Northwest **Power** and **Conservation** Council

January 4, 2016

MEMORANDUM

TO: **Council members**

FROM: **Karl Weist**

SUBJECT: Briefing on the Biological Opinion on Environmental Protection Agency's Proposed Approval of Oregon Water Quality Standards Addressing Temperature and Dissolved Oxygen

Presenter:

John Palmer, Senior Policy Advisor for the Office of Water and Watersheds and Mary Lou Soscia, Columbia River Coordinator of the Environmental Protection Agency's Region 10 office and Debra Sturdevant of the Water Quality Section of the Oregon Department of Environmental Quality

Summary

The presenters will review the implications of the recent Biological Opinion on Oregon's water quality standards and address the actions EPA and DEQ will take to meet the Reasonable and Prudent Alternative in that Biological Opinion.

Workplan:

Addresses water quality within the Council program.

Background:

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Please see the attached summary from the Biological Opinion describing RPA 2.8.1

More info:

https://nwcouncil.box.com/s/2zynbmm2po5yrfg8oi4nwguhejevooo5

For all species of salmon and steelhead not listed above, eulachon, and green sturgeon, effects on critical habitat are likely to be too minor to affect the conservation value of critical habitat to the species.

2.7 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is our biological opinion that the proposed action is likely to jeopardize the continued existence of LCR Chinook salmon, UWR Chinook salmon, SR sockeye salmon, LCR steelhead, UWR steelhead, MCR steelhead, UCR steelhead, and SRB steelhead, and will destroy or adversely modify critical habitat that we have designated for these species. We also conclude that the proposed action is likely to jeopardize the continued existence of Southern Resident killer whale.

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UCR spring-run Chinook salmon, SR fall-run Chinook salmon, SR spring/summer Chinook salmon, CR chum salmon, LCR coho salmon, OC coho salmon, SONCC coho salmon, LCR steelhead, green sturgeon, or eulachon, or destroy or adversely modify critical habitat that we have designated for these species.

We also conclude that that the proposed action will not adversely modify critical habitat proposed for LCR coho salmon. You may request in writing that we adopt the conference opinion as a biological opinion after we designate critical habitat for LCR coho salmon. If we review the proposed action and find there have been no significant changes to the action that will alter the contents of the opinion and no significant new information has been developed (including during any required rulemaking process), we may adopt the conference opinion as the biological opinion on the proposed action, and no further consultation will be necessary.

2.8 Reasonable and Prudent Alternative

2.8.1. Proposed RPA

In accordance with 50 CFR 402.14(g)(5), we have developed the following RPA in cooperation with, and using the expertise of, the action agency and applicant. In this case, the applicant is the State of Oregon, as represented by the Oregon Department of Environmental Quality (hereafter, "DEQ"). The DEQ has committed in writing to carry out certain elements of the RPA, as described below.[80] However, EPA ultimately is responsible for implementation of the RPA.

1. Cold-water Refugia
    a. The EPA shall assist the DEQ in applying the cold water refugia (hereafter, "CWR") narrative criterion in the migration corridor reach of the Willamette River. To apply the criterion, DEQ, with technical assistance and oversight from EPA, will develop a

[80] October 23, 2015 letter from Dick Pedersen, DEQ, to Dennis McLerran, EPA, regarding EPA's consultation with NOAA Fisheries on EPA's approval of Oregon's 2003 temperature standard.

CWR plan for this river segment as described below. The purpose of the CWR plan is to adequately interpret the narrative criterion to allow for implementation of the criterion through DEQ's Clean Water Act authorities.

i. With technical assistance from EPA, DEQ will gather and synthesize readily available data, information and professional expertise, and use the "Primer for Identifying Cold-Water Refuges to Protect and Restore Thermal Diversity in Riverine Landscapes" (Torgersen et al. 2012) as guidance, to characterize:
   1. the current spatial and temporal distribution of CWR,
   2. the current use of CWR by LCR Chinook salmon, UWR Chinook salmon, LCR steelhead, and UWR steelhead in the migration corridor reach of the Willamette River, and
   3. potential locations for the restoration or enhancement of CWR.

ii. Using the above information and professional expertise, DEQ will:
   1. assess whether the spatial and temporal extent of CWR present meets the CWR narrative criterion (i.e., whether CWR are "sufficiently distributed to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body"[81]);
   2. if DEQ concludes that the CWR criterion is not being met, characterize, to the maximum extent possible, the extent of additional CWR needed to attain the criterion; and
   3. identify and prioritize potential actions by DEQ and others to protect, restore or enhance CWR.

iii. DEQ and EPA will identify any scientific uncertainties and data gaps regarding the above elements and identify additional studies needed to address the uncertainties and data gaps.

iv. In coordination with EPA and NMFS, DEQ will complete a scope of work for the CWR plan within 1 year of the signing of this opinion that addresses the elements described above in 1.a.i. and 1.a.ii. The scope of work shall identify data sources and methods DEQ expects to use in completing the plans, and a schedule with milestones for completing the plans.

v. With oversight from EPA, the DEQ will complete the CWR plan for the lower Willamette River within 3 years of the signing of this opinion. DEQ and EPA will participate with NMFS in a meeting by November 30 of each year after this opinion is signed (beginning in the year 2016) to assess progress on completing the plan.

b. The EPA shall work with NMFS to facilitate an inter-agency team, including Oregon, to develop a CWR plan for the Columbia River that is consistent with the CWR plan elements described below. The purpose of the CWR plan is to adequately interpret the narrative criterion to allow for implementation of the criterion through DEQ's Clean Water Act authorities. The EPA shall work with the NMFS, the Columbia River Federal Caucus and the Northwest Power and Conservation Council (NWPCC) to align this work with Amendment 1 of the 2010 Supplemental FCRPS biological

[81] Under the CWR narrative criterion, CWR refugia are at "those portions of 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."

opinion and the water temperature and CWR strategies and objectives of the Columbia River Basin Fish and Wildlife Program of the NWPCC (Sub-Actions WQ 3.2 and CC.5).

i. EPA shall gather and synthesize readily available data, information and professional expertise, and use the "Primer for Identifying Cold-Water Refuges to Protect and Restore Thermal Diversity in Riverine Landscapes" (Torgersen et al. 2012) as guidance, to characterize:
    1. the current spatial and temporal distribution of CWR;
    2. the current use of CWR by SR fall Chinook salmon, SR sockeye salmon, SRB steelhead, UCR steelhead, and MCR steelhead; and
    3. potential locations for the restoration or enhancement of CWR.

ii. Using the above information and professional expertise, EPA shall:
    1. assess whether the spatial and temporal extent of CWR present meets the CWR narrative criterion (i.e., are CWR "sufficiently distributed to allow salmon and steelhead migration without significant adverse effects from higher water temperatures elsewhere in the water body");
    2. if EPA concludes that the CWR criterion is not being met, characterize, to the maximum extent possible, the extent of additional CWR needed to attain the criterion; and
    3. identify and prioritize potential actions by DEQ and/or other parties to protect, restore or enhance CWR.

iii. The EPA, working with NMFS and the inter-agency team, shall finalize a scope of work for the CWR plan for the Columbia River within 9 months of the signing of this opinion that addresses the plan elements described above in 1.a.i. and 1.a.ii. The scope of work shall identify data sources and methods that EPA expects to use in completing the plan; a schedule with milestones for completing the plan; and a strategy to install continuous temperature data recorders during the summer (i.e., June through September) in Columbia River tributaries that are likely to provide CWR, preferably in the year 2016, but no later than the year 2017.

iv. The EPA shall complete the CWR plan for the Columbia River within 3 years of the signing of this opinion.

Oregon DEQ Cold Water Refuge Plan for the lower Willamette River

A Briefing for the Northwest Power and Conservation Council
January 12, 2016

The Oregon DEQ has agreed to develop a Cold Water Refuge Plan for the lower 50 miles of the Willamette River. This work is included as a Reasonable and Prudent Alternative in NOAA Fisheries' Biological opinion on Oregon's temperature standard. The purpose of the plan is to interpret the Cold Water Refugia (CWR) narrative criterion included in the state's water temperature standard so that it may be implemented through DEQ's Clean Water Act authorities.

The plan will address the lower 50 miles of the river because the designated beneficial use for this reach is "salmon and steelhead migration corridor." The temperature criteria that apply to this use are a 7-day average maximum temperature of 20°C and a narrative criterion for cold water refuge. The state has not yet described how to assess whether the cold refugia narrative in these reaches is being met or how it will work toward attaining the narrative. This is what DEQ intends to do in the CWR Plan. DEQ has agreed to develop a scope of work by November 2016 and complete the plan by November 2018.

Step 1 – Gather and synthesize readily available data, information and professional expertise. Give the timeframe for this project and the fact that no resources were provided for this work, DEQ must rely on available data and expertise. With this information we will characterize, to the extent possible:

- The current distribution of CWR,
- Current use of CWR by Chinook salmon and steelhead, and
- Potential locations for the restoration or enhancement of CWR.

Step 2 – Assess whether the CWR are sufficiently distributed and identify and prioritize actions to protect, restore or enhance CWR by DEQ and by others.

Step 3 – Identify the scientific uncertainties and data gaps and identify additional research needed to more fully accomplish the objectives of the CWR plan.

Because the information and expertise to complete the CWR plan is limited within DEQ, DEQ will need to use the data and expertise of other agencies, researcher institutions and organizations to accomplish these tasks. We are encouraged by the interest and the work being done by multiple organizations and hope that we can collaborate with many of you as we pursue this work. DEQ hopes this work will contribute to improved conditions for migrating salmon and steelhead and we look forward to learning as we go.

Columbia River
Cold Water Refugia Plan
(NMFS 2015 Oregon WQS BiOp RPA)

Northwest Power & Conservation Council
January 2016

John Palmer
EPA Region 10

Clean Water Act Background

- State's adopt Water Quality Standards (WQS)
  - Desired condition to protect aquatic life
  - Used for point source permits, listing of impaired waters, and watershed clean-up plans (TMDLs)
- EPA approves or disapproves State's WQS
- EPA consults with NOAA/USFWS on WQS approvals (ESA Section 7)
- Oregon adopted new temperature WQS in 2003
  - Numeric criteria for rivers and streams based in fish use
  - 12C, 16C, 18C, 20C

NMFS Jeopardy Finding

- Oregon Columbia/Lower Willamette River Temperature Criteria
  - 20C numeric criteria
  - Cold Water Refugia (CWR) narrative criteria
    - "must have CWR that's sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher temperatures elsewhere in the water body"
    - "CWR means those portions of a water body where, or times during the diel cycle when, the water temperature is at least 2C colder than the daily maximum temperature of the adjacent well mixed flow of the water body"
- NMFS concluded CWR narrative criteria is not an effective criteria due to lack of implementation
- Jeopardy for Steelhead (LCR, UWR, MCR, UCR, SRB); Chinook (LCR, UWR); Sockeye (SR); SR Killer Whales

Columbia & Willamette Rivers
CWR Plans RPA

- EPA shall develop a Columbia River CWR Plan
- Oregon DEQ shall develop a Willamette River CWR Plan
- EPA shall work with NMFS, Columbia River Federal Caucus, and the NWPCC to align this work with FCRPS BiOp and Columbia River Fish and Wildlife Program
- Columbia & Willamette CWR plans due by November 2018

Columbia Basin Fish and Wildlife Program – Ecosystem Function Strategy

- **Water Quality sub-strategy**: The federal action agencies, FERC, and the non-federal project operators, in cooperation with the EPA and other federal, tribal, regional, and state agencies, shall:
  - Update and implement the Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers (WQP)
  - Monitor water quality parameters and implement water quality improvement measures to reduce water temperatures and TDG to meet state, EPA-approved tribal, and federal water quality standards to improve the health, condition, and survival of anadromous and native resident fish, as well as their related spawning and rearing habitat, in the Columbia Basin

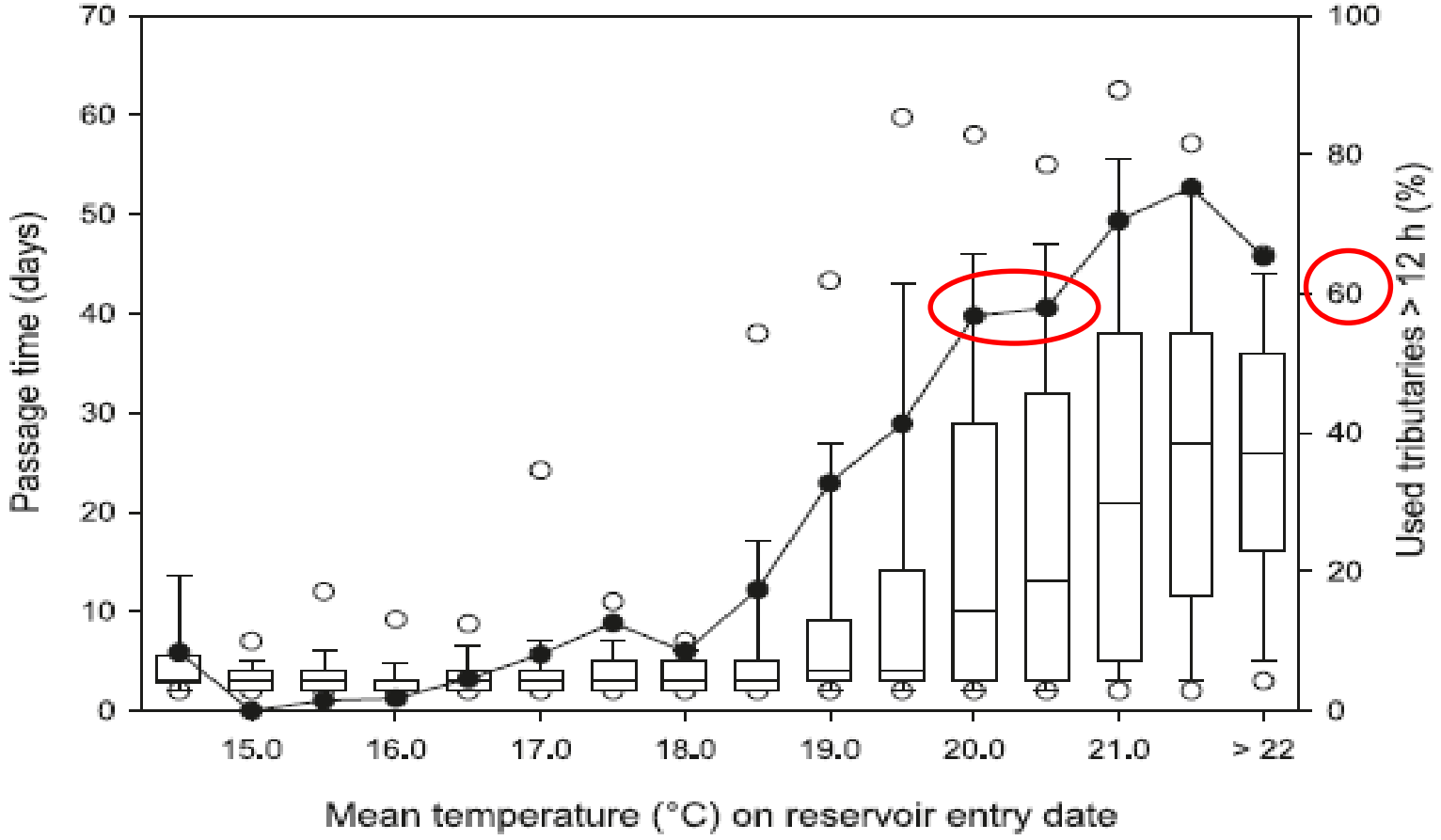
- **Climate Change sub-strategy**: The federal action agencies, in collaboration and coordination with others, shall: "Evaluate the effectiveness and feasibility of possible actions to mitigate effects of climate change, including selective withdrawal from cool/cold water storage reservoirs to reduce water temperatures or other actions to create or protect cool water refugia in mainstem reaches or reservoirs."

Columbia River CWR Plan Area
RM0-RM310

CWR Plan Elements

1. Characterize current spatial and temporal CWR
2. Characterize current salmon and steelhead use of CWR
3. Identify potential locations to restore CWR
4. Assess whether current CWR is sufficient to meet Oregon's narrative criteria
5. Characterize the additional CWR needed
6. Identify and prioritize actions to protect, restore, or enhance CWR

Steelhead CWR use in Bonneville Reservoir (Keefer et al. 2011)



Fall Chinook Refugia Use (Goniea et al. 2006)

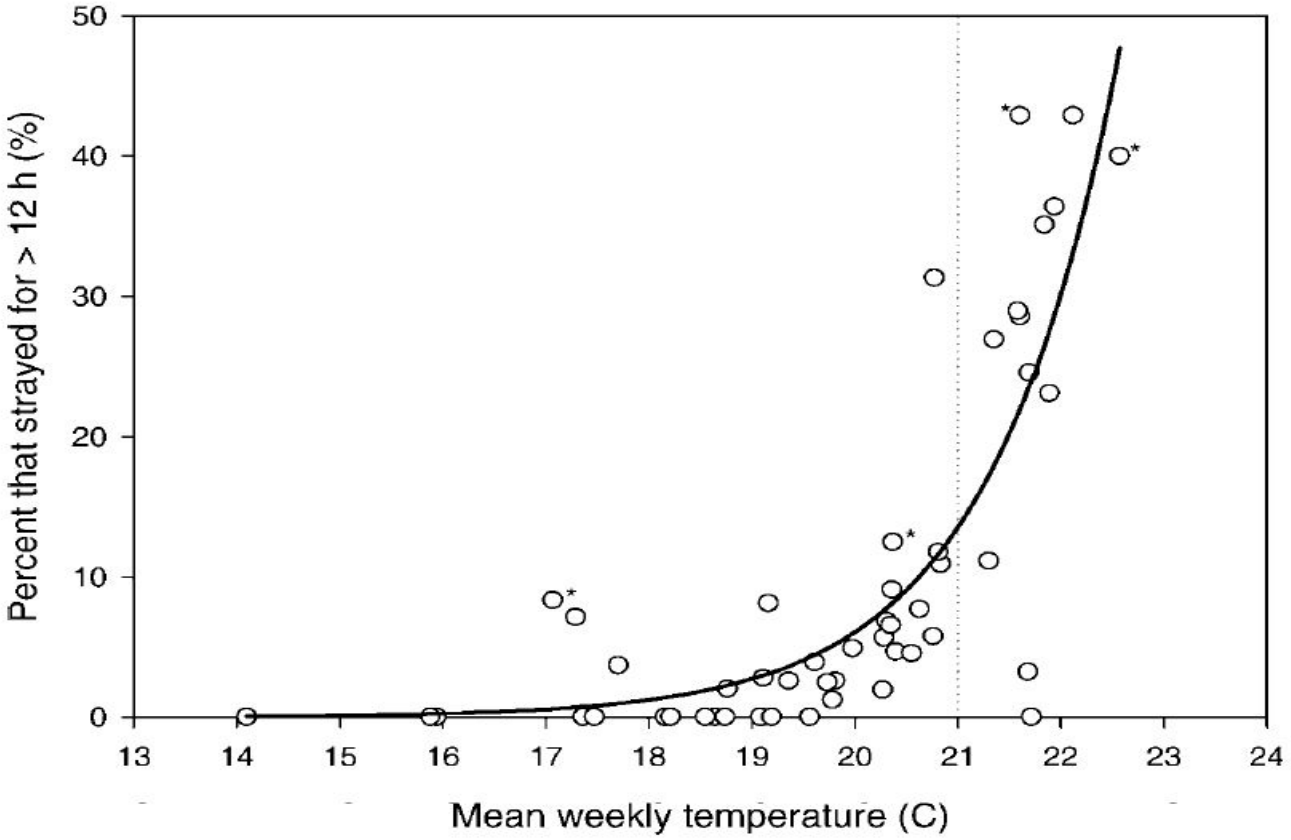


FIGURE 6.—Relationship between the percent of fall Chinook salmon that used (>12 h) coolwater tributaries and mean weekly water temperatures at Bonneville Dam. Circles represent 52 weekly bins (mean = 41 fish/bin; range = 4–122 fish/bin). The curve is the exponential regression line that best fits the data ($r^2 = 0.80$; $P < 0.0001$; percent $= 6.558^{-7} e^{0.802 \times \text{temperature}}$). Asterisks indicate data points with fewer than 10 fish.

Columbia River at Bonneville (Keefer et al.)

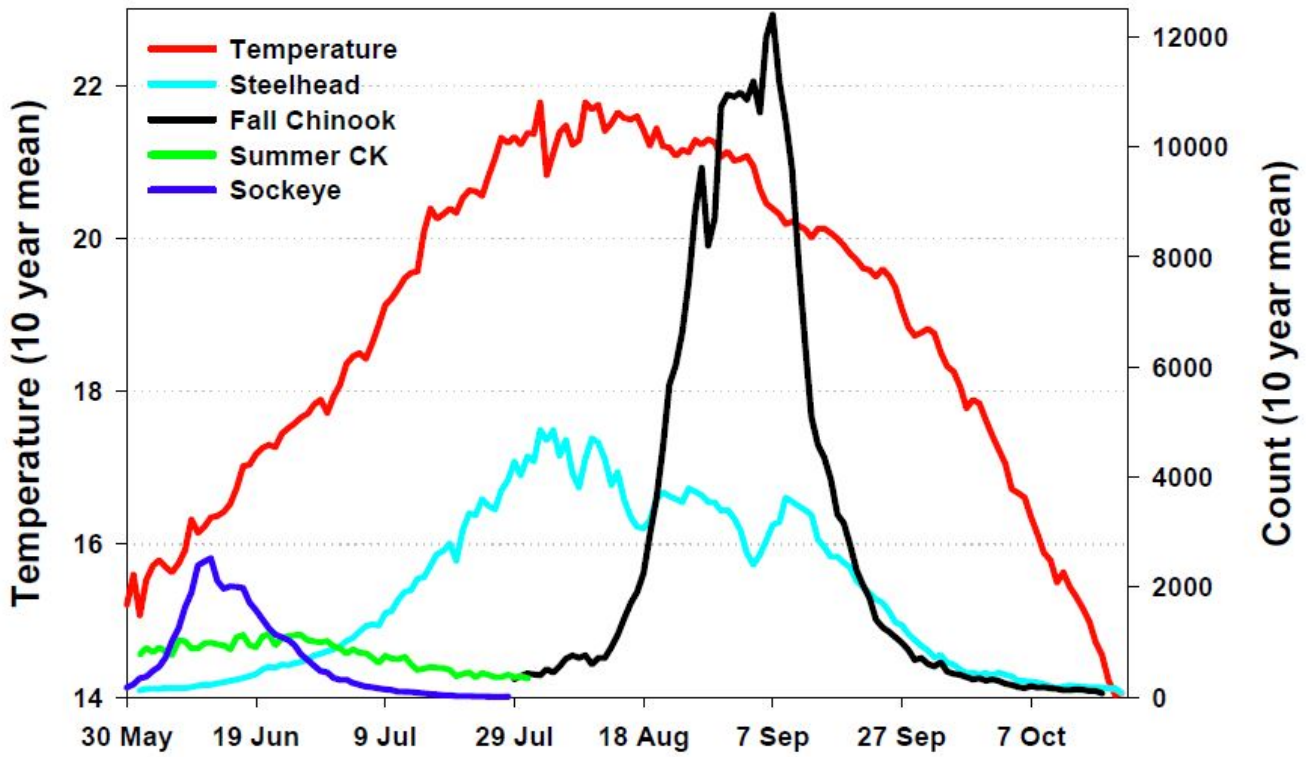
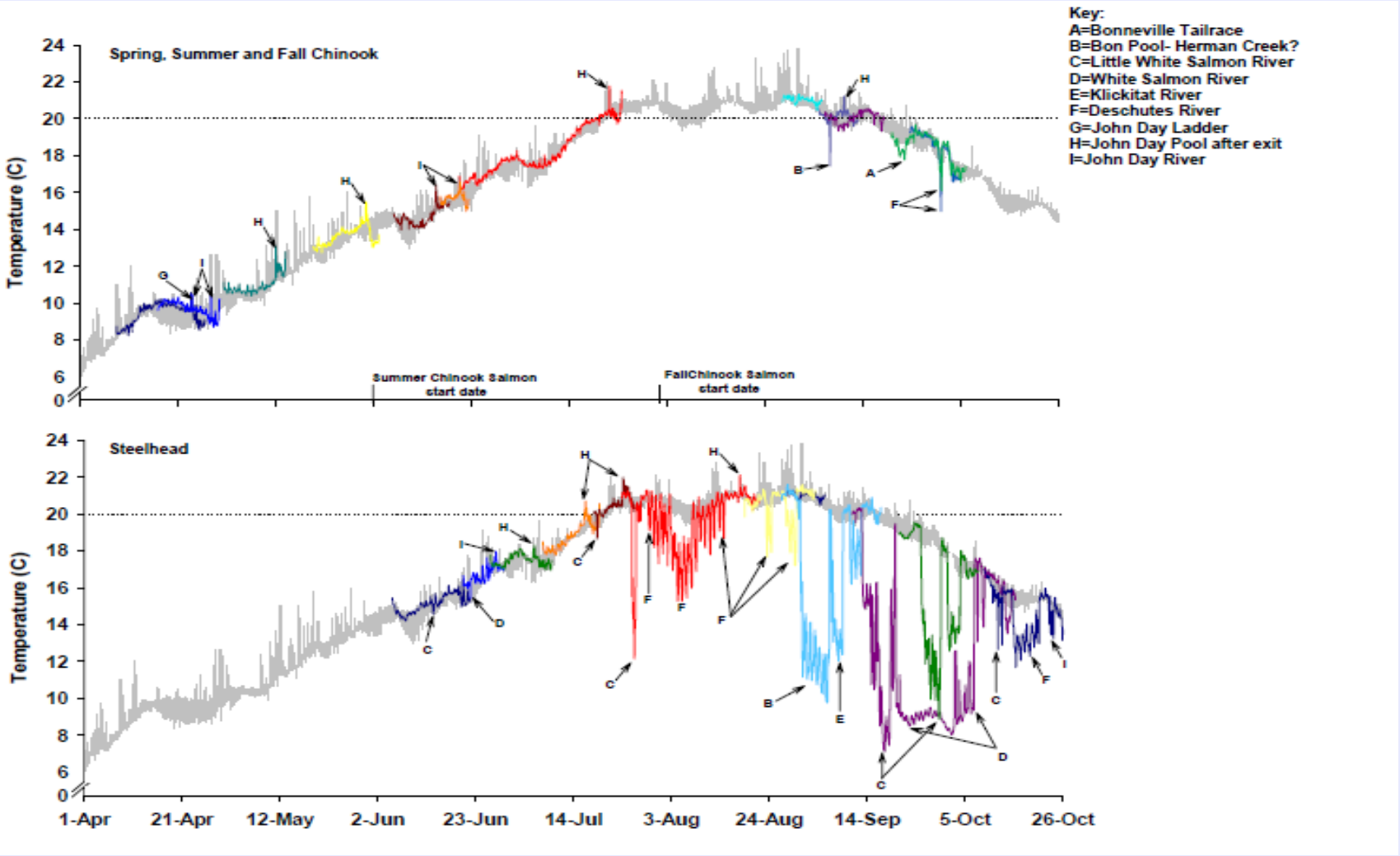


Figure 2. Ten-year (1996-2005) mean lower Columbia River water temperature (°C) and mean run size and timing of adult summer Chinook salmon, fall Chinook salmon, sockeye salmon, and summer steelhead at Bonneville Dam. Thermal refugia use by many adult populations has been associated with water temperatures greater than 19-20 °C.

Tracking Internal Temperatures of Individual fish (University of Idaho 2011 Memo)



Steelhead & Refugia (Keefer et al. 2011)

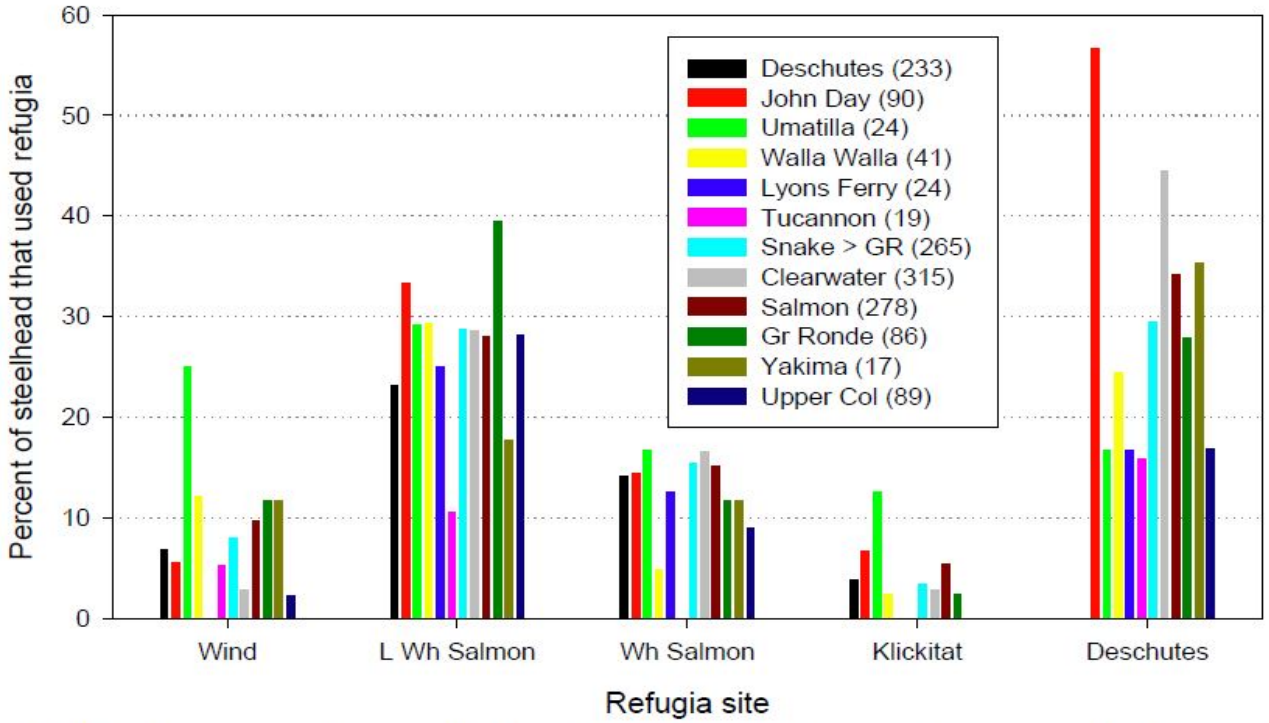


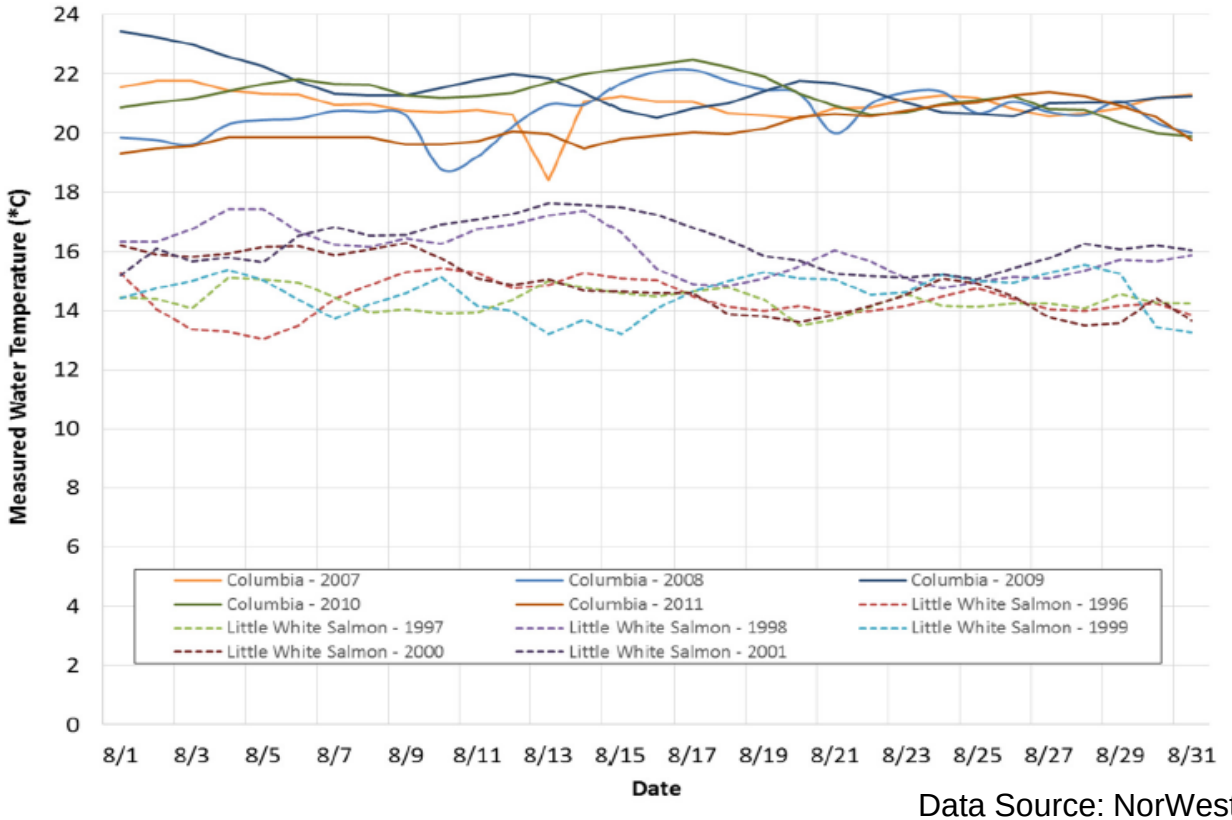
Figure 7. Population-specific use of selected cool-water refugia tributaries in the Bonneville-John Day reach by radio-tagged summer steelhead in 1996-1997 and 2000. Bar colors represent upriver populations, with sample sizes in parentheses. Steelhead additionally used Herman and Eagle creeks, but these small sites were inconsistently monitored in these study years. A small number of steelhead temporarily used the Hood River (not shown).

Little White Salmon CWR

Little White Salmon vs Columbia River Temperatures

Tributary #112 – Little White Salmon River

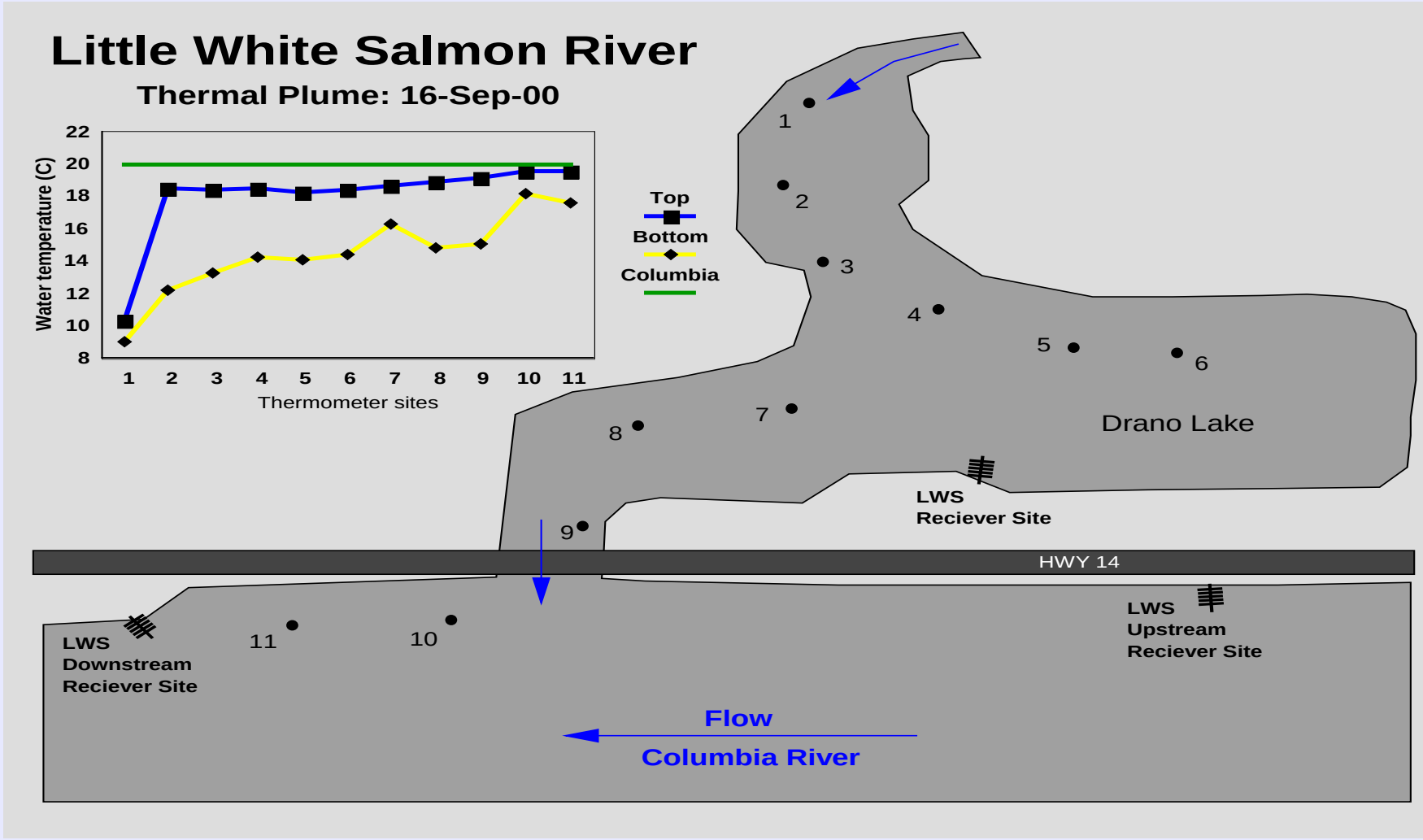
Daily Average Water Temperature



Data Source: NorWest, USFS

Little White Salmon CWR Plume

(Data source: U of I)

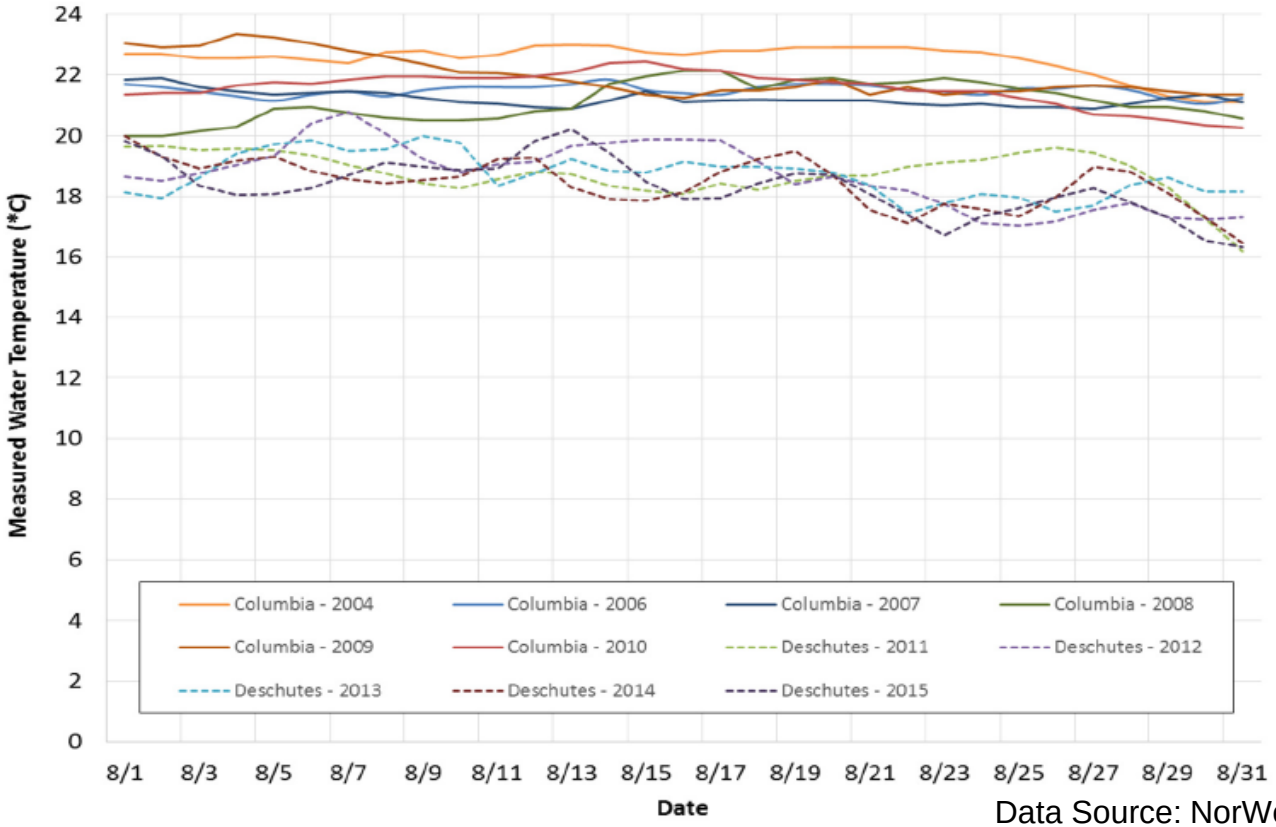


Deschutes River CWR

Deschutes vs Columbia River Temperatures

Tributary #135 – Deschutes River

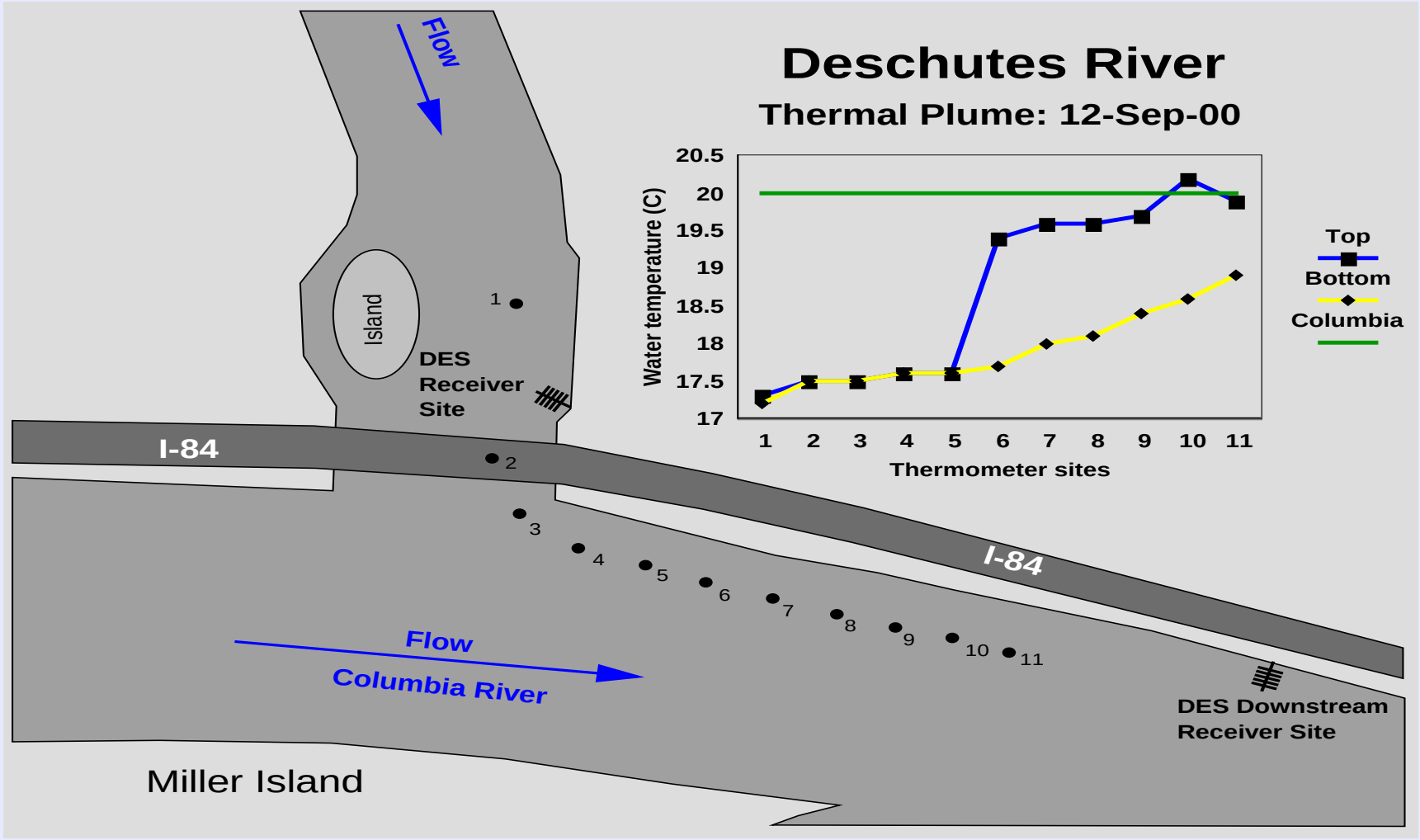
Daily Average Water Temperature



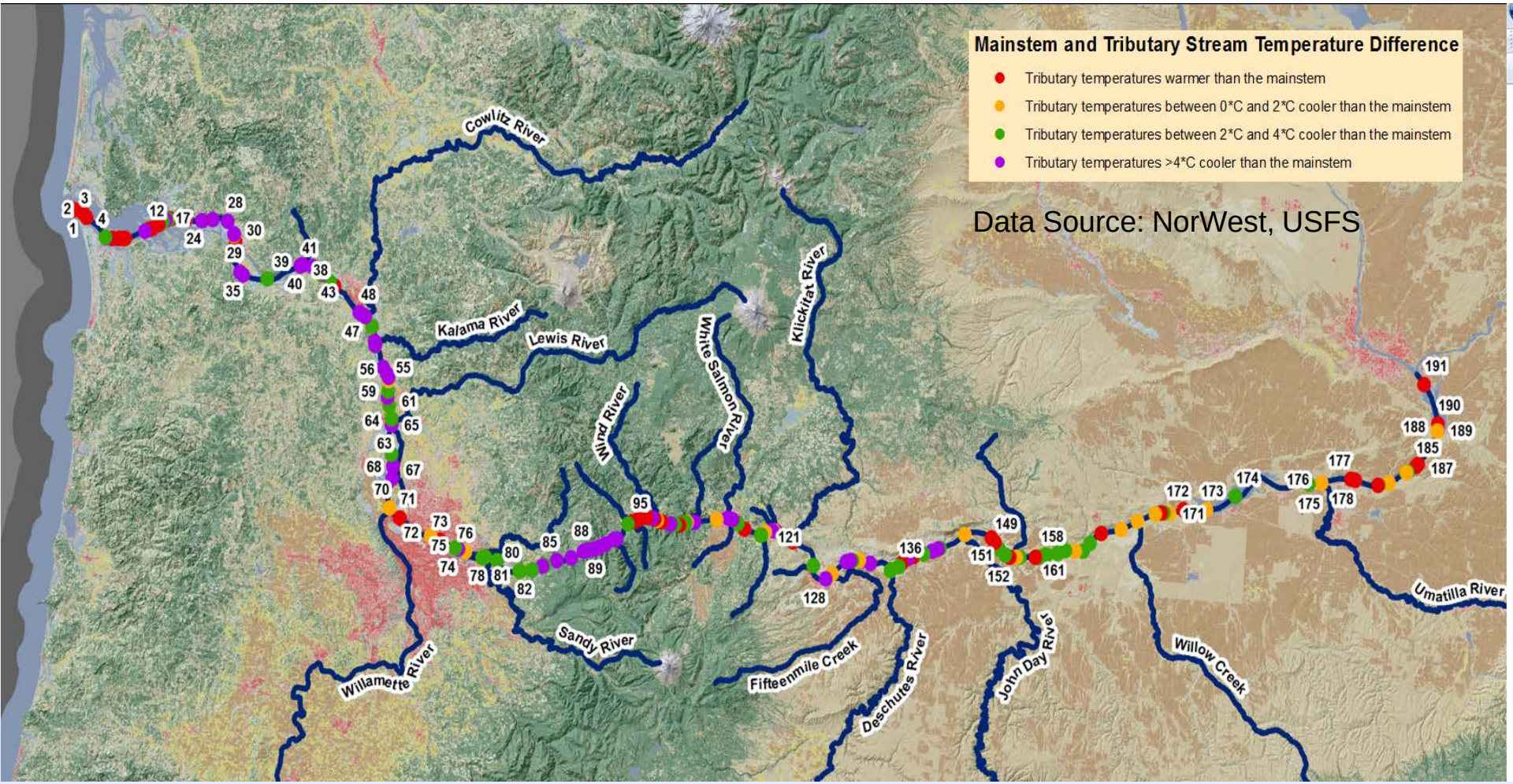
Data Source: NorWest, USFS

Deschutes River CWR Plume

(Data Source: U of I)



Columbia River CWR Tributaries



Upcoming Work

- Additional tributary temperature monitoring
- Characterization of tributary plumes/confluence areas
  - Temperature monitoring/modeling to define spatial extent across summer
  - How many fish can reside in each area at one time
- Steelhead/Salmon radio-tag studies?
  - Available study data done in 1999-2004 (Univ. of Idaho)
  - No information below Bonneville Dam on CWR use
  - 2017 study effort?
- Develop model to compare thermal risks of fish that use and don't use CWR and help determine sufficiency of CWR in Columbia River
  - Assess cumulative available CWR & fish migration rates
- Identify and prioritize actions to protect and restore CWR areas

Columbia River Summer Temperatures Exceed 20C

- Typically exceed 20C for two months (mid-July through mid-Sept) in Columbia River below the Snake River confluence
- Typically exceed 21C for several weeks
  - Lethal for Adult Sockeye
  - Stressful for Adult Chinook and Steelhead (seek CWR)
- Dworshak cold water releases essential for Lower Snake River
- Other options to cool Columbia/Lower Snake River temperatures?
- Fish ladder/Forebay temperatures an increasing concern
- Climate Change predicted to further warm these rivers
  - Increase in summer daily average temperatures
  - Increase in # of days exceeding 20C/21C

Columbia River Sockeye – Summer 2015 (Temperatures)

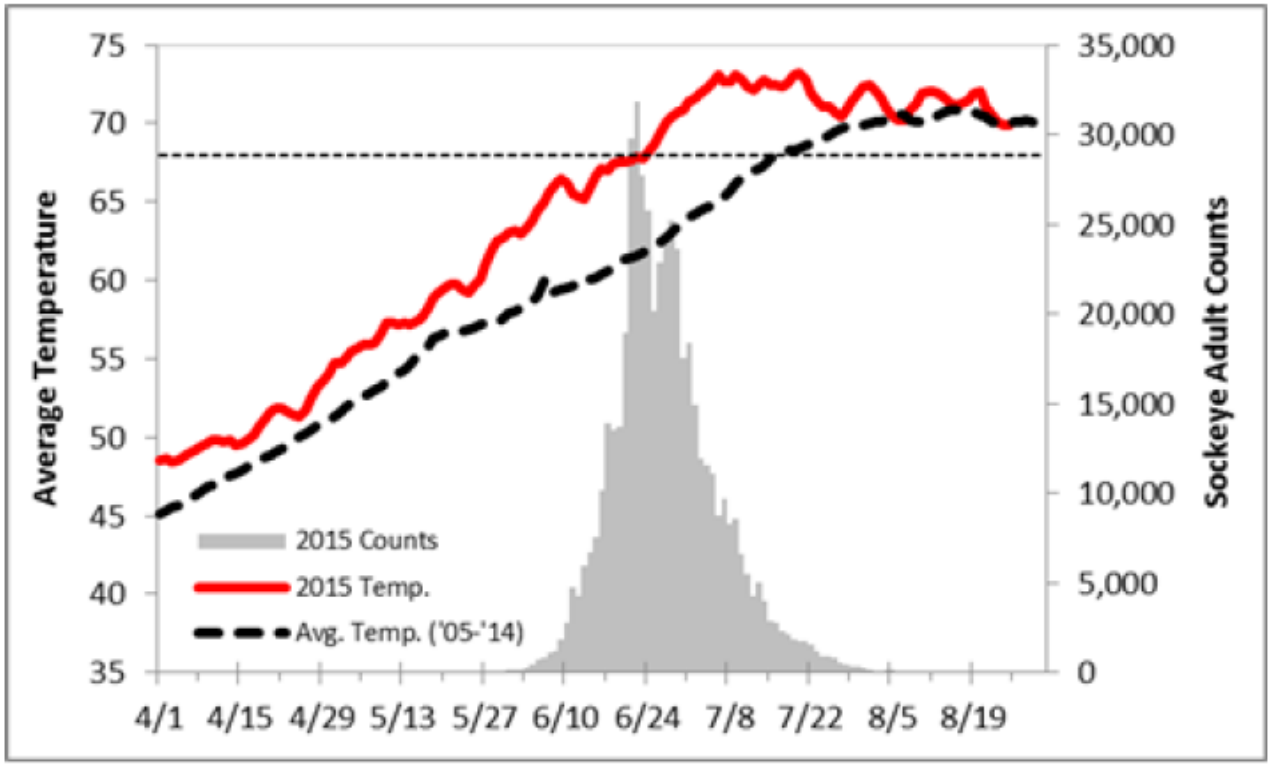


Figure 6. Water temperature at Bonneville Dam in 2015 compared to the average for the past 10 years, and the adult sockeye dam counts at Bonneville Dam in 2015.