



July 21, 2020

Mr. Andrew Wheeler
Administrator
Environmental Protection Agency

Ms. Mary Lou Soscia
Columbia River Coordinator
Environmental Protection Agency

Ms. Laurie Mann
Washington TMDL Program Manager
Environmental Protection Agency

Dear Mr. Wheeler, Ms. Soscia and Ms. Mann:

On behalf of the Port of Whitman County Commissioners, thank you for the opportunity to comment on the *Total Maximum Daily Load for Temperature on the Columbia and Lower Snake Rivers*.

The Port of Whitman County is a public port district located in southeastern Washington. Our mission to improve the quality of life for all citizens of Whitman County through industrial real estate development, preservation of multi-modal transportation, facilitation of economic development and provision of on-water recreational opportunities.

We own and operate three on-water ports along the lower Snake River in Washington: Port of Wilma, Port of Almota and Port of Central Ferry. Together, these ports employ 357 people and generate nearly \$30 million in gross regional product, according to a 2017 economic analysis. In addition, we operate and maintain Boyer Park & Marina in Colfax, Washington, which offers one of the few places to recreate on water in Whitman County. As you know, two federal dams – Lower Granite and Lower Monumental – make these sites possible.

They also provide our community with water, navigation, trade and power. The river system is truly the lifeblood of our rural communities and businesses. Its benefits to trade are dramatic on the Palouse, where the greatest amount of wheat of any county in the nation is grown and transported internationally – much of which first travels to Portland by barge.

We support the measures outlined in the preferred alternative of the Columbia River System Operations Draft Environmental Impact Statement (DEIS), which will improve fish passage,



while continuing to operate the dams for their many Congressionally mandated purposes. On March 17, we issued a public comment on the DEIS to express this viewpoint.

Similarly, we would like to see a balance achieved in this TMDL process. While water temperature is a significant concern for fish populations, assigning unattainable standards sets dam operators up for certain failure. It is clear that the states of Washington and Oregon intend to base energy and environmental policy on this report. Unfortunately, this could force a dam breaching outcome, which would run counter to the objective of the TMDL.

“Opponents of the LSR dams appear to be pushing temperature problems as a means of forcing removal or breaching of the dams,” writes John McKern, U.S. Army Corps of Engineers fish and wildlife biologist (retired). “Unfortunately, that would probably worsen rather than lessen the temperature problem. The shallow, more turbulent river would be more subject to heating in the arid desert-like canyon than the deeper reservoir’s experience.”

Recently, Mr. McKern wrote an update to his 1999 declaration on temperature regulation in response to Civil No. 99-442-FR filed by the National Wildlife Federation, et. al. against the U.S. Army Corps of Engineers for exceeding temperature and dissolved gas standards in the lower Snake River. Extensive research on current information sources has not changed the biologist’s opinion on the ability to regulate the temperature of the lower Snake River to the 20°C (68°F) standard.

KEY POINTS

These are the key points drawn from Mr. McKern’s research:

- A 2002 study of historic water temperatures in the Lower Snake River for the U.S. Army Corps of Engineers (USACE) found that the lower portion of the free-flowing Snake River commonly exceeded the 20°C (68°F) standard in July and August, sometimes running as high as 25-27°C¹.
- The free-flowing Snake River ran through a 2,000-foot to 200-foot deep arid canyon with high temperatures over 43°C in the Lewiston, ID area to 46° C near Pasco, WA. Searing summer sun and hot winds heated the shallow river to temperatures too high for summer Chinook and steelhead passage, as well as fall Chinook spawning. Combined with low summer flows, water temperatures were higher than after impoundment by Ice Harbor (IHR), Lower Monumental (LMO), Little Goose (LGO) and Lower Granite (LGR) dams.
- Installation of the four reservoirs along the Lower Snake River in the 1960s and 70s reduced peak temperatures by creating four deep pools, ranging from 20 feet deep at the upper end to over 100 feet deep at the next dam. These pools are heated by solar and air

¹ [Water Temperatures and Passage of Adult Salmon and Steelhead in the Lower Snake River](#)



sources to a lesser degree than a shallow, free-flowing river. Cold-water releases from Dworshak Reservoir have further reduced temperatures. Though unable to meet the 20°C standard consistently, more tolerable water temperatures have been achieved.

- Several commenters have stated that the primary source of water heating in reservoirs is from solar energy and mixing with hot air due to wind-wave action. This is less pronounced in the Lower Snake River reservoirs because they are run-of-river reservoirs with constant downstream water movement; whereas, storage reservoirs like Dworshak have far more pronounced stratification because the water is not moving.
- Starting in the 1990s, the fishery agencies and tribes represented by the Fish Passage Center requested spring releases of cool water from DWR with the expressed purpose of cooling the Lower Snake River for adult salmon and steelhead migration. The Corps complied with the request and cold-water releases from DWR have morphed into a routine that enabled keeping the lower Snake River below 20°C during most summers for over two decades.

RECOMMENDATION

Based on this research, as well as the comments of our partner organization, Northwest RiverPartners, we recommend the implementation of a multi-dimensional model for analysis. As Northwest RiverPartners commented, “The RBM10 model is a one-dimensional model. It is not well-suited to solving for issues of the magnitude and complexity of the analysis in the TMDL, nor can it provide the precise outcomes upon which major policy decisions should rest.”

The selected model should be able to replicate the effects of river impoundment shown in the 2002 USACE study, maintain consistency in its inclusion or exclusion of dams as part of the free-flowing river and incorporate the entirety of the Columbia and Snake river basins.

Thank you again for the opportunity to comment. We ask that you please incorporate these recommendations, as well as the attached summary review of temperature research, into your report. In addition, we respectfully request the issuance of a revised TMDL and the ability for stakeholders to participate in a public comment period before it is finalized.

Respectfully,

Port of Whitman County Commissioners

Kristine Meyer
District 2

Tom Kammerzell
District 3

SUMMARY REVIEW OF STATE AND FEDERAL TEMPERATURE STANDARDS, LOWER SNAKE RIVER

BY JOHN MCKERN, FISH PASSAGE SOLUTIONS, LLC

June 2020

1. This is an update of a declaration I made on temperature regulation in response to Civil No. 99-442-FR filed by the National Wildlife Federation, et. al. against the US Army Corps of Engineers for exceeding temperature and dissolved gas standards in the lower Snake River (LSR). In addition to the personal information in my declaration, I have been a consultant on Columbia Basin fish issues for over 20-years since I retired from the Corps in 2000.
2. Many of the sources of information for water temperature information have changed since the 1990s when I assembled my declaration. For example, the US Geologic Service has reduced the information reported from many of their stream gauging stations including temperature data, but some, like the Anatone gauge on the Snake River above Lower Granite Reservoir, are still being funded under the Corps Dissolved Gas Monitoring Program. Additional information is accessible through the University of Washington Data access in Real Time program (<http://www.cbr.washington.edu/dart>). Another significant change has been the impact of the COVID-19 pandemic on the availability of information because many on-line library services are less accessible.
3. Extensive searching for current information and review of past information has not changed my opinion on the ability to regulate the temperature of the lower Snake River to the 20° C (68° F) standard pressed for by the plaintiffs in 1999 or in the current political atmosphere. That is:
 - Historic water temperatures of the lower Snake River commonly exceeded the 20° C standard in July and August, sometime being as high as 25 to 27° C (Peery and Bjornn, 2002).
 - The free-flowing Snake River ran through a 2,000 foot to 200-foot-deep arid canyon with high temperatures over 43° C in the Lewiston, ID area to 46° C near Pasco, WA. Searing summer sun and hot winds heated the shallow river too hot for summer Chinook and steelhead passage and too hot for fall Chinook spawning (Tom Meekin, Washington Department of Fisheries, pers comm). Combined with low summer flows, water temperatures were higher than after impoundment by Ice Harbor (IHR), Lower Monumental (LMO), Little Goose (LGO), and Lower Granite (LGR) dams.
 - Several commenters have stated that the primary source of water heating in reservoirs is from solar energy and mixing with hot air due to wind-wave action. This is less pronounced in the LSR reservoirs because they are run-of-river reservoirs with constant downstream water movement whereas storage reservoirs like Dworshak have far more pronounced stratification because the water is not moving. The LSR reservoirs are in a relatively narrow canyon and have converted what was a shallow, warm summertime river to four reservoirs around 20-feet deep at the upper end to 100+feet deep at the next dam. In contrast, Dworshak Reservoir (DWR) on the Northfork Clearwater River ranges from a cold mountain river a few feet deep at the upper end to 602 feet deep 2-mile wide reservoir at the dam. The LSR reservoirs under pre-1990s circumstances did not stratify to any extent. That is, the surface water would only be a degree or so warmer than the underlying, flowing reservoir water. Dworshak, a storage reservoir, is designed to capture winter and spring flood water and store it for release over the summer. In summer, Dworshak stratifies at 24° C in the top layer, up to 20-foot deep, and 50° C down to 40° C in the lower and deepest parts of the reservoir.
 - Before the mid-1990s, LGR received waters up to 26° C from the Snake River (Anatone gauge) and 25° C from the Clearwater (Spaulding gauge). The hot water passed through LGR and about a week later reached LGO. Similarly, a week or so later, the hot water reached LMO, and another week, IHR. Liscom, et. al., 1985 published temperature data (Appendix B.6) that corroborates what I reported from Corps Annual Fish Count Reports through 1998 (EXCEL spreadsheet).

- Starting in the 1990s, the fishery agencies and tribes represented by the Fish Passage Center requested spring releases of cool water from DWR with the expressed purpose of cooling the LSR for adult salmon and steelhead migration. The Corps complied with the request and cold-water releases from DWR have morphed into a routine that enabled keeping the lower Snake River below 21° C during most summers for over two decades. Graphic representation of this affect is demonstrated in the PowerPoint file labeled Port Temperatures.
- Water from Hells Canyon typically enters LGR at Lewiston at up to 25° C, while Clearwater River water enters at 10° to 14° C. Thus, LSR reservoirs now have significant temperature stratification because hotter Snake River water rides above the colder Clearwater River water all the way to LGR (PNNL – 15532.pdf, 2006). There colder water is passed through turbines or under normal spill gates and hotter water passes over the overflow spillway weir. The PNNL study measured temperatures near the surface and at various depths that indicated surface temperature exceeding the 20° C criterion while at greater depth, temperatures were below the standard depending on the depth. That juvenile salmon and steelhead equilibrate total dissolve gas at 120 to 125 percent normal is an argument of the fishery agencies and tribes for more spill. Similarly, the fact that adult salmon and steelhead would migrate in the cooler, deeper waters should be accounted for. The ability of fall Chinook juveniles rearing in the reservoirs likewise would be able to regulate temperatures by utilizing deeper water. Turbine passage studies show that fall Chinook are distributed deeper than stream type Chinook which are guided better by turbine intake screens, and deeper than steelhead smolts that guide best by turbine intake screens. Guiding efficiency is governed by their depth in the water as it enters the turbine intakes.
- The PNNL study measured water velocities at the various sample sites too. They found that the reservoirs were flowing downstream more or less continuously even with the low summertime flows. This causes constant mixing, so stratification is not a highly defined as it is in Dworshak Reservoir.
- The current spill program has significantly changed the nature of the water temperature regimes of the LSR reservoirs. Mass spill to 120 or 125 percent TDG passes large quantities of water from about 50-feet in depth under the standard spill gates. There are seven standard gates at LGR, LGO, and LMO, and nine at IHR. Cooler water would be passed downstream through turbines because their intakes are 75 to 85-feet below the surface. Overflow weirs, one at each dam, pass 5,000 to 10,000 cfs while late summer flows range from 20,000 to 40,000 cfs.
- Hot water was entering the surface exits of the LGR and LGO fish ladders causing adult fish to delay until a pump system was installed to bring colder water up from depth around each exit so adult fish migration would not be hindered by a temperature block. Installing such features at all four LSR dams is included in the Columbia River System Operation EIS alternatives currently under public consideration.
- The EPA Columbia and Snake River TMDL report (2020) corroborates the fact that the Snake River (Anatone Gauge) mean maximum temperature exceeds the 20° C standard by 2 to 4° C during July, August, and September (2011 to 2016) while cold water from the Clearwater River typically keeps the lower Snake River 1 to 2° C cooler (Table 6.2) at LGR. Figures 6.1 through 6.3 show how water temperatures at Anatone, LGR, LGO, LMO, and IHR exceed the 20° C standard during July, August, and September (2011 to 2016).
- The EPA Columbia and Snake River TMDL report (2020) also details the temperature contribution of each dam (turbine cooling water) which is miniscule for the LSR dams. If point source permits were required, cooling water and potential oil spills would be the sources. Non-toxic vegetable oils have been used in the turbines for decades. Similarly, polychlorobiphenyl (PCB) oils were eliminated from transformers at the dams years ago.
- Case No. 18-cv-3521, COMPLAINT FOR DECLATORY RELIEF AND INJUNCTIVE RELIEF makes the case that the defendants were arbitrary, capricious, and did not act accordance with the law (Administrative Procedures Act). It appears that the defendants used the best available science in making their decisions, thus were not in violation of the APA.

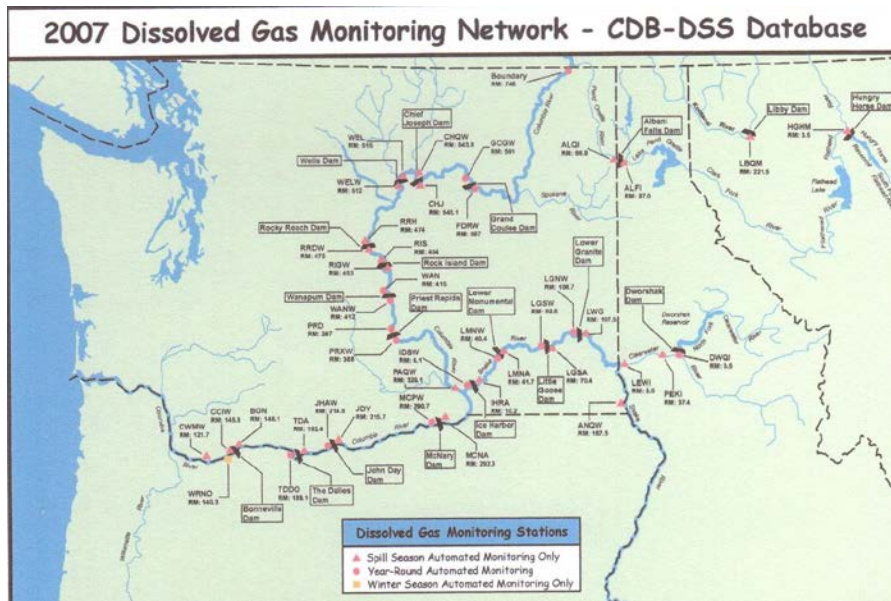
4. Although there is a great deal more information available now (some of which I was able to review), my opinion about adhering to the 20° C water temperature TMDL is not practical for the LSR. Historically, that standard was routinely exceeded during the summer months in the free flowing LSR. Installation of the four reservoirs reduced the maximum temperature to some degree by creating four deep pools that were heated by solar and air sources at a lesser degree than the shallow river. This has been reduced further with the cold-water releases from Dworshak Reservoir. Though unable to meet the 20° C standard consistently, more tolerable water temperatures have been achieved. This has not occurred without complications. Now, temperature differences between the Snake River and the Clearwater River waters have caused stratification in the reservoirs as warm water has flowed above the colder water. This caused thermal block problems at LGR and LGO fish ladder exits that have been corrected. Correction of similar problems at LMO and IHR are included in future plans (CRSO-20EIS).

5. Opponents of the LSR dams appear to be pushing temperature problems as a means of forcing removal or breaching of the dams. Unfortunately, that would probably worsen rather than lessen the temperature problem. The shallow more turbulent river would be more subject to heating in the arid desert-like canyon than the deeper reservoirs experience. The PNNL report indicates that cold-water releases from Dworshak Reservoir regain some temperature from the dam down to Lewiston due to mixing with Clearwater River water from above Orofino, and due to solar and wind action in the lower Clearwater canyon.

6. It could be suggested that more cold water could be released from Dworshak Reservoir. However, Dworshak National Fish Hatchery pumps the majority of its rearing water from the Northfork below the dam. Installing a large enough pipeline from the reservoir with temperature control would be very expensive. Changing the rearing regime would be more problematic than it has been by changes thus far. The growth of steelhead and Chinook reared at DNFH is governed by water temperature. Further cooling the water pumped into the hatchery could force 1-year rearing to smolt size to 2-year rearing, reducing the mitigation capacity of the hatchery.

7. So the question remains, how do you cool the lower Snake River to meet the 20° C standard? The only way that seems feasible to me would be to install temperature control on existing storage reservoirs above Hells Canyon. Given the vast area utilizing the stored water in southern Idaho and eastern Oregon and the thermal stratification of Brownlee Reservoir, this does not seem very promising. Another option would be to construct more storage reservoirs for the purpose of providing cold water. A large storage reservoir on the Salmon River, ID, could contribute cold water like Dworshak does now, but that concept would be politically unfavorable. While I was working at the Corps, reconnaissance level studies were initiated on more storage reservoirs in the Clearwater Basin in ID, and in OR on the Grande Ronde River and Catherine Creek. A More extensive study was carried out on the Weiser River, ID. Galloway Dam was studied as a method of providing up to 700,000 acre-feet of supplementation to offset or add to the 427,000 acre-feet being supplied by the Bureau of Reclamation reservoirs under the current Water Budget. At over 300-feet high and as a direct tributary to Brownlee Reservoir, Galloway could be equipped with temperature control outlets and contribute to the cooling of Brownlee. Adding temperature control at Brownlee Dam could then contribute cooler water through Hells Canyon.

FIGURES:



<https://www.nwd.usace.army.mil/CRWM/Water-Quality/>

REFERENCES: (Files transmitted separately)

ABSTRACTS: a variety of articles related to water temperatures, sources, authors, and dates listed.

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C. B. Cook, B. Dibrani, M.C. Richmond, M.D. Bleich, P.S. Titzler, and T. Fu. 2006. Hydraulic Characteristics of the Lower Snake River During Periods of Juvenile Fall Chinook Salmon Migration. PNNL – 15532. Richland, WA.

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Kenneth Liscom, , L. Stuehrenberg, and F. Ossiander. 1985. Ratio-tracking Studies of Adult Chinook Salmon and Steelhead to Determine the Effect of “Zero” River Flow during Water Storage at Little Goose Dam on the Lower Snake River. BPA Contract DE-A179-81BP27780).

NOAA Northwest Fisheries Science Center Publications Library: <https://www.nwfsc.noaa.gov/publications/index/cfm>

PowerPoint Presentation: PORT TEMPERATURES

PowerPoint Presentation: TEMPERATURE REGULATION LGR.

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University of Washington DART River Environment Graphics & Text:

<http://www.cbr.washington.edu/dart/queriv/river>