagoons	Oxidation ditch	Continued surveillance
Kummer Meat Co.	Dairy Creek	29-38-1	Slaughterhouse wastes	Screening, grease removal, blood removal, lagooning (non-overflow in low flow)	ST, DF	Continued surveillance
Permapost Products Company	Rock Creek	29-38-1	Phenols and osmose salts	Baffled oil separation tank, lagoon for holding osmose salts	ST, DF	Improved in-plant and process control and continued surveillance
Hervin Dog Food Co.	Tualatin R.	29-9	Processing of animals for pet food	Activated sludge plant for industrial wastes	ST, DF	Improved plant operation and continued surveillance. (8)
Alpenrose Dairy	Fanno Creek	29-9-13	Dairy barn wastes, milk and cheese processing wastes	Extended aeration and aerated lagoon irrigation during summer months	ST, disinfection and to IW system	Connect to city sewer.
The Dickinson Co.	Fanno Creek	29-9-3	Wastes from processing jams and jellies	Settling pond	ST, DF	Connection to city sewer.

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Crown Zellerbach Corp. (West Linn)	Willamette	26	Sulfite mill wastes	Primary sedimentation year-round and SWL stored in lagoons during low flow months	City	Reduce load equal to chemical recovery and secondary treatment or equivalent control of total mill wastes by June 1968.
Publishers Paper Co. (Oregon City)	Willamette	26	Sulfite mill wastes	SWL barged to Columbia River during low flow (primary sedimentation facilities under construction)	City	Reduce load equal to chemical recovery and secondary treatment or equivalent control of total mill wastes by June 1968; no barging to Columbia after 1969.
Logan Egg Farm	Foster Creek (Clackamas)	25-11-3	Chicken manure and egg washing	Lagoon, land disposal by sprinkle irrigation	ST, DF	Continued surveillance
Bigger and Better Poultry	Kellogg Creek	18-6-4	Chicken processing waste	Settling and spray irrigation	ST, DF	Continued surveillance (contemplating relocation)
Portland Area:						
Dreyfus Louis Corp.	Willamette	12.3	Grain wash water	Discharge to river	ST, DF	Connection to city sewer by 9/1/67.
Peavey (Grain) Co.	Willamette	12.1	Grain wash water	Discharge to river (occasional)		Sanitary and industrial waste connection to city sewer by 9/1/67

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Union Pacific Railway	Willamette	11.1	Oily water	Oil-water flotation unit--discharge to river	City	Continued surveillance
Gunderson Bros. Engr. Corp.	Willamette	8.6	Aceteylene lime wastes	Lime retention in sump-thence to river	ST, cesspools	Connect to city sewer when available
Reimann & McKenney	Willamette	8.5	Caustic waste	Baffled sump (discharges via Guilds Lake sewer)	Discharge to river	Interception planned by city by December 1967
Chevron Asphalt Co.	Willamette	8.0	Heavy oils and asphalts	Sedimentation tank (discharge via N.W. 54th Ave. sewer)	City	Interceptor sewer under construction
Standard Oil Co.	Willamette	7.7	Oil and caustic wastes	Sedimentation tank (discharges to Willamette River via Doane Avenue)	Doane Ave. sewer	To be intercepted by city sewer (under construction)
Union Oil Co.	Willamette	7.7	Oil wastes	Sedimentation tank (discharges to Willamette R. via Doane Ave. sewer)	ST, DF	To be intercepted by city sewer (under construction)
Shell Oil Company	Willamette	7.6	Oil wastes	Oil water separation thence to river via Balboa Creek	ST, cesspool	To be intercepted by city sewer (under construction)
Pabco	Willamette	7.6	Felt paper wastes	Saveall	ST, DF	City constructing sewers in area.

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Pennsalt	Willamette	7.4	Some salt waste (Cl^-) in cooling water	Continuous monitoring	ST, DF	Connect domestic wastes to city sewer when sewer is completed.
McCormick & Baxter	Willamette	7.2	Creosote	Discharge to river	ST, DF	Connect domestic wastes to city sewer when sewer is completed.
Air Reduction (Pacific) Company	Willamette	7.0	Carbide wastes	Discharge to Doane Lake-seepage to river	ST, DF	Connect domestic wastes to city sewer when sewer is completed.
Chipman Chemical Co.	Willamette	7.0	Chlorophenolic	In-plant control and treatment	ST, DF	Treated effluent and sewage wastes to city sewer when available prior to Dec. 1968.
MP Kirk & Sons	Willamette	7.0	Battery acid	Discharge to Doane Lake-seepage to river	ST, DF	Connection of domestic wastes to city sewer when completed.
Cargill, Inc.	Willamette	4.7	Grain wash water	Discharge to river	To the river	Connect to city sewer as soon as facilities are available.
Dulien Steel Complex	Willamette	4.5	Domestic sewage	None	To the river	Connect domestic wastes to city in 1967-68.
Mobil Oil Co.	Willamette	4.4	Oily water	Oil-water separator to storm sewer to river	ST, storm sewer	Connect domestic wastes to city sewer when sewer is completed.

TABLE 2C (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Richfield Oil Co.	Willamette	4.3	Oily water	Oil-water separator to river (occasional)	ST to river	Connect domestic wastes to city sewer when sewer is completed.
Linnton Plywood	Willamette	4.2	Glue wastes	Discharge to river	ST, effluent to river	Connect domestic waste and glue wastes to city sewer.
Tidewater Oil Co.	Willamette	4.0	Oily water and hot laundry wastes	Discharge to river	ST, DF	Connect to city sewer.
Union Carbide Co.	Columbia Sl.	0.5	Scrubber waste water	Lagoon, thickener and sludge settling bed	ST, DF	(7)
Pacific Carbide & Alloys Co.	Columbia Sl.	0.5	Scrubber waste water	Three lagoons	ST, CP	(7)
Portland Rendering Company	Columbia Sl.	0.5	General rendering wastes	Lagoons	ST, CP	(7)
Pacific Meat Co.	Columbia Sl.	0.5	Rendering wastes. Some blood.	Lagoons	Lagoon	(7)

TABLE 2D

SIGNIFICANT WASTE SOURCES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

COLUMBIA RIVER

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Umatilla	Columbia River	289.0	Domestic sewage	Primary treatment plus chlorination	--	(6)
City of Boardman	Columbia River	268.5	Domestic sewage	Secondary treatment (single cell non-overflow lagoon plus chlorination)	--	Continued surveillance (8)
City of Arlington	Columbia River	242.0	Domestic sewage	Primary treatment plus chlorination	--	(6)
City of The Dalles	Columbia River	189.5	Domestic sewage	Primary treatment plus chlorination	--	(6)
City of Hood River	Columbia River	168.0	Domestic sewage	Primary treatment plus chlorination	--	(6)
City of Gresham	Columbia River	117.0	Domestic sewage	Primary treatment plus chlorination	--	(6)
Portland International Airport	Columbia River	111.0	Domestic sewage	Primary treatment plus chlorination	--	(6)

TABLE 2D (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Portland	Columbia River	105.5	Domestic sewage	Primary treatment plus chlorination	--	(6)
Kaiser Gypsum (St. Helens)	Scappoose Slough	87.5-2.0	Soft-board mill	Primary treatment	ST,DF	Closed system or secondary treatment prior to July 1, 1967
Boise Cascade Pulp Mill (St. Helens)	Columbia River	87.0	Kraft mill wastes	Primary treatment	ST,DF	Subject to Lower Columbia River Conference Requirements
City of St. Helens	Columbia River	86.0	Domestic sewage	Primary treatment plus chlorination	--	(6)
City of Rainier	Columbia River	67.0	Domestic sewage	Primary treatment plus chlorination	--	(6)
Crown Zellerbach Corp. (Wauna)	Columbia River	42.0	Kraft and groundwood	Primary treatment	AD	Subject to Lower Columbia River Conference Requirements
City of Astoria	Columbia River	13.0	Domestic sewage	Sewers--no treatment	--	Interceptor sewers, secondary treatment or equivalent control by December 1970 (8)

TABLE 2E

SIGNIFICANT WASTE SOURCES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

GRANDE RONDE RIVER

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Valley Sausage Co. (La Grande)	Grande Ronde R.	162	Slaughterhouse	Septic tank and drainfield	ST, DF	Continued surveillance
City of La Grande	Catherine Creek	117-37	Domestic sewage	Lagoon	--	Chlorination of lagoon overflow by May 1969 and continued surveillance (8)
La Grande Concrete	Grande Ronde R.	160	Gravel washings	3 settling ponds	ST, DF	Continued surveillance (Area available for more settling capacity if necessary)
Boise Cascade Particle Board (Island City)	Grande Ronde R.	159	Resin and wax from washdown	Solids sump and effluent discharge to fire protection reservoir	ST, DF	Lagoon to be constructed by January 1968. Plans underway (8)
Borden Chemical Plant	Grande Ronde R.	159	Organic residues	Lagoon (non-overflow)	ST, DF	Continued surveillance
Boise Cascade Plywood (Elgin)	Phillips Creek	98-1	Glue wastes and log pond overflow	Land disposal (flood irrigation)	City sewer & ST, DF	Continued surveillance (8)
City of Elgin	Grande Ronde R.	98-	Domestic sewage	Lagoon plus chlorination	--	Continued surveillance

TABLE 2E Continued

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Enterprise	Wallowa River	81.5-43	Domestic sewage	Secondary treatment plus chlorination	--	Continued surveillance
City of Wallowa	Wallowa River	8.5-23	Domestic sewage	Community septic tank (only a portion of town on community system)	--	Secondary treatment and chlorination by May 1969 (Engineering plans under way) (8)

TABLE 2F

SIGNIFICANT WASTE SOURCES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

WALLA WALLA RIVER

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Roger Canning Co. (Milton-Freewater)	Walla Walla R. & Dry Creek	42-19-10-5	Pea wastes (June-August)	Land disposal	City	Continued surveillance (8)
Smith Frozen Foods (Milton-Freewater)	Walla Walla R. & Dry Creek	42-19-10-5	Pea wastes (June-August)	Land disposal	City	Continued surveillance (8)
Umatilla Canning Co. (Milton-Freewater)	Walla Walla R. & Dry Creek	42-19-10-5	Pea wastes (June-August)	Land disposal	City	Continued surveillance (8)
City of Milton-Freewater	Dry Creek	19-10-5	Domestic sewage	Secondary treatment (TF, Cl) & land disposal of IW	--	Continued surveillance
City of Weston	Pine Creek	19-23	Domestic sewage	Secondary treatment plus chlorination	--	Continued surveillance
Lamb-Weston Co. (Weston)	Pine Creek	19-23	Pea wastes (June-October)	Land disposal	City	Continued surveillance (8)

TABLE 2G

SIGNIFICANT WASTE SOURCES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

SNAKE RIVER

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Adrian School and Adrian Homes	Snake River	402.0	Domestic sewage (16 homes)	Septic tank	--	Secondary or equivalent treatment or disposal (8)
Amalgamated Sugar Co. (Nyssa)	Snake River	389.0	Sugar beet processing	Screening	City sewer	Continued surveillance and followup on construction of completely closed beet fluming system; to be completed by October 1967.
City of Nyssa	Snake River	389.0	Domestic sewage	Primary treatment and chlorination	--	Secondary treatment by May 1970.
Idaho Canning Co. (Nyssa)	Snake River	388.5	Corn processing waste	Screening	ST, DF	Continued surveillance and followup on plans to construct vibrating screens and land disposal; to be completed by June 1967.
Pioneer Meat Packers (Ontario)	Snake River	374.0	Slaughterhouse wastes	Secondary treatment (Anaerobic pond followed by two aerobic ponds, non-overflow)	Industrial waste	Continued surveillance to determine possible need for aeration equipment on aerobic ponds and chlorination if overflow occurs.

TABLE 2G (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Ore-Ida Foods, Inc. (Ontario)	Snake River	371.0	Potato, corn, and onion processing	Desilting pond and clarification of process waters	City	Continued surveillance and followup on plans to construct secondary treatment (anaerobic-aerobic system); to be constructed by October 1, 1967. (8)
Ontario Meat Packing Co. (Ontario)	Snake River	370.0	Slaughterhouse wastes	Septic tank and drainfield	ST, DF	Continued surveillance
Hawley Meat Company (Vale)	Malheur R.	368.5-17	Slaughterhouse wastes	Septic tank and drainfield	ST, DF	Continued surveillance
City of Vale	Malheur R.	368.5-16	Domestic sewage	Secondary treatment (2 cell lagoon, non-overflow)	--	Chlorination when overflow occurs.
City of Ontario	Malheur R.	368.5-1	Domestic sewage	Secondary treatment (2 cell lagoon)	--	Chlorination by May 1969.

TABLE 2H

SIGNIFICANT WASTE SOURCES

NEEDED IMPROVEMENTS AND IMPLEMENTATION PROGRAM

MARINE AND ESTUARINE WATERS OF OREGON

May 1967

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Seaside	Necanicum R.	0.5	Domestic sewage	Intermediate trickling filter and chlorination	--	(6)
City of Cannon Beach	Elk Creek	0.6	Domestic sewage	Secondary treatment (lagoon and chlorination)	--	Continued surveillance
Tillamook County Creamery Association Tillamook	Wilson River	0.7	Wash water	None	ST, Cl	Secondary treatment of sewage and industrial wastes by May 1968. Preliminary plans completed. (8)
Tillamook Cheese and Dairy Association Tillamook	Wilson River	0.7	Wash water	None	ST, Cl	Secondary treatment of sewage and industrial wastes by May 1968. (Preliminary plans completed.) (8)
City of Rockaway	Clear Lake		Domestic sewage	Secondary treatment (trickling filter and lagoon)	--	Continued surveillance

TABLE 2H (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Port of Tillamook Industrial Park	Trask River	2.6	Domestic sewage	None	--	Secondary treatment by December 1967. (Plans being prepared.) (8)
City of Garibaldi	Tillamook Bay		Domestic sewage	Primary and chlorination	--	Secondary treatment by December 1968. (8)
City of Tillamook	Trask River	0.7	Domestic sewage	Intermediate trickling filter and chlorination	--	Secondary clarifier and improved chlorination by July 1968. (8)
City of Nehalem	Nehalem Bay		Domestic sewage	Sewers--no treatment	--	Secondary treatment by December 1969. (8)
City of Wheeler	Nehalem Bay		Domestic sewage	Sewers--no treatment	--	Secondary treatment by December 1969. (8)
City of Oceanlake	Dee River to Pacific Ocean	0.3	Domestic sewage	Secondary treatment (trickling filter and chlorination)	--	Continued surveillance
City of Taft	Schooner Cr.	0.6	Domestic sewage	Secondary treatment (lagoon)	--	Chlorination by May 1969 (8)
Salishan Beach	Siletz Bay		Domestic sewage	Secondary treatment (aerobic digestion and chlorination)	--	Continued surveillance
City of Newport	Pacific Ocean		Domestic sewage	Secondary treatment (trickling filter and chlorination)	--	Continued surveillance

TABLE 2H (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Toledo	Yaquina R.	13	Domestic sewage	Primary and chlorination	--	Secondary treatment by July 1970.
Cascadia Lumber Co.	Yaquina R.		Log storage and handling	None	ST, DF	Continued surveillance
Georgia Pacific Corporation, Toledo	Pacific Ocean Yaquina River	14	Kraft liquor White water	Thermal reduction pond plus deep ocean outfall for strong wastes. None for white water.	City	Primary sedimentation of white water by May 1969. (8)
City of Waldport	Alsea Bay		Domestic sewage	Primary and chlorination	--	(6)
City of Florence	Siuslaw River	5	Domestic sewage	Primary and chlorination	--	(6)
Davidson Industries, Inc., Mapleton	Siuslaw River		Log storage and handling	None	ST, DF	(4)
U.S. Plywood Corp. Mapleton	Siuslaw River		Glue wastes, log storage and handling	None	ST, DF	(4)(5)
International Paper Co., Plywood Div., Gardiner	Umpqua Bay		Glue wastes	Settling pond to deep ocean outfall	ST, DF	Continued surveillance
International Paper Co., Paper Div., Gardiner	Pacific Ocean		Kraft mill wastes	Settling pond to deep ocean outfall	ST, DF	Continued surveillance

TABLE 2H (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Reedsport	Umpqua River	11	Domestic sewage	None	--	Secondary treatment by Dec. 1968. (Have applied for Federal construction funds.)(8)
City of Empire	Coos Bay		Domestic sewage	Primary and chlorination	--	(6)
City of North Bend	Coos Bay		Domestic sewage	Primary and chlorination	--	(6)
Coos County (USAF) North Bend	Coos Bay		Domestic sewage	Secondary treatment, trickling filter and chlorination	--	Continued surveillance (8)
City of Coos Bay	Coos Bay		Domestic sewage	Primary and chlorination	--	(6)
City of Eastside	Coos Bay		Domestic sewage	Primary and chlorination	--	(6)
Bunker Hill San. Dist., Coos Bay	Coos Bay		Domestic sewage	Primary and chlorination	--	(6)

TABLE 2H (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
Coos Head Timber Co., Pulp Div., Empire	Coos Bay		Sulfite liquor wastes, white water, and hydraulic barker fines	None	ST	Secondary treatment or equivalent control of sewage wastes and primary sedimentation or equivalent control of industrial waste solids by May 1968. Immediate study by OSSA to determine highest practicable treatment or control of SWL. (8)
Menasha Corp., Paperboard Div., North Bend	Coos Bay and Pacific Ocean		Sulfite liquor wastes and white water	Primary settling plus non-overflow lagoon	ST, DF	Continued surveillance
Menasha Corp., Plywood Div., North Bend	Coos Bay		Glue wastes	None	City ST, DF	(5)
Weyerhaeuser Co. North Bend	Coos Bay		Glue wastes, hydraulic barker fines	City sewer, vibrating screens	City	Further study by OSSA
Georgia Pacific Corp., Coos Bay	Isthmus Sl.		Glue wastes and resin production washdown	Solids lagoon	City	(5)
Coos Head Timber Co. Coos Bay	Isthmus Sl.		Glue wastes	None	ST, DF	(5)
City of Coquille	Coquille R.	25	Domestic sewage	Primary and chlorination	--	(6)

TABLE 2H (Continued)

Source	Receiving Stream	River Mile	Type of Waste	Present Treatment	Sanitary Waste Disposal	Needed Action
City of Bandon	Coquille R.	0.8	Domestic sewage	None		Interceptor sewers and secondary treatment by December 1968. (Plans being prepared.) (8)
Bullard Beach Bandon	Coquille R.	3.5	Domestic sewage	Secondary treatment (Aerobic digestion and chlorination)	--	Continued surveillance (8)
Knoxtown San. Dist. Wedderburn	Creek to Ocean	0.4	Domestic sewage	Secondary treatment (Lagoon, non-overflow)		Continued surveillance (8)
City of Gold Beach	Riley Cr. to Pacific Ocean	0.1	Domestic sewage	Primary treatment and chlorination	--	(6)
City of Brookings	Chetco Cove		Domestic sewage	Primary treatment and chlorination	--	(6)

5. Summary of Additional Programs to Control and Abate Pollution

a) Combined sewer overflows

Because high stream flows generally accompany storm flows, there is high dilution of the combined drains so that the overall problem is minimized. However, cities are required to separate storm flows for all new installations and are encouraged to conduct storm sewer separation primarily to maintain treatment plant efficiency, especially where winter flows practically preclude treatment. In any case, interception and treatment of at least three times dry weather flow is required. High MPN counts may in some cases force further separation of the two sewers.

The city of Portland has applied for a demonstration grant under Section 6 of the Federal Water Quality Act of 1965 to study and demonstrate the effects of fine screening and disinfection of storm flows.

b) Agricultural Wastewaters

The problem is thought to be minimal at present for Western Oregon areas because of low rates of water application via sprinkler systems with little or no direct surface return. Irrigation return flows are thought to present a problem east of the Cascade range by increase of natural turbidities, dissolved solids and biological nutrients. Irrigation practices will be studied in cooperation with agricultural and conservation oriented agencies. Points of irrigation water return will be located, sampled and values obtained. As problems are defined appropriate corrective measures will be adopted.

Animal wastes from commercial livestock and poultry feeding and processing operations can present serious water quality control problems, but are generally amenable to effective treatment and control. Such operations are included in the waste sources listing and will be abated in the same manner as other pollution sources.

c) Houseboats and Marinas

Discharge of inadequately treated garbage and sewage from pleasure marinas and houseboats is prohibited by ORS 449.140 to ORS 449.150 after September 1, 1967. Section (2) of said 449.150 authorizes the Oregon State Sanitary Authority to grant extensions of time, beyond September 1, 1967, for compliance where equipment and methods for complying are not reasonably available. A study to determine methods of collecting and treating or disposing of wastes from floating structures is presently being conducted by the Technical Services Division of the Federal Water Pollution Control Administration Northwest Water Laboratory at Corvallis, Oregon. An interim report is in the process of completion. The entire study and final report is scheduled for completion in 1968.

(1) Pleasure Craft

Waste discharges from pleasure craft are presently subject to control by the Oregon State Marine Board under ORS 488.830. Treatment devices must be approved by the Oregon State Sanitary Authority. Sealing of heads on certain waters is required.

(2) Commercial Vessels

Provision of treatment or disposal facilities at moorages and marinas will permit the requirement of holding tanks on pleasure

and commercial craft with discharge of wastes to approved dockside facilities.

(3) Oceangoing Vessels

Sewage wastes, because of interstate and international aspects must be subject to federal control.

For the Willamette River effective control programs for other than sewage wastes must be through cooperation with Harbor Patrol, U.S. Coast Guard, Port Authorities and Oregon State Sanitary Authority.

d) Land Erosion

There are many sources of turbidity from land erosion including farm soil, banks, forest and highway road construction, and gravel operations. These can be controlled by a closer cooperative program among the agencies involved, such as the U.S. and State Soil Conservation Service, U.S. Corps of Engineers, U.S. and State Forest Service, Bureau of Public Roads and the Highway Department and the Oregon State Sanitary Authority.

e) Mine Drainage

The only known source of acid mine drainage is from the White King Mine approximately fifteen miles northwest of Lakeview in the Goose Lake drainage basin.

f) Other Problems

As major pollution sources are controlled other problems will assume greater status. An example of this type problem is the excess nutrient and subsequent heavy algal growth which occurs in the Tualatin sub-basin of the Willamette Basin. At present the State Sanitary Authority is requiring nutrient removal or control in this basin.

6. Time Schedule

For all of the basins involved the Oregon State Sanitary Authority has an ongoing program which aims for at least secondary treatment and effluent disinfection by all municipalities within the next five years. The program contemplates appropriate treatment of all industrial wastes within the same time period. Specific time schedules are listed in Tables 2-a through 2-h.

In cases where too few data exist to translate stream standards to effluent requirements which are believed sufficient to ensure stream standards, temporary methods may be used until sufficient data are available.

7. Authority to Set Standards

Authorization for the Sanitary Authority to set standards of water quality for the public waters of Oregon is contained in ORS 449.086, as follows:

449.086 Standards of quality and purity of water. (1) The Sanitary Authority is authorized and empowered to establish standards of quality and purity of the waters of this State in accordance with the public policy of the state of Oregon as set forth in ORS 449.077, and in establishing such standards, consideration shall be given the following factors:

(a) The extent, if any, to which floating solids may be permitted in the water;
(b) The extent to which suspended solids, settleable solids, colloids or a combination of solids with other substances suspended in water may be permitted;
(c) The extent to which organisms of the coliform group, and other bacteriological organisms or virus may be permitted in the waters;
(d) The extent of the oxygen demand which may be permitted in the receiving waters;
(e) The minimum dissolved oxygen content that shall be maintained;
(f) The limits of other physical, chemical, biological or radiological properties that may be necessary for preserving the purity of the waters of the State;

(g) The extent to which any substance must be excluded for the protection and preservation of public health; and

(h) The value of stability and the public rights to rely upon standards as adopted for a reasonable period of time to permit institutions, municipalities, commerce, industries and others to plan, schedule, finance and operate improvements in an orderly and practical manner.

(2) The adoption, alteration, modification or repeal of the standards of quality and purity above prescribed shall be made by the Authority only after public hearing on due notice, subject to the limitations thereon elsewhere set forth in this chapter.

(3) Notices of public hearing for the adoption, alteration, modification or repeal of standards of quality and purity thereof shall specify the time, date and place of hearing, and the waters concerning which standards are sought to be adopted. Copies of said notice shall be published at least twice in a newspaper regularly published or circulated in the county or counties bordering or through which the waters, for which standards are sought to be adopted, flow; the first of which publications shall be not more than 30 days nor less than 20 days before the date fixed for such hearing, and copies of said notice shall be mailed at least 20 days before such hearing to the chief executive officer of each municipal corporation bordering or through which said waters for which standards are sought to be adopted, flow, and to such other persons as the Authority may find appropriate.

(4) Any person responsible for complying with the standards of water quality or purity established under this chapter shall determine, subject to the approval of the Sanitary Authority, the means, methods, processes, equipment and operation to meet said standards.

(5) The standards of quality and purity thereof shall, before becoming effective, be filed with the Secretary of State, in accordance with ORS Chapter 183.

8. Water Quality Standards Surveillance Plan for Drainage Basins in Oregon

General Surveillance

The present state of Oregon's water quality surveillance program involves periodic checking of fixed stations that are selected as monitoring or control points above and below pollution sources or near the mouths of streams. At these points it is usual to run a sanitary survey consisting of date, time, flow, pH, temperature, dissolved oxygen (DO), biochemical oxygen demand (BOD), Perle Benson Index (PBI), specific conductance, most probable number of coliforms (MPN), and any other parameter

that appears to be pertinent to the particular area or condition. In many cases waste treatment samples, domestic, municipal, agricultural or industrial, are analyzed jointly with the sanitary survey to coordinate cause and effect relationships. In addition to the sanitary survey, basic data are run at strategic locations. For these points a laboratory analysis is performed including pH, color, turbidity, total solids, suspended solids, alkalinity, hardness, sulfates, ammonia nitrogen, nitrate-nitrogen, phosphates, and chlorides. Wherever other chemicals or problems are suspected, special analyses are made to characterize these conditions. All testing is in accordance with Standard Methods*. Frequency of sampling varies from daily to yearly depending on needs for the data. Each of the stations is identified by code numbers, river mile and other identifying features so that samples are taken at the same point each time. Data are transferred to cards and then are stored for retrieval from the Federal Water Pollution Control Administration STORET system.

The future program is planned to monitor all of the parameters set forth in the standards. Frequency of measurement will be necessarily geared to needs, manpower and funds available. A minimal program will be three times per year to cover the dry low-flow season, the wet, heavy runoff season and the wet decreasing runoff season characteristic of this area of the United States. Minor estuaries having little or no pollution sources will be sampled twice yearly, winter and summer. It is anticipated

* Standard Methods for Analysis of Water and Wastewater. 12th Edition, APHA, AWWA and WPCF, 1962.

that any projected program will undergo revision in order to provide better data for statistical enumeration and evaluation. Data evaluation programs designed for computer analysis have been formulated and are being used for the Oregon program. Radiological sampling and testing is performed for the Columbia River, bays and estuaries and ocean waters and at the most downstream stations of principal streams throughout the State. It is expected that monitoring of radiological materials will be expanded as nuclear reactors are added along the streams.

Biological testing has progressed concurrently for several years along with chemical and biochemical tests. A biological stream classification is presently being worked out for Oregon streams. It is expected that rapid detection of organism changes from this classification will provide a good tool for monitoring pollution sources. Appendix 1 shows a listing of surveillance stations throughout the state of Oregon.

Municipal waste treatment plants are periodically monitored to check on the efficiency of operation and the quality and quantity of effluent as a stream load. Monthly reports of daily operational data are required by the Sanitary Authority from the municipal plants. Frequency of testing and degree of monitoring depends somewhat on the combination of reports and inspection of facilities and methods by the Oregon State Sanitary Authority staff. Thus the larger plants with good laboratory and operation personnel normally require less frequent monitoring than small plants with a single operator or even a part-time operator. Appendix 2 shows the forms for sewage treatment plant operation reporting.

At present, one of the four forms in Appendix 2 is used by each major sewage treatment plant. BOD tests are requested of all sewage treatment plants with a design flow at 0.500 MGD or greater (except lagoons). By December, 1972, all plants with a design flow of 0.100 MGD or greater will be required to run BOD tests. In areas with treatment requirements more rigid than secondary, nitrogen and phosphorus tests will need to be run for control purposes. The Sanitary Authority and Federal Water Pollution Control Administration laboratories are accumulating background data and are setting up testing procedures for the necessary monitoring of these chemicals.

During the year 1966 staff engineers in Portland with the help of the district engineers from Eugene, Pendleton and Medford sampled 200 sewage treatment plants within the State. Approximately 80 of these plants were in the interstate areas. It is planned to inspect and sample these plants at least twice yearly.

Operation, testing and reporting are primary subjects covered in a three-day sewage works operators short school co-sponsored by the Oregon State Sanitary Authority and Oregon State University. Local Sections of Pacific Northwest Pollution Control Association also hold annual technical meetings usually of one day's duration and the main section holds a three-day meeting annually. In the Portland area local sewage treatment plant operators meet at the Sanitation and Engineering Laboratories of the State Sanitary Authority on a weekly basis from September 15 through May 15. This school is divided into basic, intermediate and advanced courses. The operators organized the school and have been meeting for several years. A similar school was instituted in Corvallis this year. All of the above

training programs are part of an overall cooperative effort among the operators, university personnel and the Sanitary Authority staff to promote good operation and reporting of all the plants in the State. A voluntary certification program for operators was established in 1956 to provide a system for establishing a standard of proficiency for sewage works operators. The certification program is detailed in a report produced jointly by Oregon State University and the State Board of Health.*

Industrial waste effluents have been monitored on a problem-area basis and will to some extent remain in this classification. Many industrial operations presently submit monthly reports. The need and requirement for reporting is based on the quantity and nature of wastes and their possible effects on local conditions. For example, monthly reports of daily data are required for Willamette Basin pulp and paper mills during the winter months and weekly reports of daily data are required during the low flow period of June 1 to November 1. It is anticipated that the permit system which is pending in the 1967 Oregon Legislature will spur the industrial wastes monitoring program to provide all the samples that can be processed in the laboratories and will in turn require a more comprehensive program for reporting.

The Oregon State Sanitary Authority radiological monitoring program covers standard stations on a set schedule for various water resources in the State. Other stations are sporadically sampled on a "spot check" basis. The limited laboratory facilities and personnel for the program are now worked at capacity. No expansion of the program is planned at this time.

* "Ninth Annual Report of the Oregon Sewage Works Operators Certification Program", Oregon State University-Oregon State Board of Health, 1964.

INDIVIDUAL BASIN SURVEILLANCE

Goose and Summer Lake Basins

Twenty-five stations in the Goose and Summer Lake Basins are regularly sampled by the Oregon State Sanitary Authority as part of the regular water quality monitoring network. Cattle-country agricultural use is the main benefit served by these waters. With the exception of one uranium ore mine north of Lakeview, Oregon (Goose Lake Basin), there are no waste sources greatly changing natural water quality. Minimum summer flows and complete diversion of most streams for farmland irrigation complicate the whole area's water management program. No immediate change in the monitoring schedule for these two basins is anticipated. It is very likely that some of the stations in streams having no waste addition problems will be dropped from the schedule after two years of analysis for basic data.

Great Basin

The Great Basin streams of Southeastern Oregon are sampled on a common circuit of travel and scheduling similar to the Northeastern Oregon sector. Eleven stations covering seven streams, involving approximately 1100 miles driving in the round trip from the Portland laboratories, are collected three times per year. There are no water pollution problems needing corrective action in this area. All of the flows are used principally for agricultural purposes. No expansion is planned for either the station list or sampling schedule.

Klamath Basin

Water quality conditions in the Klamath Basin have been monitored by the Oregon State Sanitary Authority through the use of seven sampling stations since 1959. This program will be continued on the same established schedule with particular attention given to measuring beneficial effects in water conditions as treatable waste sources are removed from the river.

Specific Surveillance

1. Two sampling stations will be added to the usual seven as check points on water quality issuing from irrigation waste sources. They are the outfall canal from Pumping Plant F at the Hwy. 97 Bridge and the Lost River diversion channel from the Midland Road Bridge.

Willamette River and Tributaries

The Oregon State Sanitary Authority regularly utilizes 69 sampling stations in the Willamette Basin, excluding the Tualatin River which has 42 of its own. All waste sources and varying river zones are well monitored.

Specific Surveillance

1. More and more each year the Willamette River water qualities are being affected by upstream impounding and releases from the U. S. Corps of Engineers' projects. Very little is known about the water quality in the impoundments, and still less about the extent that releases influence downstream water quality beyond the beneficial effect of augmented summer flow. As further

monies and manpower become available, the Oregon State Sanitary Authority will study water quality characteristics of upstream impoundments and their relationship to down river conditions.

Tualatin Basin

Probably no stream in the nation gets more solicitous water quality control attention than does the Tualatin River. The 60 miles of the main stem, plus its many small tributaries are blanketed by 42 sampling stations, including biological indicators. Water quality problems in the basin are compounded by irrigation withdrawals which completely dry sections of the stream each summer. Thus, there can be no real quality control maintained without quantity guarantees. No expansion of the sampling program is planned.

COLUMBIA RIVER

Hood River - Sandy River Basins

Three sampling stations are maintained in the Hood River Basin and two in the Sandy River Basin. There are a few localized sanitary and industrial waste sources in the Hood River region, but nothing having a detrimental impact on river water quality. Samples from the Sandy River are taken purely for the sake of administrative understanding on in situ conditions. There are no major waste sources of any kind. No other surveys or expanded surveillance programs are deemed necessary at this time.

Deschutes Basin

Water quality in the Deschutes Basin is affected primarily by impoundments and irrigation waste contributions. Industrial and domestic wastes are nowhere a troublesome threat to water purity. The Oregon State Sanitary

Authority has maintained 13 sampling stations in the basin for about eight years. No expansion of survey schedules or special surveillance programs is necessary at this time.

Eastern Oregon Basins

As a matter of expediency and frugality, the Oregon State Sanitary Authority maintains a water quality survey route through Northeastern Oregon which covers 18 stations on nine major streams. Thus, they are all sampled on the same trip and frequency schedule. For the most part, these stations have given adequate data for a reasonable water quality management program.

Specific Surveillance

1. One sampling station will be added to the Burnt River at its mouth near Huntington for basic data.
2. One basic data sampling station will be established on the Owyhee River at the Hwy. 201 Bridge crossing. This is four miles north of Adrian.

South, Mid, and North Coast Basins

Along the coast of Oregon there are only two streams, Rogue and Umpqua, which penetrate inland beyond the coastal mountain range. All of the others are relatively short, steep in gradient, and characterized by flash runoffs immediately following each winter storm. All are highly important salmon, steelhead, and coastal cutthroat trout streams. These waterways drain an unbroken strip of commercial timber land which extends the full length of the immediate Pacific slope. Most human settlements on the coast are limited to the flatlands adjacent to or not far inland

from the sea. Thus, the impact of human and industrial wastes is minor on most coastal streams and generally limited to the downstream end of coastal drainage basins. Timber harvest and process activities affect the quality of coastal streams more than any other single human function.

The Oregon State Sanitary Authority maintains regular sampling programs at 31 stations on 23 coastal streams. Two of these in Clatsop County discharge to the Columbia River within the marine water intrusion zone. All of the stations have been located well downstream to measure fresh water quality just prior to entry into marine waters.

Those streams that discharge into major estuaries are subjected to separate estuarine sampling and data recording programs as part of the Oregon State Sanitary Authority's total water quality management responsibility. Expansion of surveillance activities that is planned for the coastal basins of Oregon is detailed in the following summary of marine and estuarine waters.

Winchuck River Estuary Surveillance Plan

The Winchuck River estuary is affected by marine water intrusion for only a short distance, about one mile; and it is currently free of major pollution sources.

Specific Surveillance

1. Samples have been taken from a station 1.3 miles above Hwy. 101 Bridge, which is above tidal influence. Another station is being added at Hwy. 101 Bridge to determine sanitary water quality in the estuary.
2. Wastes from any proposed housing or industrial developments in

this drainage basin will be handled on an individual basis.

3. Samples will be taken twice yearly, once at summer low flow and again during winter runoffs.

Chetco River Estuary Surveillance Program

The Chetco River estuary has a relatively short marine water intrusion, approximately three miles; and there are no major pollution sources affecting water quality.

Specific Surveillance

1. One sampling station, 2.8 miles above the Hwy. 101 Bridge, has been utilized by the Oregon State Sanitary Authority as a general observation point for water quality in the Chetco River basin.

2. A second sampling station will be added at the Hwy. 101 Bridge to measure sanitary quality in the estuarine waters.

3. Sampling frequency will be twice per year, summer low flow and again near the winter high runoff.

Rogue River Estuary Surveillance Program

The Oregon State Sanitary Authority actively samples 23 stations in the Rogue River Basin. The most downstream station in this group is located at river mile 4.7 which is only a short distance above marine water intrusion into the Rogue River estuary. There are no major sources of either industrial or domestic wastes discharged to the lower Rogue River. All known wastes in the upper river regions receive secondary or equivalent treatment.

Specific Surveillance

1. One new sampling station will be established about midway in the estuary to measure sanitary water quality.
2. Sampling frequency will be three times per year, early spring, late summer, and late fall.

Coquille River Estuary Surveillance Program

Tidal influence affects approximately 25 miles of the lower Coquille River. Most of this way is bordered by extensive dairy farms, with the city of Coquille located near the upstream end and Bandon at the seaward end. There are lumbering concerns, treated city sewage effluents, and agricultural land drainage which undoubtedly reach the upper estuary. The city of Bandon located near the sea has no sewage treatment system at present.

Specific Surveillance

1. The Oregon State Sanitary Authority currently utilizes six sampling stations in the Coquille River estuary. Sanitary water quality sampling will continue on a twice yearly basis, mid-winter and late summer.
2. Industrial and domestic waste surveys will be made throughout the lower Coquille Valley to locate and evaluate waste sources. Treatment of wastes will be enforced where necessary.

Coos Bay Surveillance Program

Coos Bay receives the most diversified utilization of any estuary on the coast of Oregon. Lumbering and wood products manufacturing dominate all other types of human activity.

Specific Surveillance

1. The Oregon State Sanitary Authority presently utilizes 25 sampling stations in Coos Bay to evaluate water quality for all beneficial uses. Sampling through 1966 has been carried out predominantly in the summer months on a yearly frequency. It is planned to increase the frequency to three times yearly which will cover low flow, increasing fall flow, and decreasing spring flow.
2. Outlying residential developments adjacent to Coos Bay will be expected to form appropriate governmental units and construct sewage treatment facilities where it is demonstrated that their wastes now reach the bay untreated.
3. Surveillance will be maintained on municipal and industrial wastes in accordance with the listing of needs in Table 2H.
4. Special studies will be instituted in three general areas to determine the effects of log storage, agricultural land drainage and discharges from cargo vessels on water quality in Coos Bay.

Umpqua River Estuary Surveillance Program

The Umpqua River estuary is approximately 25 miles long, with saline waters intruding near half this distance at low river flow. Reedsport is the major city situated on the estuary, with Gardiner and Winchester Bay (a small arm of Umpqua Bay) being lesser associated communities. Lumber products and commercial fishing are the two leading area industries.

Specific Surveillance

1. The Oregon State Sanitary Authority has 18 water quality sampling stations in the upper Umpqua River system and seven in the Umpqua estuary. The estuary stations were sampled for sanitary quality on a monthly basis for two years when first established, but in recent years the sampling has been reduced to the annual low flow period. It is planned to expand the bay sampling frequency to three times yearly to cover low flow, increasing fall flow, and decreasing spring flow.
2. Outlying residential developments adjacent to Umpqua Bay will be expected to form appropriate governmental units and construct sewage treatment facilities where it is demonstrated that their wastes now reach the bay untreated.
3. Surveillance will be maintained on municipal and industrial wastes in according with the listing of needs in Table 2H.
4. Special studies will be conducted on wood waste residues to determine their effect on over-all water quality.

Siuslaw River Estuary Surveillance Program

The Siuslaw River estuary is approximately 20 miles long and it is influenced by human activities in several small communities which are built around lumbering activities. Cattle raising is a common farming type along its shores.

Specific Surveillance

1. The Oregon State Sanitary Authority has one active basic data sampling station in the Siuslaw River at Mapleton, a short

distance above salt-water intrusion. Within the bay proper there are seven Oregon State Sanitary Authority established sampling stations which were utilized last in late 1959-60 for sanitary data. These bay stations will again be activated for sampling on a three times per year schedule as follows: low flow, increasing fall flow, and decreasing spring flow.

2. All communities having untreated sewage going to the estuary will be required to provide secondary treatment and effluent disinfection.

3. Surveillance will be maintained on municipal and industrial wastes in accordance with the listing of needs in Table 2H.

4. Special studies will be instituted to determine the effects of log storage on general water quality.

Alsea River Estuary Surveillance Program

The Alsea River estuary is the terminus of a major sportfishing stream in Western Oregon. The river's upper basin is characterized by narrow streamside pasture lands and extensive logging in the mountains. There are no major industries in the basin, and only two small towns which could possibly exert an impact on water quality. From the head of tide-water to the estuary mouth both shores are extensively developed for residential dwelling, boat docks, and marinas.

Specific Surveillance

1. The Oregon State Sanitary Authority maintains eight water quality sampling stations in the Alsea Basin above tidewater influence.

There are no stations in the estuary. Two sampling stations for sanitary water quality will be activated in the bay region, one at the Hwy. 101 Bridge and the other at the Hwy. 34 Bridge about six miles east of Waldport.

2. All recognized communities having untreated sewage going to the estuary will be required to provide secondary treatment and effluent disinfection.

3. Surveillance will be maintained on municipal and industrial wastes in accordance with the listing of needs in Table 2H.

Yaquina Bay Surveillance Program

Yaquina Bay is used extensively for lumbering, wood processing, commercial fishing and shellfish production. It is the site of the Marine Science Center, the major oceanographic and estuarine study center in Oregon. The Marine Science Center and Oregon State University have stressed the need for high quality water in this bay. A monitoring program as follows has been worked out between the Sanitary Authority and other interested groups.

Specific Surveillance

1. Sampling is conducted by the Oregon State Sanitary Authority at 26 stations within the estuary and Yaquina River system. The proposed cooperative monitoring will use the same stations with the goal of monthly frequency of sampling.

2. Any municipal wastes with effluent to the bay or river will be required to have secondary treatment and effluent disinfection.

Effluents will be monitored. Operation reports will be sent to the Oregon State Sanitary Authority monthly.

3. Paper mill wastes and other industrial wastes will be evaluated to assess need for treatment to meet standards for the bay waters.

WATER QUALITY MONITORING PROGRAM FOR YAQUINA BAY

A meeting was held at the Marine Science Center on September 1, 1966, to discuss a water quality monitoring program for Yaquina Bay. There were seventeen participants (Appendix A) representing Oregon State University, Fish Commission of Oregon, Oregon State Sanitary Authority, Federal Water Pollution Control Administration and Oregon State Game Commission. This report summarizes major conclusions of the discussions and makes recommendations for a cooperative water quality monitoring program for Yaquina Bay.

FUNCTIONS OF A WATER QUALITY MONITORING PROGRAM

Development of a major research and educational center in marine sciences on Yaquina Bay was discussed. The requirement of this center for high quality water was emphasized; but it was also pointed out that the biological usefulness of Yaquina Bay could be endangered by (1) waste effluents from a paper mill and other industries, (2) sewage from shore, (3) oil and sewage from ships, and (4) suspended solids from harbor dredging and runoff water. There are also natural factors having potentially detrimental effects on quality of Yaquina Bay water such as high runoff causing low salinity and incoming deep sea water causing low dissolved oxygen levels.

A water quality monitoring program would serve three important functions: (1) Detection of industrial, agricultural, domestic or other contaminants entering the bay; (2) collection of routine physical, chemical and biological data on changes in the environment required for field studies in ecology, and (3) applied research in development of techniques for monitoring of environmental factors.

The major function of a water quality monitoring program would be to detect occurrence of contaminants having potential adverse effects on quality of water supplied to laboratories of the Marine Science Center so that their presence could be brought to the attention of the State

Sanitary Authority without delay. The other two functions are also of importance and strengthen arguments favoring the implementation of a water quality monitoring program: collection of routine physical, chemical, and biological data could relieve individual field studies in ecology of the necessity of making measurements of certain factors, and existence of a monitoring program could act as a stimulus for further applied research in development and evaluation of monitoring techniques.

PROBLEMS IN MONITORING SPECIFIC FACTORS

Monitoring of specific factors to detect changes caused by man is made difficult by occurrence of natural variations in levels of the factors. Differences in levels occur in space and with time. The patterns of variability at a particular locality within Yaquina Bay may be quite different from the patterns at another locality. It seems unlikely that "control areas" experiencing low levels of pollution can be identified and selected for simultaneous comparisons with "test" stations on Yaquina Bay where detection of pollution is required. The most practical approach seemingly involves measurements of water quality factors at selected intervals of time over an extended period and at specific locations within Yaquina Bay. Normal variations in these factors would be established within the first few years after implementation of a monitoring program and before the existence of significant additional industrial and urban development on the watershed.

Biological populations are perhaps the most difficult to monitor because of unexplained alternations of periods of scarcity and abundance. The monitoring of biological populations would in many cases require the accumulation of considerable background information and would be costly.

Although measurements of biological populations are not to be discouraged as applied research studies, it is doubtful if such measurements would have immediate application in a routine monitoring program.

FACTORS TO BE INCLUDED IN A MONITORING PROGRAM

Measurements were considered to fall into two classes: (1) measurements of factors which would be affected very little by man but which would be of value in studies of ecological relationships, and (2) measurements of factors which would be subject to modification by man. Examples of the first class are measurements of salinity, temperature, alkalinity, dissolved solids, and certain ions. Examples of the second class are measurements of pH, turbidity, dissolved oxygen concentration, coliform bacteria, toxicity, specific industrial wastes, color, suspended solids, and ammoniacal nitrogen.

It was generally agreed that a monitoring program should include the following factors initially:

1. Salinity
2. Water temperature
3. pH
4. Turbidity
5. Dissolved oxygen concentration
6. MPN (Most probable number of coliform bacteria)
7. Pearl-Benson Index
8. Mussel larva bioassay

RECOMMENDATIONS FOR A WATER QUALITY MONITORING PROGRAM

The Oregon State Sanitary Authority currently measures characteristics of water in Yaquina Bay on three to six occasions yearly in its program

with shellfish and at least once yearly in its program of general water quality studies. The measurements include pH, water temperature, dissolved oxygen concentration, conductivity, salinity, biochemical oxygen demand, and MPN. Samples are collected at 14 stations over a 15-mile distance extending from the highway bridge inland to Elk City.

The Federal Water Pollution Control Administration is proposing to study the intrusion of salt water into Yaquina Bay and the pattern of settling of suspended solids carried by runoff from the watershed into the Bay. This project, if approved, would provide for the establishment of monitoring stations at 6-mile intervals beginning at the highway bridge, (mile 0) and terminating at the head of tide water (mile 18). Factors to be measured by recording instruments at mile 0 would include water temperature, salinity, dissolved oxygen concentration and turbidity. Salinity would be measured by recording instruments at inland stations.

Should the program proposed by the Federal Water Pollution Control Administration receive approval, data collected by them combined with data collected by the Oregon State Sanitary Authority could initially represent a major segment of a water quality monitoring program for Yaquina Bay.

It was the consensus of the participants at the meeting that two and preferably three stations should be established for monitoring water quality in Yaquina Bay under the proposed program. A station located at the highway bridge (mile 0) and nearest to the salt water intake at the Marine Science Center would receive first priority for making observations. A station a short distance downstream (west) from the Toledo industrial area (about mile 12) would receive second priority. A station at an intermediate location (about mile 6) would receive third priority. Thus, our data would be most complete for the station at mile 0 and least complete for the

station at mile 6.

Measurements at each station would initially include those made routinely by the Oregon State Sanitary Authority, measurements planned by the Federal Water Pollution Control Administration and bioassays with mussel larvae. The bioassays would be done at monthly intervals by the University.

The Oregon State Sanitary Authority is presently programing their past data from Yaquina Bay for analysis. This analysis will provide information on the variability in levels of a number of the factors which are recommended for measurements as a part of the proposed program. We should be in a much better position to evaluate the adequacy of the present intensity of sampling by the Oregon State Sanitary Authority and to consider the need for a more intensive sampling effort after their analyses have been completed.

The desirability of monitoring characteristics of water pumped into laboratories of the Marine Science Center was also considered. It was concluded that a program to monitor characteristics of water within the laboratories should be considered separately from that proposed for Yaquina Bay. Development of a water quality monitoring program within the laboratories was not discussed in detail, since it was felt that such discussions should involve primarily persons representing the investigations within the laboratories.

William J. McNeil agreed to follow-up on the recommendations in this report and to coordinate the activities of the agencies in contributing data to a water quality monitoring program for Yaquina Bay. No recommendations for a second meeting to discuss the water quality monitoring program were made. A second meeting could possibly be beneficial after plans of the Federal Water Pollution Control Administration receive approval and after the Oregon State Sanitary Authority completes the analysis of data collected from Yaquina Bay over the period 1957 through 1966.

APPENDIX A

List of participants at meeting on Water Quality Monitoring Program for Yaquina Bay held at the Marine Science Center, September 1, 1966.

Name	Agency	Mailing Address
M. O. Allum	FWPCA	570 Pittock Block, Portland
R. L. Angstrom	FCO	1400 S.W. 5th Avenue, Portland
Gerald R. Bouck	FWPCA	200 South 35th, Corvallis
W. P. Breese	OSU	P.O. Box 157, Newport
R. J. Callaway	FWPCA	200 South 35th, Corvallis
William D. Clothier	FWPCA	P. O. Box 157, Newport
Lloyd O. Cox	OSSA	State Office Building, Portland
Robert L. Garrison	OGC	303 Extension Hall, OSU
Ron Hassleman	FCO	1400 S.W. 5th Avenue, Portland
Joel Hedgpeth	OSU	P.O. Box 157, Newport
William J. McNeil	OSU	P.O. Box 157, Newport
H.W. Merryman	OSSA	State Office Building, Eugene
Paul H. Reed	FCO	P.O. Box 157, Newport
Dean Satterlee	OSU	657 S.W. Bay Blvd, Newport
Dean L. Shumway	OSU	315 Extension Hall, Corvallis
C. Dale Snow	FCO	P.O. Box 157, Newport
Warren C. Westgarth	OSSA	8148 S.W. Beaverton-Hillsdale Hwy., Portland

Agency abbreviations:

FCO	Fish Commission of Oregon
FWPCA	Federal Water Pollution Control Administration
OGC	Oregon Game Commission
OSSA	Oregon State Sanitary Authority
OSU	Oregon State University

Siletz Bay and Salmon River Surveillance Programs

Neither of these estuaries is influenced by appreciable amounts of municipal or industrial wastes.

Special Surveillance

1. One sample station has been established for each of these rivers to obtain background data. No expansion is expected unless data show need for a new evaluation.
2. No special studies are indicated with data available.

Nestucca Bay Surveillance Program

The Nestucca estuary until recent years has been relatively unaffected by residential developments. In recent years tourist accommodations and summer homes have caused increased waste problems along the lower estuary.

Specific Surveillance

1. The four stations that are currently active in the Oregon State Sanitary Authority program will in general suffice for future surveillance. Special sanitary surveys have been made in the lower Nestucca estuary in recent years. These will be continued on a sporadic basis to evaluate sanitary conditions with a view to potential treatment of residential and municipal wastes.
2. No special surveys are indicated.

Netarts Bay Surveillance Program

Netarts Bay is renowned for its shellfish production and there are no significant waste sources affecting its water quality.

Specific Surveillance

1. The Oregon State Sanitary Authority has for several years conducted sanitary surveys in Netarts Bay to monitor the bacterial content of water over shellfish growing grounds. No unacceptable

levels have been found. These surveys will continue under the shellfish sanitation program as needed. No other surveys or surveillance programs are deemed necessary at this time.

Tillamook Bay Surveillance Plan

Tillamook Bay is a wide shallow estuary utilized predominantly for shellfish production and recreational fishing. The dairy industry is the predominant industry in the basin and is concentrated in the lowlands surrounding the bay.

Specific Surveillance

1. The Oregon State Sanitary Authority maintains 15 active sampling stations on tributary streams and ten in the estuary. These stations will be sampled on a three times per year frequency. No expansion is expected in the near future.
2. Outlying residential developments adjacent to Tillamook Bay will be expected to form appropriate governmental units and construct sewage treatment facilities where the need is demonstrated.
3. Secondary treatment and effluent disinfection will be required of all municipalities adjacent to the bay or its tributaries.
4. The local Tillamook Cheese industry has been instructed to separate domestic from industrial waste and provide the equivalent of secondary treatment to both with disinfection of domestic effluents.
5. Special studies need to be conducted to determine the effect of agricultural wastes on the bay, particularly with regard to shellfish sanitation.

Nehalem Bay Surveillance Plan

Nehalem Bay is used almost exclusively for recreational fishing, clam digging, and crabbing. Other than two moderate sources of sewage wastes, there are few contaminants entering the estuary.

Specific Surveillance

1. The Sanitary Authority has two established water quality stations in the Nehalem River and plans to sample three times yearly. No particular expansion is anticipated.
2. The Sanitary Authority has conducted bacteriological studies in Nehalem Bay which have demonstrated untreated sewage from the communities of Nehalem and Wheeler. All communities will be required to provide secondary treatment and effluent disinfection of sewage wastes.
3. Special studies include the effects of agricultural runoff and marina effluents on water quality.

9. Design Streamflow

Hydrographs of flow for selected points in the basins are shown in the tentative water quality standards. Currently no comprehensive program for assessing the relationships between flows, treatment and resources has been completed for the state of Oregon. The Oregon State Sanitary Authority is presently engaged in an Ultimate Needs Study with the Water Resources Board to determine minimum flow needs. Results will be forthcoming within the next two years. The Willamette Basin task force has undertaken some of this type of work. The Northwest River Basins Commission (formerly CBIAC) is engaged in a partial study. Low-flow frequency curves of some areas are available in the Oregon Water Resources Board reports of various basins. Limited detailed analyses have been done by the computer program of the Federal Water Pollution Control Administration to relate pollution loads and flows. Much more work is needed before acceptable minimal stream flows can be set. The main needs are for travel times and physical characteristics of the streams to determine reoxygenation coefficients and for tests to determine deoxygenation rates.

APPENDIX-1

ESTABLISHED WATER SURVEILLANCE STATIONS

Oregon State Sanitary Authority

May 1967

PREFACE

The water quality sampling program of the State Sanitary Authority is always in a state of flux so that a listing of this type is tending toward obsolescence the day it is published. However, it is hoped that this list will provide interested persons with information regarding the sampling activities of the Sanitary Authority. In most cases sufficient information is provided for adequate location of the station to the nearest section. Supplemental data are being developed for use by the Sanitation and Engineering staff describing the stations in enough detail that anyone who is relatively familiar with an area can drive or walk directly to the sampling point. Every effort is being made to ensure that sampling procedures and points are duplicated on every run. It is anticipated that most of these stations plus any new ones that appear necessary will be sampled three times yearly. The plan is to obtain enough data to characterize each stream during low-flow periods, high land runoff periods and spring runoff when most of the polluting materials have been washed out.

Any corrections, additions, deletions, or general comments will be welcomed by the Sanitary Authority staff.

HOOD-SANDY BASIN

IBM No.	Station Number & Name	Sec., T., R.	River Mile
24-30	Hood R., 200 yds. above PGE	Sec. 36, T3N, R10E	1.8
24-30	W. Fk. Hood R. at mouth	Sec. 1, T1N, R9E	.01
24-30	Hood R. above U.S.Plywood at Dee	Sec. 36, T3N, R10E	13.5
20	Columbia R. at Rooster Rock	Sec. 24, T1N, R4E	129.1
23-10	Sandy R. at Troutdale RR Bridge	Sec. 24, T1N, R3E	2.7
23-10	Sandy R. at Dodge Park	Sec. 24, T1S, R4E	17.0

Biological Sampling

Biological samples are taken at all of the above stations, except for the Columbia River at Rooster Rock.

DESCHUTES BASIN

IBM No.	Station Number & Name		Sec., T., R.	River Mile
25-30	D-1	Deschutes at upper end Brooks-Scanlon log pond	Sec. 6, T18S,R12E	168.8
25-30	D-2	Deschutes at irrigation dam, N. city limits of Bend	Sec.29, T17S, R12E	164.9
25-30	D-3	Deschutes at Tumalo Br.	Sec.6, T17S, R12E	158.2
25-30	D-4	Deschutes at Cline Falls State Park	Sec.14, T15S, R12E	144.9
25-30	D-5	Deschutes at Lower Br.	Sec.16, T14S, R12E	133.7
25-30	D-6	Deschutes W. of Cove State Park	Sec.16, T12S, R12E	116.1
25-30	D-7	Deschutes at Warm Springs Bridge	Sec.30, T9S, R13E	97.0

DESCHUTES BASIN (Continued)

IBM No.	Station Number & Name		Sec., T., R.	River Mile
25-30-50	C-1	Crooked R. at Cove State Park	Sec.11, T12S, R12E	2.0
25-30-50	C-2	Crooked R. 4½ mi. E. of Terrebone	Sec. 20, T14, R14E	30.0
25-30-45	M-1	Metolius R. above Spring Creek	Sec.29,T11S, R11E	10.5
25-30-45	M-2	Metolius R. between Sheep and Code Creeks	Sec.12, T11S, R9E	24.0
25-30-45	M-3	Metolius R. at head	Sec. 29, T11S, R11E	41.2

Biological Sampling

D-1	Deschutes at upper end Brooks-Scanlon log pond
D-3	Deschutes at Tumalo Br.
D-4	Deschutes at Cline Falls State Park
D-5	Deschutes at Lower Br.
D-7	Deschutes at Warm Springs Bridge
M-1	Metolius R. above Spring Creek

KLAMATH BASIN

IBM No.	Station Number & Name		Sec., T., R.	River Mile
43-40-90-20	K-1	Sprague R. ¼ mi. above Chiloquin	Sec. 3, T35S, R7E	0.5
43-40-90	K-2	Williamson R. 1½ mi. above Chiloquin	Sec. 27, T34S, R7E	12.8

KLAMATH BASIN (Continued)

IBM No.	Station Number & Name		Sec., T., R.	River Mile
43-40-90	K-3	Williamson R. at Williamson R. store	Sec. 30,T35S, R7E	4.6
43-40	K-4	Exit of Klamath Lake at Fremont St. Br., K. Falls	Sec. 30, T38S, R9E	253.0
43-40	K-5	Klamath R. Hwy. 97 Br. $3\frac{1}{2}$ mi. S. of K. Falls	Sec. 18, T39S, R9E	248.4
43-40	K-6	Klamath R. at Keno Br.	Sec. 31,T39S, R8E	234.9
43-40	K-7	Klamath R. below Big Bend power house	Sec. 14, T40S, R6E	219.9
	K-8	Lost River Diversion Channel at Midland Road Bridge		
	K-9	Outfall canal from Pump Plant "F" at Hwy 97 bridge		

Biological Sampling

Biological samples are taken at all of the above stations.

EASTERN OREGON BASINS

IBM No.	Station Number & Name		Sec., T., R.	River Mile
25-30	DE-	Mouth of Deschutes	Sec. 26, T2N, R15E	0.3
26-10	JD-1	John Day R. at McDonald Ferry	Sec. 11, T1N, R19E	20.9
26-10	JD-2	John Day R. $1\frac{1}{2}$ mi. W. of Mt. Vernon	Sec. 30, T13S, R30E	237.2

EASTERN OREGON BASINS (Continued)

IBM No.	Station Number & Name		Sec., T., R.	River Mile
26-10	JD-3	John Day R. at W. city limits of John Day	Sec. 22, T13S, R31E	247.0
27-20	UT-1	Umatilla R. 1 3/4 mi. S. of Umatilla	Sec. 21, T5N, R28E	2.0
27-20	UT-2	Umatilla R. at Yoakum Br.	Sec. 2, T2N, R30E	38.4
27-20	UT-3	Umatilla R. at Reith Br.	Sec. 13, T2N, R31E	50.0
27-20	UT-4	Umatilla R. at Hwy 11 Br. in Pendleton	Sec. 1, T2N, R32E	57.1
31-10	GR-1	Grande Ronde R. 3 3/4 mi. S. of Elgin	Sec. 3, T1S, R39E	103.3
31-10-70	GR-2	Catherine Cr. 3 mi. N.W. of Cove	Sec. 7, T3S, R40E	
31-10-40	WA-1	Wallowa R. at Minam	Sec. 29, T2N, R41E	10.0
32-50	PO-1	Powder R. 4½ mi. N. of Baker	Sec. 17, T8S, R40E	75.0
30	SN-1	Snake R. at Weiser Br.	Sec. 21, T15S, R47E	351.0
30	SN-2	Snake R. at Payette Br.	Sec. 14, T17S, R47E	365.5
30	SN-3	Snake R. at Ontario Br.	Sec. 2, T18S, R47E	374.0
30	SN-4	Snake R. at Hwy. 20 Br. in Nyssa	Sec. 32, T19S, R47E	385.0
33-80	MH-1	Malheur R. 1½ mi. N. of Ontario	Sec. 28, T17S, R47E	0.4
33-80	MH-2	Malheur R. 5½ mi. E. of Vale (Halliday Rd.)	Sec. 18, T18S, R46E	15.0
	B-1	Burnt River at mouth, near Huntington		
	OW-1	Owyhee R. at Hwy. 201 Br. 4 mi. N. Adrian		

Biological Sampling

DE- Mouth of Deschutes

JD-1 John Day R. at McDonald Ferry

JD-2 John Day R. 1½ mi. W. of Mt. Vernon

JD-3 John Day R. at W. city limits of John Day

UT-1 Umatilla R. 1 3/4 mi. S. of Umatilla

UT-2 Umatilla R. at Yoakum Br.

UT-3 Umatilla R. at Reith Br.

UT-4 Umatilla R. at Hwy. 11 Br. in Pendleton

GR-1 Grande Ronde R. 3 3/4 mi. S. of Elgin

Grande Ronde R. above LaGrande

TUALATIN BASIN

IBM No.	Station Number & Name	Sec., T., R.	River Mile
22-50-22-80	Scoggins Cr. at Lee Road Br. above Stimson Mill	Sec. 17, T1S, R4W	6.0
22-50-22-80	Scoggins Cr. at Tualatin Hwy. Bridge	Sec. 26, T1S, R4W	1.7
22-50-22	Tualatin R. 1 mi. S. of Dilley on Springhill Rd.	Sec. 24, T1S, R4W	60.0
22-50-22	Tualatin R. at Fernhill Road above Forest Grove STP outfall	Sec. 8, T1S, R3W	57.5
22-50-22	Tualatin R. at Hwy. 47 Br. at Easton	Sec. 35, T1S, R4W	64.8

TUALATIN BASIN (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
22-50-22	Tualatin R. at LaFollet Rd.Br.	Sec. 9, T1S, R3W	56
22-50-22	Tualatin R. at Golf Course Road Br.	Sec. 9, T1S, R3W	52.8
22-50-22-50-40	W. Fk. Dairy Cr. at 3rd Br. W. of Cloverleaf intersection at Hwy. 6 (Nehalem Hwy.)	Sec. 9, T2N, R4W	4.0
22-50-22-50-40	W. Fk. Dairy Cr. on Cedar Canyon Road - Banks	Sec. 25, T2N, R4W	8.0
22-50-22-40	Rock Cr. on W. Union Rd.	Sec. 24, T1N, R1W	
22-50-22-40-10-10	Cedar Mill Cr. at Sunset Hwy.	Sec. 4, T1S, R1W	2.8
22-50-22-40 10-30	Golf Cr. at Sunset Hwy.	Sec. 15, T1S, R1W	3.7
22-50-22-40-10-30	Golf Cr. at Canyon Road	Sec. 1, T1S, R1W	2.3
22-50-22-40-10-30	Golf Cr. at Canyon Drive-In	Sec. 1, T1S, R1W	0.9
22-50-22-40-10-20	Messenger Cr. at 2nd Br. in Meeke & Co. Trailer Park	Sec. 11, T1S, R1W	0.3
22-50-22-40-10	Beaverton Cr. 200 yds above Beaverton STP	Sec. 10, T1S, R1W	8.0
22-50-22-40-10	Beaverton Cr. 75 yds above Tektronix treatment plant	Sec. 9, T1S, R1W	7.0
22-50-22-40-10	Beaverton Cr. at RR Br. below Tektronix treatment plant	Sec. 9, T1S, R1W	6.3
22-50-22-40-10	Beaverton Cr. at 185 Avenue	Sec. 7, T1S, R1W	3.7
22-50-22-40-10	Beaverton Cr. at Baseline Rd.	Sec. 3, T1S, R2W	2.4
22-50-22-40-10	Beaverton Cr. at Orenco	Sec. 35, T1N, R2W	0.3
22-50-22-40	Rock Cr. at Orenco	Sec. 34, T1N, R2W	5.1
22-50-22-40	Rock Cr. at Hwy 8 under Br.	Sec. 9, T1S, R2W	1.2
22-50-22-50	Dairy Creek at Hwy. 8	Sec. 1, T1S, R3W	2.0

TUALATIN BASIN (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
22-50-22	Tualatin R. at Jackson	Sec. 12, T1S, R3W	45.0
22-50-22	Tualatin R. at Rood Rd. Br.	Sec. 17, T1S, R2W	38.7
22-50-22	Tualatin R. at Farmington Rd. Bridge	Sec. 28, T1S, R2W	33.5
22-50-22	Tualatin R. at Hwy. 210 Scholls Road Br.	Sec. 10, T2S, R2W	27.1
22-50-22	Tualatin R. at Elsner Rd. Br.	Sec. 19, T2S, R1W	16.0
22-50-22-20-10	Cedar Cr. (Chicken Cr.) at W. Sherwood	Sec. 32, T2S, R1W	1.8
22-50-22-20-10	Cedar Cr. at Hwy. 99W	Sec. 30, T2S, R1W	1.0
22-50-22	Tualatin R. at Hwy. 99W Roamers Rest	Sec. 16, T2S, R1W	11.5
22-50-22	Tualatin R. at Boones Ferry Rd. at Tualatin	Sec. 24, T2S, R1W	8.5
22-50-22	Tualatin R. at Shipley Br.	Sec. 21, T2S, R1E	5.5
22-50-22	Tualatin R. at 1½ mi. W. of Willamette	Sec. 34, T2S, R1E	2.0
22-50-22-10	Fanno Cr. at Durham Station	Sec. 13, T2S, R1W	1.2
22-50-22-10	Fanno Cr. on Bonito Rd.	Sec. 12, T2S, R1W	2.4
22-50-22-10	Fanno Cr. ½ mi. S. of Metzger plant	Sec. 27, T1S, R1W	6.4
22-50-22-10	Fanno Creek at Hwy. 210	Sec. 23, T1S, R1W	7.3
22-50-22-10	Fanno Creek on Hwy. 217	Sec. 27, T1S, R1W	8.7
22-50-22-10	Fanno Cr. at Scholls Ferry Rd.	Sec. 23, T1S, R1W	11.1
22-50-22-10	Fanno Creek at Oleson Road	Sec. 13, T1S, R1W	15.1

Biological Sampling Stations

All of the above listed stations.

GREAT BASIN

IBM No.	Station Name	Sec., T., R.	River Mile
41-20	Silvies R. N. of Seneca	Sec. 27, T16S, R31E	83.2
41-20	Silvies R. south of Seneca	Sec. 11, T17S, R31E	79.0
41-20	Silvies R. east of Burns	Sec. 7, T23S, R31E	3.3
41-75	Donner & Blitzen R. at Malheur Refuge Rd. to Diamond	Sec. 14, T29S, R31E	26.5
41-75	Donner & Blitzen R. at French Glen	Sec. 6, T32S, R32E	42.9
	Trout Creek at Whitehorse Ranch Road	Sec. 26, T39S, R36E	
	Crooked Creek at Hwy. 95 Br.	Sec. 6, T32S, R41E	
34-30	Owyhee River at Rome	Sec. 19, T31S, R42E	
	Jordan Creek at Hwy. 95 Br.	Sec. 1, T30S, R45E	
	Succor Creek	Sec. 32, T32S, R46E	
34-30	Owyhee River at Hwy. 201 Br.	Sec. 35, T20S, R46E	

Biological Sampling

Biological samples are taken at all of the above stations, except for Donner & Blitzen River at Malheur Refuge Rd. to Diamond.

GOOSE AND SUMMER LAKES

IBM No.	Station Number and Name	Sec., T., R.	River Mile
	H4-V8 Goose Lake, w. side at state line, 1 mi. off-shore, 6 ft. depth (bottom)	Sec. 21, T41S, R19E	
	H9-V8 Goose Lake, e. side at state line, 1½ mi. off-shore, 7 ft. depth (bottom)	Sec. 22, T41S, R20E	

GOOSE AND SUMMER LAKES (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
H9-V5	Goose Lake, approx. 3 mi. n. of state line, 1½ mi. offshore, e. side of lake, 6 ft. depth (bottom)	Sec. 3, T40S, R20E	
H7-V4	Goose Lake, approx. 5 mi. n. of state line, near center (east-west) of lake, 2½ ft. depth (bottom)	Sec. 31, T40S, R20E	
H4-V5	Goose Lake, approx. 3 mi. N. of state line, 1 mi. offshore, w. side of lake, 2 ft. depth (bottom)	Sec. 3, T41S, R19E	
	New Pine Creek-¼ mi. e. of city center of New Pine Creek.	Sec. 13, T40S, R20E	2.6
	Kelly Creek at Hwy. 399 Bridge	Sec. 18, T41S,R21E	1.8
	Crane Ck. at Hwy 399 Br.	Sec. 7, T40S, R20E	1.5
	Thomas Ck.at Hwy. 140 Br.	Sec. 17, T39S, R20E	5.5
	Cox Creek at county rd. culvert ½ mi. upstream from Auger Cr. confluence	Sec. 30, T38S, R20E	1.5
	Cottonwood Cr. at Hwy 140 Bridge	Sec. 12, T39S, R18E	7.1
	Muddy Creek at Hwy 140 Bridge	Sec. 17, T39S, R19E	7.3
	Antelope Cr. at county rd. br. 1 mi. n. of Westside store	Sec. 4, T40S, R19E	4.3
	Drews Cr. at county rd. 2 mi. sw of Westside store	Sec. 19, T40S, R19E	3.9

GOOSE AND SUMMER LAKES (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
	Dry Cr. at county rd. 2 mi. n. of state line on w. side of Goose Lake	Sec. 18, T41S, R19E	0.7
	Thomas Cr. at county rd. Xing 4½ mi. upstream from Hwy. 140	Sec. 24, T38S, R19E	10.3
	Auger Cr. at county rd. culvert ½ mi. downstream from White King Mine	Sec. 13, T38S, R19E	6.2
	Silver Cr. at Hwy. 31, ¼ mi. n. Silver Lake Ranger Station	Sec. 21, T28S, R14E	0.2
	Ana Springs Reservoir	Sec. 6, T30S, R17E	
	Chewaucan R. ½ mi. above Paisley Mill	Sec. 19, T33S, R19E	21.2
	Lake Abert at Hwy. 395	Sec. 36, T34S, R12E	
	Honey Creek at Plush	Sec. 28, T36S, R24E	2.1
	Hart Lake at Plush	Sec. 27, T36S, R24E	
	Crooked Cr. 1 mi. n. Valley Falls	Sec. 31, T35S, R12E	4.1
	Chewaucan R. at Paisley	Sec. 24, R18E, T31S	22.4

Biological Sampling Stations

Silver Cr. at Hwy 31

Chewaucan River at Paisley

Chewaucan River 0.5 mi. above Paisley Mill

Crooked Cr. 1 mi. no. of Valley Falls

Honey Creek at Plush

Biological Sampling Stations (Continued)

Cottonwood Cr. at Hwy. 66

Antelope Creek at Westside

Thomas Creek at Lakeview

Cox Creek at Logging Rd.
13 mi. n. of Lakeview

Ana Springs Reservoir

Drew Reservoir

Lake Abert

UMPQUA RIVER BASIN

IBM No.	Station Number & Name		Sec., T., R.	River Mile
13-50	U-1	Umpqua R. at Scottsburg Bridge	Sec. 18, T22S, R9W	27.2
13-50	U-2	Umpqua R. at Elkton Br.	Sec. 30, T22S, R7W	48.6
13-50	U-3	Umpqua R. at Kellogg Br.	Sec. 20, T23S, R7W	71.0
13-50	U-4	Umpqua R. at Bullock Br. (at Tyee Rd.)	Sec. 13, T24S, R7W	79.4
13-50	U-5	Umpqua R. at Umpqua Br.	Sec. 25, T25S, R7W	102.7
13-50-40	EC-1	Elk Creek at Elkton	Sec. 20, T22S, R7W	0.2
13-50-98	NU-1	N. Umpqua R. at Garden Valley Br. (Brown's Br.)	Sec. 33, T26S, R6W	1.8
13-50-98	NU-2	N. Umpqua R. at Whistlers Bend	Sec. 17, T26S, R4W	24.0
13-50-98	NU-3	N. Umpqua R. at Lone Rock Bridge	Sec. 17, T26S, R3W	31.1
13-50-96	SU-1	S. Umpqua R. at Melrose Rd.	Sec. 16, T27S, R6W	7.1

UMPQUA RIVER BASIN (Continued)

IBM No.	Station Number & Name		Sec. T., R.	River Mile
13-50-96	SU-2	S. Umpqua R. 6 mi. S. of Roseburg at Old Hwy. 99 Br.	Sec. 15, T28S, R6W	21.0
13-50-96	SU-3	S. Umpqua R. at Myrtle Cr. Br.	Sec. 28, T29S, R5W	38.8
13-50-96	SU-4	S. Umpqua R. 2 mi. N. of Canyonville	Sec. 22, T30S, R5W	51.0
13-50-96	SU-5	S. Umpqua R. at Days Cr. Br.	Sec. 9, T30S, R4W	58.1
13-50-96-30	CC-1	Cow Creek ½ mi. below Riddle	Sec. 19, T30S, R5W	1.3
13-50-96-30	CC-2	Cow Creek 4 mi. above Riddle	Sec. 33, T30S, R6W	6.2
13-50-96-30	CC-3	Cow Creek ½ mi. below Glendale	Sec. 32, T32S, R6W	40.0
13-50-96-30	CC-4	Cow Creek ½ mi. above Glendale at city water intake.	Sec. 33, T32S, R6W	42.0

Biological Sampling Stations

Umpqua R. at Umpqua Bridge

Umpqua R. at Bullock or Kellogg Br.

Umpqua R. below Elkton Br.

Umpqua R. at Scottsburg

N. Umpqua at Lone Rock Br.
or at Whistler's Bend

N. Umpqua at Garden Valley Br.

S. Umpqua at Day's Cr. Br.

S. Umpqua at Melrose Rd.

Cow Creek 0.5 mi. below Glendale

Cow Creek 0.5 mi. below Riddle

Cow Creek 1 mi. above Glendale city
water intake

WILLAMETTE RIVER

IBM No.	Station Number & Name		Sec., T., R.	River Mile
22-50	W-1	Springfield Br.	Sec. 34, T17S, R3W	185.6
22-50	W-2	Eugene Bridge	Sec. 29, T17S, R3W	182.2
22-50	W-3	Willamette Sand & Gravel	Sec. 18, T17S, R3W	178
22-50	*W-4	Koon Sand and Gravel	Sec. 3, T16S, R4W	168
22-50	*W-5	Harrisburg Bridge	Sec. 16, T15S, R4W	162
22-50	*W-6	Irish Bend at Norwood Is.	Sec. 1, T14S, R5W	152
22-50	*W-7	Corvallis Intake	Sec. 13, T12S, R5W	134.5
22-50	*W-8	Corvallis Bridge	Sec. 35, T11S, R5W	131.7
22-50	*W-9	Adair Intake	Sec. 3, T11S, R4W	122.8
22-50	W-10	Albany Bridge	Sec. 6, T11S, R3W	120
22-50	W-11	Conser Road	Sec. 24, T10S, R4W	114
22-50	W-12	Buena Vista Ferry	Sec. 23, T9S, R4W	107
22-50	W-13	Independence Bridge	Sec. 28, T8S, R4W	97
22-50	W-14	Salem RR Bridge	Sec. 22, T7S, R3W	84.8
22-50	*W-15	Manbrin Gardens	Sec. 3, T7S, R3W	82
22-50	W-16	Wheatland Ferry	Sec. 34, T5S, R3W	72.6
22-50	W-17	Old Newberg Br.	Sec. 29, T3S, R2W	50
22-50		New Newberg Bridge	Sec. 2, T4S, R2W	46.6
22-50	*W-18	Wilsonville Bridge	Sec. 23, T3S, R1W	38.6
22-50	W-19	Canby Ferry	Sec. 21, T3S, R1E	35.0
22-50	W-20	Marina Mart	Sec. 2, T3S, R1E	27.8
22-50	W-21	Sportcraft	Sec. 30, T2S, R2E	25.6
22-50	*W-22	Oswego Log Dump	Sec. 2, T2S, R1E	20.9

WILLAMETTE RIVER (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
22-50	W-23 Staff Jennings	Sec. 22, T1S, R1E	16.5
22-50	*W-24 Morrison Street Br.	Sec. 3, T1S, R1E	12.7
22-50	W-25 Steel Bridge	Sec. 34, T1N, R1E	12.0
22-50	W-26 SP & S RR Bridge	Sec. 12, T1N, R1W	7.0

* Discontinued or infrequently sampled station.

Biological Sampling

Multnomah Channel
1. near mouth at St. Helens (Boise-Cascade intake)
2. Coon Island Marina Dock
3. Sauvie Island Bridge
4. mouth main Willamette Channel

Coast Fk. Willamette above Cottage Grove

Mid Fk. Willamette at Jasper

Willamette at Independence

Willamette at Wheatland Ferry

Willamette at Wilsonville

Willamette at Marina Mart

Willamette at Oswego

Willamette at Swan Island

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WILLAMETTE TRIBUTARIES

IBM No.	Station Number & Name		Sec., T., R.	River Mile
22-50-96	CF1	Coast Fk. Willamette above Cottage Grove	Sec. 9, T21S, R3W	26
22-50-96	CF1a	Coast Fork below Cottage Grove	Sec. 22, T20S, R3W	21
22-50-96-40	CF2	Row R. 1 mi. NE of Cottage Grove	Sec. 22, T20S, R3W	2
22-50-96	CF3	Coast Fk. at Saginaw Br.	Sec. 15, T20S, R3W	18
22-50-96	CF3a	Coast Fk. at Creswell	Sec. 13, T19S, R3W	12
22-50-96	CF4	Coast Fk. at Hwy. 58 Br.	Sec. 30, T18S, R2W	5
22-50-98	MF1	Mid Fk. Willamette at Jasper Bridge	Sec. 15, T18S, R2W	7
22-50-82	LT8	Long Tom R. at Elmira	Sec. 25, T17S, R5W	31
22-50-90	MK3	McKenzie R. at Coburg Br.	Sec. 9, T17S, R3W	4
22-50-82	LT4	Long Tom R. at Monroe	Sec. 29, T14S, R5W	6.7
22-50-82	LT2	Long Tom R. 1 mi. above mouth	Sec. 2, T14S, R5W	1
22-50-76	MA1	Mary's River at Corv.	Sec. 2, T12S, R5W	1
22-50-70	CA1	Calapooya R. at Bryant Park	Sec. 12, T11S, R4W	1
22-50-64-96	SS20	S. Santiam R. at Lebanon Dam	Sec. 19, T12S, R1W	20.3
22-50-64-96	SS3	S. Santiam, Mark's Slough	Sec. 2, T12S, R2W	16
22-50-64-96	SS14	Fitzwater Farm	Sec. 25, T11S, R2W	13.7
22-50-64-96	SS8	Crabtree Bridge	Sec. 3, T11S, R2W	7.6
22-50-64-98	NS10	N. Santiam at Stayton	Sec. 15, T9S, R1W	16.7
22-50-64	S6	Santiam R. at Freeway Br.	Sec. 4, T10S, R3W	6.0
22-50-62	WTL5	Luckiamute R. at Helmick State Park	Sec. 18, T9S, R4W	12.6

WILLAMETTE TRIBUTARIES (Continued)

IBM No.	Station Number & Name		Sec., T., R.	River Mile
22-50-54	WTR5	Rickreall Cr. at Rickreall	Sec. 30, T7S, R4W	8.2
22-50-38	YL30	N. Yamhill above Yamhill	Sec. 6, T3S, R4W	16
22-50-38	YL1	Yamhill R. at Dayton	Sec. 17, T4S, R3W	5
22-50-28-10	WTP10	Pudding R. at Hwy 213 Br.	Sec. 6, T7S, R1W	49.9
22-50-28-10-85	WTS2	Silver Creek above Silverton	Sec. 2, T7S, R1W	5
22-50-28-10-80	WTA2	Abiqua Creek at Tom Hartley Farm	Sec. 34, T6S, R1E	10
22-50-28-10-70	WTB2	Butte Creek above Scotts Mills	Sec. 19, T6S, R1E	17
22-50-28	WTM7	Molalla R. above Shady Dell	Sec. 14, T5S, R2E	21
22-50-28	WTM5	Molalla R. at Hwy. 211 Br.	Sec. 3, T5S, R2E	18.6
22-50-28-10	WTP5	Pudding R. at Hwy 211 Br.	Sec. 11, T5S, R1W	22.9
22-50-28-10	WTP8	Pudding River below Birdseye outfall	Sec. 16, T5S, R1W	27
22-50-28-10	WTP9	Pudding River above Birdseye outfall	Sec. 16, T5S, R1W	27.1
22-50-28	WTM2	Molalla R. at Canby	Sec. 5, T4S, R1E	3.5
22-50-28-10	WTP2	Pudding R. at Pat's Acres	Sec. 6, T4S, R1E	5.3
22-50-16	WTC1	Clackamas R. at Hwy. 99E Bridge	Sec. 29, T2S, R2E	0.2
22-50-16	WTC5	Clackamas R. at Carver	Sec. 13, T2S, R2E	8.1
22-50-22	T2	Tualatin R. at Shipley Br.	Sec. 34, T2S, R1E	5.5
22-50-07	WTK1	Kellogg Cr. at Hwy 99E Bridge	Sec. 34, T1S, R1E	0.1
22-50-06	WTJ2	Johnson Cr. at Ochoco Avenue	Sec. 12, T1S, R1E	1.5

Biological Sampling

McKenzie at Bellinger's Boat Landing

McKenzie at Pat's Acres

McKenzie at Coburg Bridge

Santiam R. at Freeway Bridge

S. Fk. Santiam above Lebanon Dam

S. Fk. Santiam at Fitzwater Farm

S. Fk. Santiam at Crabtree Bridge

N. Fk. Santiam

Row R. at U. S. 99 Br.

Long Tom R. near Monroe

Mary's R. at Corvallis

Calapooya R. Near Albany

Rickreall Creek at Oregon 51 Br.

Yamhill River at Dayton

Pudding River

Molalla R. at U. S. 99 Br.

Clackamas at U. S. 99E Bridge

SOUTH COAST BASIN

IBM No.	Station Number & Name	Sec., T., R.	River Mile
14-10	SC-1 S. Fk. Coos River at ford crossing beyond Dellwood	Sec. 28, T25S, R11W	10.0
14-40-98	SC-2 N. Fk. Coquille R. 0.4 mi. N. of Myrtle Point	Sec. 8, T29S, R12W	.2
10-40-96	SC-3 S. Fk. Coquille R. 0.6 mi. N. of Powers	Sec. 12, T31S, R12W	27.2

SOUTH COAST BASIN (Continued)

IBM No.	Station Number & Name		Sec., T., R.	River Mile
14-60	SC-4	Sixes R. 1 mi. above Hwy. 101 Br.	Sec. 10, T32S, R15W	7.2
14-62	SC-5	Elk R. 1 mi. above Hwy. 101 Br.	Sec. 21, T32S, R15W	4.5
15-50	SC-6	Rogue R. at Plywood Mill	Sec.16 , T36S, R14W	4.7
14-80	SC-7	Pistol R. 4 mi. above Hwy. 101 Br.	Sec. 22, T38S, R14W	4.5
14-95	SC-8	Chetco R. 3.1 mi. above Hwy. 101 Br.	Sec. 34, T40S, R13W	4.5
14-99	SC-9	Winchuck R. 1.3 mi. above Hwy. 101 Br.	Sec. 24, T41S, R13W	2.5

Biological Sampling

Biological samples are taken at all of the above stations.

MID COAST BASIN

IBM No.	Station Number & Name		Sec., T., R.	River Mile
12-02		Salmon R. east of Otis Junction	Sec. 30, T6S, R10W	4.0
12-05		Dee R. at Hwy. 101 Br.	Sec. 15, T7S, R11W	0.1
12-07		Schooner Cr. 2.5 mi. above Taft	Sec. 30, T7S, R10W	2.6
12-10	C-3	Siletz R. 3 mi. N of Siletz	Sec. 28, T9S, R10W	31.5
12-35		Yaquina R. 0.5 mi. off Hwy. 20	Sec. 36, T10S, R10W	27.5
12-35		Yaquina R. above Toledo	Sec. 21, T11S, R10W	14.7
12-35		Yaquina R. below Toledo	Sec. 19, T11S, R10W	12.0

MID COAST BASIN (continued)

IBM No.	Station Number & Name		Sec., T., R.	River Mile
12-55		Alsea R. east of Tidewater	Sec. 28, T13S, R10W	13.4
12-60		Yachats R. 1.4 mi. east of Yachats	Sec. 26, T14S, R12W	1.4
12-85	C-4	Siuslaw R. at Mapleton Br.	Sec. 2, T18S, R10W	21.0

Biological Sampling

Salmon R. east of Otis Junction

Dee R. at Hwy. 101 Br.

Schooner Cr. 2.5 mi. above Taft

Siletz R. 3 mi. north of Siletz

Yaquina R. 0.5 mi. off Hwy. 20

Alsea R. east of Tidewater

Yachats R. 1.4 mi. east of Yachats

Siuslaw R. at Mapleton Br.

NORTH COAST BASIN

IBM No.	Station Number & Name		Sec., T., R.	River Mile
11-30		Nehalem R. at Hwy. 26	Sec. 4, T4N, R7W	36.5
11-30	C-1	Nehalem R. at Foss	Sec. 35, T3N, R9W	13.3
11-65	C-2	Wilson R. at Hwy. 6	Sec. 24, T1S, R9W	8.5
11-70		Trask R. at Hwy. 101	Sec. 6, T2S, R9W	4.0
11-90		Nestucca R. east of Beaver	Sec. 29, T3S, R9W	15.7
11-90		Nestucca R. N. of Hebo	Sec. 12, T4S, R10W	11.0
11-90		Nestucca R. S. of Hebo	Sec. 14, T4S, R10W	9.5

NORTH COAST BASIN (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
11-90	Nestucca R. at Clover-dale	Sec. 22, T4S, R10W	7.1
21-40	Big Cr. above Fish Hatchery	Sec. 3, T7N, R7W	5.0
21-40	Big Cr. on County Rd.	Sec. 18, T8N, R7W	0.2
21-70	N. Fk. Klaskanine R. below fish hatchery	Sec. 20, T7N, R8W	1.5
11-05	Necanicum R. at Hwy 101 and Hwy. 26	Sec. 10, T5N, R10W	5.8

Biological Sampling

Nehalem R. at Hwy 26

Nehalem R. at Foss

Wilson R. at Hwy. 6

Trask R. at Hwy. 101

Nestucca R. north of Hebo

Big Creek above fish hatchery

Big Creek on County Road

North Fork Klaskanine R. below fish hatchery

North Fork Klaskanine R. above junction of forks

Necanicum R. at Hwy. 101 and Hwy. 26

ROGUE RIVER BASIN

IBM No.	Station Number & Name	Sec., T., R.	River Mile
15-50	Ro-1 Rogue R. below Grave Cr.	Sec. 1, T34S, R8W	68.0
15-50	Ro-1a Rogue River at Huntley Park	Sec. 11, T36S, R14W	7.0
15-50	Ro-1b Rogue R. at Lobster Cr. Br.	Sec. 31, T35S, R13W	11.0
15-50	Ro-1c Rogue R. below mouth of Illinois River	Sec. 1, T36S, R13W	17.6
15-50	Ro-1d Rogue R. 500 ft. above mouth of Illinois R. at Agness	Sec. 18, T35S, R11W	27.1
15-50	Ro-2 Rogue R. at Robertson's Br. near Merlin	Sec. 26, T35S, R7W	86.0
15-50	Ro-3 Rogue R. 2½ mi. west of Grants Pass	Sec. 24, T36S, R6W	99.2
15-50	Ro-4 Rogue R. at Hwy. 99 Br. in Grants Pass	Sec. 19, T36S, R5W	101.3
15-50	Ro-5 Rogue R. at Rocky Pt. Br. Hwy. 234	Sec. 20, T36S, R3W	117.3
15-50	Ro-6 Rogue R. 100 yds below Raygold Dam	Sec. 18, T36S, R2W	125.7
15-50	Ro-7 Rogue R. at Dodge Br.	Sec. 17, T35S, R1W	138.4
15-50	Ro-8 Rogue R. at Laurelhurst Park near Prospect	Sec. 16, T33S, R2E	164.1
15-50-30	Gc-1 Graves Cr. 0.5 mi. above mouth	Sec. 6, T34S, R7W	0.5
15-50-10	Il-1 Illinois R. at Finch Br. ½ mi. west of Kerby	Sec. 9, T39S, R8W	53.9
15-50-10	Il-2 Illinois R. at mouth	Sec. 18, T35S, R11W	0.1
15-50-40	Ap-1 Applegate R. at Applegate	Sec. 22, T38S, R4W	24.8
15-50-40	Ap-2 Applegate R. at Wilderville Br.	Sec. 31, T36S, R6W	2.6

ROGUE RIVER BASIN (Continued)

IBM No.	Station Number & Name	Sec., T., R.	River Mile
15-50-60	Bc-1 Bear Cr. 1 mi. N. of Central Point	Sec. 34, T36S, R2W	3.8
15-50-60	Bc-2 Bear Cr. Hwy. 62 Br. 1 mi. N. of Medford	Sec. 13, T37S, R2W	7.6
15-50-60	Bc-3 Bear Cr., Main St. Br. in Medford	Sec. 30, T37S, R1W	9.0
15-50-60	Bear Cr. at Fern Valley Rd. Br.	Sec. 9, T38S, R1W	14.4
15-50-60	Bear Cr. opp. Jackson Hot Springs	Sec. 31, T38S, R1E	19.9
15-50-60	Bear Cr. at Mtn. Ave. Br. in Ashland	Sec. 4, T39S, R1E	22.4

Biological Sampling Stations

Rogue R. at Elk Cr. Park

Rogue R. at Rogue R. Park

Rogue R. 4½ mi. west of Grants Pass

Rogue River at Galice Park

Ro-1a Rogue R. at Huntley Park

Ap-1 Applegate R. at Applegate

Ap-2 Applegate R. at Wilderville Br.

Illinois R. at Kerby

Illinois R. at Agness

Bear Cr. 3½ mi. N.E. of Central Point

Bear Cr. at Mtn. Ave. Br. in Ashland

Gc-1 Grave Cr. ½ mi. above mouth

RADIOLOGICAL SAMPLING STATIONS

Code (River Miles)	Description	Frequency
	Columbia River at The Dalles Dam	Quarterly
C 130.0	Columbia River at Rooster Rock State Pk.	Monthly
C 74.0	Columbia River at Goble	Monthly
C 53.6	Columbia River at Beaver Army Terminal	Monthly
C 13.7	Columbia River at Astoria	Monthly
TB	Tillamook Bay	Monthly
W7	Willamette River at SP&S RR Bridge	Monthly
S6	Santiam River at Interstate 5 Bridge	Quarterly
W185	Willamette River at Springfield Bridge	Monthly
MK15	McKenzie River at Hayden Bridge	Monthly
	EASTERN OREGON	
DE1	Deschutes River at U. S. 30	Quarterly
JD21	John Day River at McDonald Ferry	Quarterly
UT2	Umatilla River at Umatilla	Quarterly
GR103	Grand Ronde River near Elgin	Quarterly
PD75	Powder River $4\frac{1}{2}$ miles north of Baker	Quarterly
SN351	Snake River at Ontario	Quarterly
	WESTERN OREGON	
NE7	Nehalem River near Wheeler	Infrequent
WL8	Wilson River $4\frac{1}{2}$ miles W. of Tillamook	Monthly
SL20	Siletz River near Siletz	Infrequent
S110	Siuslaw River near Mapleton	Infrequent
U43	Umpqua River at Elkton	Infrequent
CNO.2	Coquille River N.Fk. near Myrtle Point	Infrequent
CS27	Coquille River South Fork	Infrequent
RG86	Rogue River at Robertson's Br. near Merlin	Infrequent
K	Klamath River at Big Bend powerhouse south of Klamath Falls	Quarterly
	CITY WATER	
Portland	Tap water from State Office Building	Quarterly
St. Helens	Tap water from Municipal Office Bldg.	Quarterly

MAINSTEM COLUMBIA RIVER

Station Number and Name	River Mile
1. McNary Dam at intake to fishladder on Washington shore	292.0
2. Umatilla Bridge near Washington shore	290.5
3. Boardman boat launching ramp	270.1
4. The Dalles Dam at intake to fish ladder on Oregon shore	191.5
5. Bonneville Dam at upstream side, Oregon shore	146.1
6. Rooster Rock State Park	129.1
7. Interstate Bridge	106.5
8. Goble	74.0
9. Longview Bridge	66.0
10. Clifton	38.0

WALLA WALLA BASIN

Station Number and Name

1. Walla Walla River at Hwy. 410 bridge, 4 mi. west of Touchet, Washington.
2. Walla Walla River at Hwy. 11 bridge, 3 mi. south of Walla Walla , Wash.
3. Walla Walla River at bridge, $\frac{1}{4}$ mi. west of Hwy. 11, on Walla Walla River Road at south city limits of Milton-Freewater.
4. North Fork Walla Walla River at bridge $1\frac{1}{2}$ mi. above confluence with South Fork.
5. South Fork Walla Walla River at log bridge 7.5 miles above confluence with North Fork.

WALLA WALLA BASIN (Continued)

Station Number and Name

6. South Fork Walla Walla River from bank ½ mi. above confluence with North Fork.

7. Yellowhawk Creek at Hwy. 11 bridge 2½ mi. south Walla Walla, Washington.

8. Dry Creek 1.8 miles S.W. of Umapine

9. Pine Creek 2.5 miles S.W. of Umapine

ALSEA BASIN
(Special)

Station Number and Name		Sec., T., R.
A.	N. Fork at Game Commission hatchery dam	Sec. 20, T13S, R7W
B.	N. Fork at Hwy 31 Bridge	Sec. 29, T13S, R7W
C.	N. Fork 200 ft. below bridge at town of Alsea	Sec. 1, T14S, R8W
D.	S. Fork at bridge on Lobster Valley Road	Sec. 12, T14S, R8W
E.	Fall Creek at Hwy. 34 bridge	Sec. 1, T14S, R9W
F.	Five Rivers at confluence with Alsea	Sec. 18, T14S, R9W
G.	U.S.G.S. gauging station 3½ miles east of Tidewater	Sec. 36, T13S, R10W
H.	Drift Creek 2½ miles above tidal influence	Sec. 13, T13S, R11W
I.	Flynn Creek at mouth	Sec. 12, T12S, R10W
J.	Needle Branch at mouth	Sec. 32, T12S, R9W
K.	Deer Creek at mouth	Sec. 11, T12S, R10W

COQUILLE BAY

Station Number and Name	Approx. River Mile
1. City of Bandon Dock	0.75
2. Hwy. 101 Bridge	3.0
3. Parkerdale Dock	7.5
4. Riverton Ferry	15.0
5. City of Coquille Bridge	24.0
6. ½ Mile west of Norway	32.0

COOS BAY

Station Number and Name	Longitude and Latitude
1. Green light 7, ¼ mi. S. of Fossil Point	43°21'31"N, 124°19'08"W
2. Red light 10, ¼ mi. N. of Pigeon Point	43°22'8"N, 124°18'33"W
3. Red light 12, ½ mi. N. of Sitka Dock	43°23'2"N, 124°17'21"W
4. Red light 16, ¼ mi. No. of Empire Dock	43°24'4"N, 124°16'46"W
5. Green light 23 opposite Henderson Marsh	43°25'21"N, 124°15'52"W
6. Black Can 27, ¼ mi. W. of RR Bridge	43°25'35"N, 124°14'24"W
7. Green light 35, mouth of Kentuck Slough	43°25'24"N, 124°12'57"W
8. Red light 36, opposite mouth Cooston-Willanch Channel	43°24'25"N, 124°13'6"W
9. Coos Bay Yacht Club	43°23'20"N, 124°13'03"W
10. Shipping channel opposite mouth of Marshfield Channel	43°22'30"N, 124°12'31"W

COOS BAY (Continued)

Station Number and Name	Longitude and Latitude
11. Red light 1 mile up Marshfield Channel	43°22'28"N, 124°10'56"W
12. Green light 43 opposite mouth Coalbank Slough	43°21'48"N, 124°12'31"W
13. Coalbank Slough at Hwy 101 bridge	43°21'23"N, 124°12'28"W
14. Isthmus Slough at Eastside Bridge	43°21'24"N, 124°11'35"W
15. Isthmus at Coos City Bridge	(Not on chart)

ESTABLISHED SAMPLE STATIONS
SHELLFISH SANITATION PROGRAM
SOUTH SLOUGH (COOS BAY) COOS COUNTY

Station Number and Name	Longitude and Latitude
1. 150 yds east of flashing light at entrance of S. slough opposite Fisherman's Coop.	43°20'51"N, 124°19'01"W
2. 15 yds east of 3rd (southern most) moorage float at Charleston small boat basin	43°20'44"N, 124°19'10"W
3. 100 yds west of slip (old drydock) on east bank of S. Slough	43°20'28"N, 124°19'02"W
4. Channel, 50 yds east of Hallmark Fisheries Dock, Charleston	43°20'23"N, 124°19'46"W
5. Channel, 20 yds west of Hansen's landing docks	43°20'26"N, 124°19'13"W
6. Channel, 50 yds west of mouth of Joe Ney Slough	43°20'06"N, 124°18'56"W
7. Channel, 250 yds south of Collver Point	43°19'37"N, 124°19'27"W
8. Channel, 0.3 mi. SW of Sta.7, 50 yds west of bank	Not on Chart
9. Channel, 0.3 mi. south of Sta. 8	Not on Chart
10. Channel, 0.2 mi. south of Sta. 9	Not on Chart

UMPQUA BAY

Station Number and Name	Longitude and Latitude
1. Red Buoy 6	43°41'07"N, 124°11'10"W
2. Double Cove Point	43°42'49"N, 124°9'11"W
3. 4 mile green light	43°44'37"N, 124°9'9"W
4. Red Buoy 20	43°44'00"N, 124°7'38"W
5. Hwy. 101 Bridge	43°42'36"N, 124°6'04"W
6. One mile up Smith River	43°43'03"N, 124°4'44"W
7. One mile E. of RR Br.	43°41'55"N, 124°4'19"W

SIUSLAW BAY

Station Number and Name	Longitude and Latitude
1. U. S. Plywood dump - Mapleton	No chart data
2. Tiernan	No chart data
3. Midway Boat Dock	No chart data
4. Mouth Lawson Creek	No chart data
5. Cushman	No chart data
6. North side Cox Island	43°58'41"N, 124°03'25"W
7. South side Cox Island	43°58'3"N, 124°03'34"W
8. West tip Cox Island	43°58'9"N, 124°04'52"W
9. N. Fork Siuslaw River	43°58'28"N, 124°04'45"W
10. Opposite city water tower	43°58'6"N, 124°5'26"W
11. Florence waterfront	43°58'2"N, 124°6'2"W
12. Florence waterfront	43°57'57"N, 124°6'16"W
13. Highway 101 bridge	43°57'56"N, 124°6'31"W
14. Green navigation marker 17	43°58'17"N, 124°7'12"W
15. Red navigation marker 16	43°58'55"N, 124°7'27"W

SIUSLAW BAY (Continued)

Station Number and Name	Longitude and Latitude
16. Red navigation marker 14	43°59'24"N, 124°7'15"W
17. Red navigation marker 10	44°00'6"N, 124°7'26"W
18. Green navigation marker 7	44°00'55"N, 124°7'50"W

YAQUINA BAY

Station Mile	Name	Longitude and Latitude
1.2	Newport Bridge	44°37'22"N, 124°3'23"W
2.0	McLean Point	44°37'26"N, 124°02'00"W
3.4	Coquille Point	44°36'40"N, 124°00'49"W
5.0	Oneatta Point	44°35'05"N, 124°01'14"W
5.75	Oysterville	44°34'49"N, 124°00'06"W
7.5	Red Light 32	44°34'23"N, 123°57'55"W
8.75	Red Light 42	44°35'19"N, 123°56'33"W
9.6	Flashing Light 47	44°35'52"N, 123°56'17"W
10.2	Below Shingle Mill	44°36'31"N, 123°56'48"W
10.75	Shingle Mill	44°36'55"N, 123°56'50"W
11.1	Mouth Depot Slough	44°36'55"N, 123°56'19"W
	Up Depot Slough 0.25 mi.	44°37'11"N, 123°56'19"W
11.5	Toledo Bridge	44°36'33"N, 123°56'03"W
12.75	Cascadia Mill	44°36'14"N, 123°55'26"W
15.5	Mouth Mill Creek	(No chart description)

ESTABLISHED WATER SAMPLE STATIONS

SHELLFISH SANITATION PROGRAM
YAQUINA BAY, LINCOLN COUNTY

Station	Description and Distances from Point	Longitude and Latitude
1	Coquille Pt., 600 yds S, 400 yds W	44°36'23"N, 124°00'51"W
2	Flashing Light #17, 150 yds S, 30 yds W	44°36'18"N, 124°00'33"W
3	Weiser Pt., 10 yds S., 100 yds W	44°35'41"N, 124°00'43"W
4	Oneatta Pt., 275 yds N, 400 yds W	44°35'16"N, 124°01'19"W
5	Flashing Lt. #25, 200 yds S, 0 yds W	44°34'51"N, 124°00'40"W
6	Red Channel Buoy #26, 425 yds S, 50 yds E	44°35'12"N, 124°00'02"W
7	Oregon Oyster Co. Plant, 100 yds S, 50 yds E	44°35'45"N, 123°59'30"W
8	Red Channel Buoy #28, 10 yds S, 125 yds E	44°35'25"N, 123°58'45"W
9	Flashing Light #32, 30 yds N, 0 yds E	44°35'24"N, 123°57'03"W
10	Flashing Light #32, 250 yds N, 25 yds E	44°35'38"N, 123°57'36"W

NETARTS BAY, TILLAMOOK COUNTY

Station	Description and Distances	Longitude and Latitude
1	Channel 0.4 mi west of Tillamook County boat launching site	45°25'53"N, 123°57'00"W
2.	Channel 50 yds west of Wilson Beach	45°25'18"N, 123°56'32"W
3	Channel 0.5 mi south of Wilson Beach	45°25'50"N, 123°56'27"W
4	Channel 300 yds west of Hwy junction (Cape Lookout - Netarts Bay Hwy)	45°24'32"N, 123°56'07"W
5	Channel 0.6 mi SW of sample sta. #4	45°24'15"N, 123°56'27"W
6	Channel 1000 yds west of Whiskey Creek and 400 yds north	45°23'08"N, 123°56'55"W

ESTABLISHED WATER SAMPLE STATIONS

SHELLFISH SANITATION PROGRAM
TILLAMOOK BAY, TILLAMOOK COUNTY

Station	Description and Distances from Point	Longitude and Latitude
1	Temp. Channel Marker, 45 yds N, 15 yds E BW "A" △	45°31'19"N, 123°53'57"W
2	Temp. Channel Marker, 50 yds N, 15 yds E BW "B" △	45°30'31"N, 123°54'13"W
3	Pile - Near covered Jetty, 70 yds S 10 yds E	45°30'06"N, 123°54'05"W
4	Dick Pt. Dike near North End, 145 yds S, 100 yds E	45°29'26"N, 123°54'02"W
5	Memaloose Pt. 100 yds N, 0 yds E/W	45°28'15"N, 123°53'12"W
6	Boulder Pt. 800 yds N, 80 yds W	45°29'56"N, 123°55'08"W
7	Opposite Sandstone Pt., 225 yds S, 1.59 miles W	45°31'46"N, 123°55'54"W
8	Flashing Green Light #17, .91 mi. S, 100 yds W	45°32'27"N, 123°55'10"W
9	Flashing Light #19, 30 yds S, 100 yds W	45°33'14"N, 123°54'50"W
10	Hobsonville Pt. 700 yds S, 340 yds E	45°32'30"N, 123°54'05"W
11	Sandstone Pt. 100 yds N, .62 mi. W	45°31'54"N, 123°54'36"W

NEHALEM BAY, TILLAMOOK COUNTY

Station	Description and Distances from Point	Longitude and Latitude
1	Mid channel, 50 yds south of Hwy 101 Br. at Nehalem	45°43'20"N, 123°53'20"W
2	Channel, 200 yds west of Tyee Grill at Wheeler	45°42'31"N, 123°52'53"W
3	Channel, 150 yds West of Paradise Cove	45°41'11"N, 123°54'24"W
4	Channel, 175 yds West of Easton's Moorage	45°41'10"N, 123°55'27"W
5	Channel, 250 yds W. of cable crossing entry to Nehalem Bay near large yellow house	45°39'20"N, 123°55'10"W

Appendix 2

Sewage Treatment Plant Operation Reporting

Monthly Reports:

The accompanying report forms are used by all the sewage treatment plants to keep the Sanitary Authority informed regarding plant operation. The following is a breakdown showing the use of each of the four forms:

1. Lagoon Sewage Treatment (WPC-4 1963)
   a). All sewage lagoons
   b). BOD test and/or other tests to be determined by June, 1969. These tests will be run on the raw and final at least once weekly during overflow periods for lagoons designed for 0.100 MGD or greater.
2. Sewage Treatment Plant Report (OSBH WPC-26, 12/56)
   a). All primary sewage treatment plants (BOD test, twice weekly on all plants designed for 0.100 MGD or greater.)
   b). All secondary plants of design flow $<$0.100 MGD (except aerobic digestion plants and lagoons)
3. Extended Aeration Sewage Treatment Plant (WPC-35 1/63)
   a). All aerobic digestion sewage treatment plants at design flow $<$0.100 MGD.
4. Secondary Sewage Treatment Plant (WPC-36, 4/63)
   a). All secondary plants of design flow 0.100 MGD or greater (BOD tests required twice weekly).

APPENDIX II

Forms Used for Sewage Treatment Plant Operation Reporting

SEWAGE TREATMENT PLANT REPORT _____ Group _____
(for)

_____ 19 _____ _____
(Month) (Operator)

Date	Flow (mgd)	pH			Settleable Solids		B.O.D. (ppm) ☐ Relative Stability (%) ☐		Sludge Pumped to Digester (gal/day)	Chlorination		Man-hours at plant per day	REMARKS (Breakdown, Bypass, Sludge drawn, etc.)
		Raw	Final	Di-gester	Raw (ml/L)	Final (ml/L)	Raw	Final		Resid-ual (ppm)	Pounds used per day		
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3													
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5													
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26													
27													
28													
29													
30													
31													
Total													
Max.													
Min.													
Ave.													

Materials and Costs

Power used in KWH _____ $_____ Repairs $_____

Chlorine purchased (lbs) _____ $_____ Paint & Lub. $_____

Auxilliary fuel used (gal) _____ $_____ Other maintenance -

Water used (cu. ft.) _____ $_____ $_____

Miscellaneous Receipts $_____

Mail to: Oregon State Sanitary Authority, 1400 S. W. 5th Avenue, Portland, Oregon 97201

OSBH WPC-26, 12/56

EXTENDED AERATION
SEWAGE TREATMENT PLANT REPORT

FOR: _____ MONTH: _____ 19 ____

POPULATION OR
CONNECTIONS SERVED: _____ OPERATOR _____

Date	Daily Flow	VISUAL OBSERVATIONS							TEST RESULTS				
		Aeration Tank				Settling Tank			Chlorination				
		Brown	Light Brown	Gray	Sludge Vol.*	Clear	Turbid	Milky	Chlorine used	Chlorine Residual	pH	Man Hours per day	REMARKS: Odor, complaints, foaming, etc.
1													
2													
3													
4													
5													
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30													
31													

MATERIALS AND COST:

Power $_____

Chlorine $_____

Water $_____

Maint. $_____

_____

* Sludge Volume -- Use numbers 0 to 10 from jar test.

MAIL TO: and request forms from:
OREGON STATE SANITARY AUTHORITY
1400 S. W. 5th Avenue
Portland, Oregon 97201

WPC-35 1/63

MONTHLY LAGOON SEWAGE TREATMENT REPORT FOR _____ OPERATOR _____

POPULATION SERVED _____ LAGOON AREA _____ MONTH _____ 19 _____

	Sewage Flow			Temp.		Rain-fall in.	Weather	Tests Conducted				Chlorine		Lagoon Color	Man Hours		REMARKS: Odor noted, complaints received bypassing, etc.
	Flow MGD	Overflow Pri.	Overflow Sec.	Air	Water			Sample Time	pH	D. O.	BOD or Rel. Sta.	Lbs.	Res.		Lagoon	Lift Sta.	
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3																	
4																	
5																	
6																	
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31																	

MATERIALS and COST:

Power $ _____

Paint & Lube $ _____

Repairs $ _____

Weed Control $ _____

WEATHER:

Cloudy, partly cloudy, sunny

LAGOON COLOR:

Lt. Green, Dk. Green, Brown, Gray

MONTHLY OBSERVATIONS:

Bank Inspection _____

_____

_____

_____

Weed Control Program _____

_____

_____

MAIL TO: OREGON STATE SANITARY AUTHORITY
P. O. Box 231, PORTLAND, OREGON 97207

WPC-4 9/63

SECONDARY SEWAGE TREATMENT PLANT REPORT

NO. ____ MONTH _____, 19____ FOR _____ GRP. _____ OPERATOR _____

DATE	WEATHER			SEWAGE FLOW—M.G.D.	RAW SEWAGE					PRIMARY EFF.					DIGESTER					AERATOR ☐					FILTER ☐			FINAL CLARIFIER							CHLORINE		STREAM ANALYSIS					
																																				UPSTREAM			DOWNSTREAM		
	MAXIMUM—°F	MINIMUM—°F	RAINFALL—IN.		TEMPERATURE	pH	D.O. - PPM	B.O.D. - PPM	SET. ☐ SUSP. ☐ SOLIDS	pH	D.O. - PPM	B.O.D. - PPM	% B.O.D. RED.	VOL. ☐ SUSP. ☐ SOLIDS	pH	CO_2	TEMPERATURE	GAS PRODUCED CU. FT.	SLUDGE PUMPED GAL.	pH	D.O. - PPM	SLUDGE VOLUME INDEX	SLUDGE AGE	LOADING	M.L.S.S.	RETURN SLUDGE G.P.M. OR %	WASTE SLUDGE G.P.M.	AIR - C.F.M.	pH	D.O. - PPM	B.O.D. - PPM	% B.O.D. RED.	LBS. B.O.D. DISCHARGED	VOL. ☐ SUSP. ☐ SOLIDS	% REDUCTION	LBS. USED	RESIDUAL	D.O.	B.O.D.	TEMP.	D.O.	B.O.D.	TEMP.
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2																																								
3																																								
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5																																								
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MAX.																																								
MIN.																																								
AVE.																																								

MATERIALS AND COSTS

CHLORINE PURCHASED _____ $_____

AUXILIARY FUEL USED _____ $_____

WATER USED _____ $_____

POWER USED KWH _____ $_____

REPAIRS $_____

MAINTENANCE $_____

SUPPLIES $_____

COST/M.G.D. $_____

REMARKS

_____

_____

_____

_____

_____

_____

MAIL TO: OREGON STATE SANITARY AUTHORITY, 1400 S.W. 5TH AVE., PORTLAND, OREGON 97201