Temperature Total Maximum Daily Loads Replacement project **Snake River**

April 22, 2026

Rule Advisory Committee meeting #2

Virtual meeting

Agenda

Time	Topic
10:00	Welcome, introductions, meeting agenda
10:10	Project background
10:15	Document overview
10:20	Total Maximum Daily Load
11:10	Water Quality Management Plan
11:30	Fiscal Impact Statement
11:50	Wrap up, next steps
12:00	Adjourn meeting

Zoom logistics and meeting ground rules



Raise hand to be recognized for questions or comments



Use chat to:

- Ask questions
- Provide informational resources
- Second good ideas/issues



Mute when not speaking

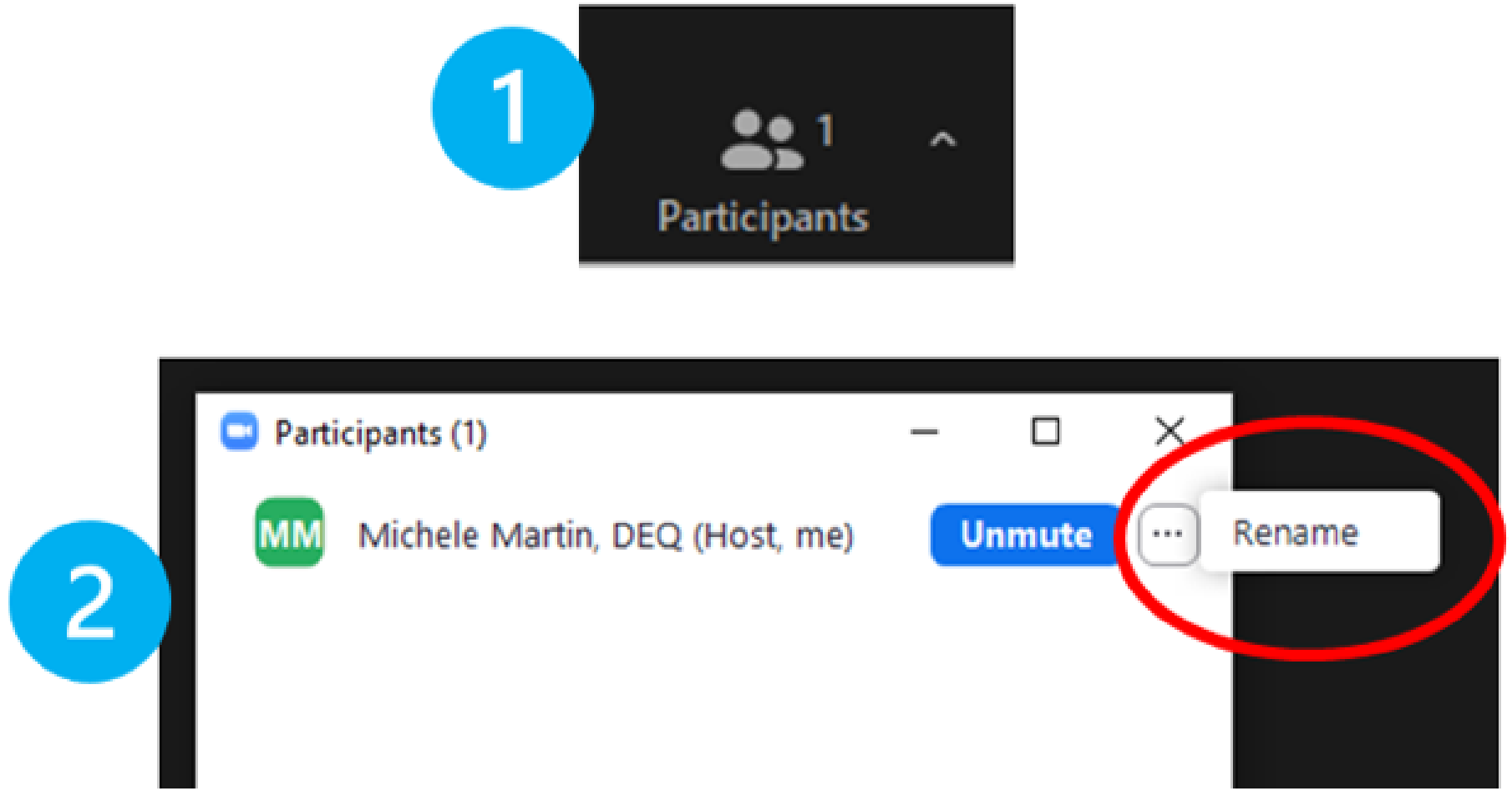


If using phone: press *9 to raise hand, *6 to mute/unmute

Rulemaking Advisory Committee

- Purpose: provide input to DEQ on proposed rulemaking
- Legal Basis: Fulfills ORS 183.333 (advisory input on fiscal/economic impacts)
- RAC members:
  - Provide input and perspectives
  - Prepare for and attend meeting
  - Consult regularly with constituencies to inform them and gather input
  - No expectation of group decisions or consensus
- DEQ: Facilitate, provide info, record input
- Public: Observe only; DEQ may allow brief comments if time allows
- Stays focused on the specific agenda topics for each meeting;
- Stay on topic, share research/documentation, be respectful

RAC member roll call



Oregon temperature TMDL replacement Project Background

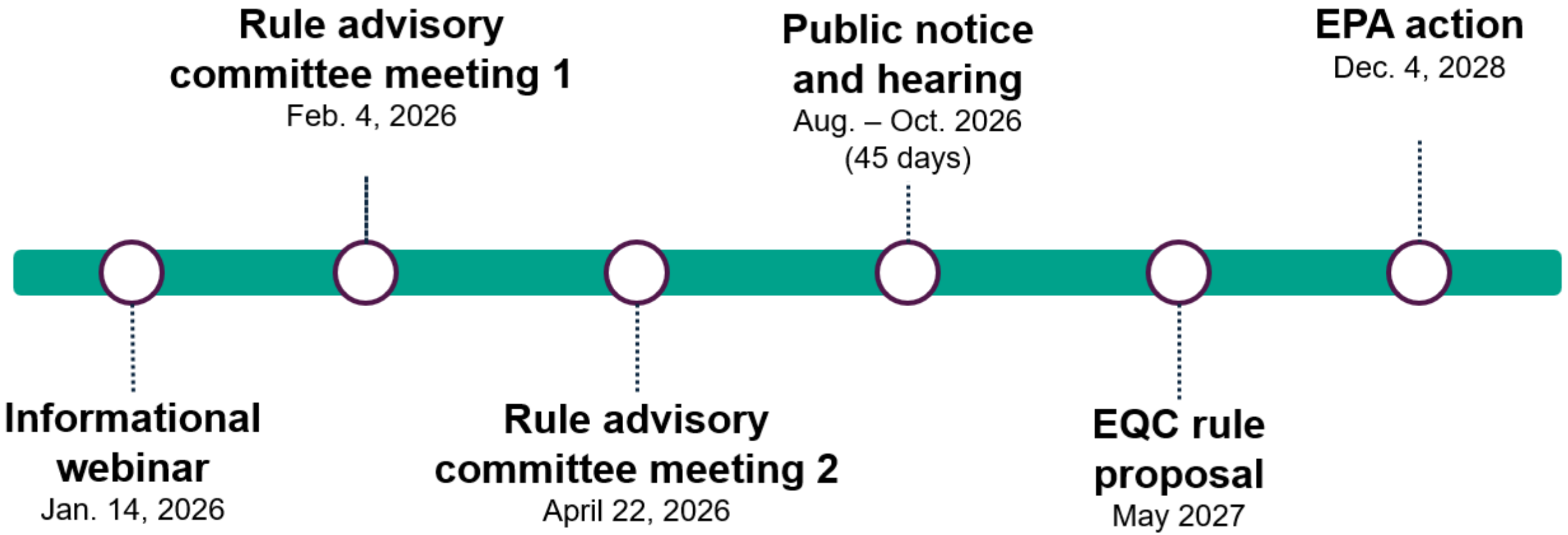
- Legal drivers behind temperature TMDL replacements
  - 2012: NWEA vs. USEPA, NMFS, USFWS
  - 2019: NWEA vs. USEPA

- 15 temperature TMDLs need replaced statewide

- Court-ordered dates for EPA action that are guiding the temperature TMDL replacement project timeline
  - Snake River Temperature TMDL EPA action date is **December 4, 2028**

Snake River temperature TMDL project schedule

Subject to change



Document overview

- **Total Maximum Daily Load**
  - Beneficial uses
  - Temperature standard
  - Heat sources
  - Numeric targets
  - Allocations
- **Water Quality Management Plan**
  - Names Designated Management Agencies and Responsible Persons
  - Management strategies
  - Timeline for implementation
- **Technical Support Document and appendices**
  - Background information
  - Data evaluation and analysis
  - Model details
- **Fiscal Impact Statement**
  - Statement of fiscal and economic impact
  - Costs associated with compliance

Draft Snake River temperature TMDL changes from RAC1

- Provision that DEQ may adjust the TMDL allocation period if the critical period shifts after the natural seasonal thermal pattern is restored.
- Updated Tributary B model and estimates of tributary warming in the Snake River (TMDL Section 7 and TSD Appendix C)
- Cold water refugia. Added Deep Creek (RM 247) as a cold water refugia source (Section 4.1.1.1). DEQ is working on additional analysis and updates to this section.
- Updates to section describing applicable water quality standards (Section 4.2-4.3)
  - Removed natural conditions language included with Washington temperature criteria. These standards are no longer applicable. WAC 173-201A-602 Table 602: WRIA 35
  - Added Idaho's provision for protecting downstream water quality. IDAPA 58.01.02.070.08.
- Various grammar, spelling or clarity edits.

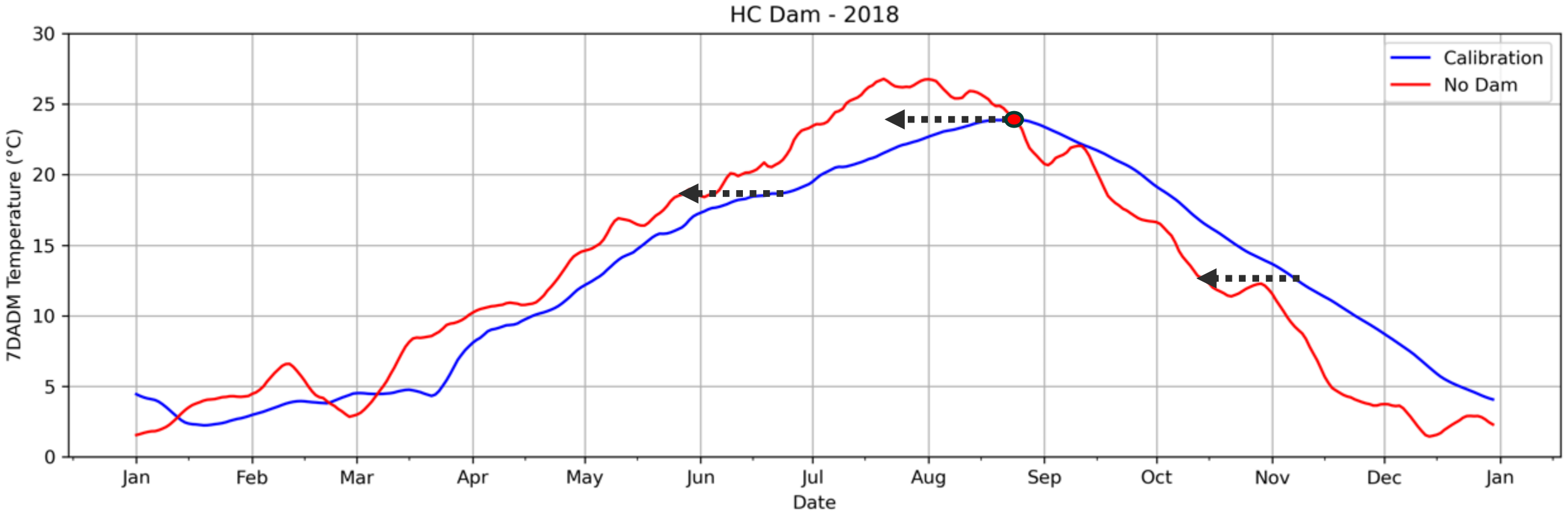
Natural seasonal thermal pattern narrative criteria

- Seasonal temperature pattern in the Snake River migration corridor must reflect the natural seasonal thermal pattern. OAR 340-041-0028(4)(d)

- Applies downstream of Hells Canyon Dam (~ river miles 176 to 247)

- Focused on temperature profile shifts and timing, not magnitude.

Seasonal temperature shift at Hells Canyon Dam, 2018



Critical period shifts and TMDL allocation period

Added a provision in Section 5 that DEQ may adjust the TMDL allocation period from Brownlee Reservoir and downstream (river miles 340 – 176) if the critical period shifts after the natural seasonal thermal pattern is restored.

- Current TMDL allocation period (Table 5-1):
  May 15 – November 15

- Allocation period with natural seasonal thermal pattern:
  April 1 - October 31

- Clarified surrogate measure temperature target applies
  April 1 – November 15. Corrected dates in Section 9.4

Tributary B model scenario

Are Snake River tributaries a source of temperature warming?

What is the temperature impact on the Snake River from tributary temperatures that exceed the applicable criteria?

Two scenario versions:

- Oregon tributaries only
- Oregon and Idaho tributaries; and Snake River at model boundary condition

Update: Adjusted Idaho tributary temperatures to attain OR Snake River criteria.

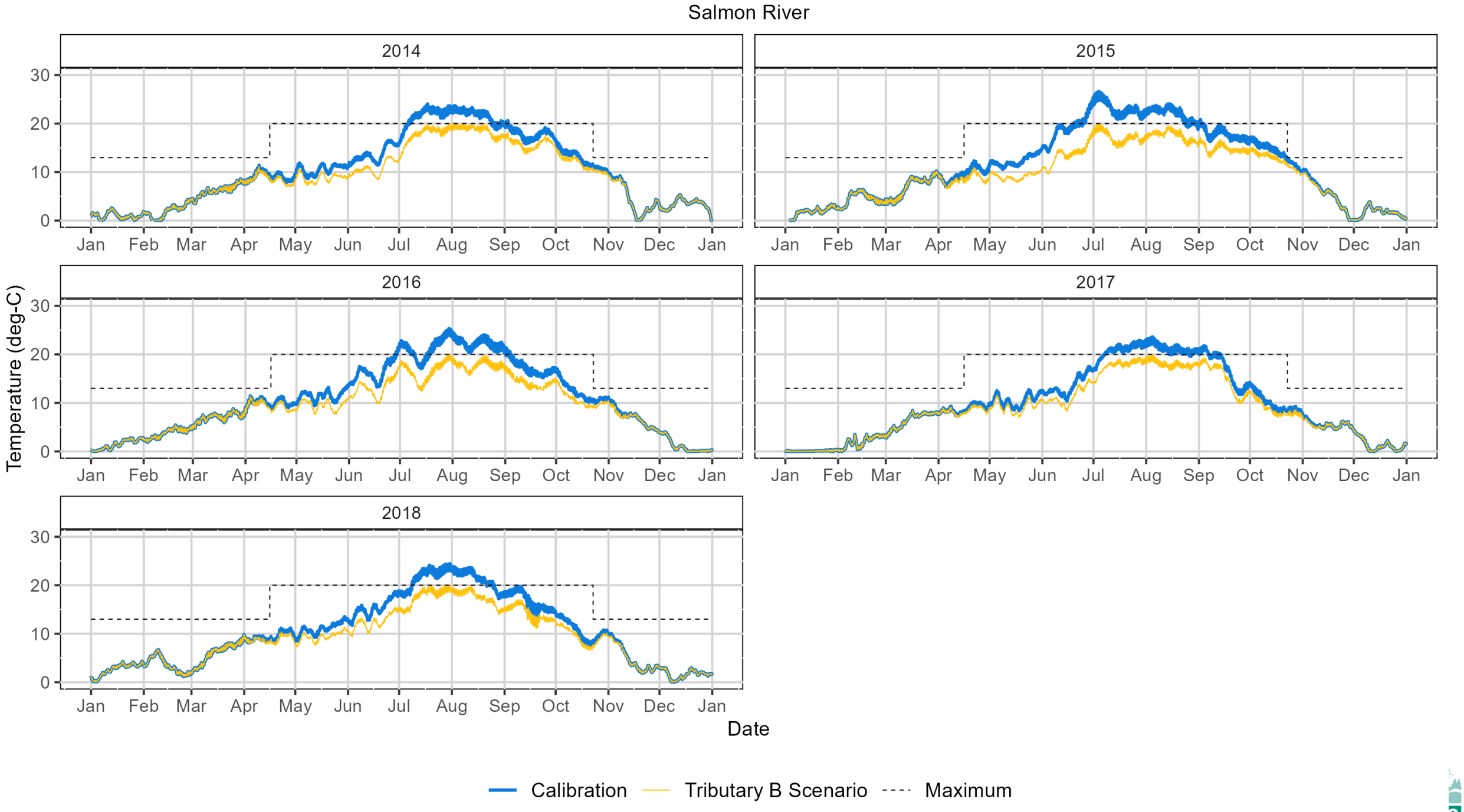
See the draft model scenario report for more info (TSD Appendix C)

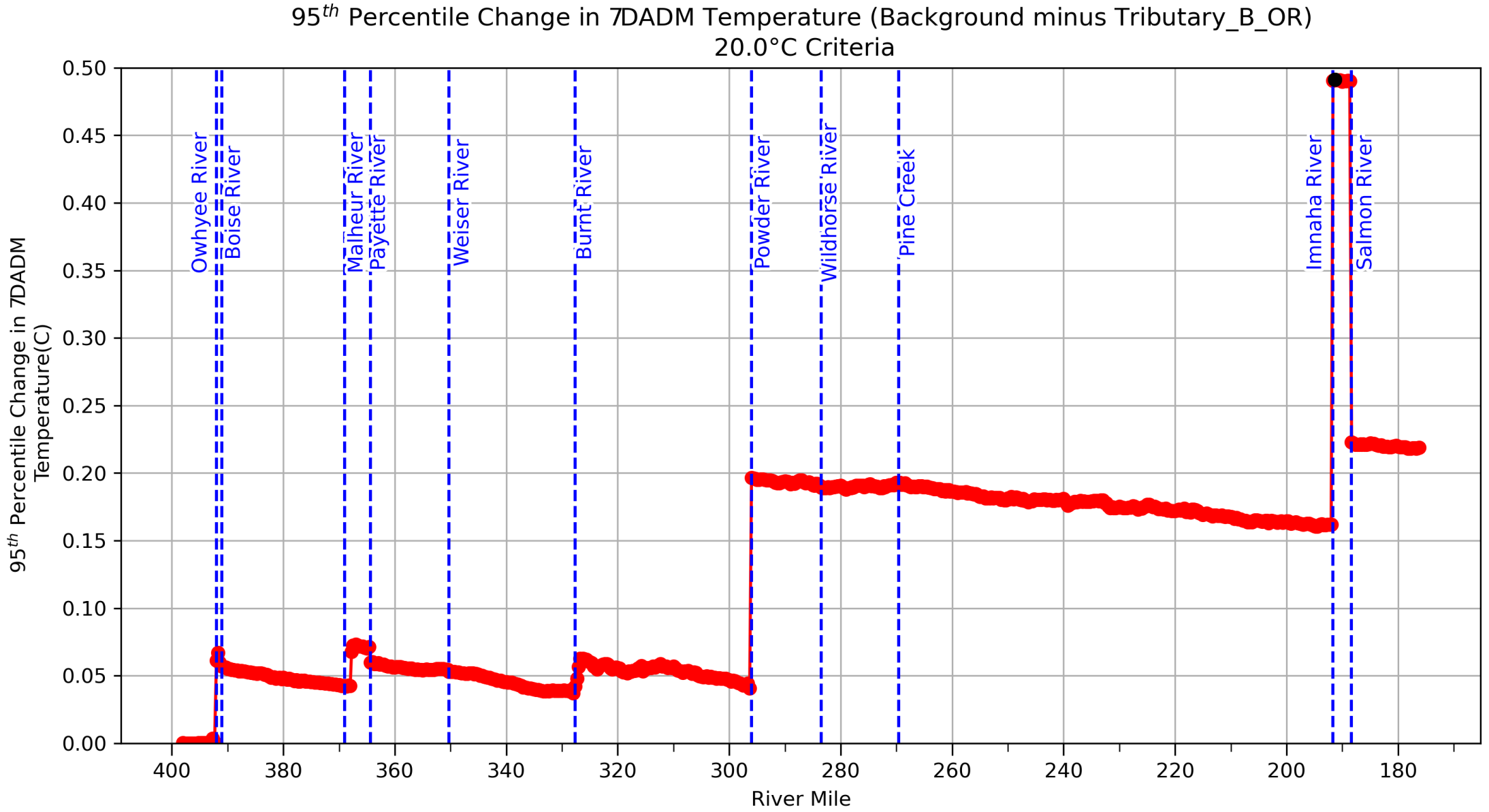
Tributaries in model

- Snake River boundary
- Boise River
- Weiser River
- Owyhee River
- Malheur River
- Burnt River
- Powder River
- Wildhorse River
- Pine Creek
- Imnaha River
- Salmon River

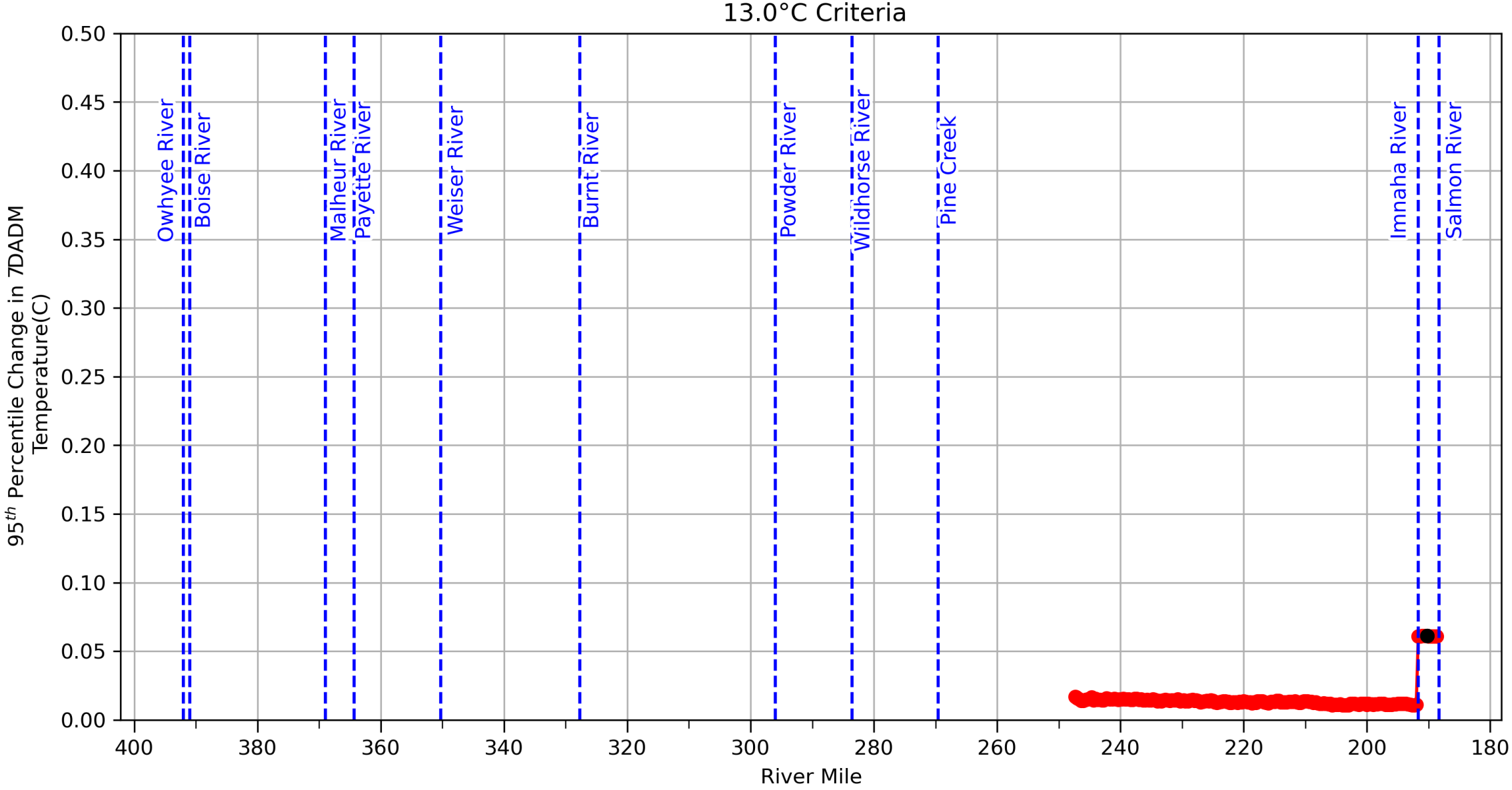


Snake River at Kirkwood Creek (RM 220)

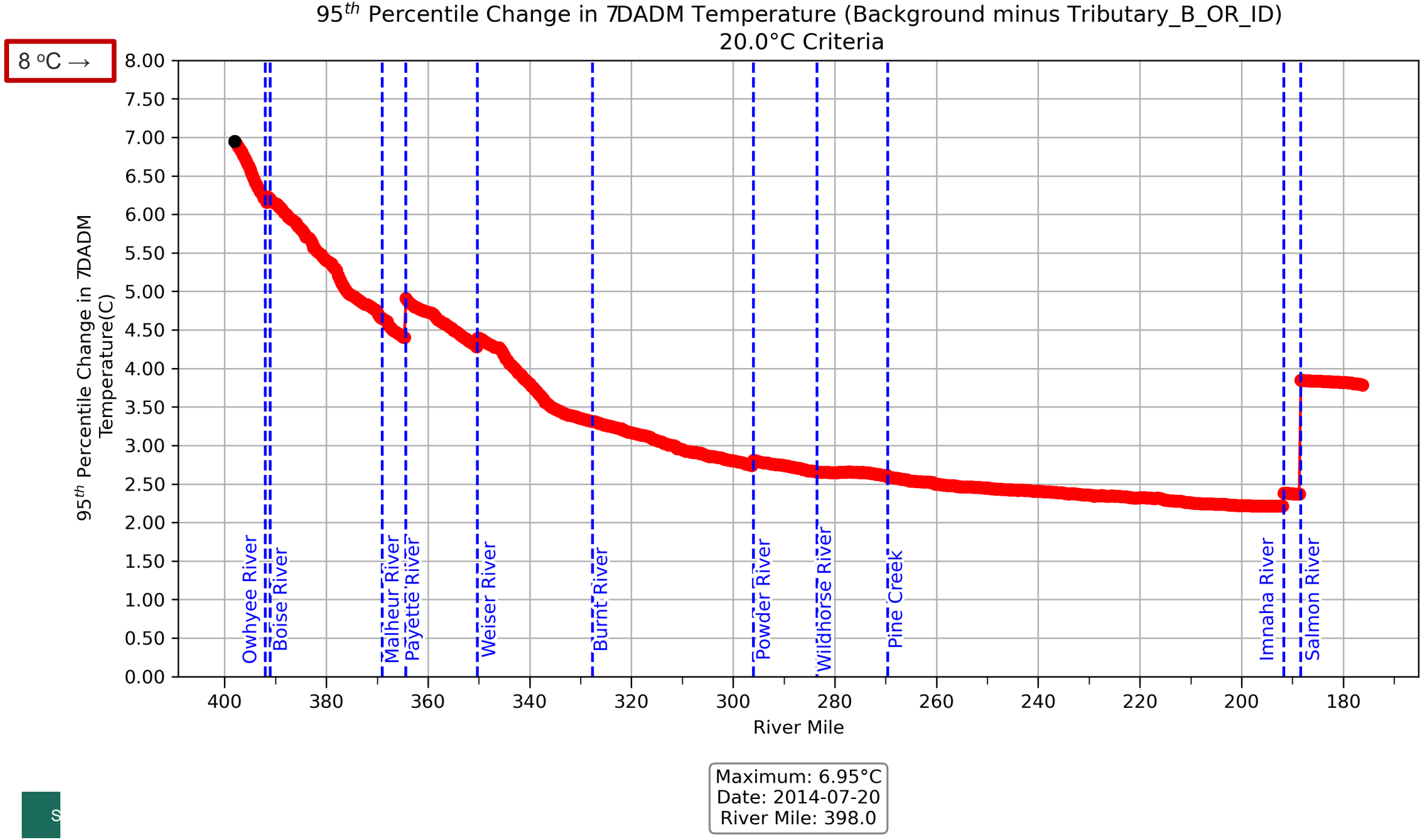

Salmon River
2014
2015
2016
2017
2018
Temperature (deg-C)
0
10
20
30
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Date
Calibration
Tributary B Scenario
Maximum

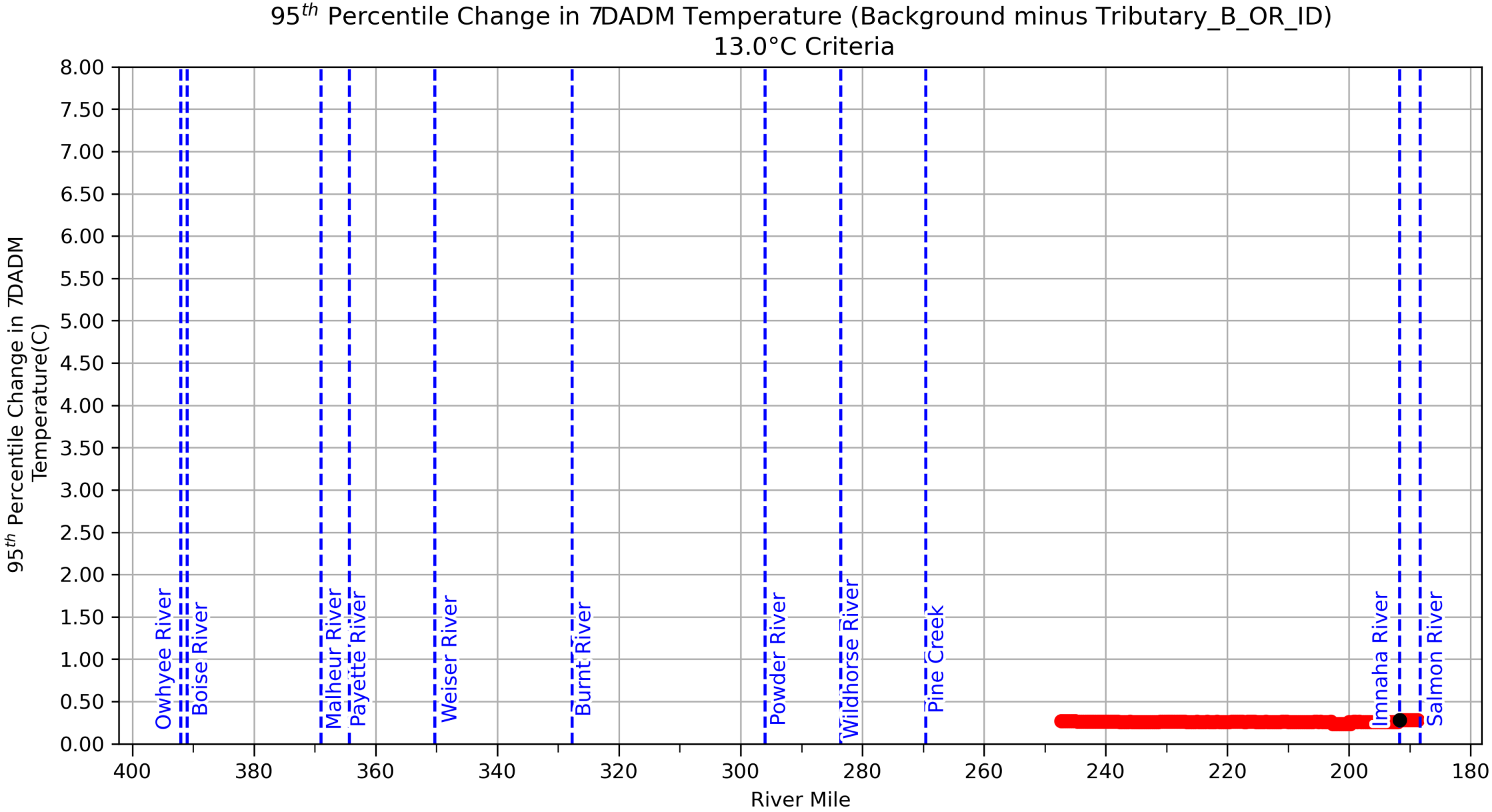

95th Percentile Change in 7DADM Temperature (Background minus Tributary_B_OR)
20.0°C Criteria
95th Percentile Change in 7DADM Temperature(C)
River Mile
Owhyee River
Boise River
Malheur River
Payette River
Weiser River
Burnt River
Powder River
Wildhorse River
Pine Creek
Imnaha River
Salmon River
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
400
380
360
340
320
300
280
260
240
220
200
180
Maximum: 0.49°C
Date: 2015-06-13
River Mile: 191.33

0.5 °



Maximum: 0.06°C
Date: 2016-04-15
River Mile: 190.25


95th Percentile Change in 7DADM Temperature (Background minus Tributary_B_OR_ID)
20.0°C Criteria
8 ºC →
95th Percentile Change in 7DADM Temperature(C)
River Mile
Owhyee River
Boise River
Malheur River
Payette River
Weiser River
Burnt River
Powder River
Wildhorse River
Pine Creek
Imnaha River
Salmon River
Maximum: 6.95°C
Date: 2014-07-20
River Mile: 398.0


95th Percentile Change in 7DADM Temperature (Background minus Tributary_B_OR_ID)
13.0°C Criteria
95th Percentile Change in 7DADM Temperature(C)
8.00
7.50
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
400
380
360
340
320
300
280
260
240
220
200
180
River Mile
Owhyee River
Boise River
Malheur River
Payette River
Weiser River
Burnt River
Powder River
Wildhorse River
Pine Creek
Imnaha River
Salmon River
Maximum: 0.28°C
Date: 2016-04-15
River Mile: 191.67

Tributary B scenario results

- Temperature criteria exceedances on Oregon tributaries increase Snake River 7DADM temperatures above the applicable criteria by as much as 0.37°C in the summer and 0.01°C during the spawning period.

- Temperature criteria exceedances on Oregon and Idaho tributaries; and on the Snake River upstream of the model boundary increase Snake River 7DADM temperatures above the applicable criteria by as much as 6.9°C in the summer and 0.10°C during the spawning period.

- Temperatures in the Snake River are strongly influenced by upstream temperatures of the Snake River in Idaho. The Snake River boundary is the largest thermal input and is predicted to have the largest temperature decreases with cooler temperatures at the boundary.

Questions?



Snake River

Cold Water Refugia

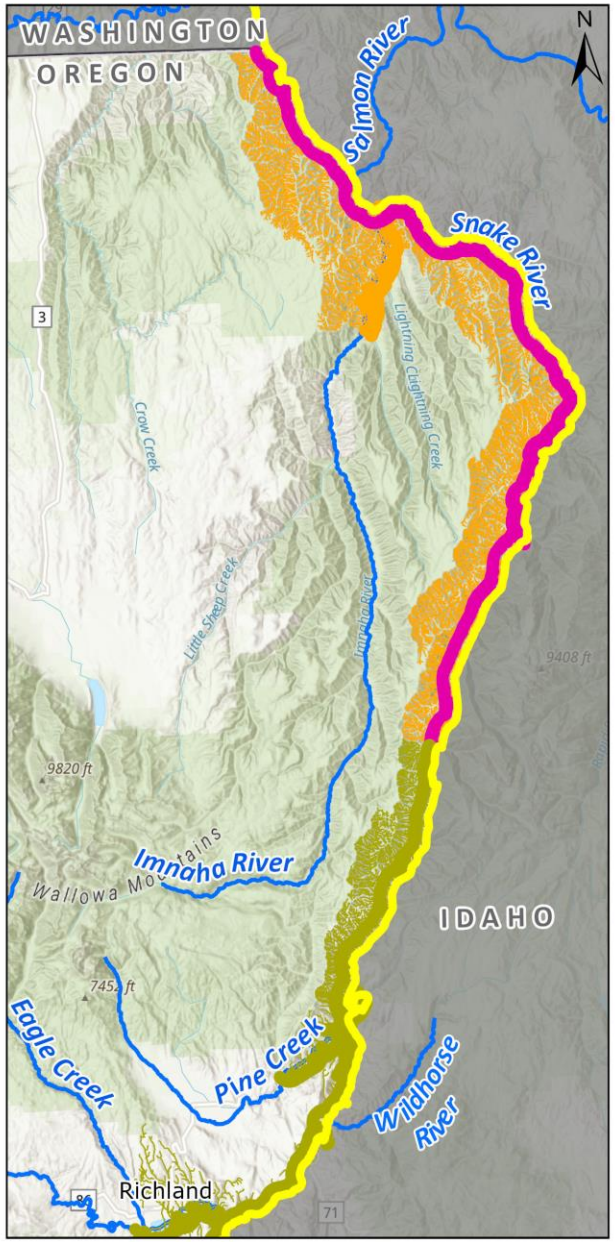
- What is cold water refugia
- Proposed screening approach
- Preliminary results
- Next steps



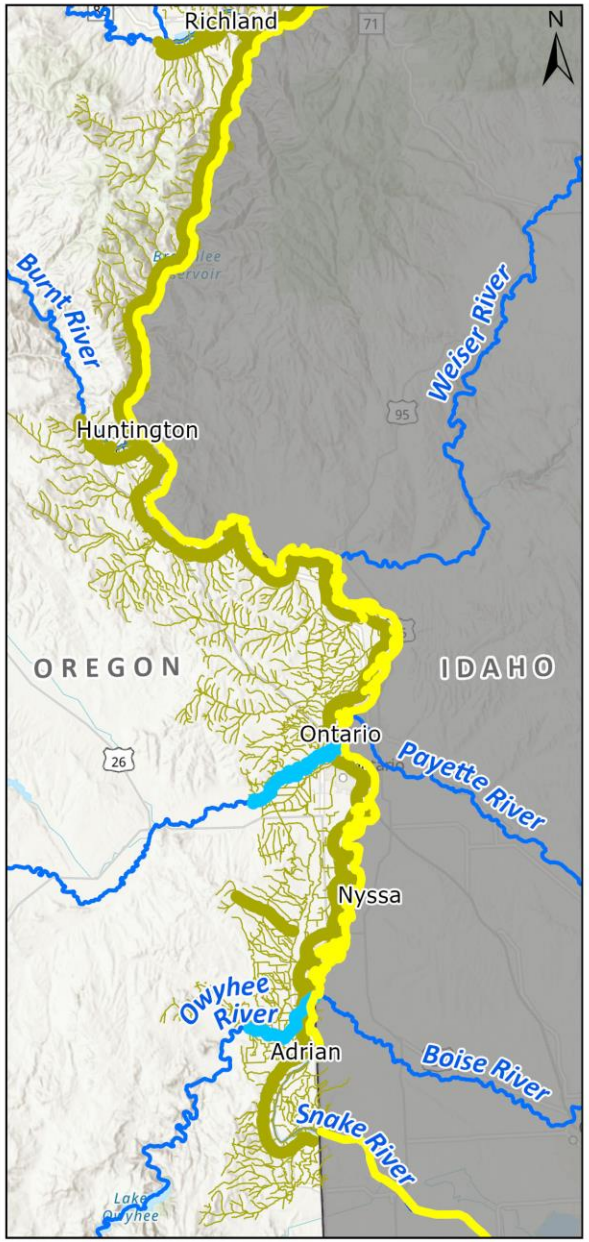
Snake River downstream of Saddle Creek looking upstream (RM 236)

Applicable Temperature Criteria

Spawning uses not shown



River Mile 296 - 176



River Mile 409 - 296

Legend

- Major Tributaries

State Boundaries

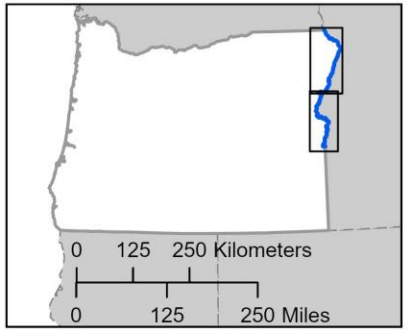
- Other States
- State of Oregon

Fish Use Designations (Oregon)

- Salmon and Trout Rearing and Migration (18°C)
- Salmon and Steelhead Migration Corridors (20°C)
- Redband or Lahontan Cutthroat Trout (20°C)
- Narrative - Cool Water Species

Fish Use Designations (Idaho)

- Cold Water Aquatic Life (Daily max = 22°C; Daily average = 19°C)



Cold water refugia narrative criteria

- The Snake River migration corridor must have cold water refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body. OAR 340-041-0028(4)(d)

- Cold water refugia means those portions of a water body where or times during the diel temperature cycle when the water temperature is at least 2°C colder than the daily maximum temperature of the adjacent well-mixed flow of the water body. OAR 340-041-0002(10)

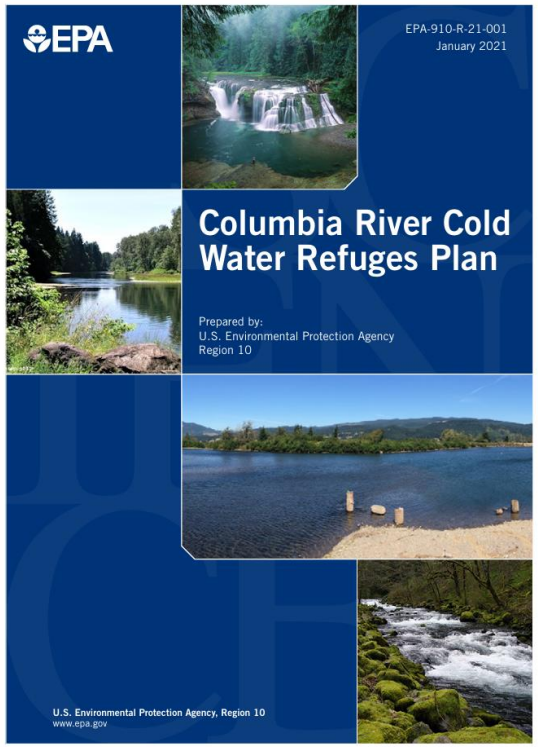
Cold water refugia narrative criteria

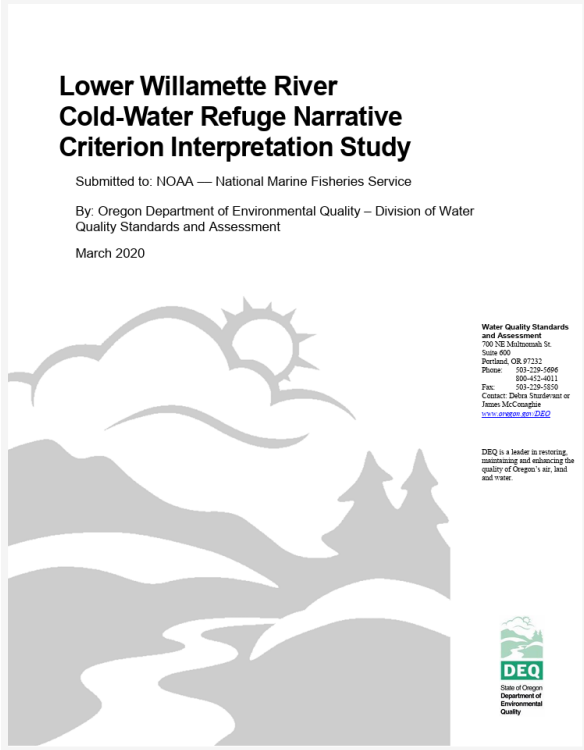
- The narrative criteria directs that sufficient cold-water refugia be available within the warmer waters of migration corridors. As the temperature of corridors approach 20°C, the role of cold water refugia is expected to enable fish to migrate to upstream and downstream destinations beyond the Snake River without impairment. Fish may move into cold water refugia if the temperature of the mainstem Snake River corridor becomes too warm.

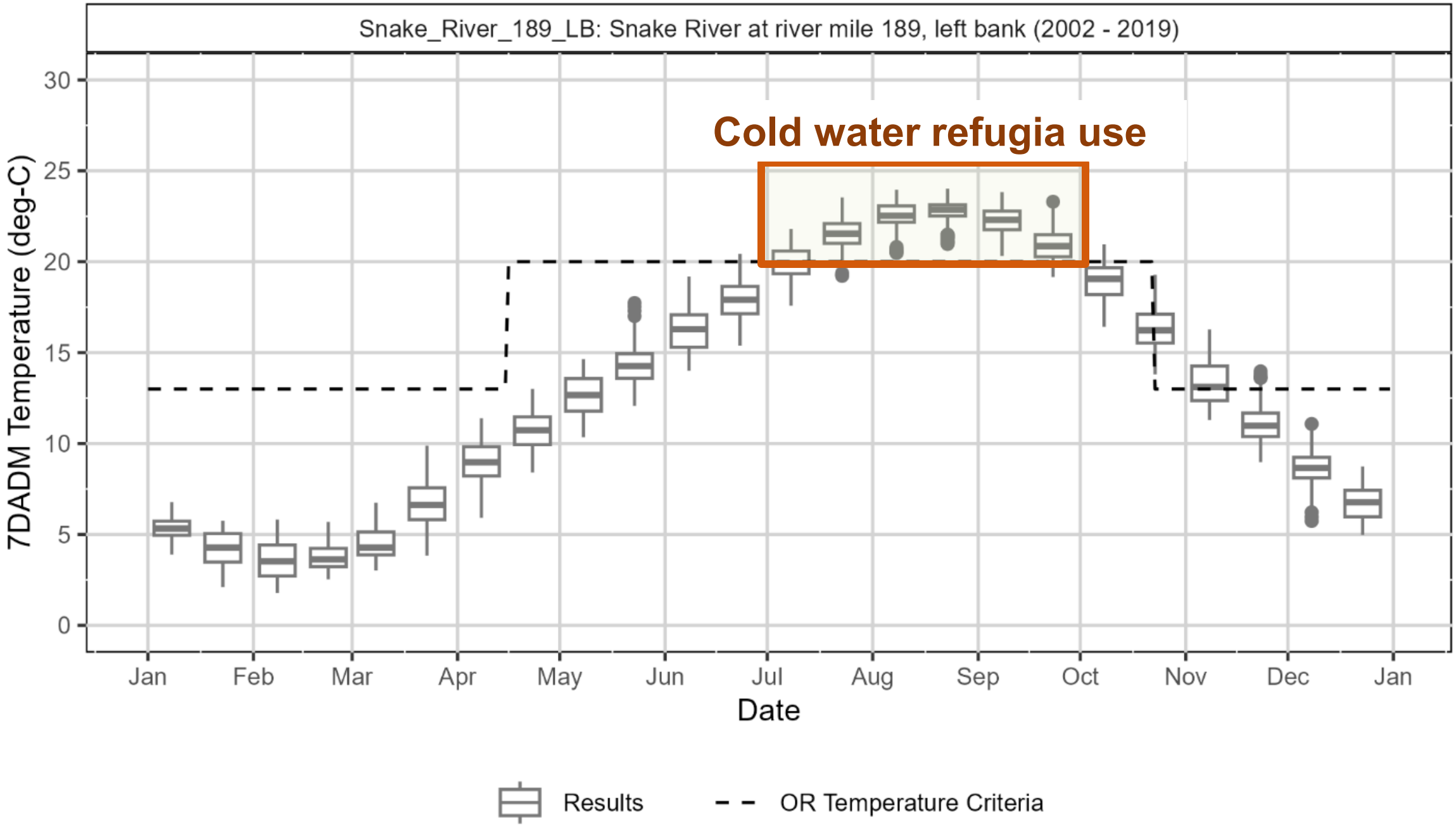
- The narrative provision supplements the numeric criterion of 20°C to protect migrating populations of salmon and steelhead.

Interpretation to a numeric benchmark

- “sufficiently distributed”
- “times during the diel temperature cycle”

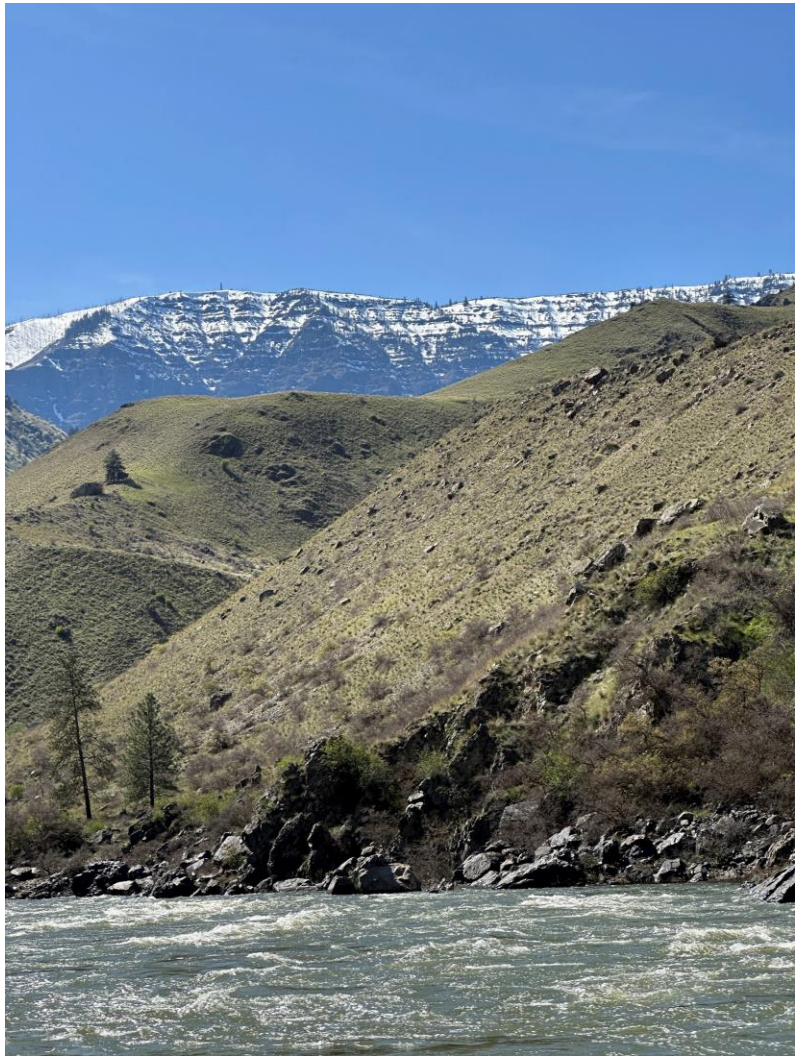




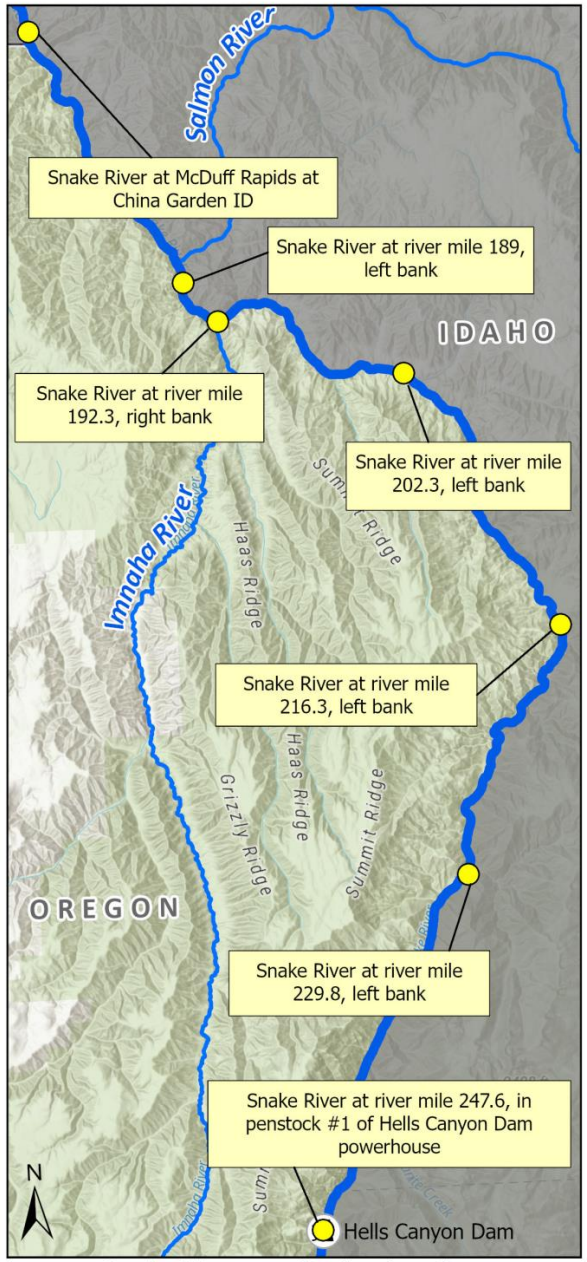

Snake_River_189_LB: Snake River at river mile 189, left bank (2002 - 2019)
Cold water refugia use
7DADM Temperature (deg-C)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Date
Results
OR Temperature Criteria

Types of cold water refugia

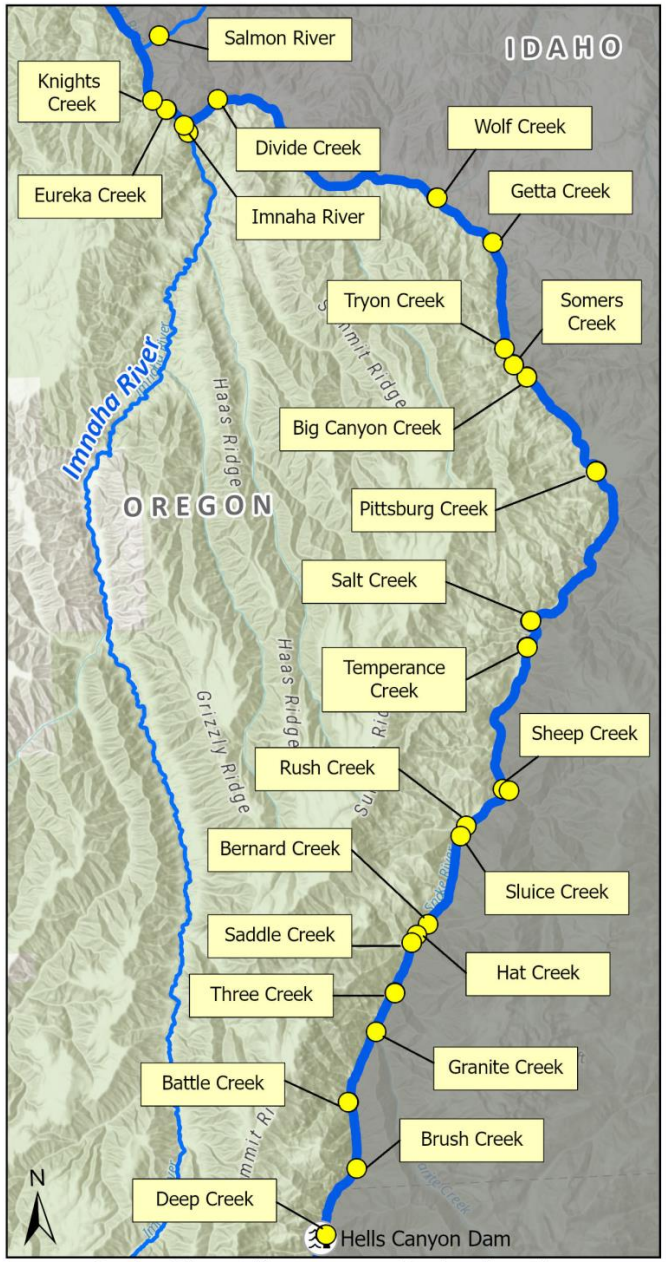
- Tributary plumes
- Inflowing groundwater or hyporheic flow
- Diurnal cold water refugia



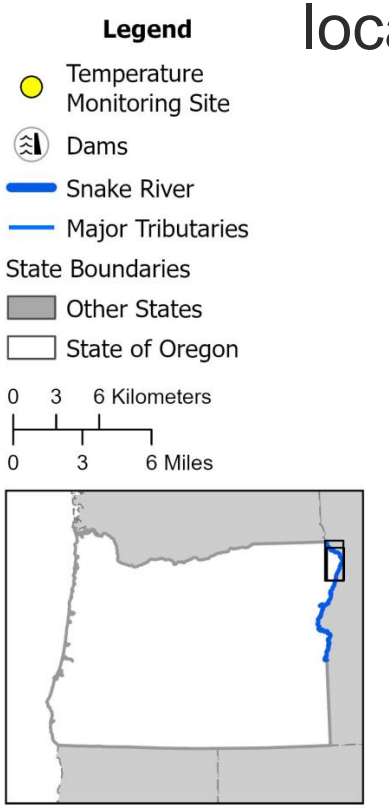
Temperature Monitoring Sites



Snake River monitoring locations

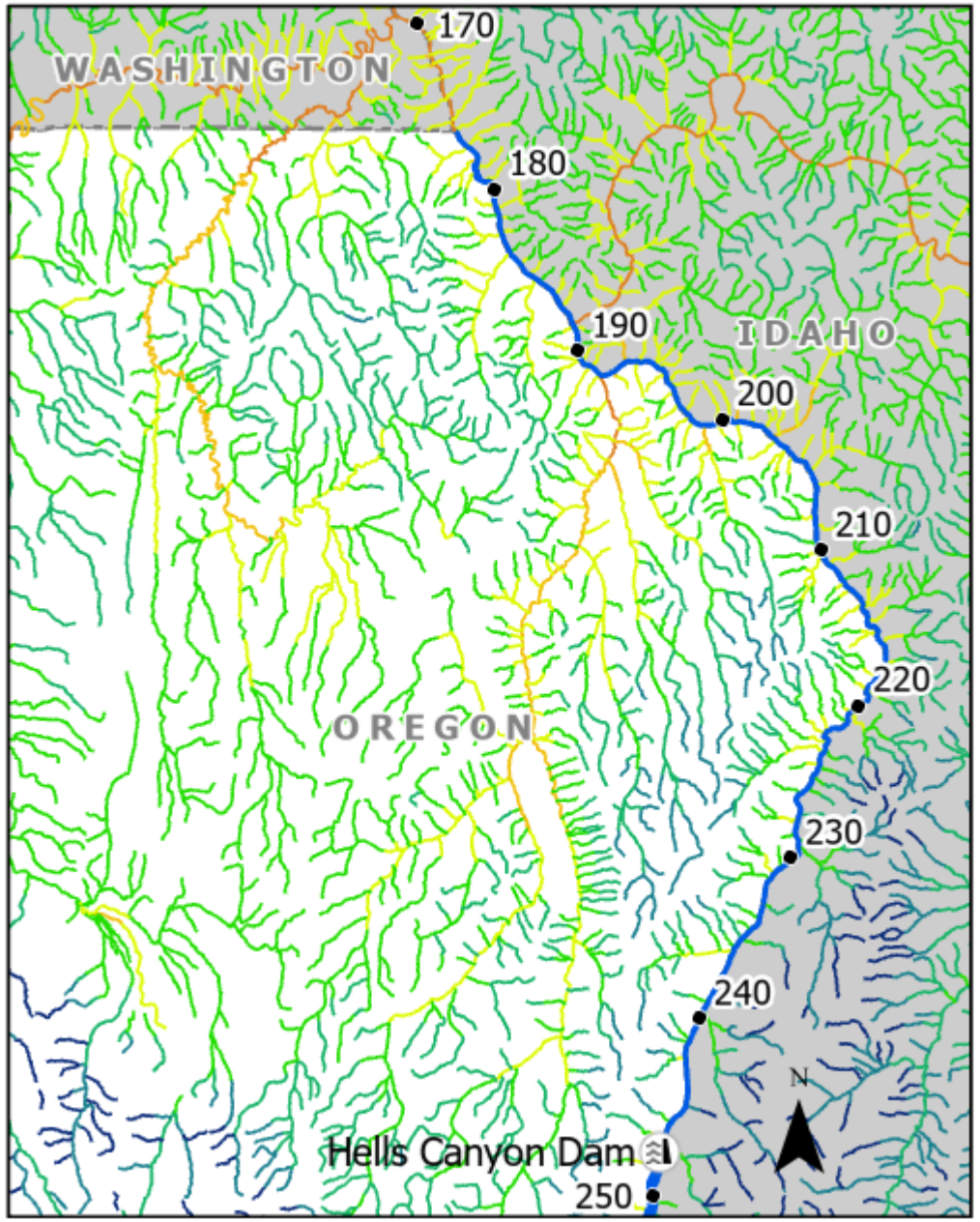


Snake River tributary monitoring locations



- 116 tributaries (NHD)
- 22 tributary monitoring sites
- 7 Snake River sites
- Tributary data paired with nearest Snake River monitoring location

NorWeST Temperature Model Predictions



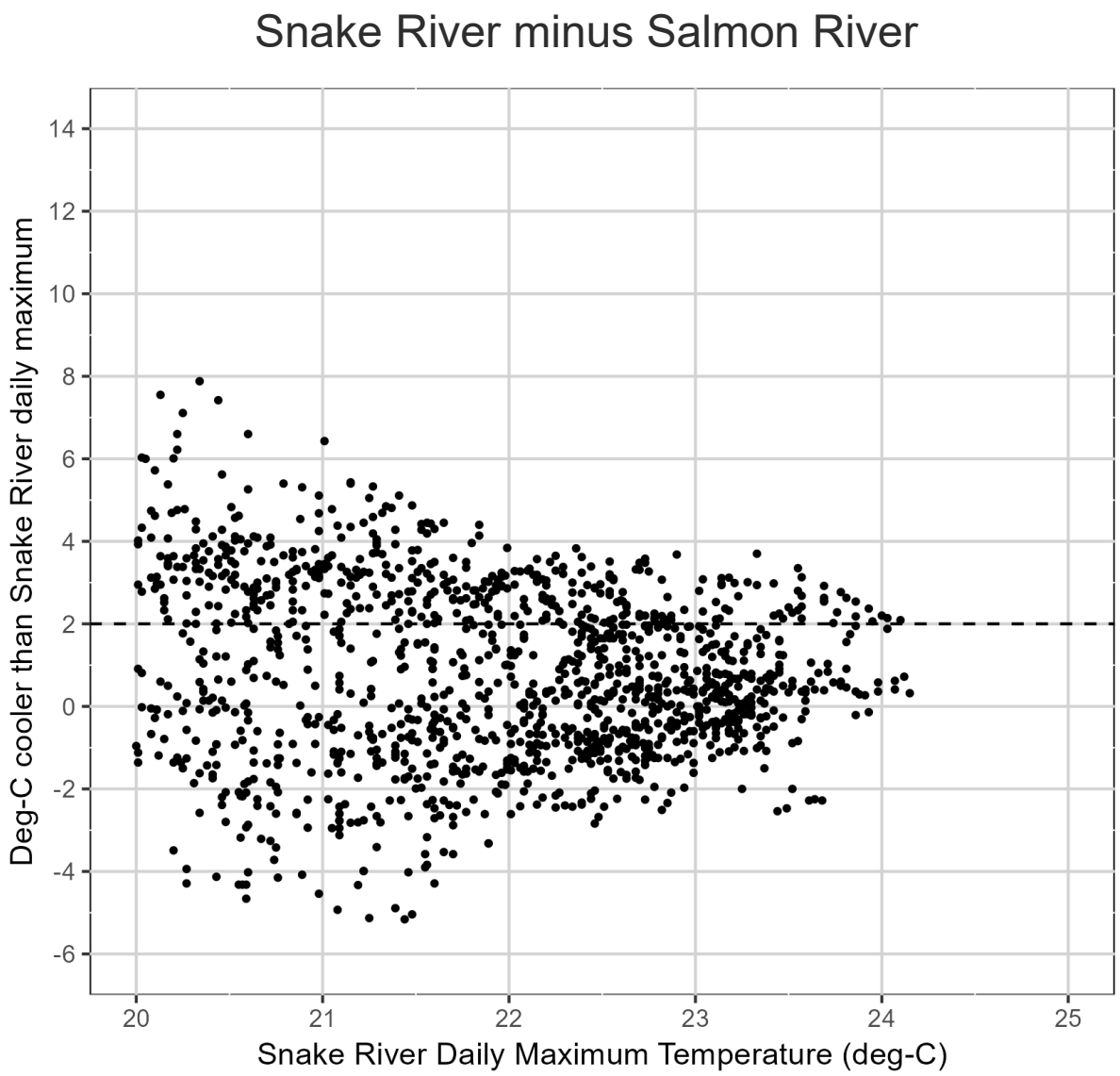
- Issak et al 2016
- Mean August stream temperature (Model S1 1993-2011)
- 116 tributaries in model

- Used to estimate difference between tributary and Snake River

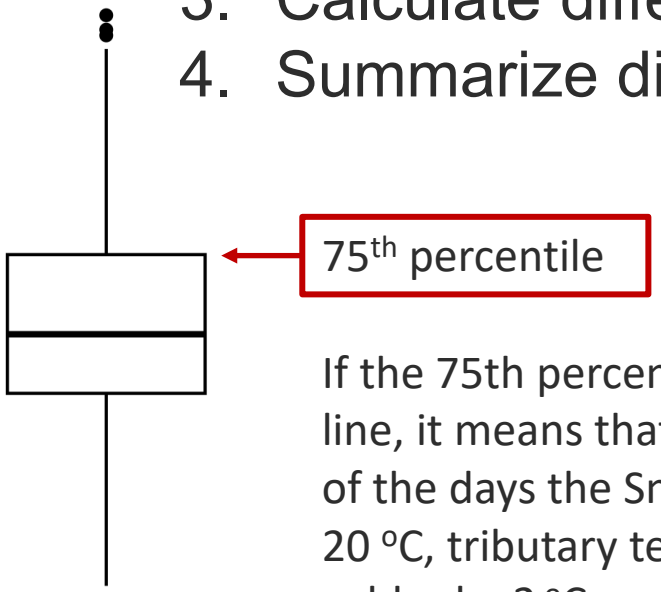
- More on NorWeST project

Isaak, D.J.; Wenger, S.J.; Peterson, E.E.; Ver Hoef, J.M.; Hostetler, S.W.; Luce, C.H.; Dunham, J.B.; Kershner, J.L.; Roper, B.B.; Nagel, D.E.; Chandler, G.L.; Wollrab, S.P.; Parkes, S.L.; Horan, D.L. 2016. NorWeST modeled summer stream temperature scenarios for the western U.S. Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2016-0033.

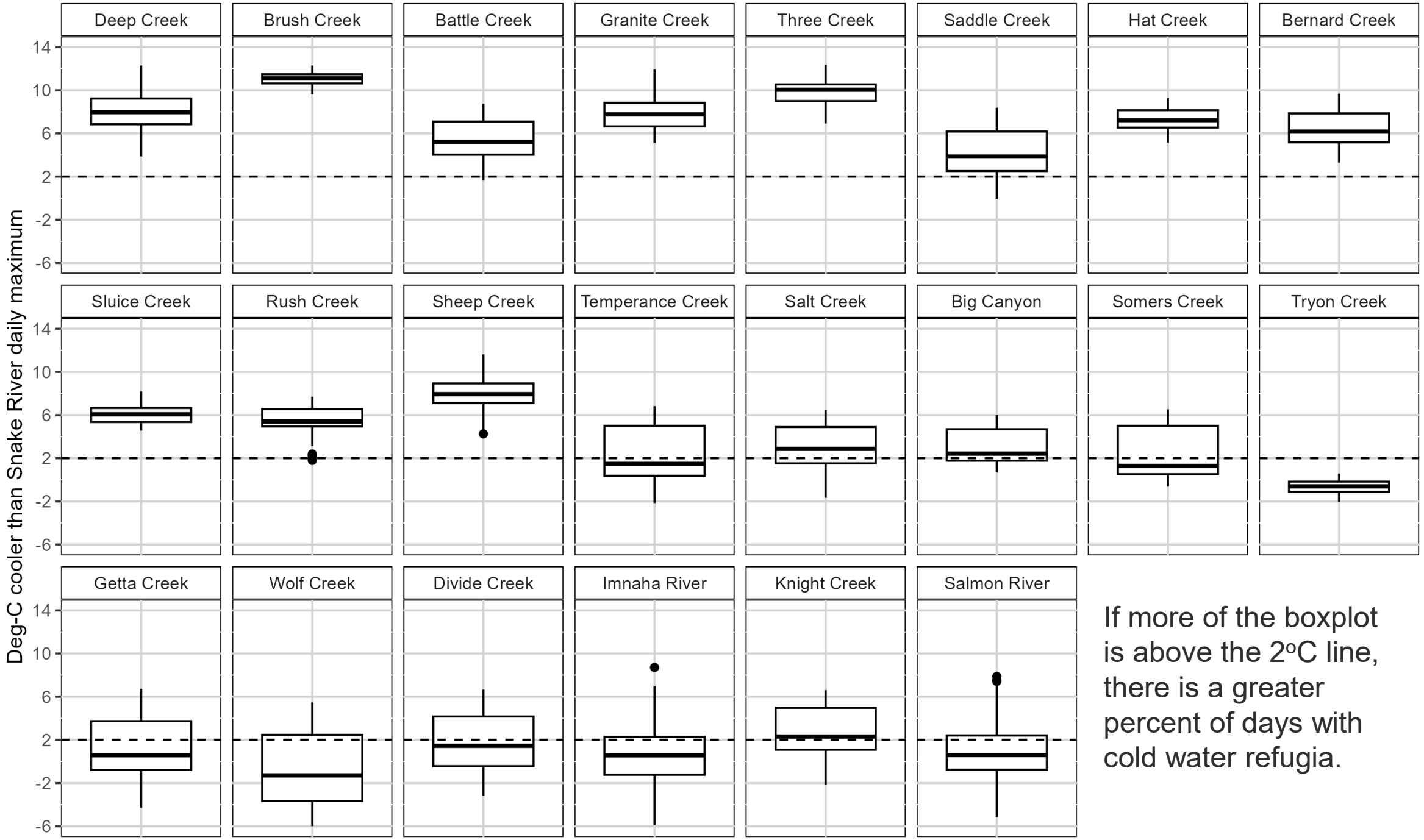
Temperature data difference calculation



1. Calculate daily maximums
   - Snake River
   - Tributary
2. Filter days when Snake River >= 20.0°C
3. Calculate difference on each day
4. Summarize distribution with boxplots



If the 75th percentile is above the 2°C line, it means that at least 25 percent of the days the Snake River exceeds 20 °C, tributary temperatures are colder by 2 °C or more.

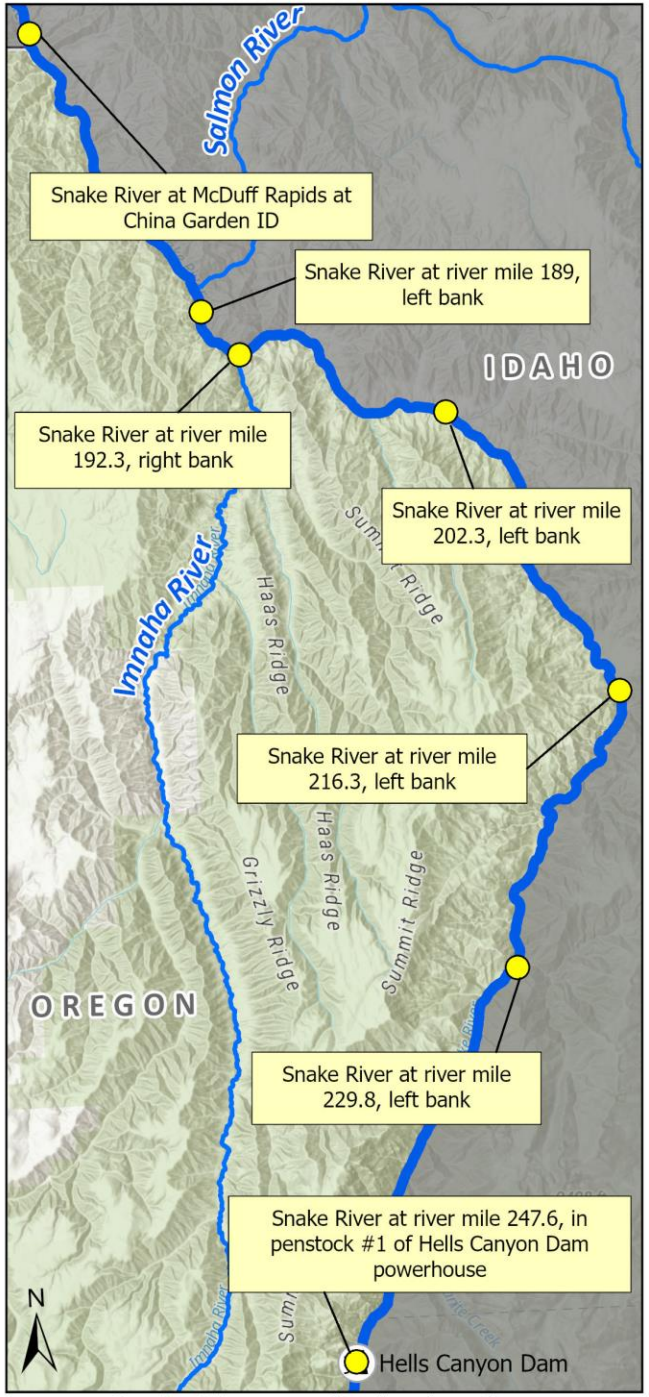


If more of the boxplot is above the 2°C line, there is a greater percent of days with cold water refugia.

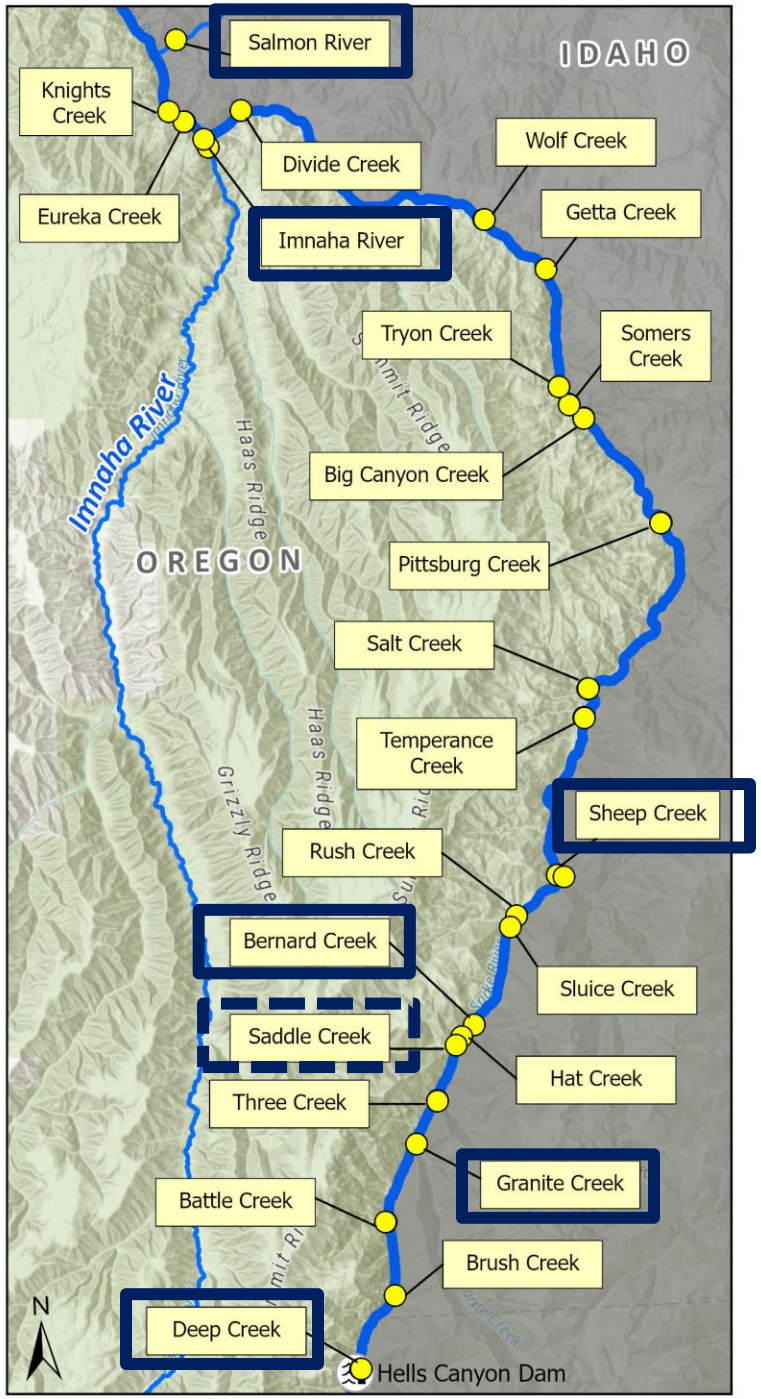
Draft tributary screening approach

Tier	Screen	Tributaries Meeting Screen / Total Tributaries
Tier 3	Tributary >= 2°C colder than Snake River • Difference in daily maximum at 75th percentile when Snake exceeds 20°C; or • Differences in NorWeST August Mean	21/22 114/116
Tier 2	Tier 3 and tributary mean August flow >= 7 cfs	6/116
Tier 1	Tier 2 and tributary 95th percentile daily maximum <= 18°C	4/116

Tier 2 and Tier 1 tributaries provide cold water refugia to the Snake River



Snake River monitoring locations



Snake River tributary monitoring locations



Tier 1
Deep Creek (RM 247, Idaho)
Granite Creek (RM 239, Idaho)
Bernard Creek (RM 235, Idaho)
Sheep Creek (RM 229, Idaho)

Tier 2
Imnaha River (RM 191, Oregon)
Salmon River (RM 188, Idaho)

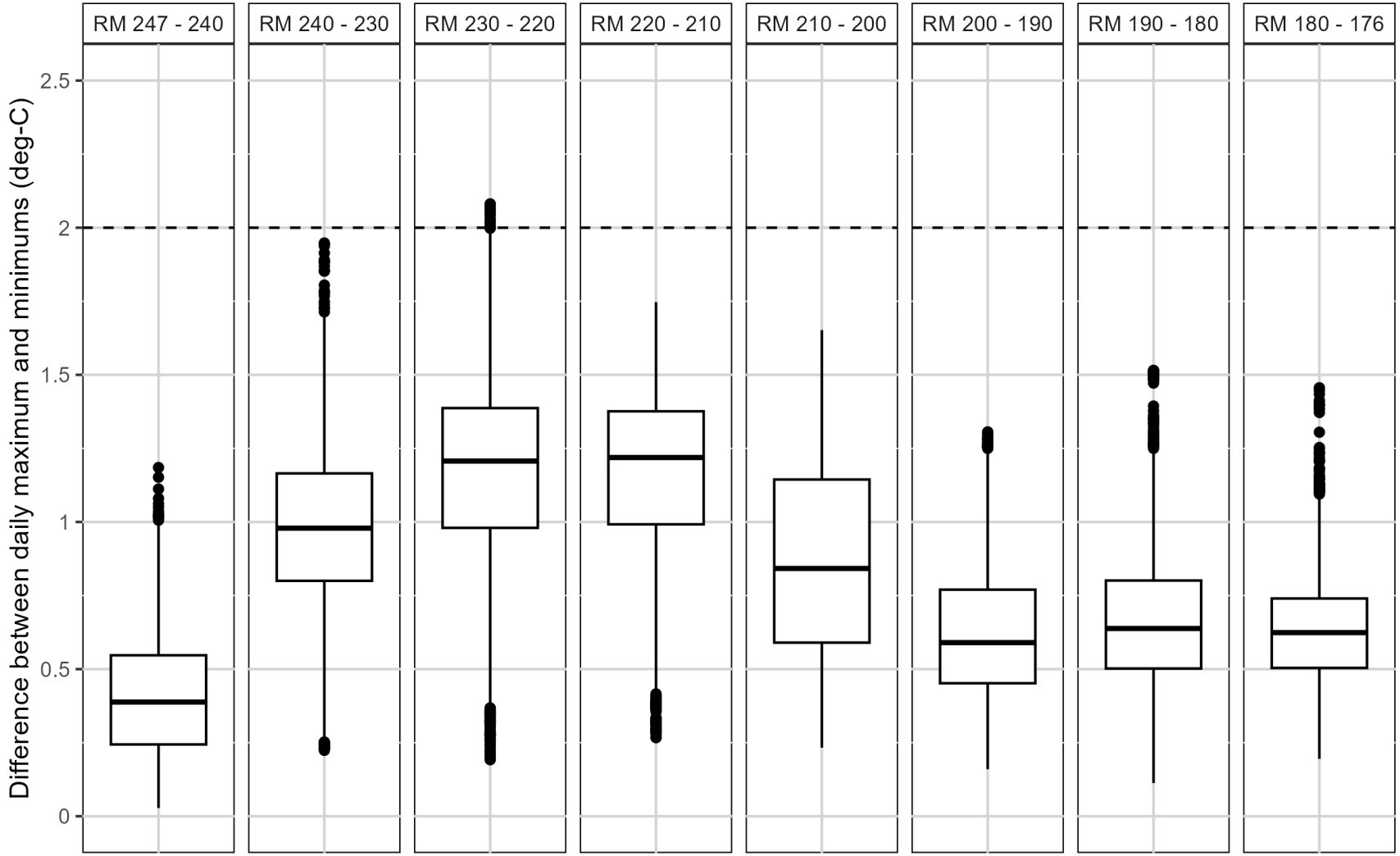
Almost Tier 1 (6 cfs)
Saddle Creek (RM 236, Oregon)

Tier 1 and Tier 2 tributary summary

Tributary	Tier	Snake River Mile	Distance from downstream CWR (Miles)	Result Count	Tributary 95th Percentile Daily Maximum (°C)	75th Percentile Difference (°C)	EROM Mean August Flow (cfs)	NorWeST Tributary August Mean (°C)	NorWeST Snake River August Mean (°C)	NorWeST Difference (°C)
Deep Creek	1	247	8	588	16.0	9.2	42	13.51	18.32	4.81
Granite Creek	1	239	4	275	16.1	8.8	47	14.1	19.76	5.66
Bernard Creek	1	235	6	137	17.1	7.9	8	14.48	20.36	5.88
Sheep Creek	1	229	38	439	15.9	8.9	30	13.47	21.42	7.95
Imnaha River	2	191	3	648	25.3	2.3	247	20.77	22.04	1.27
Salmon River	2	188	12 (to border)	1369	24.4	2.4	5833	21.07	22.56	1.49

Snake River daily diel differences

(surface temperatures)



Preliminary results

- Six tributaries provide cold water refugia to the Snake River
- The distance between cold water refugia tributaries is <= 12 miles, except one reach that is 38 miles (Imnaha River to Sheep Creek).
- 109 tributaries are at least 2^{o}C colder than the Snake River but probably don't have a flow rate large enough to generate a cold-water plume.
- Nighttime temperatures in the Snake River are not a diurnal cool water refuge.

Next Steps*

- Gather information on migration strategy and cold water refugia use
- Estimate mean migration rate (km/day)
- More discussion on screening and target benchmarks
- Assess flow rates on Somers, Salt, Big Cayon, Pittsburg, Temperance and other creeks between Imnaha River and Sheep Creek (RM 200-220). Potential TMDL implementation action.

Example fish tag temperature data from the Columbia River Cold Water Refuges Plan (EPA, 2021)

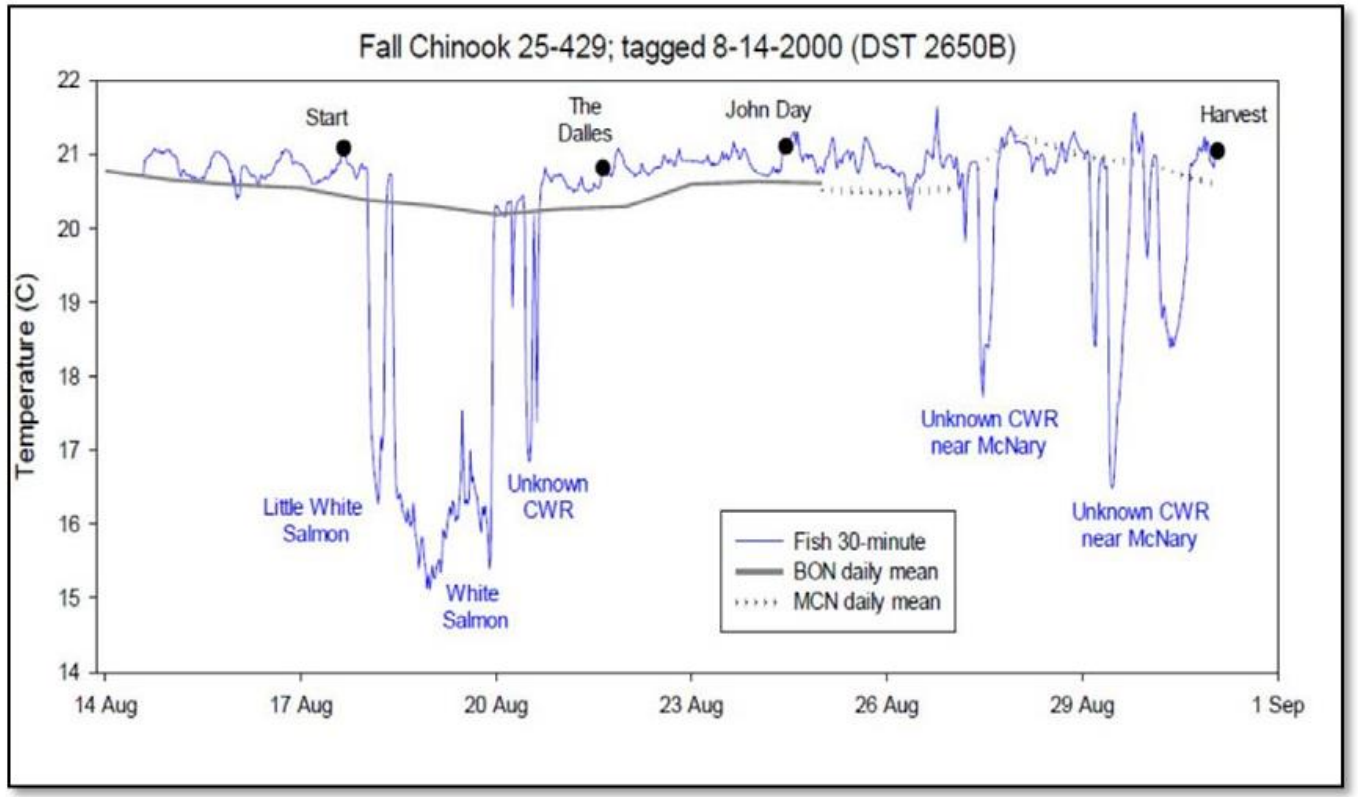


Figure 3-6 Temperature profile of a fall Chinook salmon using cold water refuges (Keefer & Caudill 2017)

*pending available data

Questions?



Snake River at Weiser looking downstream (RM 351.5)

Water Quality Management Plan

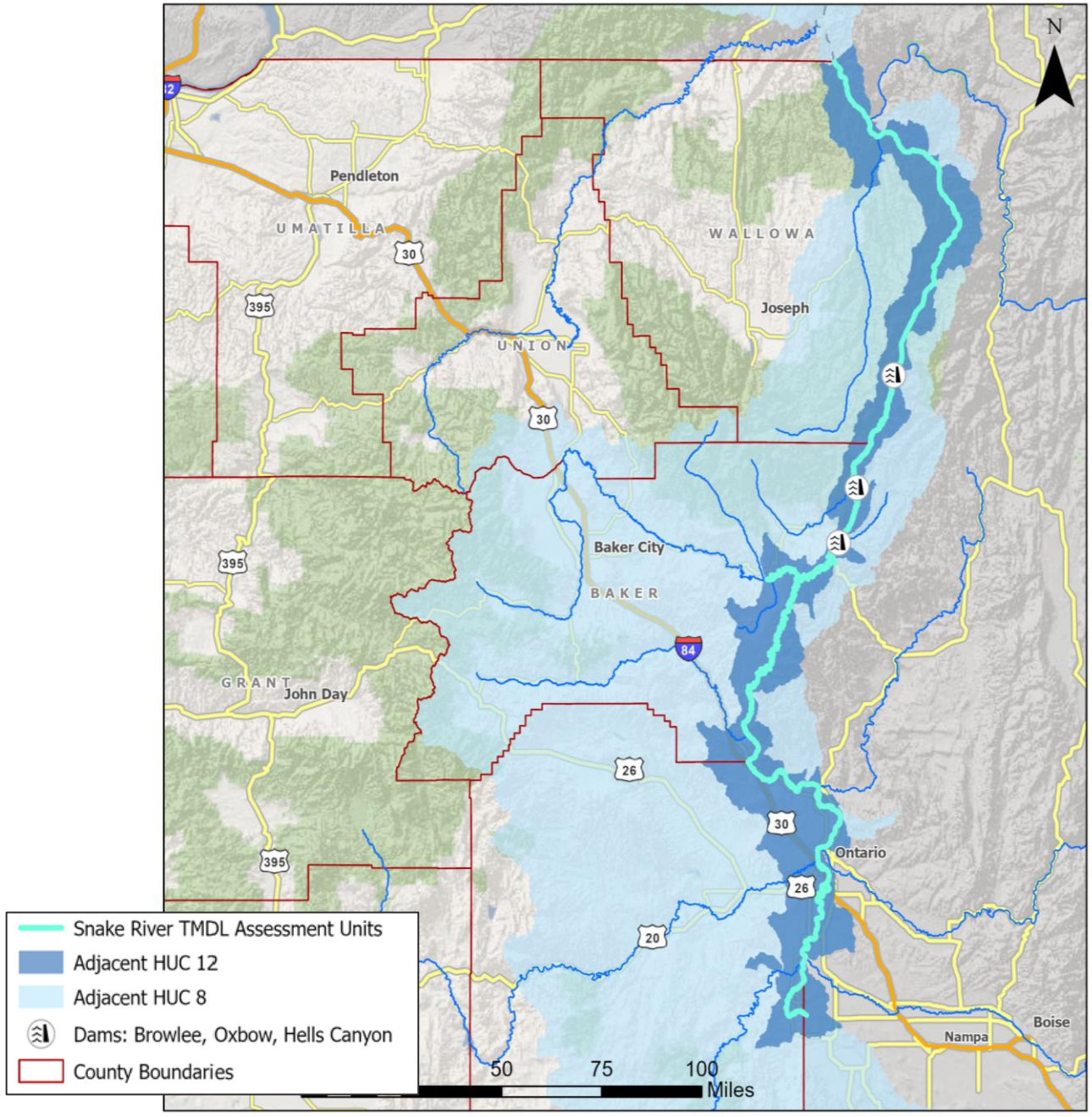
The Water Quality Management Plan is a required element of a TMDL and describes strategies to achieve allocations identified in the TMDL to attain water quality standards.

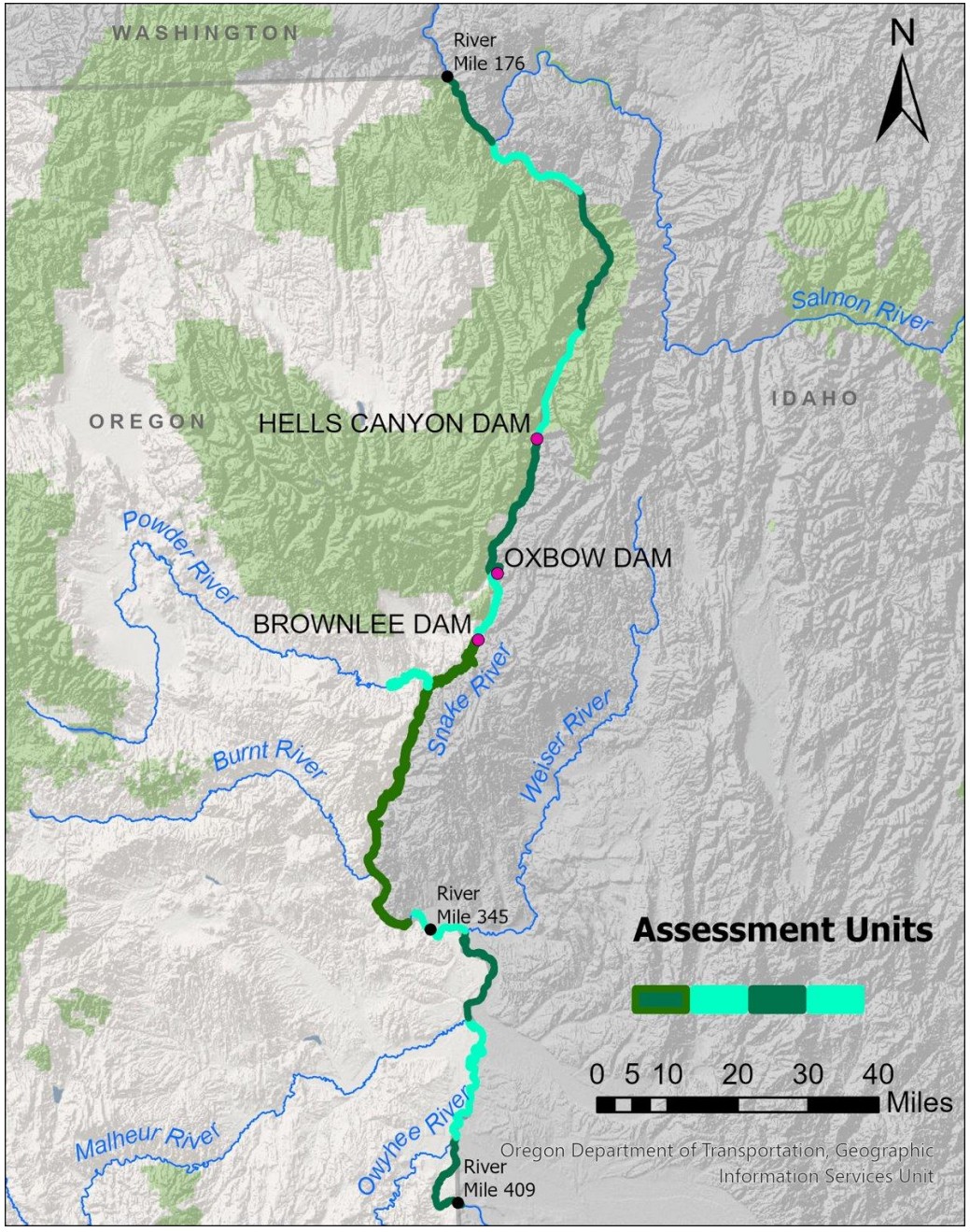


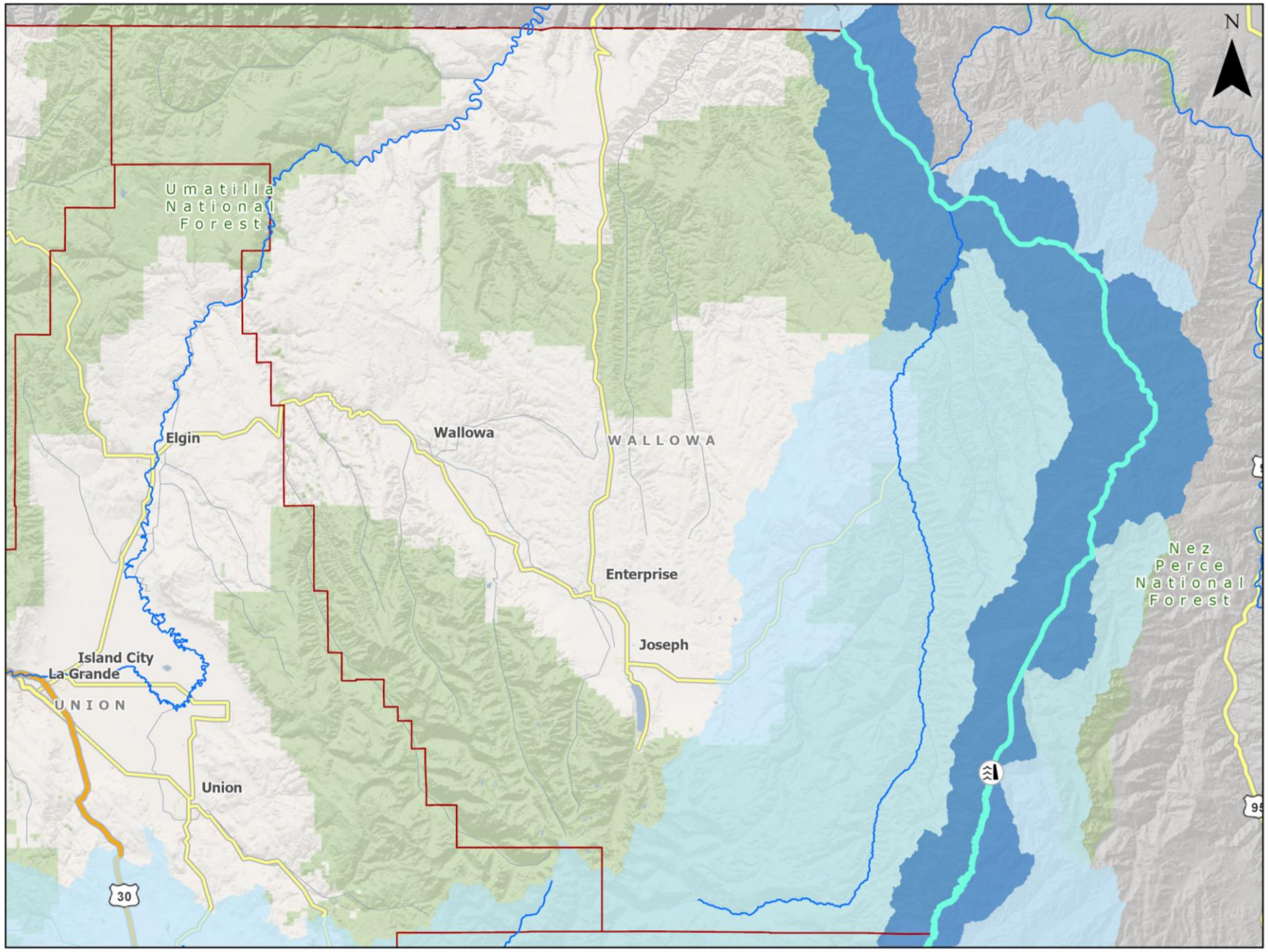
Hells Canyon

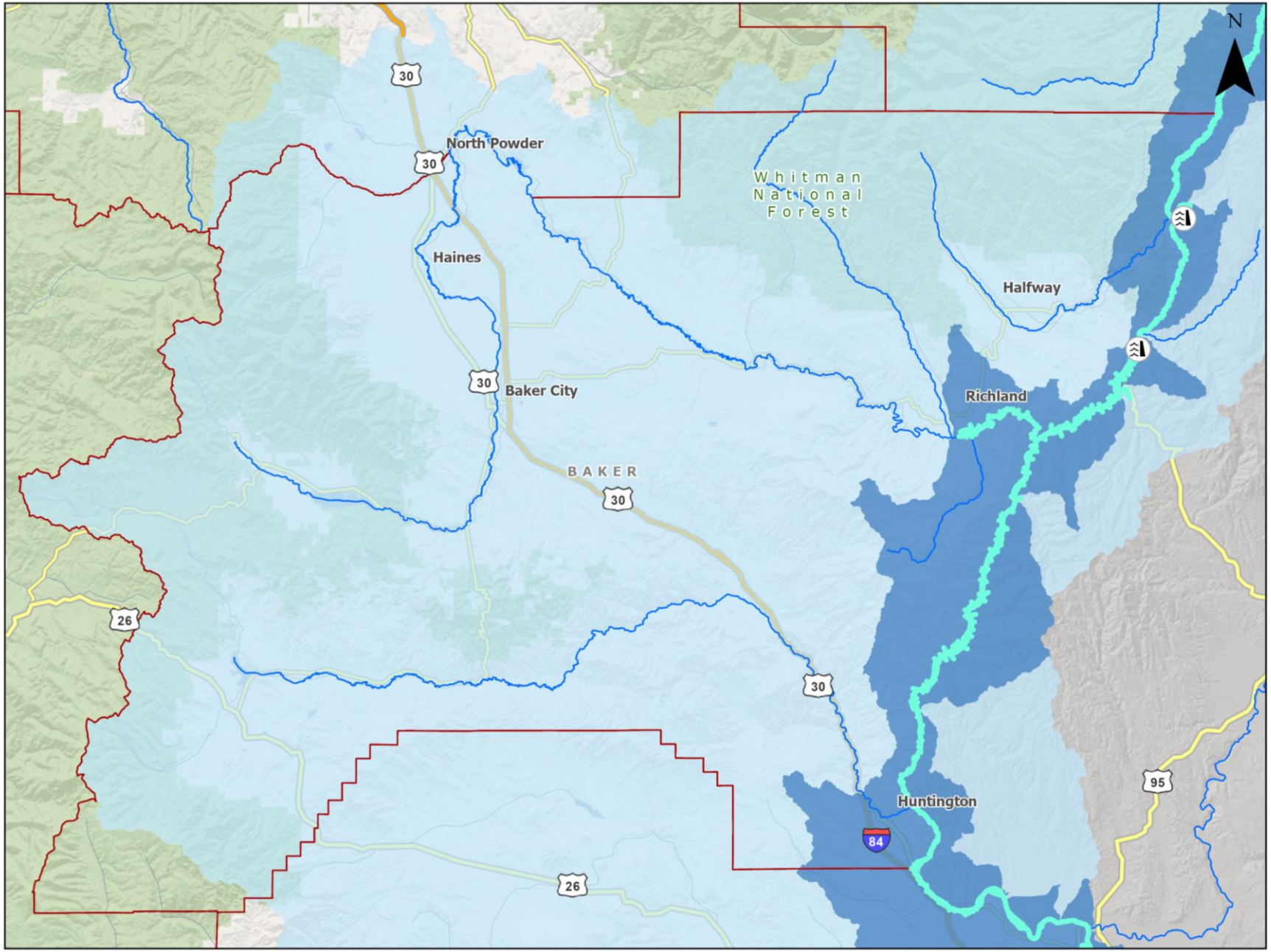
Changes to Water Quality Management Plan

- Clarified TMDL extent
- Clarified applicable management strategies tributaries vs. mainstem
- Reasonable assurance for monitoring
- Timeline for implementation
- Clarification of funding opportunities

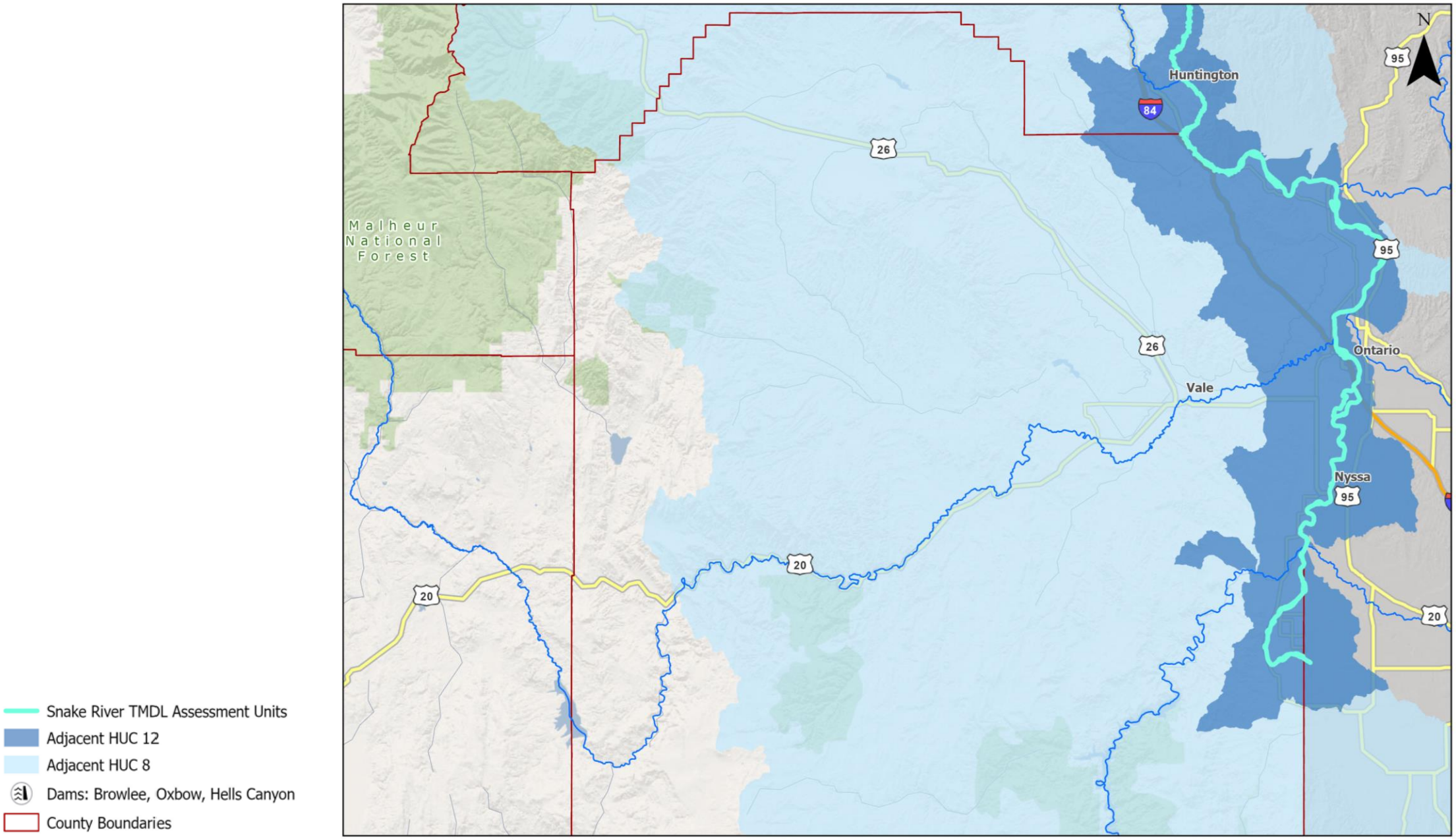

N
Pendleton
UMATILLA
WALLOWA
Joseph
UNION
Baker City
BAKER
GRANT
John Day
Ontario
Nampa
Boise
Snake River TMDL Assessment Units
Adjacent HUC 12
Adjacent HUC 8
Dams: Browlee, Oxbow, Hells Canyon
County Boundaries
50 75 100
Miles


WASHINGTON
River Mile 176
N
Salmon River
IDAHO
OREGON
HELLS CANYON DAM
Powder River
OXBOW DAM
BROWNLEE DAM
Snake River
Weiser River
Burnt River
River Mile 345
Assessment Units
0 5 10 20 30 40
Miles
Malheur River
Owyhee River
River Mile 409
Oregon Department of Transportation, Geographic Information Services Unit


N
Umatilla National Forest
Elgin
Wallowa
WALLOWA
Enterprise
Joseph
Island City
La Grande
UNION
Union
30
Nez Perce National Forest
Snake River TMDL Assessment Units
Adjacent HUC 12
Adjacent HUC 8
Dams: Browlee, Oxbow, Hells Canyon
County Boundaries



Snake River TMDL Assessment Units
Adjacent HUC 12
Adjacent HUC 8
Dams: Browlee, Oxbow, Hells Canyon
County Boundaries


N
Huntington
84
26
95
Malheur
National
Forest
26
95
Ontario
Vale
Nyssa
95
20
20
20
Snake River TMDL Assessment Units
Adjacent HUC 12
Adjacent HUC 8
Dams: Browlee, Oxbow, Hells Canyon
County Boundaries

Monitoring

- Changes in WQMP to clarify existing monitoring:
  - Existing monitoring activities may be sufficient to achieve the goals of this monitoring requirement. The specific details for monitoring plans and determination of expansion of these programs will be developed during DMA implementation workgroups after adoption of this TMDL.
  - Both where DMAs perform and/or fund
- DMA workgroups will provide opportunities to combine efforts for Mercury and Temperature monitoring into one plan

Implementation Strategies

- Changes in WQMP
  - Addition of protection and enhancement of cold water refuges including groundwater recharge zones and springs
- Management Strategies still a priority for review – looking to add strategies we might have missed

Timeline for implementation

- Reminder of TMDL timeline
- Implementation plans due to DEQ 18 months after completion of Mercury TMDL
  - Added backstop for implementation in the unlikely case delays occur with Mercury TMDL
    - December 31, 2030

- We have plenty of time to work together in DMA workgroups to develop effective and achievable implementation plans

Clarification of Funding Sources

- Deleted funding table from WQMP
  - Grant opportunities are consistently changing
  - Providing information in the form of a static list that may include opportunities that are no longer valid by the time implementation begins may include incorrect information
  - Providing funding agencies to reach out to for information on the various resources seems more appropriate
  - Please review this section – should we add funding agencies or more information to this section?

Water Quality Management Plan

Questions?



Snake River

Fiscal, economic, and racial equity impacts

Administrative Procedures Act

- ORS 183.333: DEQ must solicit input from a rule advisory committee on:
  - Whether the rule has fiscal impact, and the extent of that impact
  - Whether the rule will have a significant adverse impact on small businesses
- ORS 183.335(2)(b)(F): how adoption of the rule will affect racial equity
- ORS 182.545: consider the effects of the action on environmental justice

FIS questions from RAC 1

- Will the draft rule have a significant adverse impact on small businesses?
- If a significant impact is identified, how could DEQ reduce the fiscal impact on small business?
- Will the proposed rule impact racial equity?
- What are additional considerations for environmental justice for this draft rule?
- What types of entities will be impacted by the proposed rule?
- How and to what extent will the proposed rule have a positive, negative, or no impact on these entities?

Next steps

- Email RAC feedback from meeting #2 → May 11, 2026 snakehells.temperaturetmdl@deq.oregon.gov
- Public notice (45 days) → Aug. – Oct. 2026 ***subject to change***
- EQC consideration → May 2027 ***subject to change***
- EPA action → December 4, 2028

Questions?



Snake River

Snake River Temperature TMDL Contacts

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