December 5, 2019

To Whom It May Concern,

The Environmental Protection Agency (EPA) "Columbia Cold Water Refuge (CWR) Plan" relies substantially upon the results of the US Department of Agriculture NorWeST summer stream temperature scenarios of the Western United States. As such, my comment here will focus primarily on a substantial error within their "1-kilometer resolution spatial statistical stream network model", which greatly misinforms the EPA's CWR report.

Following that critique, this comment will address the EPA's omission of the Lower Snake River (LSR) from their CWR plan. Removal of the LSR dams in southeastern Washington -- undergoing serious consideration by the US Army Corps of Engineers -- is a reasonable and prudent solution for addressing water temperature needs of Northwest salmon and steelhead. On the other hand, removal of the LSR from the CWR is an inexcusable flaw. Please know, that Federal Judge Michael Simon will be seeing this comment, as will Earthjustice.

It is painful for me to make these criticisms. The errors and omissions are obvious and should have been readily recognized by the developers of these government publications. Having been involved in the effort to recover Idaho's wild Salmon and Steelhead for two decades now, I am unfortunately becoming accustomed to the political maneuvering that has been, and continues to be, insider-meddling of government documents. This is a strong allegation, but it is not put forth without substantial data and documentation.

At The Confluence of Two Important Rivers

Highest
The drainage basin of the Clearwater River is 9,650 square miles and has an average annual discharge of 15,300 cubic feet per second (cfs). As the largest tributary of the Snake River, flowing from the high mountain peaks of the Continental Divide, its clear cool waters were once the world's largest producer of steelhead trout. But in 1972, with the construction of 717-foot tall Dworshak Dam, the world's greatest run of steelhead was extirpated.

To "mitigate" this great loss, the world's largest steelhead hatchery was built a dozen miles downstream. Currently classified as a "Threatened" species worthy of Endangered Species Act protection, the declining numbers of Snake River Steelhead have triggered the Early Warning Indicator of the 2014 Biological Opinion (the very same document that set this CWR Plan into motion). With "recovery" and delisting unimaginable for 50 to 100 years (see NOAA Fisheries Recovery Plan), Idaho Fish & Game now considers it good news if they are able to trap enough steelhead for their broodstock hatchery needs. Importantly, this year's dismal run will trip the Significant Decline Trigger of NOAA Fisheries' Adaptive Management Implementation Plan.

Longest
The drainage basin of the Snake River is 108,000 square miles and encompasses parts of six western states. The largest tributary of the Columbia River, its flows have been recorded as high as 410,000 cfs but average flows are 55,000 cfs at Ice Harbor Dam on the Lower Snake River.

Midway up the Lower Snake River, and flooded by the federal government's Lower Monumental Dam in 1969, is Washington's first National Historic Landmark, the Marmes Rockshelter that holds elk bones, human remains and tools from over 10,000 years ago. Evidence suggests the site first sheltered humans 11,230 years ago and occupation continued for the next 8,000 years.

To the headwaters of the Salmon River, following a 950-mile migration and climbing 6000 feet to snow-fed lakes in Idaho's Sawtooth Mountains, ten thousands of Sockeye would spawn annually. In 2015, warm water conditions in the Columbia and Snake Rivers killed 99% of the Endangered Snake River Sockeye run. This tragedy is very well documented. Sturgeon found belly-up were sliced open, only to find they had engorged themselves with dead Sockeye.

Curiously, the CWR Plan carefully avoids elaborating on this tragic, warm-water incident:

When the river does warm earlier and coincide with sockeye and summer Chinook fish runs, as it did in 2015, the use of CWR is seen as an ineffective migration strategy for these fish. This appears to be because delayed upstream migration by holding in CWR results in exposure to warmer mainstem temperatures during their continued upstream migration as river temperatures continue to heat up from early to mid-summer (CWR Plan page 24).

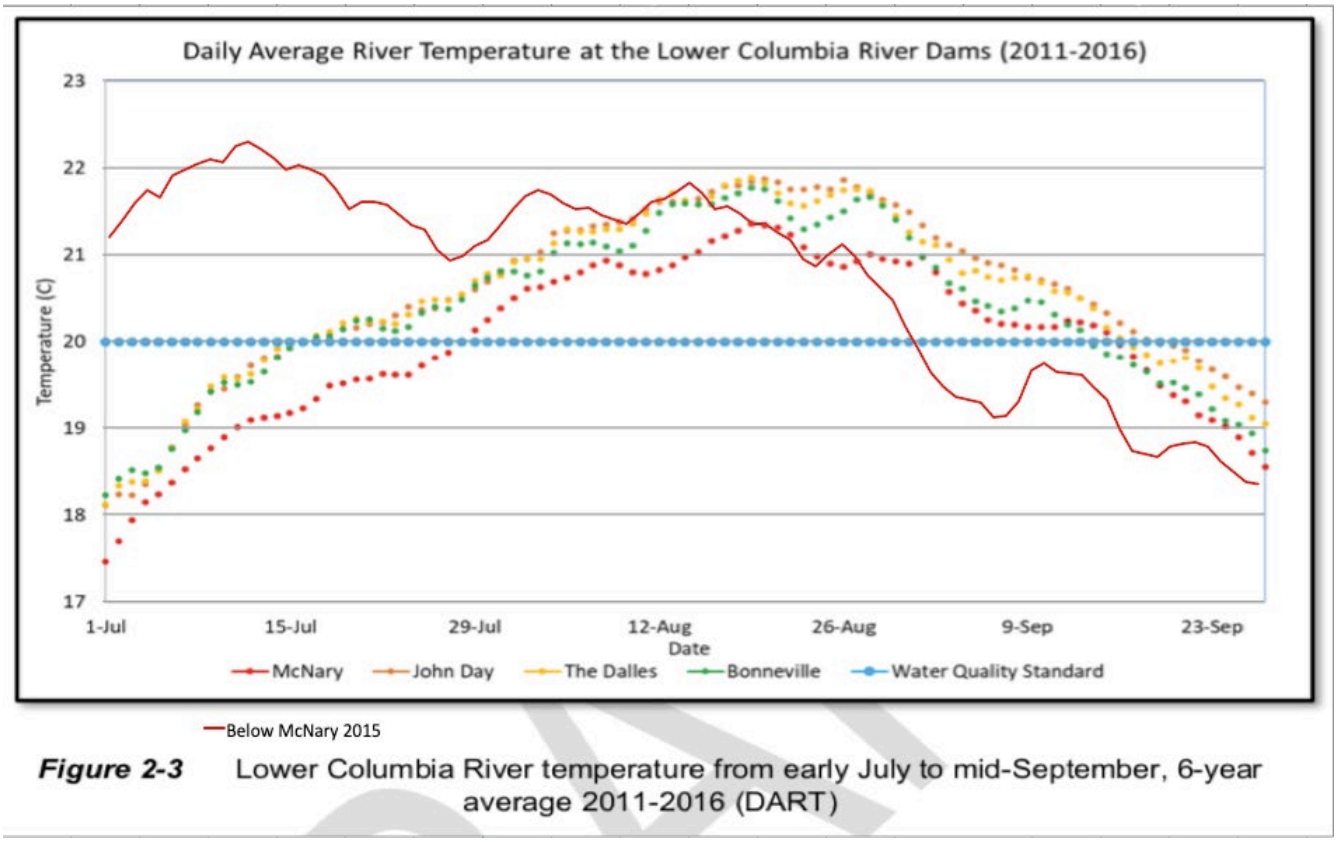
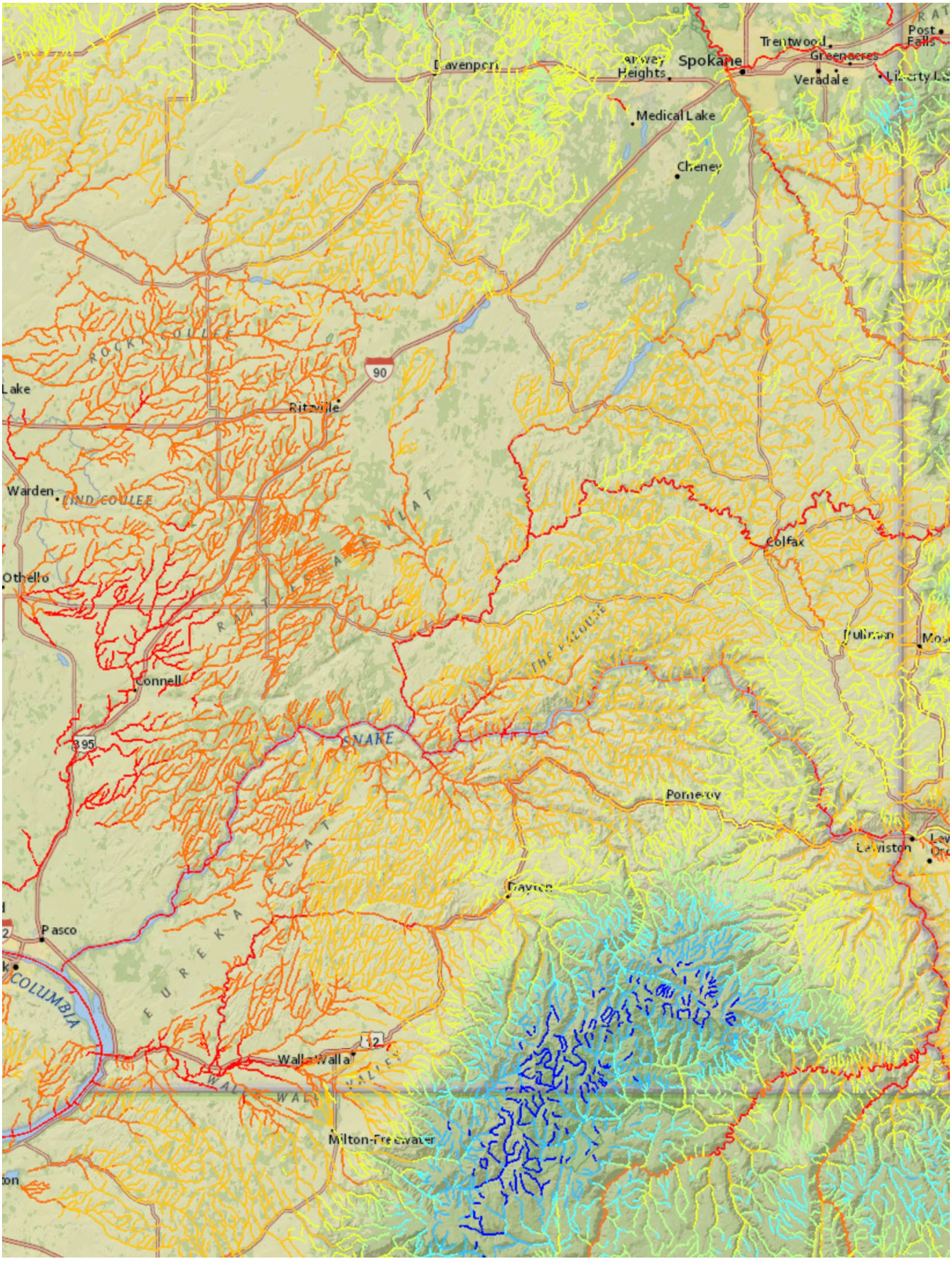


Figure 2-3 of CWR with July 2015 Columbia River temperature below McNary Dam appended by bluefish.

Government employees who fail to address Endangered Species needs are violating the Endangered Species Act and are subject to both civil and criminal penalties (Section 3(12) ESA). By ignoring the injury to Idaho's endangered fish, finding instead that existing river conditions are "not sufficiently impairing", brings all of the CWR authors into the purview of this legislation.

NOAA's Biological Opinion (2019) on the Operations of the Columbia River System, NOAA concluded these losses under current conditions are ***not substantially impairing*** *the recovery of ESA-listed Snake River steelhead and Fall Chinook* (CWR Plan page 51).

Would the CWR authors have us ignore the needs of critically endangered Sockeye? That would be a risky proposition for both the ESA-protected fish, and thereby the CWR authors themselves.



Map: Estimated stream temperatures of Lower Snake River vicinity as modeled by NorWeST.

Stream Temperature Modeling

The result of countless hours of tedious, mind-numbing work, is on display at the NorWeST Modeled Stream Temperatures website (see tinyurl.com/snz8sve), a collaborative project of the US Department of Agriculture and US Forest Service.

By considering the river slope, latitude and elevation of temperature gauges, an impressive map is created (see map of previous page). Think of that a minute. This is rather remarkable: Upstream river temperatures are estimated from downstream recording devices. How is this accomplished?

At the start of the estimating, adjustments are made for recorded temperature readings from within slack-water reservoirs, which are big absorbers of solar radiation. Air temperatures and elevation of temperature recording devices further inform the model. Addition of the average slope of a riverbed helps to estimate the speed of cold-water inputs. The slower the movement of a stream, the more heat absorbed for a given length of travel; reservoirs store lots of heat. To the opposite effect, glaciers bring cold water for an extended time, and are also included in the modeling.

With heaps of historic data carefully inputted, an impressive interactive map is created. The modeled temperatures of nearly all of the streams, creeks and rivers of the West are presented. Impressive.

Oddly, an important input was left aside: The impounded waters of the Lower Snake River dams are missing. For some reason, the NorWeST model has been told that the Lower Snake is a river, but the model needs to know that it is actually a reservoir. Thermometer readings in the wide slack water reservoirs are indicative of the heat that is being absorbed and stored in its slow-moving waters. The model is misinformed: The LSR is not a free flowing river. The LSR has been a reservoir for fifty years, so it is a wonder how the modelers might have missed that fact.

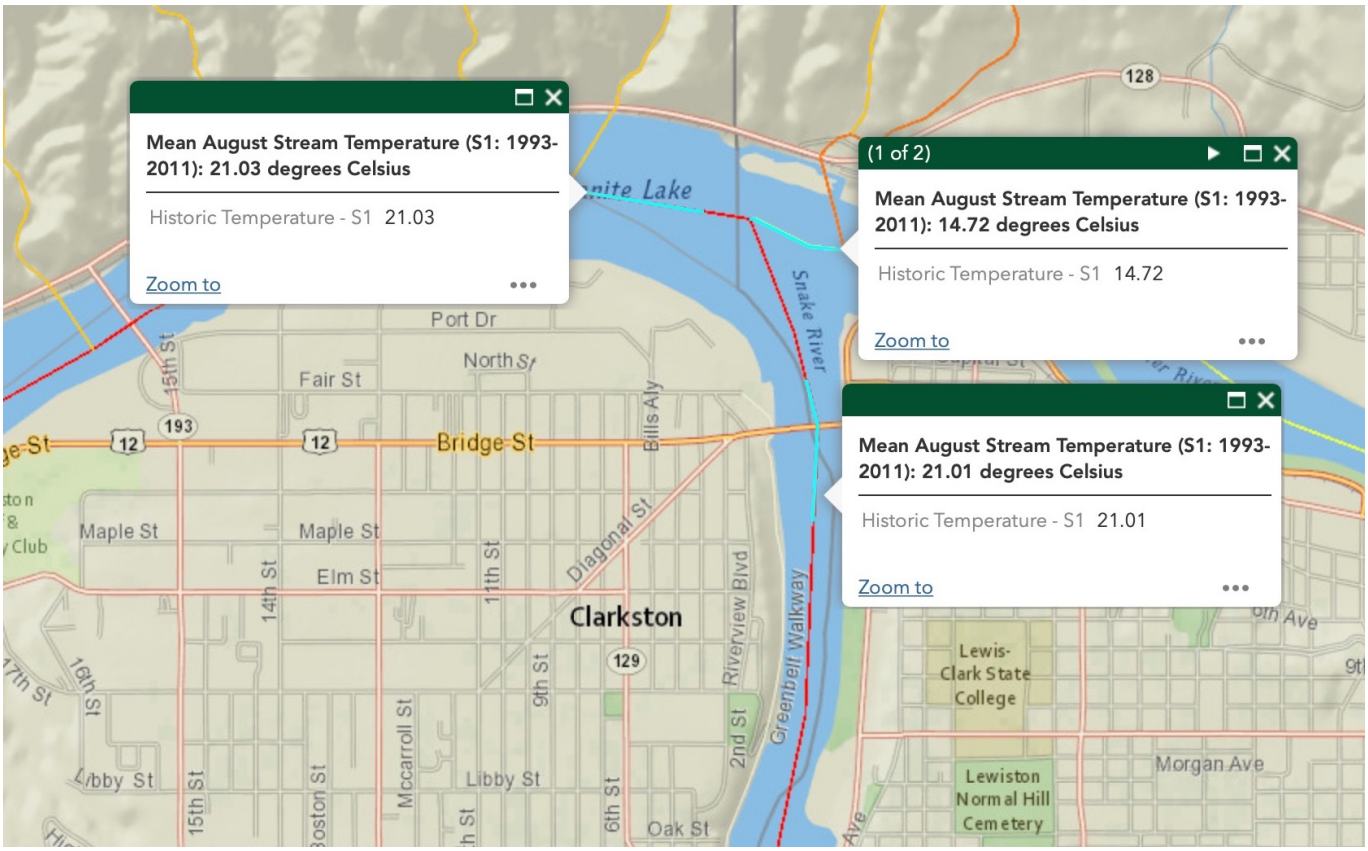
An Obvious Error in modeling the Lower Snake River

From a high-level view (see map previous page), the orange hues that designate the warm water flowing in the Lower Snake Basin, contrast noticeably from the cooler colors of the nearby basins to their north and south. Did the stream temperature modelers somehow miss this oddity?

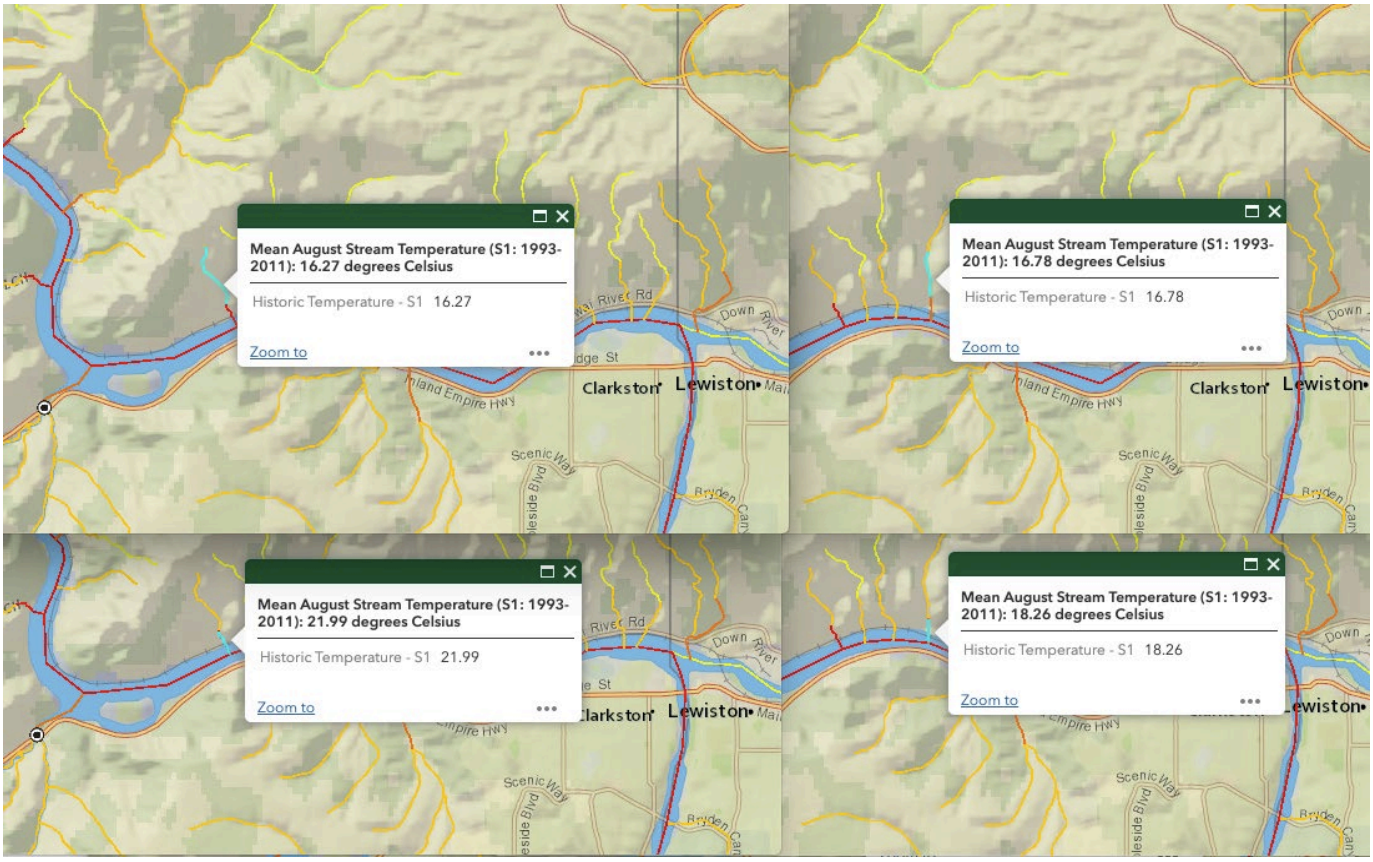
A closer look, zooming into the border towns of Lewiston/Clarkston, brings further unease. Separating the explorer-namesake cities, the warm Snake River from the south meets the cool Clearwater River flowing from the Continental Divide Mountains to the east. Rather than mixing into an equilibrium temperature at the rivers confluence, the model has the Snake becoming warmer! This is clearly incorrect. Warm water plus cool water does not bring warmer water. The NorWeST model is obviously confused here (see upper map next page). Computer programmers refer to this type of problem as "Garbage in, garbage out".

Continuing our map exploration downstream (see map on previous page), one notices warm red spikes from a multitude of small tributaries joining the Lower Snake. In their final descent, the modeled stream temperatures suddenly rise as though hot springs were present near the banks of the Lower Snake River (see lower map on next page). But there are no such heat sources along this section of the river.

Not knowing that the input temperature readings on the Lower Snake are located within a slow-moving, heat absorbing reservoir, the model guesses that warm water must be flowing in from the sides, and that the cool Clearwater River must somehow disappear without any effect at its confluence with the warm Lower Snake River. The model results are absurd.



The Snake River is modeled as becoming warmer below its confluence with Clearwater River.



The NorWeST model incorrectly guesses that small tributaries are abundant sources of heat.

Excusable or Inexcusable?

Compared to the laborious details of connecting the streams to rivers, and creeks to streams, while repeatedly checking for topological connectivity, adding four reservoirs is extremely simple. The modelers need only state the elevation of the four LSR reservoirs, and then allow the Geographic Information System (GIS) software to precisely determine the shoreline. The slow speed and width of the LSR reservoirs would be readily calculated and the spatial statistical model could then estimate the solar radiation input and heat absorption to correspond to the temperature readings within these reservoirs. It would have been easy for the modelers to include these four reservoirs in the model input. Four elevations needed input, but were not. Why the omission?

For those unaware that Senator Slade Gorton rewrote the cover page of the previous NEPA process regarding the Lower Snake River dams -- and adding that the LSR dam "breaching is not necessary at this time to recover listed salmon and steelhead stocks" -- these temperature anomalies might seem to be excusable as just a small oversight, an inconsequential error that will quickly be corrected following this comment. But for those that have seen decades of dishonest reports from a variety of government agencies, this becomes just one more example of insider meddling, dishonesty and might well be considered as fraud. Add to the list of abusers, the Department of Agriculture and US Forest Service for their seriously flawed NorWeST model. The handling of this public comment will determine whether the Environmental Protection Agency may also be added to the growing list of agencies guilty of insider meddling and fraud.

The authors of the CWR Plan must have seen the source of the warm water problems: It is abundantly obvious that the LSR reservoirs are thermal reservoirs. Uninitiated readers of the CWR draft, however, will not see this fact because this fact has been purposely hidden from view.

Cold water plus hot water makes warm water. Correct? Well, not always. Seventy-five pages of a CWR Plan have ample room to explain, but it does not. In a reservoir, mixing is often absent.

Cool water is denser than warm water. Being heavier by volume, it sinks below the warm water that floats on top. This is why the cooling from the Clearwater River does not make it past Lower Granite dam; the coolest water stays below the dams' spillways and turbine intake. Similarly, at the confluence of the Columbia and Snake Rivers the warmer Snake River floats on top of the cooler Columbia. The CWR somewhat describes this occurrence, but greatly obfuscates the fact that the Snake River warms the Lower Columbia. Study Figure 4 (next page) to see the fact.

The Snake River flow is generally close to 20% that of the Columbia River in July and August, so the temperature of the Columbia River has a larger impact after mixing. Figure 4 illustrates this blending, showing the Columbia River (yellow) mix with the smaller yet warmer Snake River (blue) leading to the temperature at McNary (MCPW, Columbia River below McNary Dam near Umatilla*).*

Did you follow that? If the rivers were to actually mix, the smaller Snake River would influence the temperature downstream by "close to 20%". But Figure 4 (next page) reveals that mixing is **not** occurring, meanwhile the text suggests the opposite of that finding. Downstream of McNary Dam, the Columbia River closely corresponds to the temperature of the Snake River, which merged without mixing with the Columbia River, thirty-five miles upstream. The warm water floats on top.

McNary dams spillways and turbine intakes pass this warm surface water downstream. It is the Lower Snake River reservoirs that are the source of the warm temperature problem. This is obvious and irrefutable, but the CWR authors have ignored stating that fact. Why are the CWR authors seeking to hide the truth?

The vertical stratification behind McNary Dam is more complicated than that of other reservoirs in the Lower Columbia River. This is due to the influence of the Snake River on the Columbia River 35 miles upstream. Where the Snake River enters the Columbia River, the Columbia River is cooler than the Snake River during the summer (Figure 4). The merging of the cooler Columbia River and the warmer Snake River likely contributes to the more substantial vertical temperature gradient in the McNary reservoir, with the warmer Snake River water layering on top of the cooler Columbia River water. (CWR Plan Appendix 1 page 11)

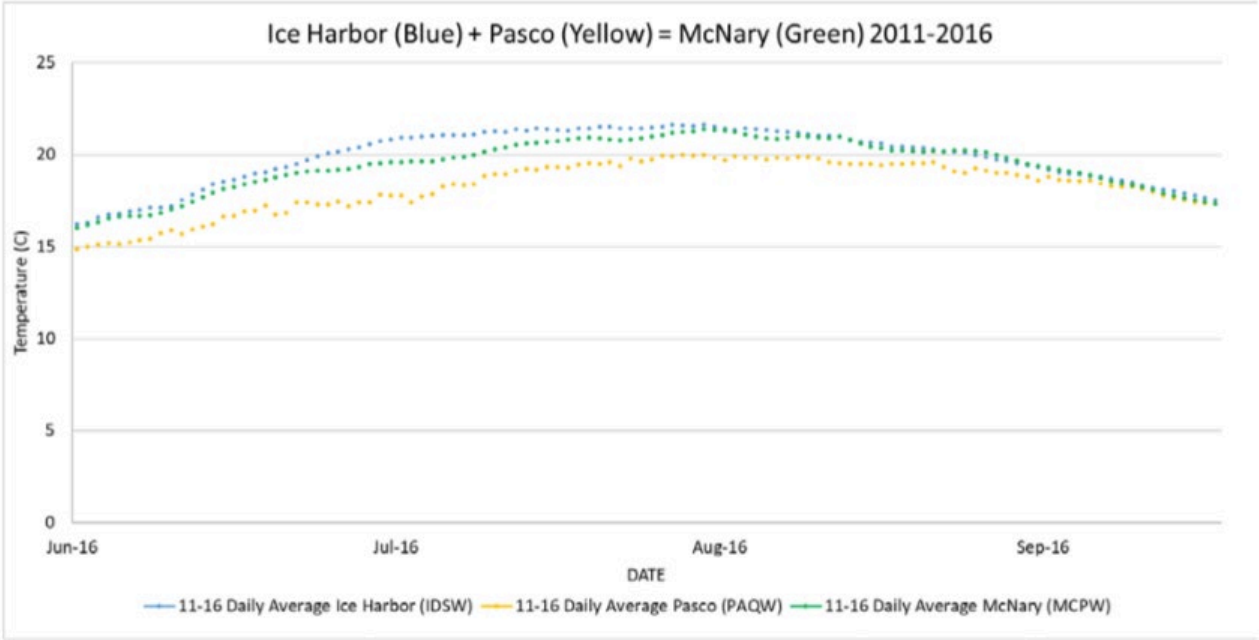


Figure 4 Influence of the Snake River (IDSW) and Columbia River as measured upstream of the Snake confluence in Pasco (PAQW) on the Lower Columbia River as measured at McNary Dam (MCPW)

Explanation of Obfuscation

Before presenting their draft out for public view and comment, insiders bent upon keeping the LSR dams, corrupted the CWR draft. By incorporating a well-used strategy of limiting the scope of a plan (or report), the warm waters of the Lower Snake River were concealed by placing them outside the scope of study. In its opening pages, the reader is told that the CWR will include the Snake River.

Since the Snake River entry at river mile 325 is near the Oregon-Washington border, EPA extended some of the analyses in the plan to the Snake River. (CWR Plan page 3)

The leading map (Figure 2-1, next page) suggests that the CWR Plan will look at Columbia River tributaries far up into Washington. Five pages later, we learn that the study will stop at the confluence of the Snake River. With 191 tributaries <u>below</u> the Snake River included, the Lower Snake River (entering top right of Figure 2-5 on next page) is almost completely ignored.

The National Hydrography Dataset identifies 191 tributaries that flow directly into the Columbia River between the mouth of the Columbia River and the confluence with the Snake River. Current August mean water temperatures for these rivers were obtained from a Spatial Stream Network model developed by the U.S. Forest Service (page 8). Figure 2-5 illustrates these 191 tributary confluences (white dots) along with the predicted August mean temperature of the tributary.

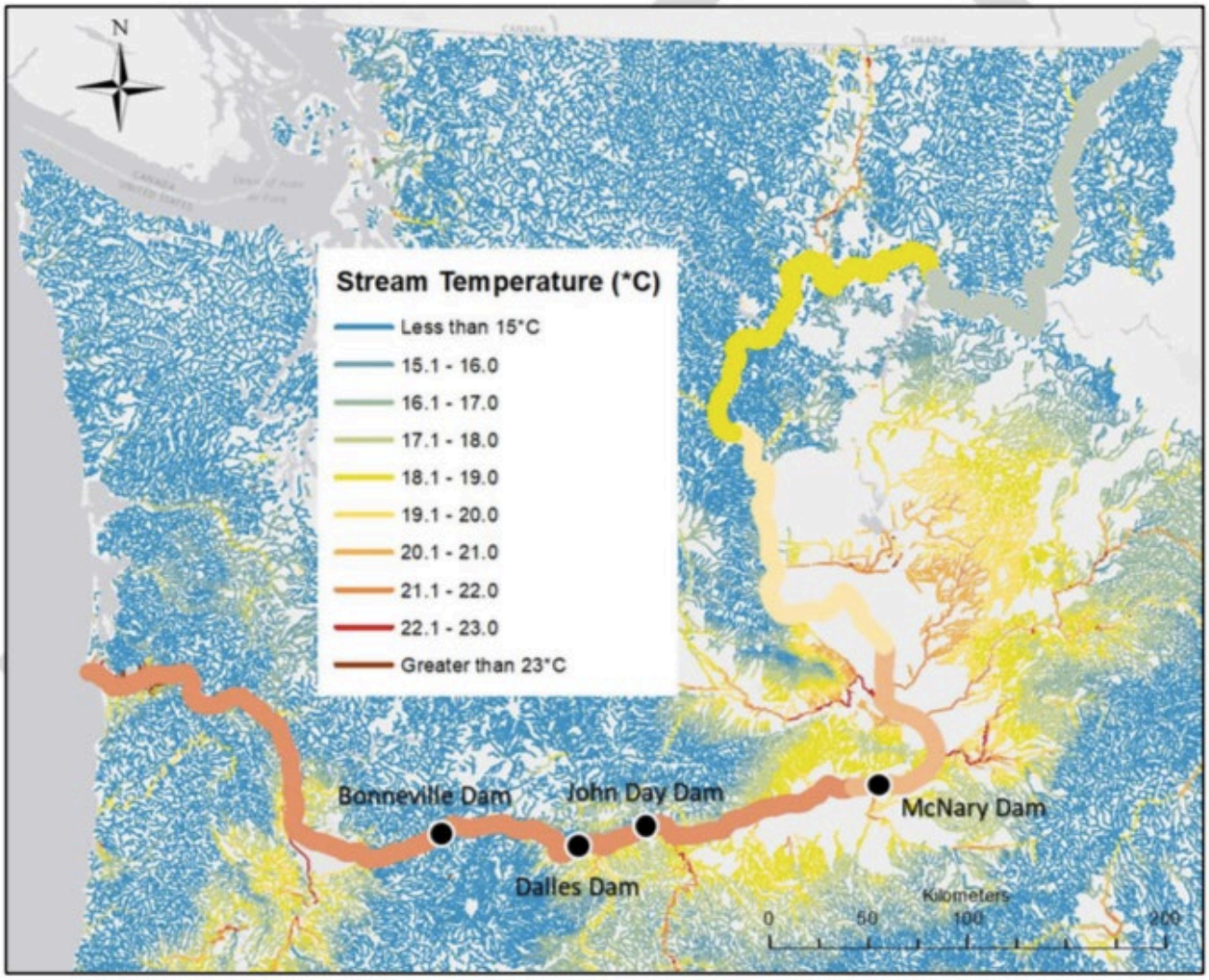


Figure 2-1 Current August mean water temperature in the Columbia River and tributaries (2011-2016) (Appendix 12.14)

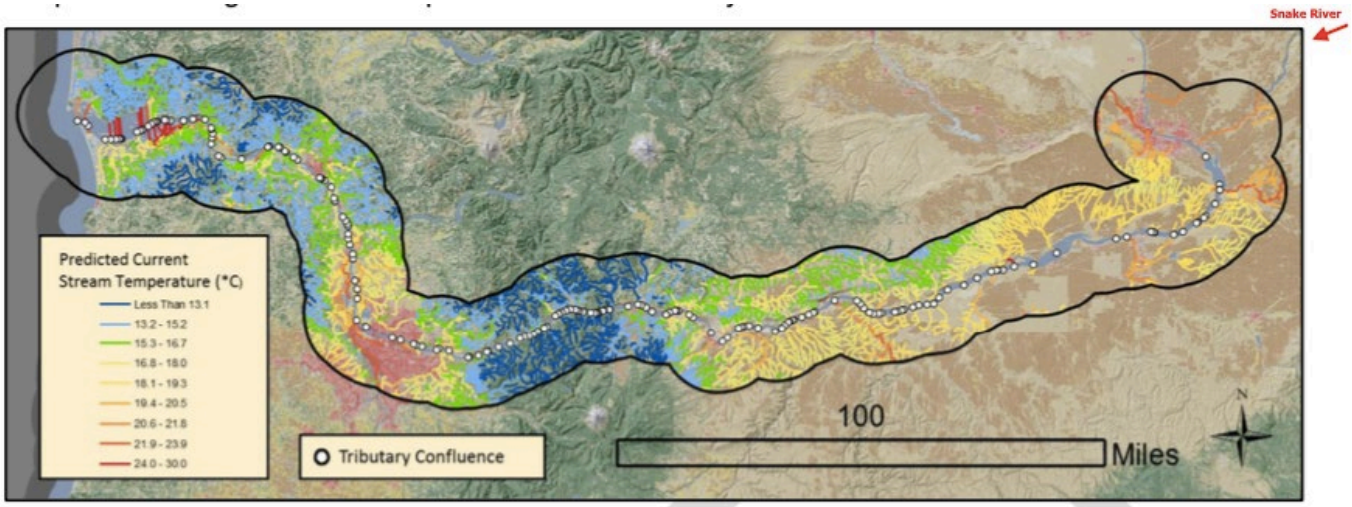


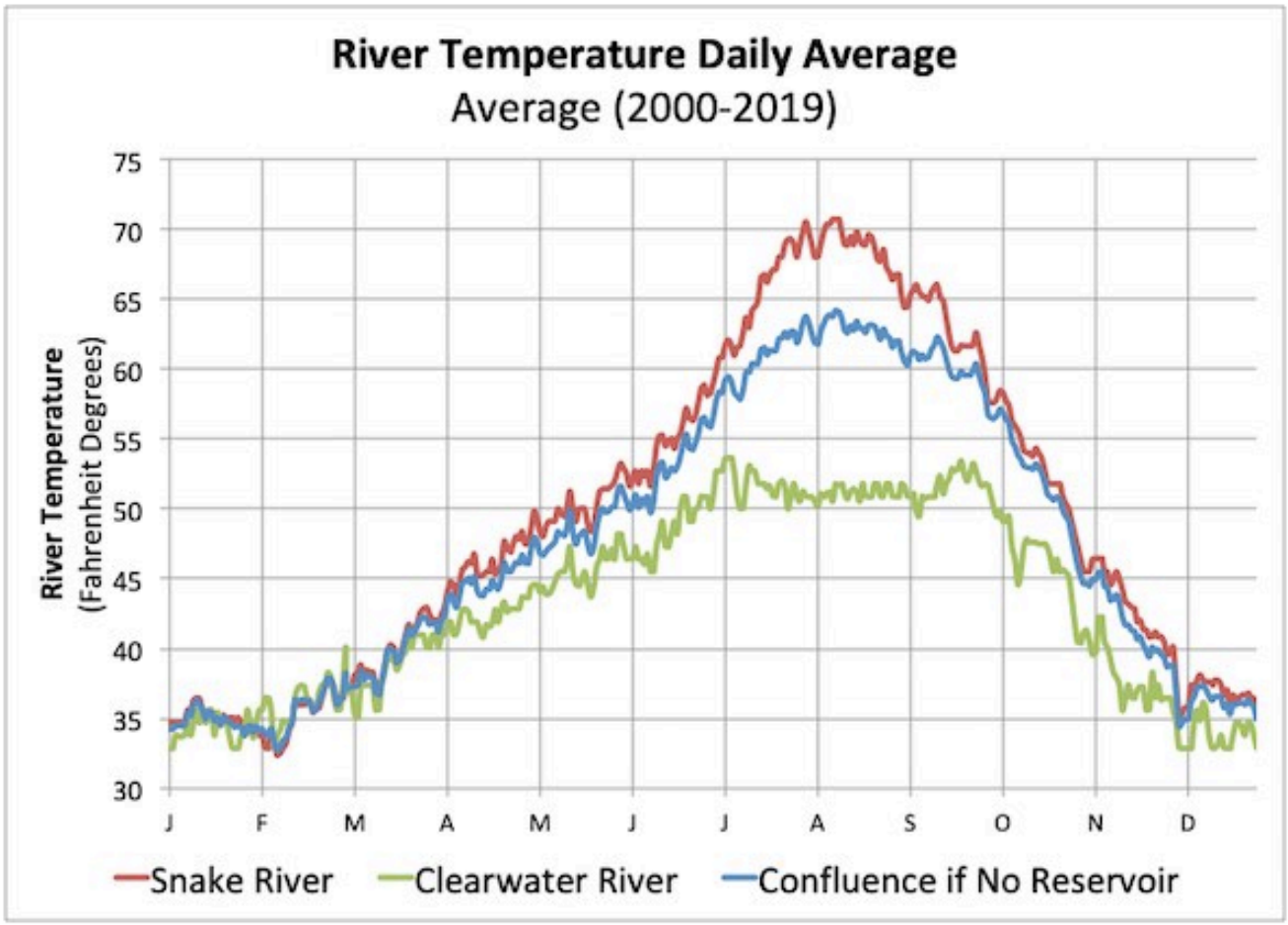
Figure 2-5 191 tributary confluences with the Lower Columbia River (white dots), with predicted stream temperatures from the NorWeST database [predicted August mean stream temperature for the 1993-2011 period]

Though seldom mentioned elsewhere in the CWR Plan, the Snake River does appear in the discussion of the HexSim model by noting that the Lower Snake River should have been included.

If too much energy is lost during migration and pre-spawning, a fish may not have enough energy to complete spawning.... However, to evaluate the implications of energy use on spawning success, energy loss needs to be evaluated within the context of the entire migratory journey, including holding and spawning. For example, Grande Ronde summer steelhead migrate another 170 miles upstream in the Snake River before traveling up the Grande Ronde River to their spawning grounds.
...
In summary, it is necessary to model the full migration to the spawning grounds to fully assess energy loss and the potential for pre-spawning mortality, as was done in the Plumb (2018) and Conner et al. (2019) papers. (CWR Plan page 69).

As it stands now, the cooler Clearwater River slips under the warmer, less dense Snake River. Then at Lower Granite Dam, the warm surface water passes downstream, with the cool Clearwater inflows trapped beneath the reservoir's thermocline.

Using US Geological Survey stream data, it is easy to calculate water temperatures if the rivers were to mix. Summer temperatures would be six-Fahrenheit degrees cooler and the Columbia River would also be cooler, with the Snake River turning into a Cool Water Refuge tributary.



Confluence Temperature = (Snake Temperature x Snake Volume + Cleawater Temperature x Clearwater Volume) / (Snake Volume + Clearwater Volume)
Source: US Geolocial Survey data available at waterwatch.usgs.gov

If the Lower Snake River dams truly were harmless, as the Save Our Dams lobby would have us believe, would there be such a grand effort towards hiding the truth? Why not let the facts speak for themselves?

By including just one more mile to the scope of study, the whole story changes entirely (see final page of this comment, comparing Figure 2-7 of CWR Plan and an amended version by bluefish).

The authors of the CWR surely know the temperature problem confronting the migrating salmon and steelhead. After seeing the graphics of the next page, you too will know the root of the temperature problem.

With this serious charge of illegitimate meddling, I now conclude this comment. If just one more mile were included in the CWR Plan the Lower Snake River would be included. Quite obviously, the CWR authors purposely excluded the Lower Snake from our view. This is inexcusable.

Sincerely,

Scott Levy
bluefish.org
promoting an open and **honest** dialogue concerning the plight of Idaho's wild Salmon and Steelhead.

BEWARE: the Save Our Dams lobby does not want you to see this comparison.

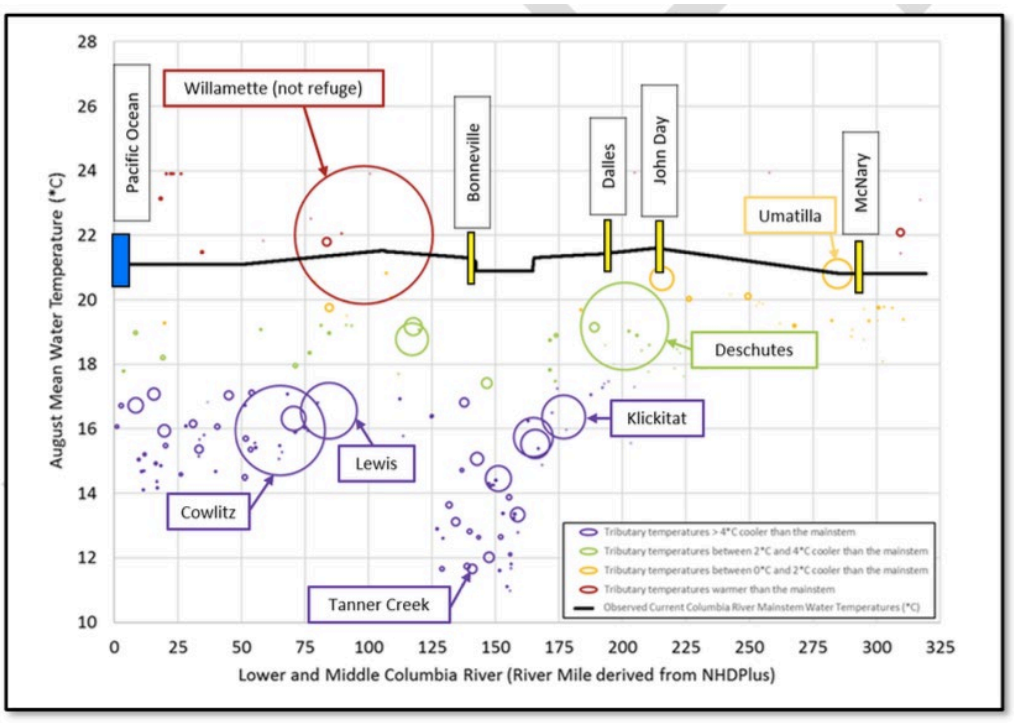
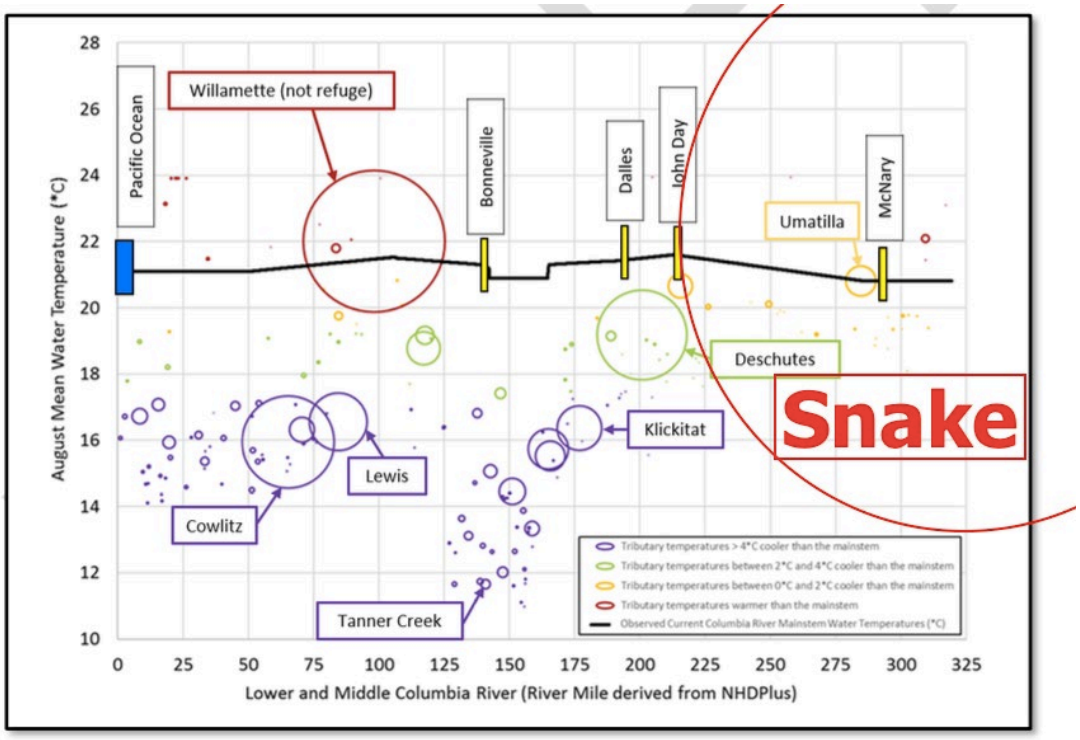


Figure 2-7 Modeled August mean stream temperatures for tributaries in the Lower Columbia River. Circle sizes illustrate relative tributary flow.



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