Total Maximum Daily Loads

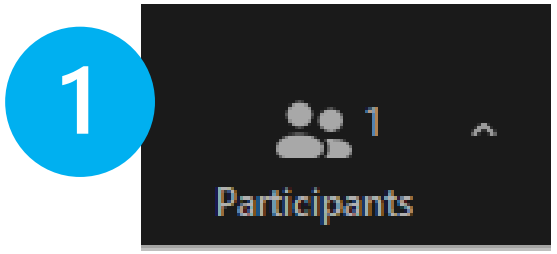
Temperature TMDL Replacement Project: Willamette Mainstem and Major Tributaries

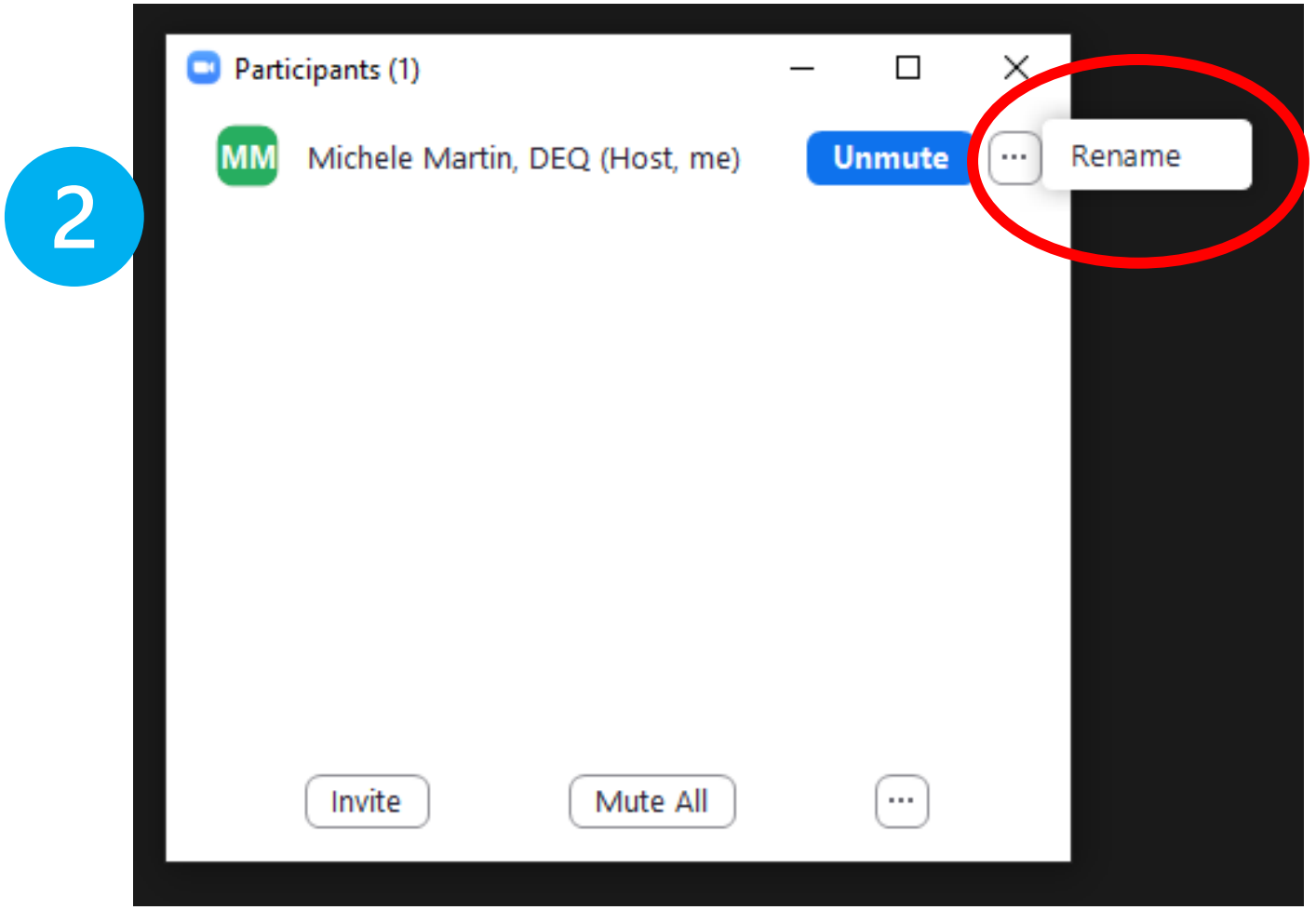
July 30, 2024, 9:30 a.m. PT

Rule Advisory Committee meeting #3

Online: Willamette River Mainstem and Major Tributaries Temperature TMDL

Add “AC” to your name in Zoom to identify you as an advisory committee member, e.g., **AC** Michele Martin, DEQ





Zoom logistics and meeting ground rules

Raise hand to be recognized for questions

Use chat to: Ask questions

Mute when not speaking

If using phone: press *9 to raise hand, *6 to mute/unmute

Agenda

Time	Topic
9:30 a.m.	Welcome, introductions, meeting agenda
9:45 a.m.	Draft Total Maximum Daily Load, changes from RAC 2
11 a.m.	Break (5 min.)
11:05 a.m.	Draft Fiscal and Economic Impact Statement, and draft rule language
11:20 a.m.	Wrap up, next steps
11:30 a.m.	Adjourn

Temperature TMDL Replacement project litigation

2012: NWEA vs. USEPA, NMFS, USFWS

- Lawsuit was seeking judicial review of the EPA's decision to approve Oregon's revised water quality standards (including the Natural Conditions Criteria) and the Services' "no jeopardy" BiOp.
- Judge found “the EPA was unable to articulate a rationale [sic] basis for its approval of the NCC”.
- Court’s judgment resulted in EPA’s disapproval of the Natural Conditions Criteria.

2019: NWEA vs. USEPA

- Lawsuit asserted the EPA unlawfully approved TMDLs that were based on the now disapproved Natural Conditions Criteria.
- The court issued a judgment on Oct. 4, 2019, requiring DEQ and EPA to replace 15 Oregon temperature TMDLs that were based on the Natural Conditions Criterion and to reissue the temperature TMDLs based on the remaining elements of the temperature criteria.

Website: https://www.oregon.gov/deq/wq/tmdls/Pages/tmdlreplacement.aspx

Key dates for **EPA approval or disapproval** of Temperature TMDLs

Sept. 15, 2024

Willamette Subbasins*

Lower Columbia-Sandy Subbasin

Feb. 28, 2025

- Willamette River Mainstem and Major Tributaries*
- Umpqua River Basin**

April 17, 2026

- Rogue River Basin
- John Day River Basin

June 4, 2027

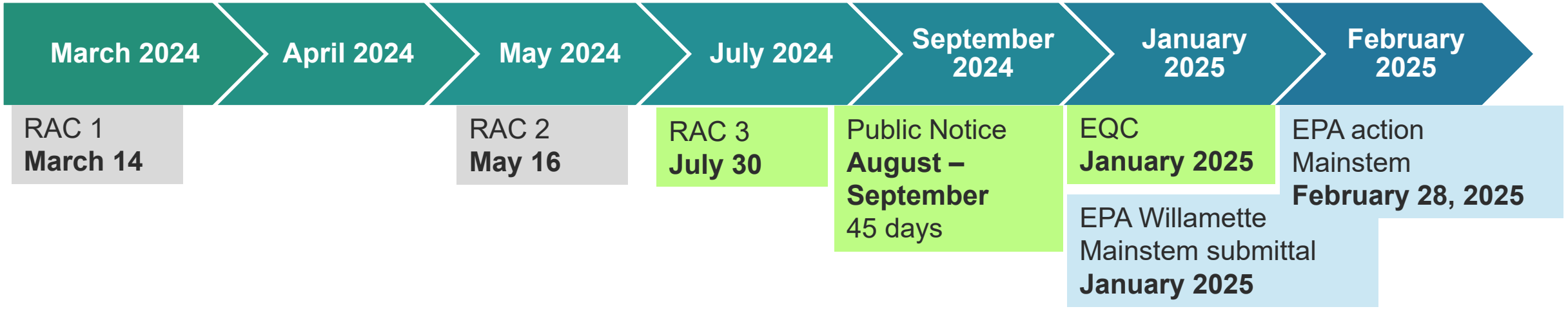
- Snake River - Hell's Canyon
- Lower Grande Ronde, Imnaha, and Wallowa Subbasins
- Middle Columbia-Hood, Miles Creeks

May 29, 2028

- Walla Walla Subbasin
- Willow Creek Subbasin
- Malheur River Subbasins

*The Willamette temperature TMDL replacements will occur in two waves and will be combined into one rule.
**Umpqua River Basin is a separate TMDL

Milestones, Willamette Mainstem and Major Tributaries



Willamette Subbasins rulemaking https://www.oregon.gov/deq/rulemaking/Pages/willamettetempTMDL.aspx

Willamette Mainstem and Major Tributaries rulemaking https://www.oregon.gov/deq/rulemaking/Pages/tmdlrwillmainstem.aspx

Willamette Subbasins and Willamette Mainstem and Major Tributaries – schedule overlaps

Court ordered schedule split the Willamette Basin into two TMDLs for development:

1. Willamette Subbasins (**EPA** action Sept. 15, 2024)
2. Willamette mainstem and major tributaries (**EPA** action Feb. 28, 2025)

- DEQ will amend Willamette Subbasins rule to include Willamette Mainstem and Major Tributaries rule. The rule will continue to be referred to as: *Willamette Subbasins*, temperature.

- DEQ will present the Willamette Subbasins to **EQC** for adoption, Aug. 6. (visit EQC online) This is the rule that will be amended to include the Willamette Mainstem and Major Tributaries, temperature.

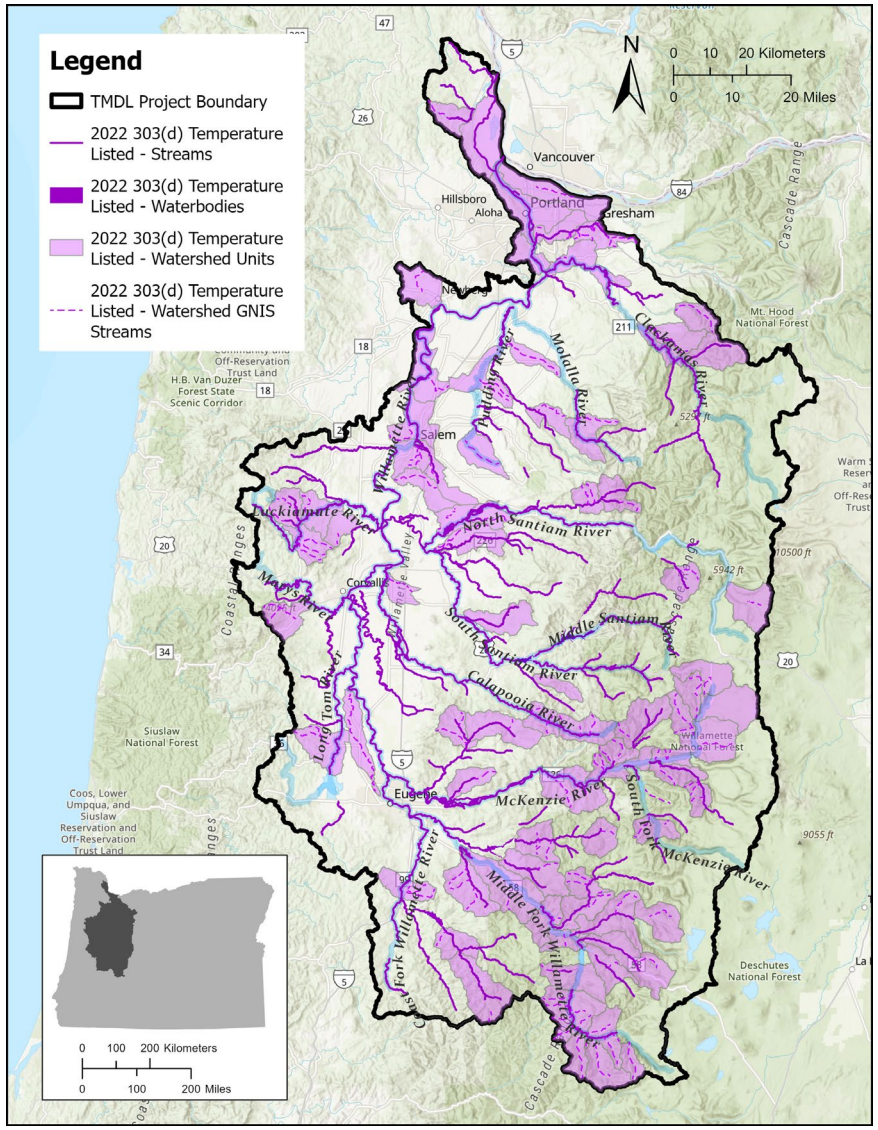
Total Maximum Daily Loads

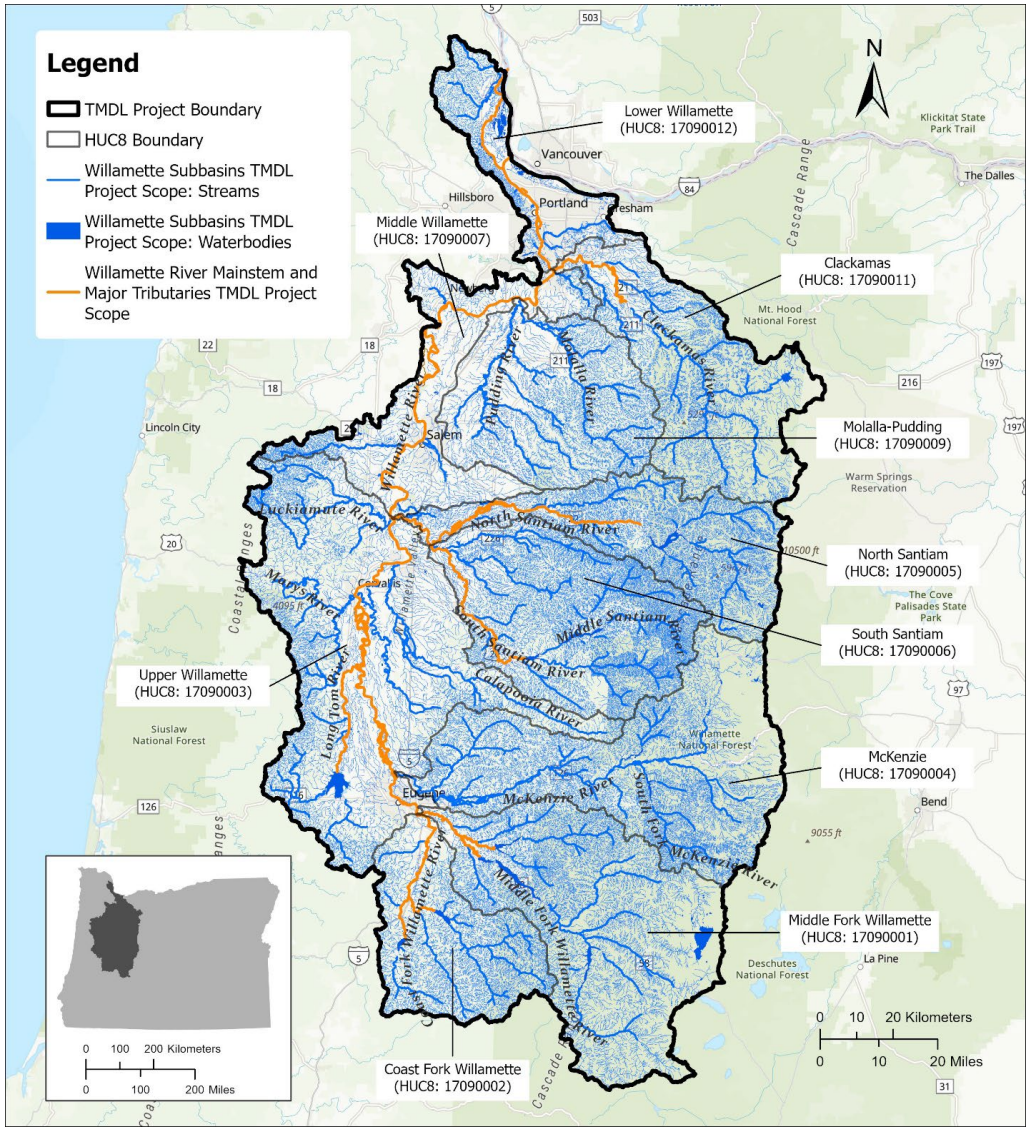
A TMDL, or clean water plan, is a science-based approach to cleaning up polluted water so that it meets state water quality standards.

A TMDL is also a numerical value that represents the highest amount of a pollutant a surface water body can receive and still meet the standards. *The numerical value TMDL is also known as a loading capacity.*

TMDL web page

Willamette Mainstem Temperature TMDL project area





Willamette Mainstem TMDL – today's discussion items:

- Review Willamette Mainstem TMDL changes:
  - Changes since last RAC meeting
  - A few changes since last week
- Detailed examples of how thermal wasteload allocations were developed
  - Example of a major point source
  - Example of a minor point source
  - Example of a very small point source
- Discuss use of 7-day averages flow and temperature for WLA derivation vs. daily values for calculation of Excess Thermal Loads
- Cumulative effects modeling and human use allowance assignments
- Attainment scenario modeling and potential impact on Reserve Capacity

TMDL changes since rule advisory committee meeting #2

- 7Q10 updates in response to input and additional data
- Provided wasteload allocations for additional facilities
- Revised draft wasteload allocations:
  - In response to revised 7Q10s
    - Reviewed all 7Q10s
    - Recalculated using recent data
  - In response to additional effluent data
  - Provided thermal WLAs for No Discharge periods

Some additional changes:

- Minor changes since the RAC #3 documents posted on July 23, 2024
- Lower Willamette area increase to 7Q10s to accommodate two additional small tributaries; wasteload allocations will be slightly adjusted

Some additional changes:

- Lower Willamette area increase in 7Q10 river flow rates

Waterbody	Facility Name	River Mile	7Q10	Gages
Willamette River	CANBY STP	33	5790	14197900 Willamette River At Newberg + 14200000 Molalla River Near Canby + 14202000 Pudding River At Aurora
	CANBY REGENCY MOBILE HOME PARK	31.6	5790	
Willamette River	FOREST PARK MOBILE VILLAGE	28.2	5988	14197900 (Willamette River At Newberg, OR) + 14207500 (Tualatin River At West Linn, OR) + 14200000 (Molalla River Near Canby) + 14202000 (Pudding River At Aurora)
	BLUE HERON PAPER CO.	27.8	5988	
	WEST LINN PAPER COMPANY	27.5	5988	
	WES Tri-city WPCP	25.5	5988	
Willamette River	TRYON CREEK WWTP	20.3	6740	14197900 (Willamette River At Newberg, OR) + 14207500 (Tualatin River At West Linn, OR) + 14211010 (Clackamas River Near ORn City) + 14200000 (Molalla River Near Canby) + 14202000 (Pudding River At Aurora)
	OAK LODGE WATER SERVICES WRF	20.1	6740	

Willamette Mainstem WLAs and HUA assignments

Steps:

- Estimate point source maximum current thermal loads
  - Spring spawning period
  - Summer non-spawning period
  - Fall spawning period
  - For each period, use 7Q10 and applicable criteria (16^{o}C, 18^{o}C, or 20^{o}C non-spawning, 13^{o}C spawning)
- Evaluate max current ΔT at point of discharge
- Set WLA to equal to or greater than current ΔT (or max acceptable ΔT)
- Perform cumulative effects modeling
  - Max cumulative ΔTs
  - Points of Maximum Impact
  - Human use allowance assignments including Reserve Capacity
- Attainment scenario modeling and evaluation of Reserve Capacity
- Revise mainstem wasteload allocations and load allocations – as needed

Estimate point source maximum current thermal loads:

Impact that an effluent has on temperature at 7Q10 and T criterion

$$\Delta T_{PS} = \left(\frac{Q_E}{Q_E + Q_{R,7Q10}}\right)(T_E - T_C) \quad \text{(Equation 8)}$$

where:

ΔT_{PS} = change in river temperature due to point source

$Q_{R,7Q10}$ = 7Q10 design low river flow rate upstream from point source

Q_E = effluent flow rate

T_C = applicable temperature criterion

T_E = effluent temperature

- Determine maximum thermal loads from each point source
- Current maximum thermal loads derived by:
  - Processing DMR data
    - 7-day average effluent flow for each day
    - 7DADM effluent temperature for each day
    - ΔT for each day
    - Derive max Spring Spawning, Summer, Fall Spawning ΔT and effluent flow and temperature combination

Example - major point source with daily data

Date	Q_cfs dailyavg	T_C dailymax	Tcrit	7Q10	Q_cfs 7davg	T_C 7DADM	Delta T
2019-05-01	56.75	16.10	13	10688	60.09	15.84	0.0159
2019-05-02	55.92	16.20	13	10688	58.90	15.90	0.0159
2019-05-03	55.85	16.50	13	10688	57.98	15.99	0.0161
2019-05-04	55.52	16.80	13	10688	57.29	16.13	0.0167
2019-05-05	55.85	16.90	13	10688	56.70	16.31	0.0175
2019-05-06	55.15	17.10	13	10688	56.13	16.51	0.0184
2019-05-07	53.86	17.10	13	10688	55.56	16.67	0.0190
2019-05-08	53.18	17.20	13	10688	55.05	16.83	0.0196
2019-05-09	53.46	17.50	13	10688	54.70	17.01	0.0204
2019-05-10	51.80	17.70	13	10688	54.12	17.19	0.0211
2019-05-11	51.29	17.70	13	10688	53.51	17.31	0.0215
2019-05-12	**51.06**	**17.60**	**13**	**10688**	**52.83**	**17.41**	**0.0217**
2019-05-13	51.17	17.30	13	10688	52.26	17.44	0.0216
2019-05-14	52.62	17.30	13	10688	52.08	17.47	0.0217
2019-05-15	52.89	17.20	13	10688	52.04	17.47	0.0217
					Max Spring (Apr 1 - May 15):		**0.0217**

Example - major point source with daily data

Results generated by R code:					
		Date of max Delta T for time period	Max Delta T for time period (C)	7-day Avg Flow for date of max Delta T (cfs)	7DADM T for date of max Delta T (C)
TimePeriod	Criterion	Date_maxDelta	MaxDeltaT	Qcfs_maxDelta	TC_maxDeltaT
Apr 1-May 15	13	**2019-05-12**	**0.0217**	**52.83**	**17.41**
June	18	2021-06-30	0.0236	44.16	21.06
July	18	2021-07-31	0.0270	38.33	22.03
August	18	**2021-08-16**	**0.0318**	**38.23**	**22.76**
September	18	2022-09-01	0.0285	40.12	22.07
Oct 15-Nov 15	13	**2023-11-08**	**0.0576**	**80.12**	**18.19**

Example - major point source with daily data

Annual 7Q10_cfs	DMR Summer Max 7DADM T (C)	DMR Summer Max Effluent Q (cfs)	DMR Summer Max Delta T (oC)	Effluent Flow to use for WLA (round up) (cfs)	Delta T based on Effluent Flow and T (oC)	WLA based on Effluent Flow and T (kcal/day)	2006 TMDL WLA Chap 4 Tab 4.15 (kcal/day)
5684.0	22.76	38.23	0.0318	38.3	0.032	445,778,600	714,000,000

Adj Factor	Preliminary WLA (kcal/day)	WLA as Delta T (oC)	Effluent T that corresponds to WLA (oC)	Delta T as allocated (with rounding to 2 or 3 decimal places) (oC)	WLA via allocated Delta T (kcal/day)	WLA as allocated based Delta T as allocated (with rounding,) 5 or 6 sig digits (kcal/day)	Effluent T that corresponds to WLA (oC)
10%	490,356,460	0.0350	23.23	**0.036**	504,019,841	504,020,000	23.38

7-day averages for WLA vs. daily values for ETL:

Use the following equation to calculate the excess thermal loading (ETL):

$$ETL = (T_E - T_C) \cdot Q_E \cdot C_F$$

Where:

$ETL =$ The daily excess thermal load (kilocalories/day).
$T_C =$ River temperature criterion (°C)
$T_E =$ The daily maximum effluent temperature (°C)
$Q_E =$ The daily mean effluent flow (cfs or MGD)
$C_F =$ Conversion factor for flow in cubic feet per second (cfs): 2,446,665
Conversion factor for flow in millions of gallons per day (MGD): 3,785,411

ETL calculated using daily values – then averaged over 7 days
Results very similar

7-day averages for WLA vs. daily values for ETL:

ETL calculated using daily values – then averaged over 7 days

Results very similar:

Time Period	Max ΔT_{PS} via 7DADM T_{eff} and 7-day Avg Q_{eff} (°C)	Max 7-day Avg ΔT_{PS} via daily max T_{eff} and daily avg Q_{eff} (°C)
Max Spring (Apr 1 - May 15):	**0.022**	**0.022**
Max Summer:	**0.032**	**0.032**
Max Fall (Oct 15 - Nov 15):	**0.058**	**0.057**

Example for minor point source with limited data

Annual 7Q10_cfs	DMR Summer Max 7DADM T (C)	DMR Summer Max Effluent Q (cfs)	DMR Summer Max Delta T (oC)	Effluent Flow to use for WLA (round up) (cfs)	Delta T based on Effluent Flow and T (oC)	WLA based on Effluent Flow and T (kcal/day)	2006 TMDL WLA Chap 4 Tab 4.15 (kcal/day)
5734.0	22.5	1.002	**0.0008**	1.1	0.0009	12,084,078	

Adj Factor	Preliminary WLA (kcal/day)	WLA as Delta T (oC)	Effluent T that corresponds to WLA (oC)	Delta T as allocated (with rounding to 2 or 3 decimal places) (oC)	WLA via allocated Delta T (kcal/day)	WLA as allocated based Delta T as allocated (with rounding,) 5 or 6 sig digits (kcal/day)	Effluent T that corresponds to WLA (oC)
20%	14,500,894	0.0010	23.39	**0.002**	28,063,737	28,064,000	28.43

Effluent Flow set to ADWDF (Average Dry Weather Design Flow)
Effluent Temperature set to max 7DADM value

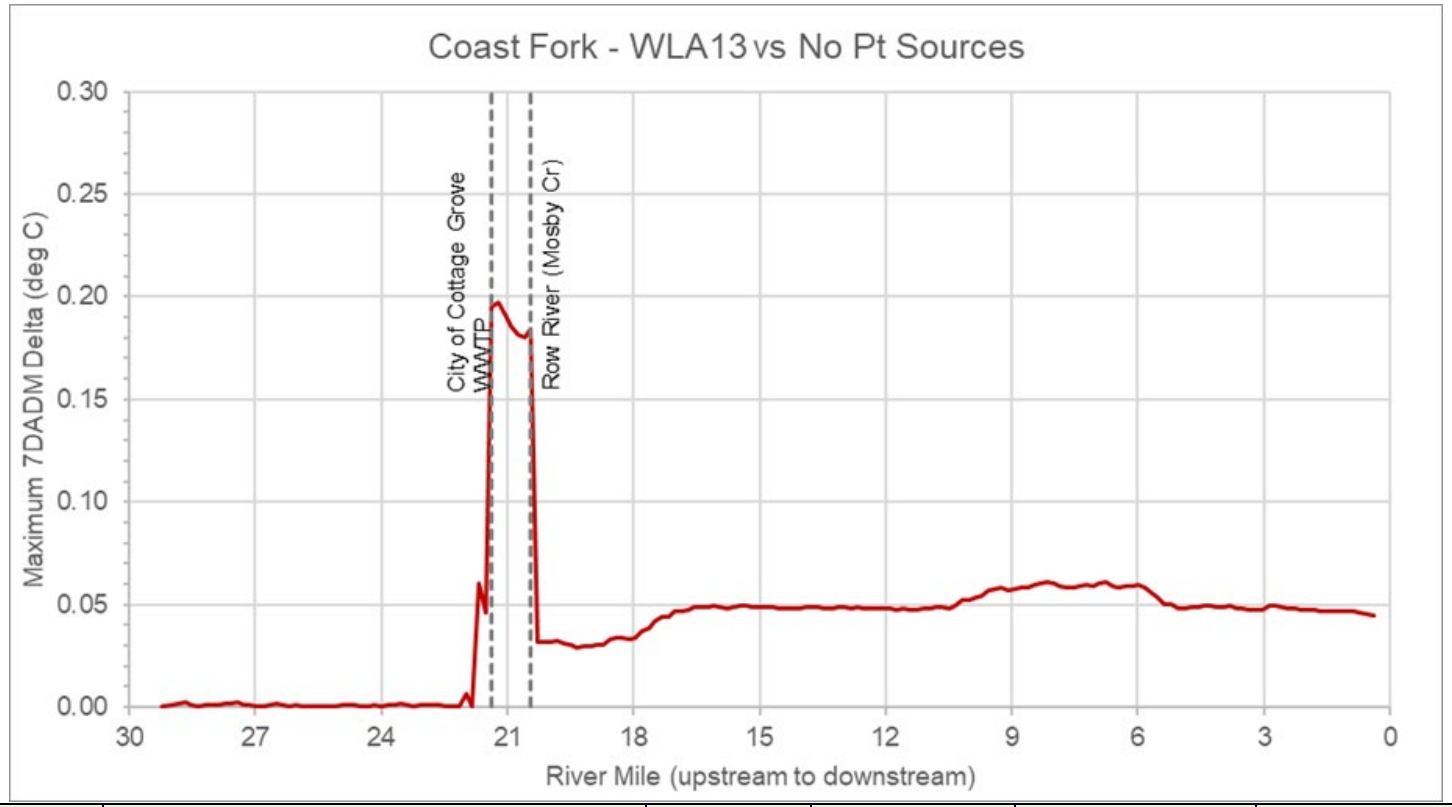
Example - very small point source with limited data

Annual 7Q10_cfs	DMR Summer Max 7DADM T (C)	DMR Summer Max Effluent Q (cfs)	DMR Summer Max Delta T (oC)	Effluent Flow to use for WLA (round up) (cfs)	Delta T based on Effluent Flow and T (oC)	WLA based on Effluent Flow and T (kcal/day)	2006 TMDL WLA Chap 4 Tab 4.15 (kcal/day)
5790.0	21.7	0.05	**0.000015**	0.06	0.00002	249,560	

Adj Factor	Preliminary WLA (kcal/day)	WLA as Delta T (oC)	Effluent T that corresponds to WLA (oC)	Delta T as allocated (with rounding to 2 or 3 decimal places) (oC)	WLA via allocated Delta T (kcal/day)	WLA as allocated based Delta T as allocated (with rounding,) 5 or 6 sig digits (kcal/day)
50%	374,340	0.0000	22.55	**0.001**	14,166,337	14,166,000

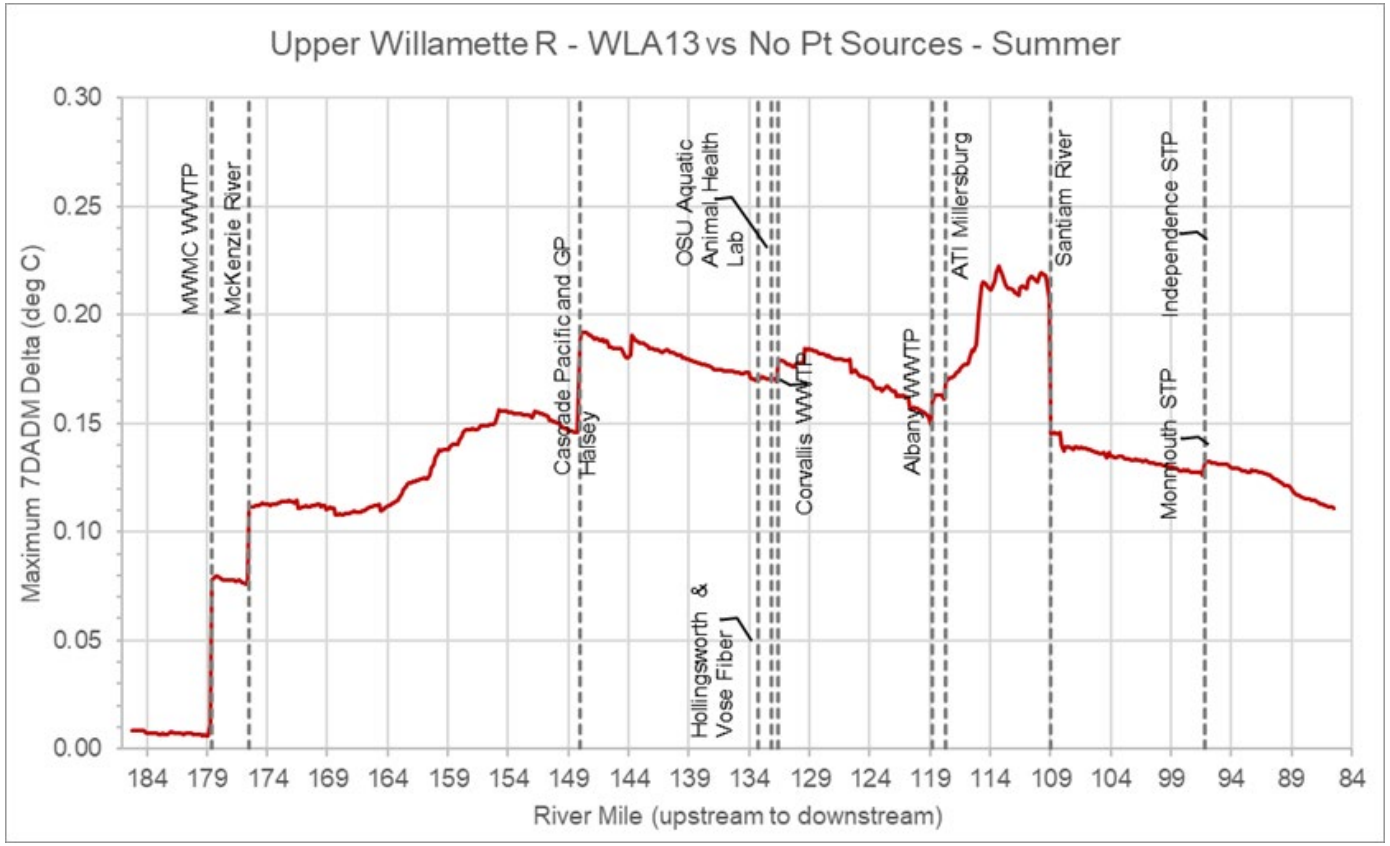
Mobile Home park
Effluent Flow set to max reported, rounded up (> ADDWF)
Effluent Temperature set to max value, via Permit Evaluation Report and DMRs

Cumulative effects analysis and HUA assignments



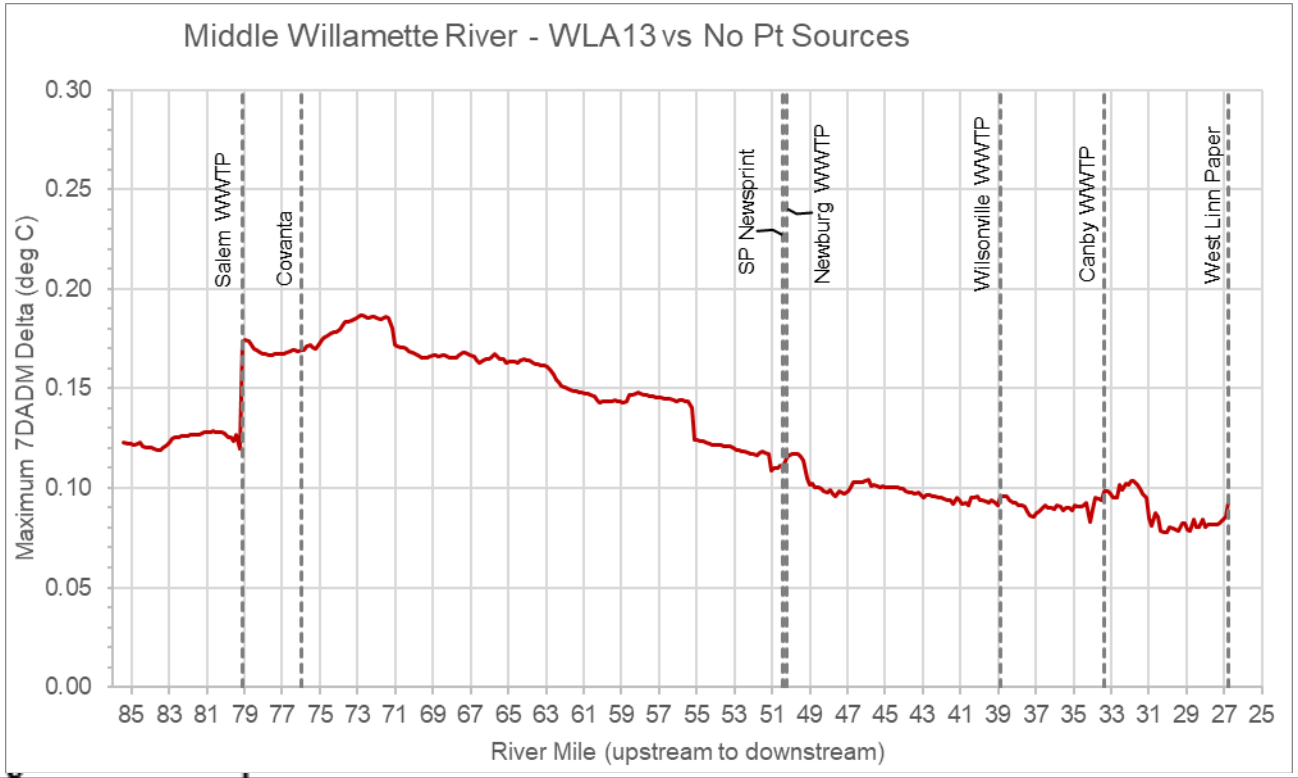
AU Name	AU ID	NPDES point sources	NPS dam and reservoir operations	Consumptive use water management and water withdrawals	Solar load existing transportation corridors, buildings, and utility infrastructure	Reserve capacity	Total HUA
Coast Fork Willamette River	OR_SR_1709000203_02_104585	0.21	0.00	0.02	0.05	0.02	0.30
Coast Fork Willamette River	OR_SR_1709000204_02_103787	0.08	0.00	0.04	0.05	0.13	0.30

Cumulative effects analysis and HUA assignments



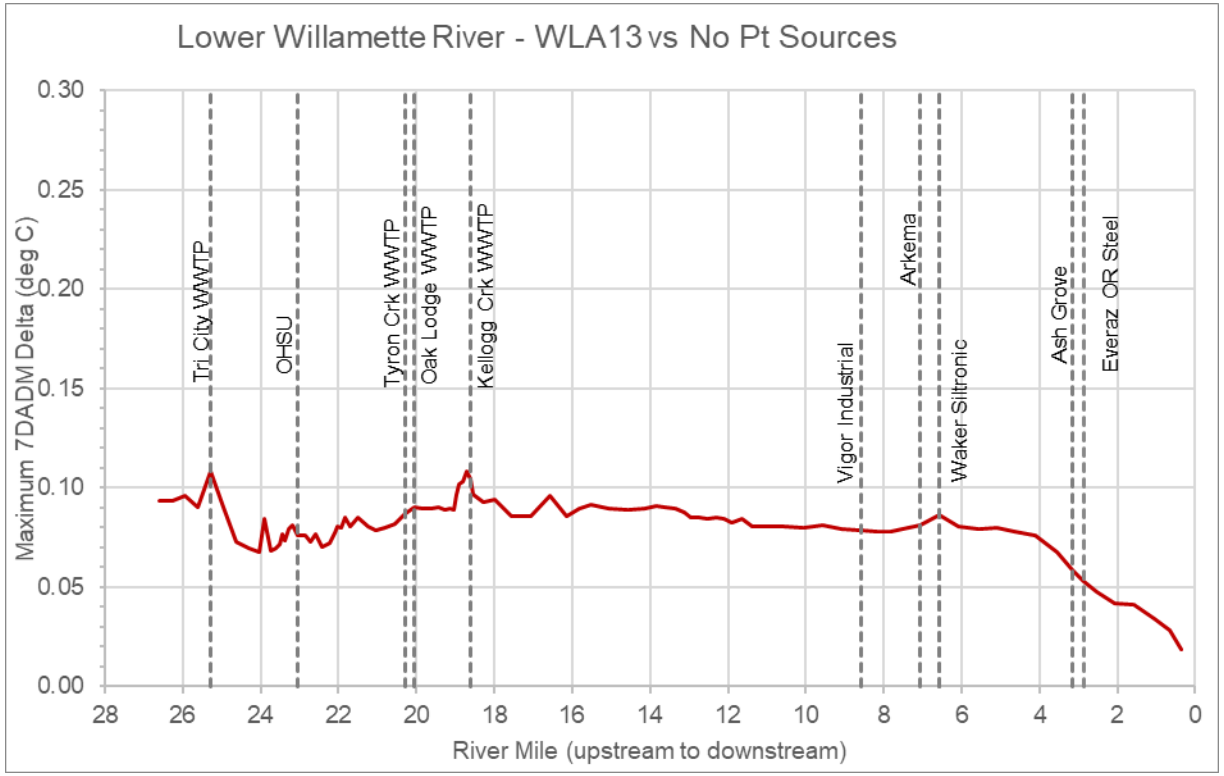
AU Name	AU ID	NPDES point sources	NPS dam and reservoir operations	Consumptive use water management and water withdrawals	Solar loading from existing transportation corridors, existing buildings, and existing utility infrastructure	Reserve capacity	Total HUA
Willamette River RM 187-107.5 Conf of MF/CF to Santiam R	OR_SR_1709000306_05_103854	0.23	0.00	0.02	0.03	0.02	0.30

Cumulative effects analysis and HUA assignments



AU Name	AU ID	NPDES point sources	NPS dam and reservoir operations	Consumptive use water management and water withdrawals	Solar loading from existing transportation corridors, buildings, and utility infrastructure	Reserve capacity	Total HUA
Willamette River RM 84.5 - 51 Willamette Sl to Chehalem Cr	OR_SR_1709000703_04_104013	0.21	0.00	0.04	0.03	0.02	0.30
Willamette River RM 51 – 45 Chehalem Cr to Champoeg Cr	OR_SR_1709000703_88_104015	0.14	0.00	0.04	0.03	0.09	0.30

Cumulative effects analysis and HUA assignments



AU Name	AU ID	NPDES point sources	NPS dam and reservoir operations	Consumptive use water management and water withdrawals	Solar loading from existing transportation corridors, buildings, and utility infrastructure	Reserve capacity	Total HUA
Willamette River RM 45 - 0 Champoeg Cr to Columbia	OR_SR_1709000704_88_104020 OR_SR_1709001201_88_104019 OR_SR_1709001202_88_104175	0.12	0.10	0.04	0.00	0.04	0.30

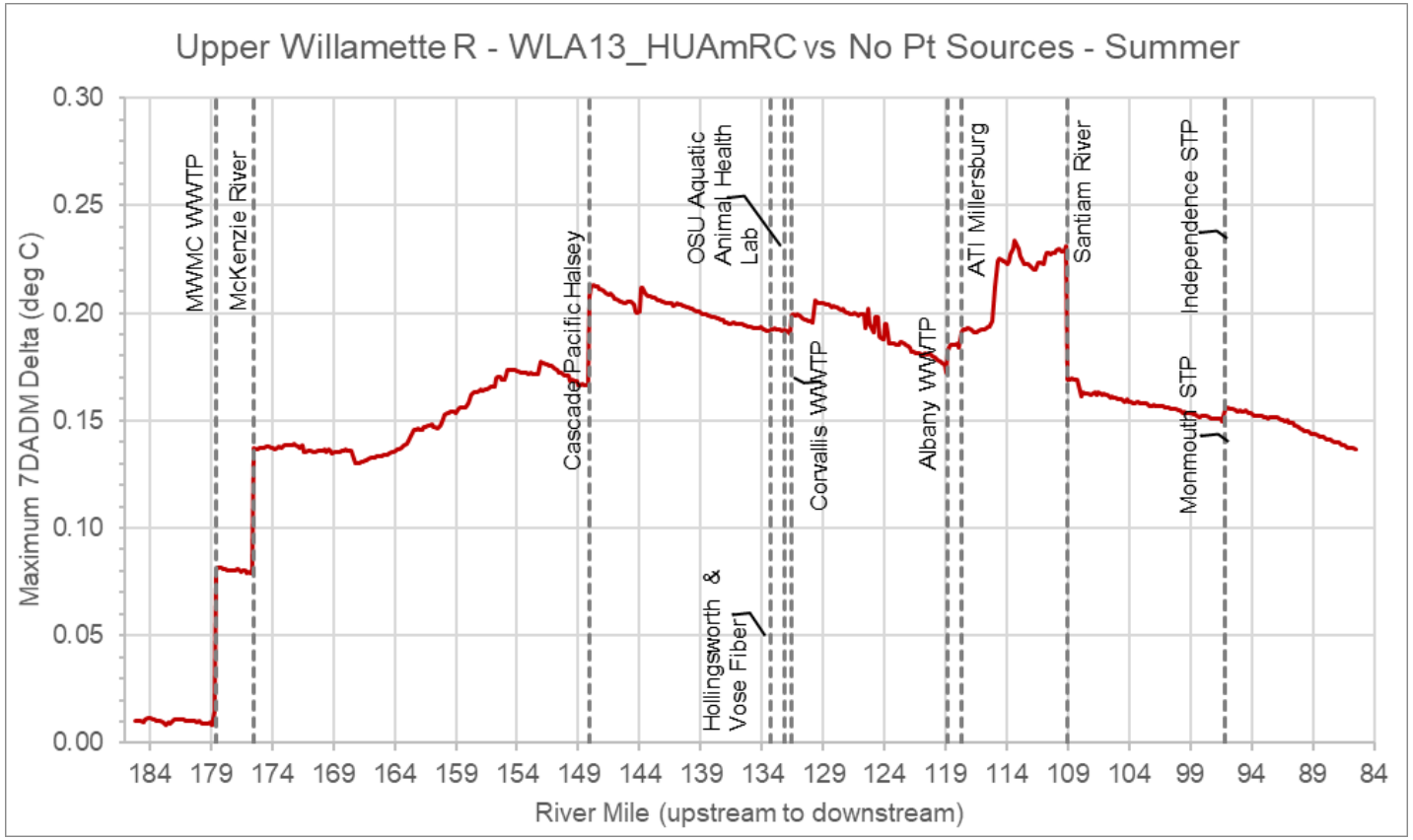
Human Use Allowance assignments

Assessment Unit Name	RM	WLA SCENARIO: Model calculated max ΔT due to mainstem WLAs	NPDES General point sources	NPDES point sources	Dam and Reservoir operations	Consumptive use water management activities and water withdrawals	Solar loading from existing transportation corridors, existing buildings, and existing utility infrastructure	Reserve capacity	Total HUA
Coast Fork Willamette River	30-21	0.20	0.01	0.21	0.00	0.02	0.05	0.02	0.30
Coast Fork Willamette River	21-0	0.06	0.02	0.08	0.00	0.04	0.04	0.14	0.30
Middle Fork Willamette River	17-0	0.02	0.02	0.04	0.00	0.04	0.04	0.18	0.30
South Santiam River	37-0	0.11	0.02	0.13	0.00	0.04	0.05	0.08	0.30
North Santiam River	58-11.5	0.05	0.02	0.07	0.00	0.04	0.05	0.14	0.30
Santiam River	11.5-0	0.02	0.02	0.04	0.00	0.04	0.04	0.18	0.30
Willamette River	187-107.5	0.22	0.01	0.23	0.00	0.03	0.03	0.01	0.30
Willamette River	107.5-84.5	0.15	0.01	0.16	0.00	0.03	0.03	0.09	0.30
Willamette River	84.5-51	0.19	0.01	0.20	0.00	0.03	0.03	0.04	0.30
Willamette River	51-45	0.12	0.01	0.13	0.00	0.02	0.02	0.13	0.30
Willamette River	45-0	0.11	0.01	0.12	0.10	0.02	0.02	0.04	0.30

Attainment Scenario Modeling

- Evaluation to determine if sufficient assimilative capacity remains for load allocations (LAs) for mainstem reaches and Reserve Capacity
- Modeling:
  - Tributary temperatures increased amount caused by tributary load and WLAs
  - Plus mainstem Point Sources at WLAs
- Like WLA Scenario, Attainment Scenario compared to baseline scenario with no point sources
- Modeling shows:
  - Impact of Tributary WLAs
  - Impact of Tributary Point Sources
  - Impact of Mainstem WLAs
  - Remaining human use allowance (HUA) available for additional load allocations (LAs) and Reserve Capacity

Attainment Scenario at POMI

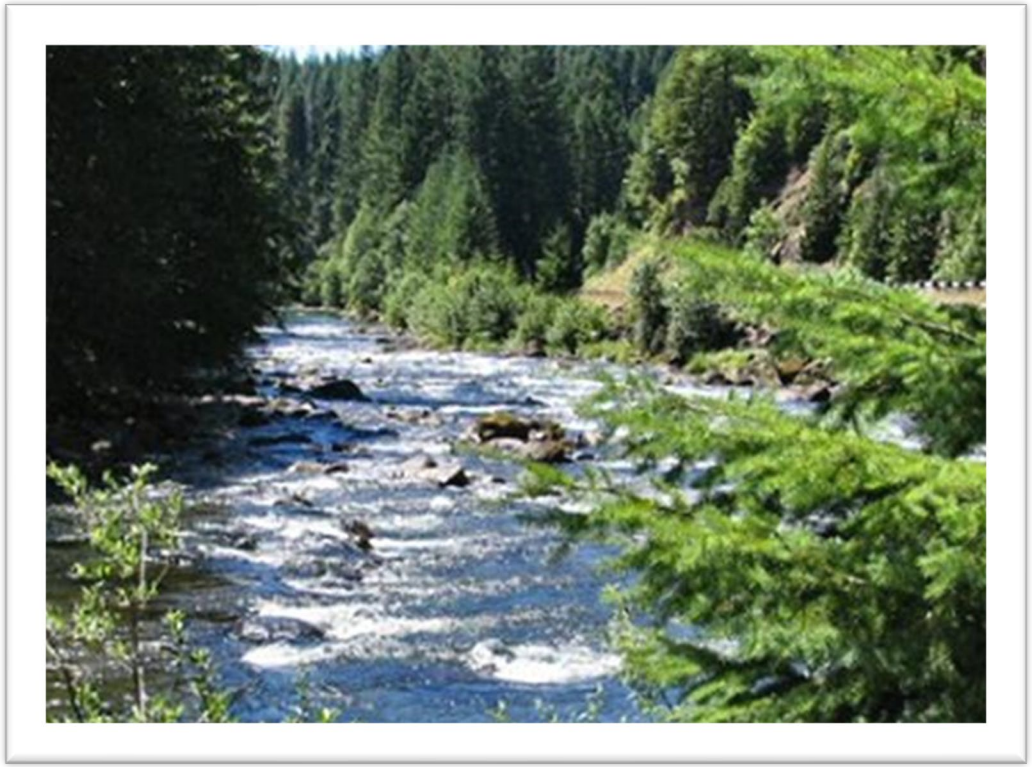


Assessment Unit Name	RM	Reserve capacity	ATTAINMENT SCENARIO: Model calculated max ΔT due to WLAs (mainstem + tributary) plus tributary LAs	NPDES General point sources	ATTAINMENT SCENARIO plus NPDES General Permits	HUA available to allocate
Willamette River	187-107.5	0.01	0.23	0.01	0.24	0.06

Attainment Scenario – Allocation of Remaining HUA

Assessment Unit Name	RM	Reserve capacity	ATTAINMENT SCENARIO: Model calculated max ΔT due to WLAs (mainstem + tributary) plus tributary LAs	NPDES General point sources	ATTAINMENT SCENARIO plus NPDES General Permits	ATTAINMENT SCENARIO minus WLA SCENARIO: Trib WLA + Trib LA	HUA available to allocate	HUA assigned to non-point source LAs	Unallocated HUA	Unallocated HUA if 50% of the HUA assigned to non-point source LAs is due to trib NPS LAs
Coast Fork Willamette River	30-21	0.02	0.20	0.01	0.21	0.00	0.09	0.07	0.02	0.05
Coast Fork Willamette River	21-0	0.14	0.09	0.02	0.11	0.03	0.19	0.08	0.11	0.15
Middle Fork Willamette River	17-0	0.18	0.02	0.02	0.04	0.00	0.26	0.08	0.18	0.22
South Santiam River	37-0	0.08	0.11	0.02	0.13	0.00	0.17	0.09	0.08	0.13
North Santiam River	58-11.5	0.14	0.06	0.02	0.08	0.01	0.22	0.09	0.13	0.18
Santiam River	11.5-0	0.18	0.05	0.02	0.07	0.03	0.23	0.08	0.15	0.20
Willamette River	187-107.5	0.01	0.23	0.01	0.24	0.01	0.06	0.06	0.00	0.03
Willamette River	107.5-84.5	0.09	0.17	0.01	0.18	0.02	0.12	0.06	0.06	0.09
Willamette River	84.5-51	0.04	0.20	0.01	0.21	0.01	0.09	0.06	0.03	0.07
Willamette River	51-45	0.13	0.13	0.01	0.14	0.01	0.17	0.04	0.13	0.04
Willamette River	45-0	0.04	0.14	0.01	0.15	0.03	0.15	0.14	0.01	0.04

Questions?



North Santiam River, Oregon

Fiscal impact analysis, questions for feedback

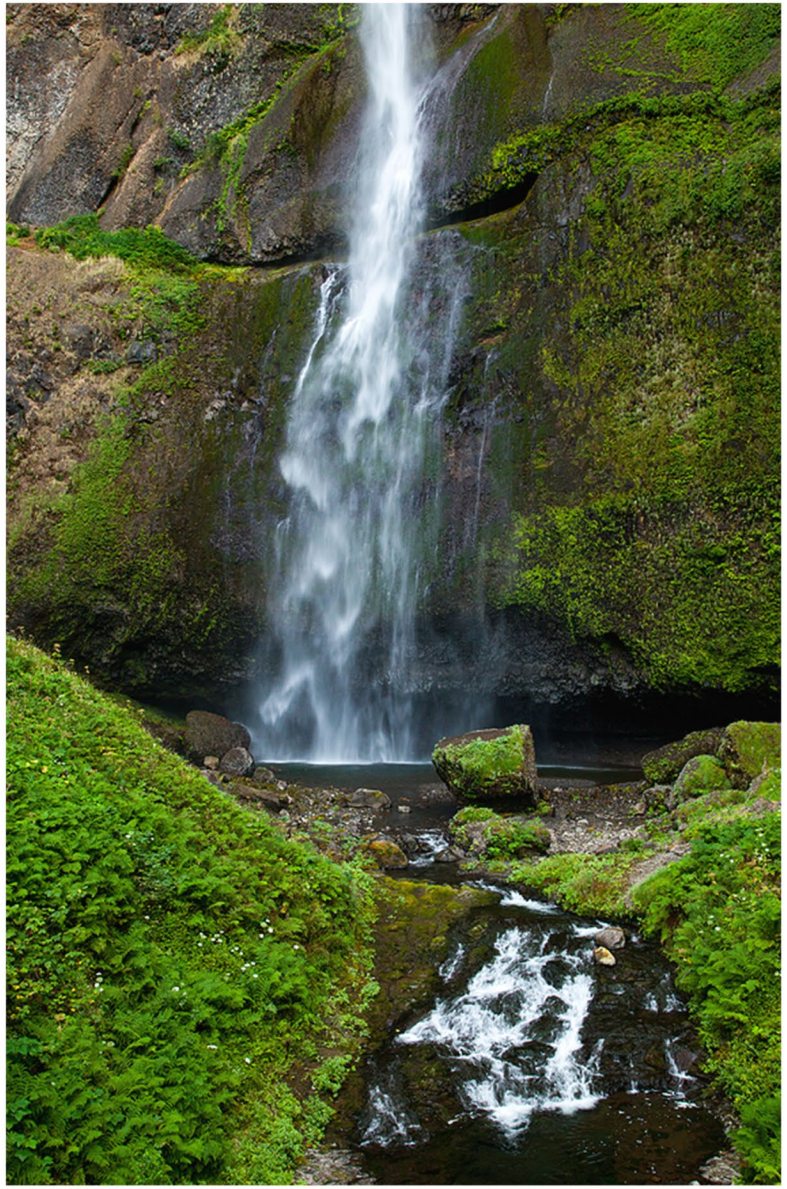
1. Will the draft rule have a significant adverse impact on small businesses?
2. If a significant impact is identified, how could DEQ reduce the fiscal impact on small business (ORS 183.333 and 183.450)
3. Will the proposed rule impact racial equity?
4. What are additional considerations for environmental justice for this draft rule?

Next steps, Willamette Mainstem and Major Tributaries

Public notice (45 days)	Early August after August 6 EQC meeting
EQC meeting for adoption	Jan. 9-10, 2025*
EPA action for approval / disapproval	Feb. 28, 2025

*EQC date estimated, depending on any potential changes

Sign up for email updates on TMDLs



Contacts and resources

Steve Mrazik, Water Quality Manager Steve.Mrazik@deq.Oregon.gov
Jim Bloom, Water Quality Analyst James.Bloom@deq.oregon.gov
Michele Martin, Project Manager Michele.Martin@deq.oregon.gov

Basin Coordinators
Grace Goldrich-Middaugh, grace.goldrich-middaugh@deq.Oregon.gov
Priscilla Woolverton Priscilla.woolverton@deq.oregon.gov
Brian Creutzburg, Brian.Creutzburg@deq.oregon.gov

Web pages (links to rulemaking pages, Quality Assurance Project Plans, etc.)

Project page

Rulemaking page

Committee input and rulemaking email:
Willamette.MainStem@DEQ.oregon.gov

Title VI and alternative formats

DEQ does not discriminate on the basis of race, color, national origin, disability, age or sex in administration of its programs or activities.

Visit DEQ's Civil Rights and Environmental Justice page.

Español | 한국어 | 繁體中文 | Русский | Tiếng Việt | العربية
Contact: 800-452-4011 | TTY: 711 | deqinfo@deq.state.or.us