Protecting the Sovereignty of the Kalispel Tribe in the Pend Oreille River Temperature TMDL

Presentation to EPA Headquarters

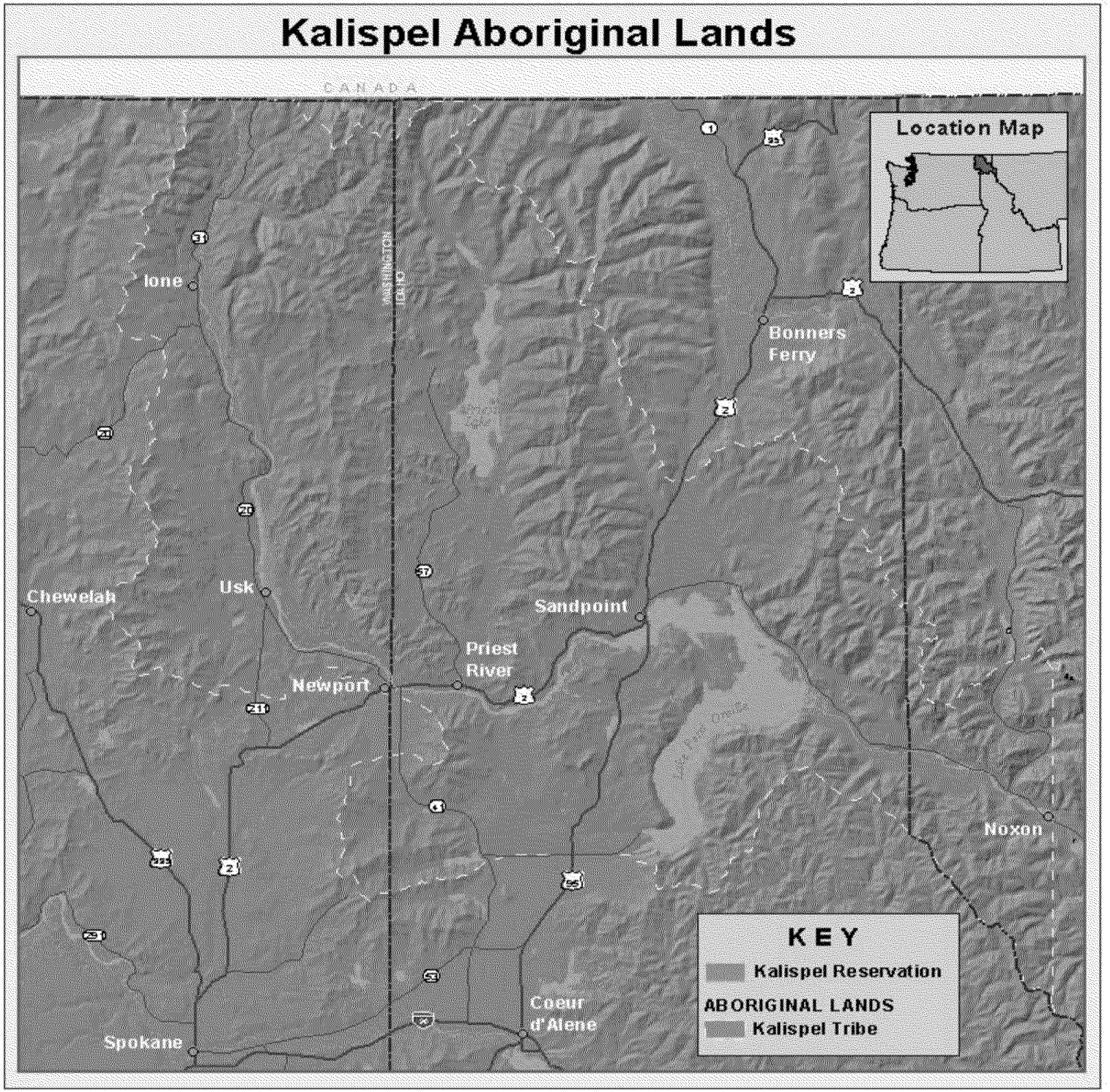
July 24, 2012 • Washington D.C.

Objective

* Ensure that the final Pend Oreille River Temperature TMDL accurately describes all violations of Kalispel temperature criteria, as determined by the Tribe, and includes allocations that remedy those violations

Roadmap

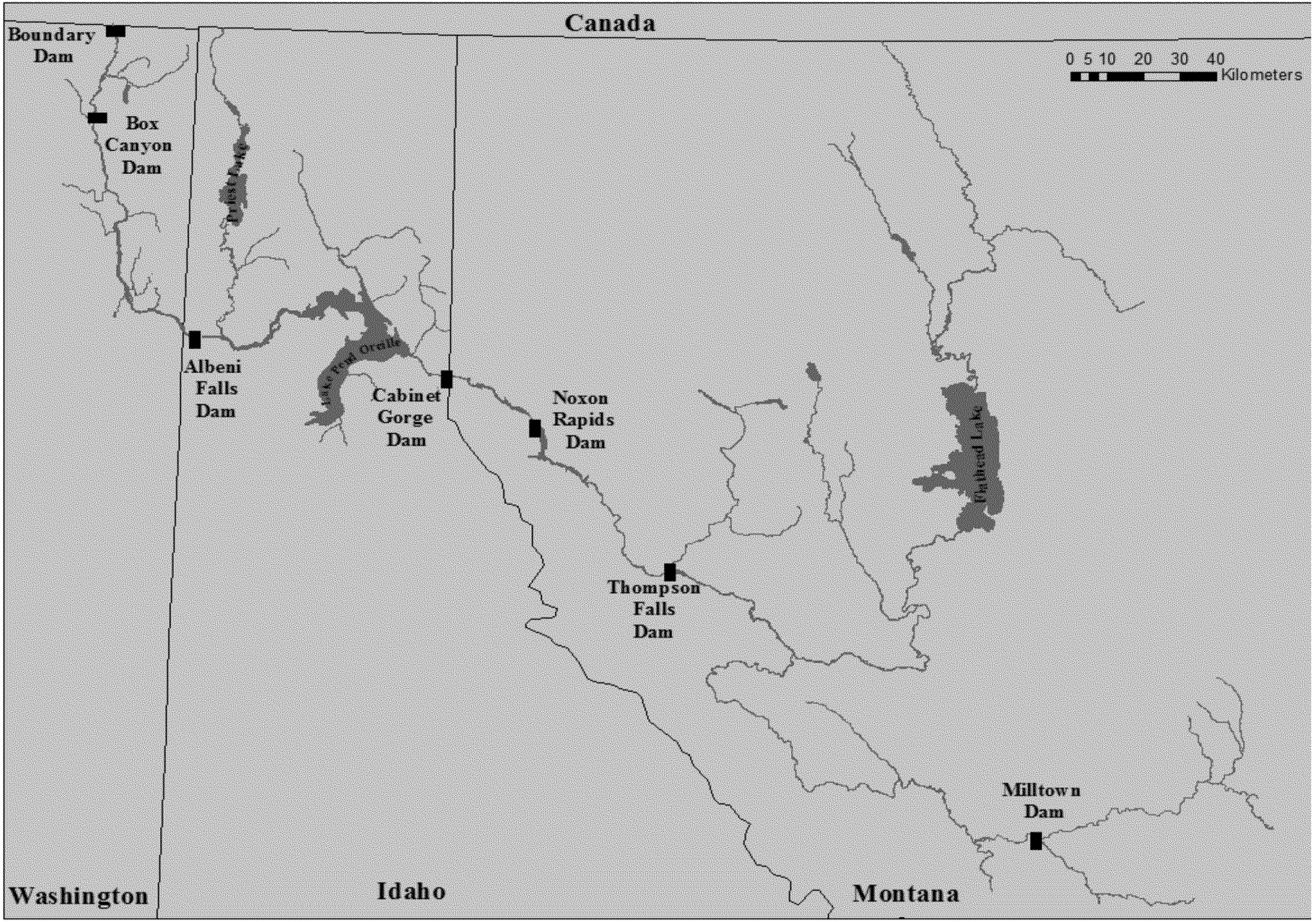
- The TMDL's Critical Importance to the Kalispel Tribe
- History of the TMDL: From Collaboration to Compartmentalization
- Why EPA Approval of the TMDL Would Be Arbitrary and Capricious
  - The Department of Ecology's cumulative frequency analysis is:
    - Unlawful under Kalispel and State Water Quality Standards
    - Statistically indefensible
    - Contrary to EPA's longstanding TMDL policy requiring upstream sovereigns to ensure compliance with downstream sovereigns' WQS
    - Applied for non-scientific reasons
- Solution



- Kalispel Ceded Lands
  - Over 2.3 million acres
- Reservation
  - 4,750 acres
  - 1,800 acres in Trust status
  - 1 River
  - Strategically situated to include major bull trout fishery

Impoundment & Injustice

- Series of impoundments throughout the Tribe's aboriginal territory in the 1950s and 60s, most notably
  - Box Canyon Dam (1952)
  - Albeni Falls Dam (1955)
- Box Canyon Dam inundated Kalispel lands
  - 460 acres or about 10% of the tribal land base
- Albeni Falls Dam entrains adfluvial bull trout
- Extirpation of salmon and loss of bull trout fishery
- Subsistence and cultural consequences



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Kalispel Approach to Remedying Environmental Injustice

* Cohesive, basin-wide approach to conservation
  * Fish passage efforts to date
* Collaboration with federal and state agencies
  * MOA with USACE and BPA regarding Albeni Falls Dam
  * 401 Certification work with EPA at Box Canyon
  * Settlement at Boundary
  * Cooperative work with WDFW and IDFG
* Obtain TAS status and enact water quality standards to exert the Tribe's sovereign prerogative over Kalispel waters

2005 Pend Oreille River TMDL MOA

* Multi-sovereign agreement
* EPA exerts itself as trustee to ensure compliance with Kalispel water quality standards
  * "Because the Washington portion of the Pend Oreille River abuts Kalispel Tribal waters, and these waters are impaired for temperature and TDG under the Kalispel Tribe's water quality standards, EPA is the lead on a TMDL to address impairment to Tribal waters in the Pend Oreille River."
* All parties agree that a single multi-jurisdictional TMDL is necessary to address temperature impairment

Dissolution of the 2005 MOA

* Collaborative, river-wide approach crumbled under pressure from the regulated community regarding the effect of alleged time lags on the TMDL
* EPA helped the regulated community push its agenda but did not seek to promote the Tribe's sovereign prerogatives as required by the MOA
* EPA then managed the Tribe as a State-problem
* The Tribe has consistently voiced opposition to the resulting fragmented approach to the temperature problem on the Pend Oreille River and incorporation of the polluters' preferred methodology into the TMDL

Ecology's Cumulative Frequency Analysis ("CFA")

* Based on input from the regulated community, Ecology decided to employ a seasonal CFA to determine compliance with state and tribal water quality criteria
* Using a sophisticated model (CEQUAL-W2) that generates two-dimensional temperature data every 30 minutes throughout the entire river, Ecology determined maximum temperatures at a given point in the river for each day under existing and natural conditions
* Ecology then disassociated maximum existing and natural temperatures from the dates on which they occurred
* Resulting data provides seasonal impairment information that bears no relationship to State and Kalispel water quality standards

CFA Is Inconsistent with Kalispel and State Water Quality Standards

* Both sovereigns' standards are designed to protect fish
  * Kalispel Water Quality Standards, Chapter 12(b)(1) (adult salmonid migration)
  * WAC 173-201A-602 (Table 602, WRIA 62) (spawning & rearing)
* Both sovereigns protect fish by including a 1-DMax component in their temperature criteria
  * Kalispel: "[N]o single daily maximum temperature [shall exceed] greater than 20.5°C. When natural background conditions prevent the attainment of the numeric temperature criteria, human-caused conditions and activities considered cumulatively can increase temperature levels by only an additional 0.3°C."
  * WA: "Temperature shall not exceed a 1-DMax of 20.0□C due to human activities. When natural conditions exceed a 1-DMax of 20.0□C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3 □C"

Ecology's Application of CFA Is Not Lawful Under Kalispel and State WQS

* When water quality standards are designed to look at more persistent impacts, they expressly say so
  * Kalispel standards include a 7-DADMax component
  * Ecology's general aquatic life temperature criteria are based on a 7-DADMax
* And when standards target more persistent impacts, the permissible temperature threshold becomes more stringent
  * Kalispel criteria includes a 7-DADMax of 18□C compared to a 1-DMax of 20.5□C
  * "Moderately acclimated (16-20°C, or 60.8-68°F) adult and juvenile salmonids will generally be protected from acute lethality by discrete human actions maintaining the 7-DADMax temperature at or below 22°C (71.6°F) and the 1-day maximum (1-DMax) temperature at or below 23°C (73.4°F)." WAC 173-201a-200(1)(c)(vii)(A).

Ecology's Application of CFA Is Not Lawful Under Kalispel and State WQS

* The function of a 1-DMax standard is to ensure that a particular temperature threshold is not exceeded over a 24-hour period
* Ecology's CFA fails to preserve the relationship between thermal threshold and time of exposure
  * The purpose of a seasonal CFA is to evaluate whether "projects or scenarios ha[ve] an *overall impact on the river instead of just a day to day impact*"
* While Ecology could potentially rewrite its water quality standards to address temperature impairment on a seasonal basis, its application of CFA to its current standard is flat wrong
* Ecology's application of CFA to determine compliance with the Tribe's criteria is wrong, results in harm to the Tribe, and undermines tribal sovereignty

Ecology's Use of CFA Is Statistically Indefensible

* A fundamental principle of using CFA is that individual occurrences are random, i.e any given temperature must occur independently of all others (Daniel, W.W., *Applied Nonparametric Statistics*, PWS-Kent Publishing Company (1990, 2d Ed.); Conover, W.J., *Practical Nonparametric Statistics*, John Wiley and Sons, Inc. (1999, 3d Ed.))
* Time-series data generated by the CEQUAL-W2 model is not random because the chemo-physical drivers modifying temperatures correlate with preceding conditions in both space and time (Manly, B.F.J, *Randomization, Bootstrap and Monte Carlo Methods in Biology*, Chapman and Hall/CRC, (1997, 2d. Ed.) ("A time series is a set of ordered observations, each of which has an associated observation time. Because of the ordering, observations are inherently not interchangeable unless the series is 'random', where this means that all the observations are independent values from the same distribution.")
* From a statistical point of view, it is therefore inappropriate to ignore the interdependence of the time-series data generated by the CEQUAL-W2 model

Ecology's TMDL Does Not Comport with Interstate TMDL Policy

* It is well established that a TMDL must ensure that the water quality standards of all affected states are attained.
  * Chesapeake Bay TMDL, App'x W, p. 206; Snake River – Hells Canyon Temperature TMDL, p. 57; Columbia River Dioxin TMDL, p. A-2; *see also* Coeur d' Alene Basin TMDL, Technical Support Doc., pp. 2-3; Christina River Basin TMDL, p. 11; Tug Fork TMDL, p. 5; Shenandoah River TMDL, p. 3; Pend Oreille River Temp TMDL, pp. 2, 8.
* The following slides demonstrate that Ecology's TMDL masks the frequency and magnitude of Kalispel water quality violations, as well as upstream contributions to those violations

Kalispel Temperature Criteria

* Temperature shall not exceed 18°C as a moving 7-day average of the daily maximum [7-DADMax] temperatures with no single daily maximum temperature [1-DMax] greater than 20.5°C. When natural background conditions prevent the attainment of the numeric temperature criteria, human-caused conditions and activities considered cumulatively can increase temperature levels by only an additional 0.3°C.
* A violation of the Tribe's temperature criteria occurs where any of the following four conditions are met:
  1. natural 7-DADMax ≤ 18°C, and existing 7-DADMax > 18°C;
  2. natural 7-DADMax > 18°C, and existing 7-DADMax > natural 7-DADMax + 0.3°C;
  3. natural 1-DMax ≤ 20.5°C, and existing 1-DMax > 20.5°C; or
  4. natural 1-DMax > 20.5°C, and existing 1-DMax > natural 1-DMax + 0.3°C

Tribally determined violations of Kalispel temperature criteria

(Highlighted row=date on which existing heat flow across Stateline > natural)

Date	Type of Violation	Location of Violation	Magnitude of Violation	Temperature under existing conditions		Warming between RM 88 and RM 72
				RM88	RM72	
06/29/04	**Type 3**	RM64	0.34	19.53	20.23	0.70
06/30/04	**Type 3**	RM66	0.03	18.66	20.03	1.38
07/10/04	**Type 3**	RM72	0.16	20.60	20.66	0.06
07/11/04	**Type 3**	RM72	0.27	20.41	20.77	0.36
07/18/04	**Type 4**	RM64	0.01	21.53	22.79	1.26
07/27/04	**Type 4**	RM72	0.17	23.51	24.59	1.08
07/28/04	**Type 2**	RM72	0.04	23.44	24.38	0.95
07/29/04	**Type 4**	RM72	0.06	23.47	24.49	1.02
07/30/04	**Type 4**	RM72	0.58	23.34	24.50	1.16
07/31/04	**Type 4**	RM72	0.19	23.40	24.47	1.07
08/04/04	**Type 4**	RM64	0.10	23.55	24.42	0.87
08/09/04	**Type 2**	RM72	0.05	23.15	23.72	0.57
08/10/04	**Type 4**	RM72	0.24	23.43	24.10	0.67
08/11/04	**Type 4**	RM72	0.69	23.68	24.56	0.88
08/12/04	**Type 4**	RM72	0.80	23.61	24.81	1.20
08/13/04	**Type 4**	RM64	0.68	23.65	24.80	1.15
08/14/04	**Type 4**	RM64	0.65	23.79	24.87	1.08
08/15/04	**Type 4**	RM64	0.61	23.83	25.01	1.18
08/16/04	**Type 4**	RM64	0.59	23.92	25.10	1.18
08/17/04	**Type 4**	RM64	0.02	23.74	24.83	1.09
08/18/04	**Type 4**	RM64	0.09	23.74	24.76	1.02

Tribally determined violations of Kalispel temperature criteria, cont.

Date	Type of Violation	Location of Violation	Magnitude of Violation	Temperature under existing conditions		Warming between RM 88 and RM 72
				RM88	RM72	
08/21/04	**Type 4**	RM64	0.35	23.81	24.27	0.45
08/23/04	**Type 4**	RM72	0.21	22.38	22.29	-0.10
08/25/04	**Type 2**	RM72	0.13	21.78	21.10	-0.69
08/26/04	**Type 2**	RM72	0.29	21.63	21.42	-0.21
08/27/04	**Type 3**	RM72	0.83	21.50	21.33	-0.18
08/28/04	**Type 3**	RM72	0.72	21.08	21.22	0.14
08/29/04	**Type 3**	RM72	0.74	20.97	21.24	0.26
08/30/04	**Type 3**	RM64	0.86	20.90	21.23	0.33
08/31/04	**Type 3**	RM64	0.87	20.75	21.26	0.51
09/01/04	**Type 3**	RM64	0.44	20.65	20.78	0.13
09/04/04	**Type 2**	RM72	0.04	19.55	19.54	-0.01
09/05/04	**Type 2**	RM72	0.15	19.58	19.75	0.17
09/06/04	**Type 2**	RM72	0.26	19.38	19.82	0.44
09/07/04	**Type 2**	RM72	0.35	19.27	19.45	0.18
09/08/04	**Type 2**	RM72	0.31	19.01	19.72	0.71
09/09/04	**Type 2**	RM72	0.16	18.76	19.21	0.46
Average violation:			**0.35**			
Maximum violation:			**0.87**			

Tribally Determined Violations of Kalispel Temperature Criteria

* There are violations of Kalispel standards on 37 days during the period from 6/29/04 to 9/9/04
* 26 of these violations occur after 8/8/04
* Violations occur on 87% of the days during the period from 8/9/04 to 9/1/04; on 85% of these days, heat flow across Stateline is greater under existing conditions than it was under natural conditions
* The average violation is 0.35 degree C
* The maximum violation is 0.87 degree C

Ecology Determined Violations of Kalispel Temperature Criteria

	Above the Kalispel Reservation (RM 72, Segment 115)		Below the Kalispel Reservation (RM 63.6, Segment 172)	
Criteria	**Average differential**	**Maximum differential**	**Average differential**	**Maximum differential**
Kalispel daily maximum	0.06	0.60	-0.50	0.22
Kalispel 7DADM	-0.03	0.40	-0.51	0.14

CFA underestimates the magnitude of the maximum temperature violation by a factor of approximately 1.5 (0.6 degrees versus 0.9 degrees)

This 0.3 degree difference is equivalent to adding a continuous source of boiling water to the river at a rate equal to 54 million gallons per day

Bottom Line: The TMDL Will Not Ensure Compliance w/ Kalispel WQS

* Incorrect application of Kalispel temperature criteria
  * Type 3 violations occur when natural 1-DMax ≤ 20.5°C, and existing 1-DMax > 20.5°C
  * By disassociating temperature data from the date on which it occurs, Ecology's CFA allows an existing temperature that exceeds 20.5°C to be paired with a natural temperature that exceeds 20.5°C even if the natural temperature from the same day is actually less than 20.5°C; CFA then compounds this problem by bundling a 0.3°C allowance with the existing data even though the WQS don't allow such allowance when a type 3 violation is at issue
* Failure to identify the proper frequency and magnitude of Kalispel temperature violations
* Failure to account for upstream heating contributing to violations of Kalispel temperature criteria
* Resulting allocations will intensify the temperature problem within Kalispel waters

Ecology's Justifications for Using CFA Have No Rational Basis

- We don't have to comply with our own water quality standards
  - "There are many parts of [state water quality] standards that we choose not to implement in TMDLs." (Internal email from Susan Braley, Dep't of Ecology (July 25, 2008)
  - "The special condition in Table 602 for the Pend Oreille is established as a 1-day maximum because that is what the standards metric was before we revised our water quality standards in 2003. We made a deliberate decision not to change any of the special conditions because they hadn't been earmarked as part of our proposed revisions. . . . [I]n the last 303(d) listing process we assessed temperature data based on the 7DADMax even though the standards were set as one day maxs. So, my recommendation was that we use the seven day metric for the Pend Oreille for the modeling exercise . . . ." (Braley email, Nov. 30, 2007)

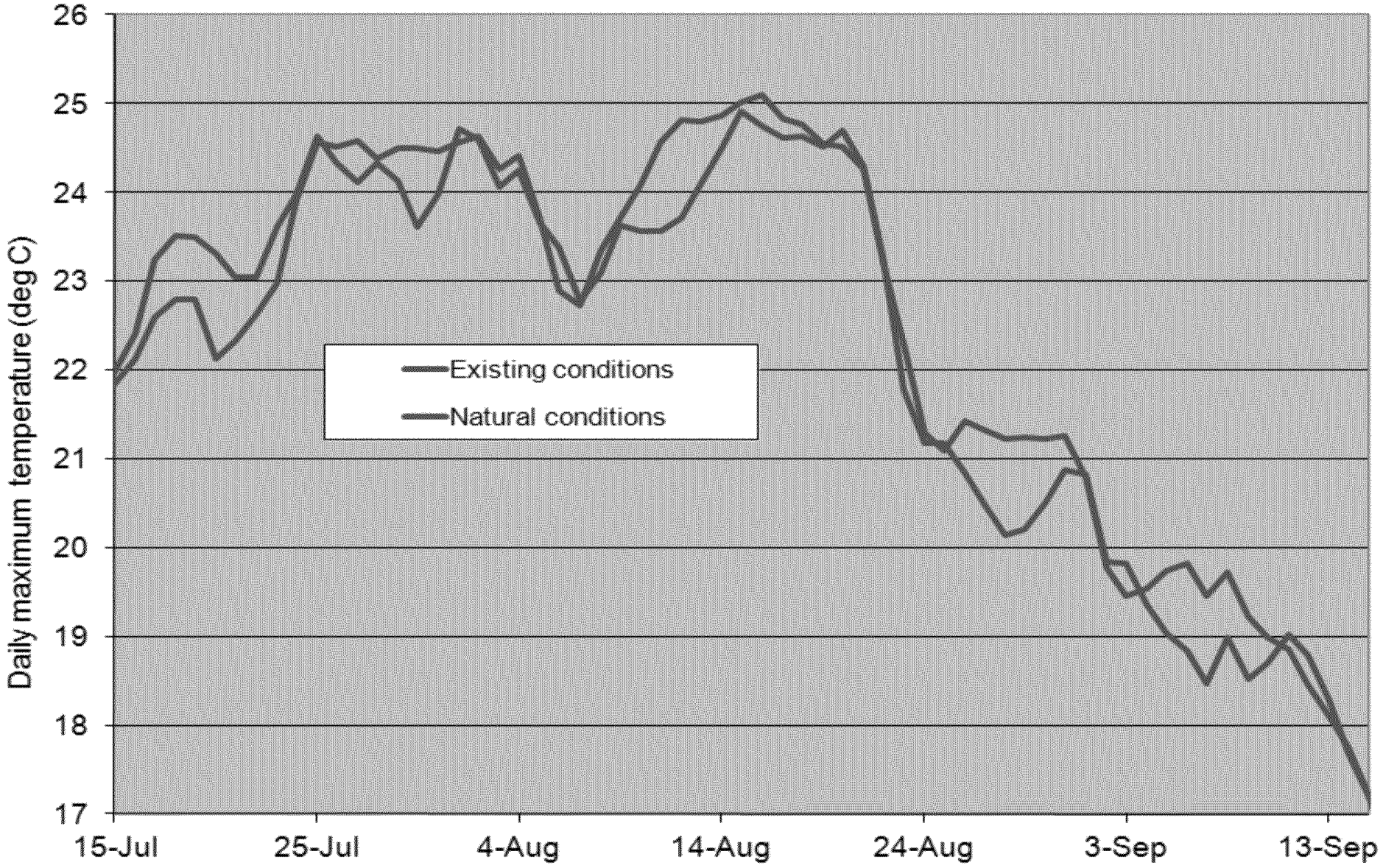
Ecology's Justifications for Using CFA Have No Rational Basis

- The Willamette TMDL used CFA so we can use it here
  - EPA advised Ecology to look to the Willamette TMDL for support to beef up its rationale for using CFA
  - Ecology found no support
  - ODEQ confirmed that the Willamette TMDL did not provide a rationale for using CFA
  - Ecology did not look for support elsewhere, noting instead that ODEQ's statement that it "didn't do much to justify using the cfd . . . is priceless"

Ecology's Justifications for Using CFA Have No Rational Basis

- CFA is necessary to account for time lag
  - Next slide shows that there is no significant time lag
  - Even if time lag were an issue, the pooling period does not correspond to the lag
    - The selected remedy for the lag (93-day CFA) is grossly disproportionate to a time lag that is on the order of days according to Ecology, and at most 1 day on tribal waters

Comparison of temperatures under existing and natural conditions at the upstream end of the Kalispel Tribe's reservation (River Mile 72)



Additional Reasons Why Ecology's Decision to Use CFA Is Not Defensible

* Ecology employed CFA for non-scientific reasons in contravention of the Clean Water Act's TMDL requirements (*Earth Island Inst. v. Hogarth*, 494 F.3d 757, 768 (9th Cir. 2007))
* Ecology's decision to use CFA is incongruous with its decision not to allow volume-weighted averaging
  * Ecology rejected the argument that daily maximum temperatures should be determined by volume- weighted averaging because "[u]sing an average may obscure the impacts of warmer surface waters by averaging with cooler deeper waters." (Ecology Letter to Seattle City Light, June 26, 2007). It is not rational to interpret the standards to prohibit spatial manipulations that mask water quality violations, but to permit temporal manipulations that achieve the same effect.

Why EPA Approval of the TMDL Would Be Arbitrary & Capricious

The evidentiary record demonstrates that:

* Ecology's CFA does not comport with the temporal requirements of Kalispel or State water quality standards, and is statistically indefensible
* Ecology's CFA masks the frequency and magnitude of Kalispel water quality violations, as well as upstream contributions to those violations, in contravention of EPA TMDL policy
* Ecology's justifications for employing CFA have no rational basis

Solution

* Disapprove the TMDL or send it back to Ecology for correction
* Work with the Tribe to ensure that the final Pend Oreille River Temperature TMDL accurately describes all violations of Kalispel temperature criteria, as determined by the Tribe, and includes allocations that remedy those violations
* A TMDL that comports with the request above will enable the Tribe to work toward appropriate temperature-reduction actions as it has done with Seattle City Light and is doing with the Corps and PUD