10-21-2016

Affidavit of D. Riser

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IN THE DISTRICT COURT FOR THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO IN AND FOR THE COUNTY OF TWIN FALLS

In Re the CSRBA	) Consolidated Subcase No. 91-7755
Case No. 49576	) **AFFIDAVIT OF DUDLEY W. REISER, Ph. D.**

State of Washington)
)
County of King)

I, Dudley W. Reiser, Ph.D., being first duly sworn, state the following:

1. I am a competent adult over the age of eighteen years, and the statements made herein are based on my own personal knowledge and my 39 years of professional experience working as a fisheries scientist designing, implementing, and managing fisheries and aquatic ecology projects.

2. I am currently a fisheries scientist and President of R2 Resource Consultants, Inc. ("R2 Resource"). My business address is 15250 NE 95th Street, Redmond, WA 98052. A true and

correct copy of my resume is attached as Attachment 1 to my May 26, 2016 report, "Rebuttal Report on the Importance and Biological Attributes of the Fisheries of the Coeur d'Alene Reservation."

3. In the context of this Consolidated Subcase regarding water rights claimed for the Coeur d'Alene Indian Reservation in the Coeur d'Alene-Spokane River Basin Adjudication, the United States hired me to prepare a rebuttal report regarding the fisheries on the Coeur d'Alene Reservation. The statements in my report are based upon my personal knowledge, including that gained as a result of my research in this case, or my professional opinion, or both.

4. Attached to this Affidavit is a true and correct copy of the following document that I s prepared for this case:

> Ex. 1 – *Rebuttal Report on the Importance and Biological Attributes of the Fisheries of the Coeur d'Alene Reservation,* dated May 26, 2016.

5. My opinions set forth in Exhibit 1 are held to a reasonable degree of probability and certainty in my respective field of expertise.

DATED this 18th day of October, 2016.

Dudley W. Reiser, Ph.D.

Subscribed and sworn before me this 18th day of October, 2016

SABRINA S. PANOS
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
JUNE 19, 2018

Notary Public for Washington

Residing at KING COUNTY

My Commission expires: 6/19/18

Rebuttal Report on the Importance and Biological Attributes of the Fisheries of the Coeur d'Alene Reservation

Photo Credit – Pat Clayton

Submitted to:
U.S. Department of Justice

Prepared by:
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May 26, 2016

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1. INTRODUCTION AND BACKGROUND

On January 30, 2014 the United States filed five categories[1] of claims on behalf of the Coeur d'Alene Tribe (CDT) as part of the General Adjudication of Rights to the Use of Water from the Coeur d'Alene – Spokane River Basin (CSRBA). The second category of claims filed pertained to Instream Flows for Fish Habitat and included a total of 71 stream reaches encompassing rivers and tributaries of known historical and contemporary importance to the CDT for the fishery resources they provide (Figure 1).

The Instream Flow Claims were developed based on a combination of methods centered around the Physical Habitat Simulation (PHABSIM) models that are part of the Instream Flow Incremental Methodology (IFIM) developed by the U.S. Fish and Wildlife Service (Bovee 1982, Stalnaker et al 1995, others). This included application of PHABSIM based on site specific data as well as the application of regression equations developed using habitat-flow relationships from other PHABSIM studies. The primary output of the PHABSIM is the determination of a relationship between habitat and stream flows. These relationships represent fish habitat-flow responses and were used as the bases for the Instream Flow Claims. These claims were directed at preserving and/or restoring streamflows to those systems necessary to protect and maintain habitats essential to the fish species to which the CDT has historically been and is currently reliant upon. These species, include the Westslope Cutthroat Trout (*Oncorhynchus clarkii*), Bull Trout[2] which is a native char species (*Salvelinus confluentus*), and in one drainage, Hangman Creek, Chinook Salmon (*O. tshawytscha*). Evaluating and defining such flows has been the primary objective of the work I directed on behalf of the United States since 2008.

1.1 Geographic Extent and Scientific Basis of the Instream Flow Claims

The 71 stream reaches that are represented by the Instream Flow Claims are contained within an approximate area of 3,840 square miles that consist of streams and water courses within three primary watersheds, the Coeur d'Alene River (CDR), the Saint Joe River (SJR) and its primary tributary the Saint Maries River (SMR), as well as a number of streams that are directly confluent to Coeur d'Alene Lake (Figure 1). The CDR is comprised of two major sub-basins, the North Fork Coeur d'Alene River and South Fork Coeur d'Alene River which collectively encompass a drainage area of 1,380 sq. miles. The Saint Joe River watershed consists of 1,886 sq. miles, while that of the Saint Maries is 480 sq. miles.

[1] The five categories of claims included: 1) Domestic, Commercial, Municipal and Industrial (DCMI); 2) Instream Flows for Fish Habitat; 3) Irrigated Agriculture; 4) Lake Elevation Maintenance in Lake Coeur d'Alene; 5) Springs, Seeps and Wetlands.

[2] Bull trout populations in the CDA basin were listed as threatened by the USFWS in 1998 under the Endangered Species Act (63 FR 31647). Bull trout in the CDA basin are considered part of the CDA Lake Basin Recovery Unit. Legal harvest of bull trout in the CDA subbasin has not been allowed since 1988 (GEI Consultants 2004) and current Idaho Fish and Game fishing regulations limit bull trout mortality associated with incidental capture.

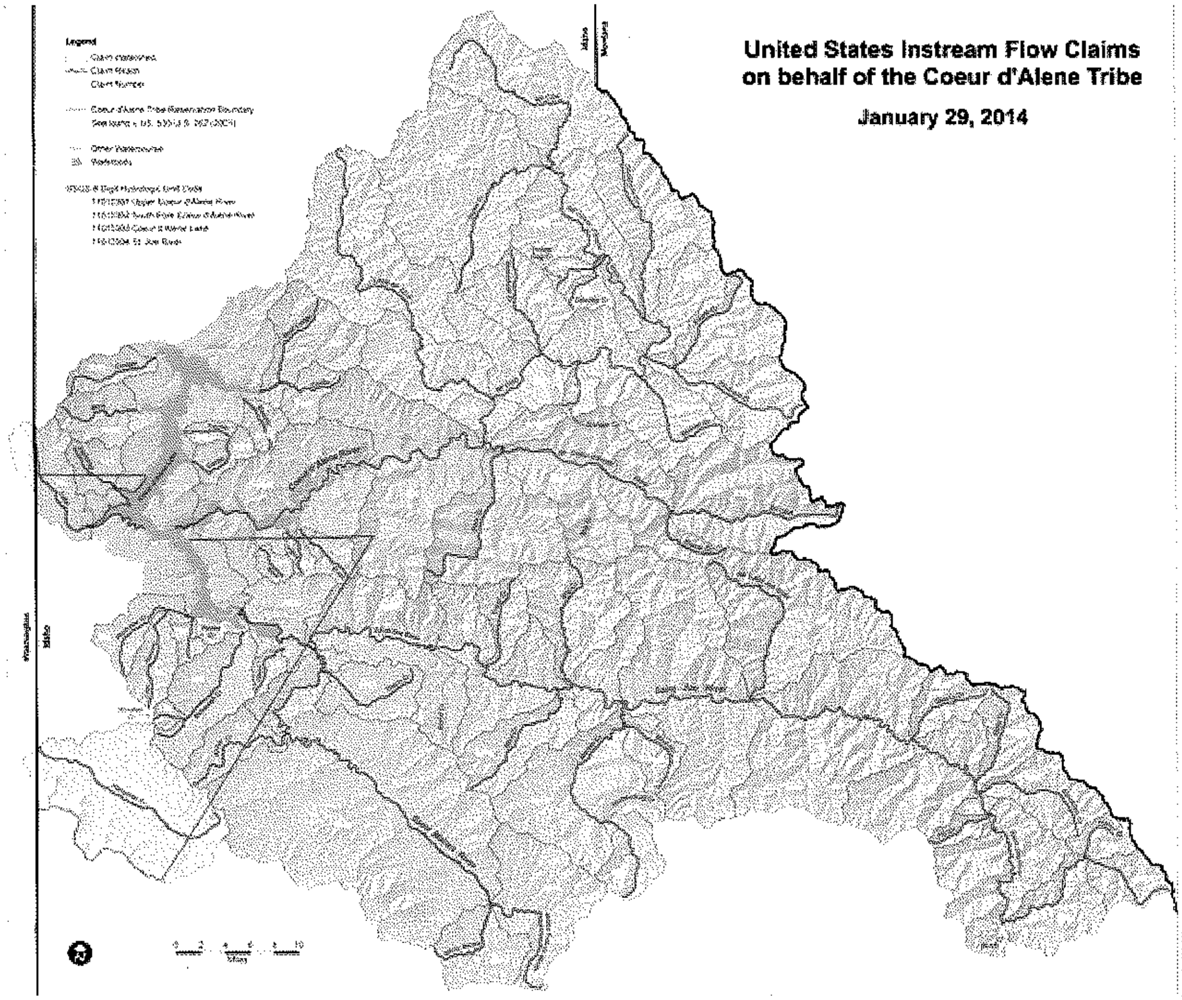


Figure 1. Map of the Coeur d'Alene Basin Idaho depicting the Instream Flow Claim Reaches filed under the Coeur d'Alene and Spokane River Basin Adjudication. The 1891 boundaries of the Reservation are demarcated by a purple/dark line. This same map was submitted as part of the Notices of Claims submittal that was filed by the Department of Justice on January 30, 2014.

Collectively, these watersheds, along with Coeur d'Alene Lake proper as well as the Spokane River below Spokane Falls (which was not included in the claims[3]), represent those to which the CDT had traditionally relied upon for fishing, as confirmed by my review of three recent historical reports (see next section).

As a fisheries scientist with 39 years of experience[4], I approached the development of the Instream Flow Claims from the perspective of the different fish species of interest to the CDT, and the different

[3] The Spokane River is regulated by Post-Falls Dam and was not included in the DOJ claims submittal.

[4] See Attachment 1 for a copy of Dr. Reiser's full vitae.

lifestages and life history strategies of those species. In doing so, I was not concerned about any man-made boundaries or borders that exist on maps, but rather defining the flow needs within all of the watersheds of both historical and contemporary importance to the CDT and that are contributive to providing healthy, sustainable populations of fish that can be utilized by the CDT. After all, fish do not recognize borders or boundaries unless those boundaries happen to be of a physical nature such as a natural waterfall, a steep and extremely fast and turbulent set of rapids, a section of river or stream that becomes dewatered (naturally or anthropogenically), or a dam or other man-made structure[5] that results in a barrier to fish movements. Fish do not recognize boundaries on maps so such boundaries do not dictate the relative importance of any of the Instream Flow Claims to the CDT. That determination is anchored on the best available science that defines the ecological importance of the watersheds to the overall sustainability of the fish populations accessible to and used by the CDT.

Importantly, the long term sustainability of the target fish populations is contingent on maintaining the availability of diverse, high quality habitats throughout the historic range the species occupied within the watershed. For reasons that will become clearer later in this paper, not doing so escalates the risk of population demise.

1.2 Historical and Contemporary Importance of Fish and Fishing Places to the Coeur d'Alene Tribes

In addition to the technical information specific to the target species and watershed characteristics of the CDR basin that formed the basis for the Instream Flow Claims, I was recently provided and reviewed three reports[6] that described the history of the Coeur d'Alene Indian Reservation over time. My interest in the reports was to gain an understanding of the extent, both geographically and culturally to which the CDT relied upon fish and fishing as part of their way of life, as well, to obtain some idea of the geographic area to which they fished. A key word search of the reports for fish and fishing in each of the reports confirmed the importance of fish and fishing to the CDT.

For example, Wee (2016) noted from sources that he reviewed and cited that -

> *"Fish were an important part of Coeur d'Alene aboriginal diet. Along with game, salmon, steelhead, cutthroat trout, mountain whitefish, and others provided tribal members with necessary protein to supplement their consumption of camas root, water potatoes, and berries."*

[5] Many dams and diversion structures are specifically designed to accommodate upstream and downstream fish passage.

[6] The three reports are: Hart, E. R. 2015. A history of the Coeur d'Alene Tribal Water Use; Wee, S. 2016. Establishment of the Coeur d'Alene Indian Reservation and the Transformation of Coeur d'Alene Land and Water Use, from Contact through Allotment; and Smith, I. 2015. Draft – Historical Examination of the Purposes for the Creation of the Coeur d'Alene Indian Reservation.

and

> *"Fishing was of considerable importance in this simple economy owing to the tribes' location on good waterways and Coeur d'Alene Lake."*

and

> *"Some of the earliest Euro-American accounts suggest that there was an abundance of fish in the Coeur d'Alene homeland. Catholic priest Father Nicolas Point, for instance, a member of the Society of Jesus (the Jesuits) who established the first Christian mission for the Coeur d'Alene on the St. Joe River (also known as the St. Joseph River) in 1842 observed: The Coeur d'Alene had their great hunt, but their country, dotted with lakes and interlaced with rivers, abounds in fish no less than in games animals, so they also have their great fishing expeditions. Fishing like hunting is done almost the year around.... Fish are abundant in lakes, rivers, and small streams."*

Likewise, Smith (2015) citing to some of the same references and others, noted that

> *"Fishing was a vital component of traditional Coeur d'Alene life. "A village site," Sven Liljeblad wrote, "was always in close proximity to a good fishing place which, together with the surrounding land, was considered property of the village."*

and

> *"All the rivers and rivulets in the Coeur-d'Alene country abound wonderfully in mountain trout and other fish."*

and

> *"Meanwhile, Nicholas Point reported in the early 1840s that the Coeur d'Alene Indians fished virtually year-round, but "the great fishing expedition" took place annually in the fall. He described one such expedition on banks of Spokane River, "at the place where Lake Coeur d'Alene teems with a prodigious number of fish. ... The catch is usually so abundant that canoes are filled and emptied within a space of a few hours." The Coeur d'Alene people feasted on runs of west slope cutthroat trout, whitefish, steelhead trout, and Chinook salmon."*

Similar findings were reported by Hart (2015) regarding the importance of fish and fishing to the CDT. For example,

> *"At the time of first contact with non-Indians from the United States, the Tribe continued to be dependent on fishing for subsistence. Although they also relied on hunting for deer and other animals in their own region, and engaged in an annual buffalo hunt to the east, without their provident supply of fish, they could not survive."*

and

> *"Fishing was crucial to the survival of the Coeur d'Alene Tribe. Using an extensive and complex system, involving weirs, basket traps, various types of nets, lines, spears, and hooks, the Tribe harvested large numbers of fish through all seasons of the year for purposes of subsistence. The Tribe depended for survival on the fishing resources in the Coeur d'Alene River, St. Joe River (and its tributaries), and Coeur d'Alene Lake."*

The reports also provided a picture of the geographic extent the CDT relied upon for fishing. Although apparently centered around villages associated with Coeur d'Alene Lake, Coeur d'Alene River, and the St. Joe and St. Maries rivers (see Figure 2 adopted from Hart (2015)), the reports mention wide-spread fishing expeditions that likely entailed forays that could be quite distal from the more permanent villages.

From Hart (2015) -

> *"The only systematic archaeological inquiry into Coeur d'Alene country was carried out between 1950 and 1953 by Tom O. Miller, who examined artifacts and materials gathered from Coeur d'Alene territory. In a publication recounting the work, he described thirty-eight village sites, all associated with rivers or lakes. Villages were situated near the lakes and rivers not only because of the ready and abundant supply of fish, but because travel through the dense undergrowth and thick forests was difficult, and much easier by canoe in the lakes and rivers. All available evidence demonstrates that the Coeur d'Alene Tribe depended on the water resources of the Coeur d'Alene River, St. Joe River, and Coeur d'Alene Lake in the location, establishment and occupation of their villages. They depended on these water resources for transportation and subsistence from time immemorial."*

And from Wee (2016) as noted above -

> *"The Coeur d'Alene had their great hunt, but their country, dotted with lakes and interlaced with rivers, abounds in fish no less than in games animals, so they also have their great fishing expeditions."*

Although only mainstem rivers are mentioned by name in these historical accounts, the CDT ranged widely in both their hunting and fishing expeditions that likely included at least portions or contributions from all of the Instream flow Claim reaches.

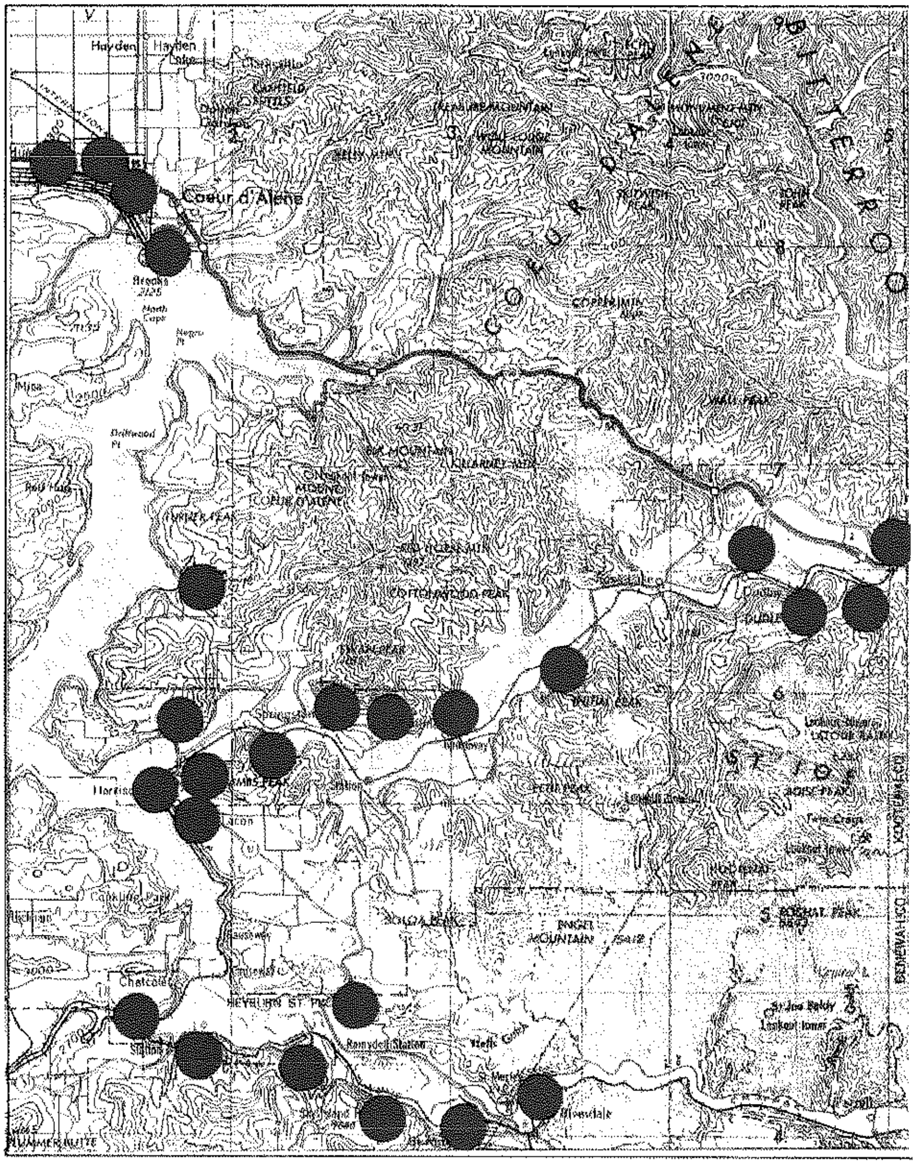


Figure 2. Location of Coeur d'Alene village sites near Coeur d'Alene Lake (from Hart 2015).

The CDT's interest and commitment to managing, protecting and enhancing the same fishery resources that were part of their aboriginal lands continues today. The CDT Fisheries Department consists of a staff of 20 fisheries scientists and ecologists who are actively involved in projects designed to enhance and protect the native fishery resources, and where possible restore fish back to areas where they were historically present. An example of the former is the ongoing research efforts by the CDT to learn more about the distribution and abundance of Northern Pike (*Esox lucius*) in the southern portion of Coeur d'Alene Lake. Northern Pike are highly predaceous on other fish including native fish species (Westslope

Cutthroat Trout) and the results of that analysis will help the CDT in developing management strategies for the control of that species. The CDT also has an active monitoring program on a number of streams within the current Reservation to enumerate upstream and downstream movement patterns of Westslope Cutthroat Trout as one means to better understand its behavioral patterns and biological needs. An example of the CDT's restoration efforts is the ongoing work in the Hangman Creek basin designed to enhance the habitats of Redband Trout (*Oncorhynchus mykiss gairdneri*) (Kinkead and Firehammer 2011; Reinke and Fesenmyer 2014) a subspecies of Rainbow Trout that is native to watersheds below Spokane Falls, and ultimately the reintroduction of Chinook Salmon (Green 2016).

1.2.1 Tribal Reservation Boundaries

During my reading of the historical reports I reviewed the process in which the CDT Reservation boundaries were decided. My interest stemmed not for the legal basis and rationale that was applied in deriving the different boundaries, but rather from the standpoint that such boundaries are meaningless relative to meeting the overall life history needs of the important fish species to the CDT. And yet, depending on the specific boundary, the number of instream flow claim reaches lying within could vary from 6 based on the 1867 boundary to 20 for the 1873 boundary, to 14 under the 1889 and 1894 boundaries (Figure 3 and Table 1)[7]. In contrast, all 71 instream flow claim reaches would be considered when the focus is on flows needed to provide habitats for fish species of both historical and contemporary importance to the CDT, without the constraints of human imposed borders.

Table 1. Effect of varying the boundaries of the Coeur d'Alene Tribe's Reservation on the number of Instream Flow Claims that would fall within each boundary.

Reservation Boundary (Year)	Number of Claims	Claim Numbers
Aboriginal Lands	71	101-113,1010-1015, 2001-2006, 3001–3009, 4001-4023, 4501-4504
1894	14	101-113, 4023
1889/1891	14	101-113, 4023
1873	20	101-113, 3001-3006, 4023
1867	6	106-110, 113

[7] The Reservation of the CDT was initially established by executive order in 1867, with the current reservation established under a second executive order in 1873 (Smith 2015).

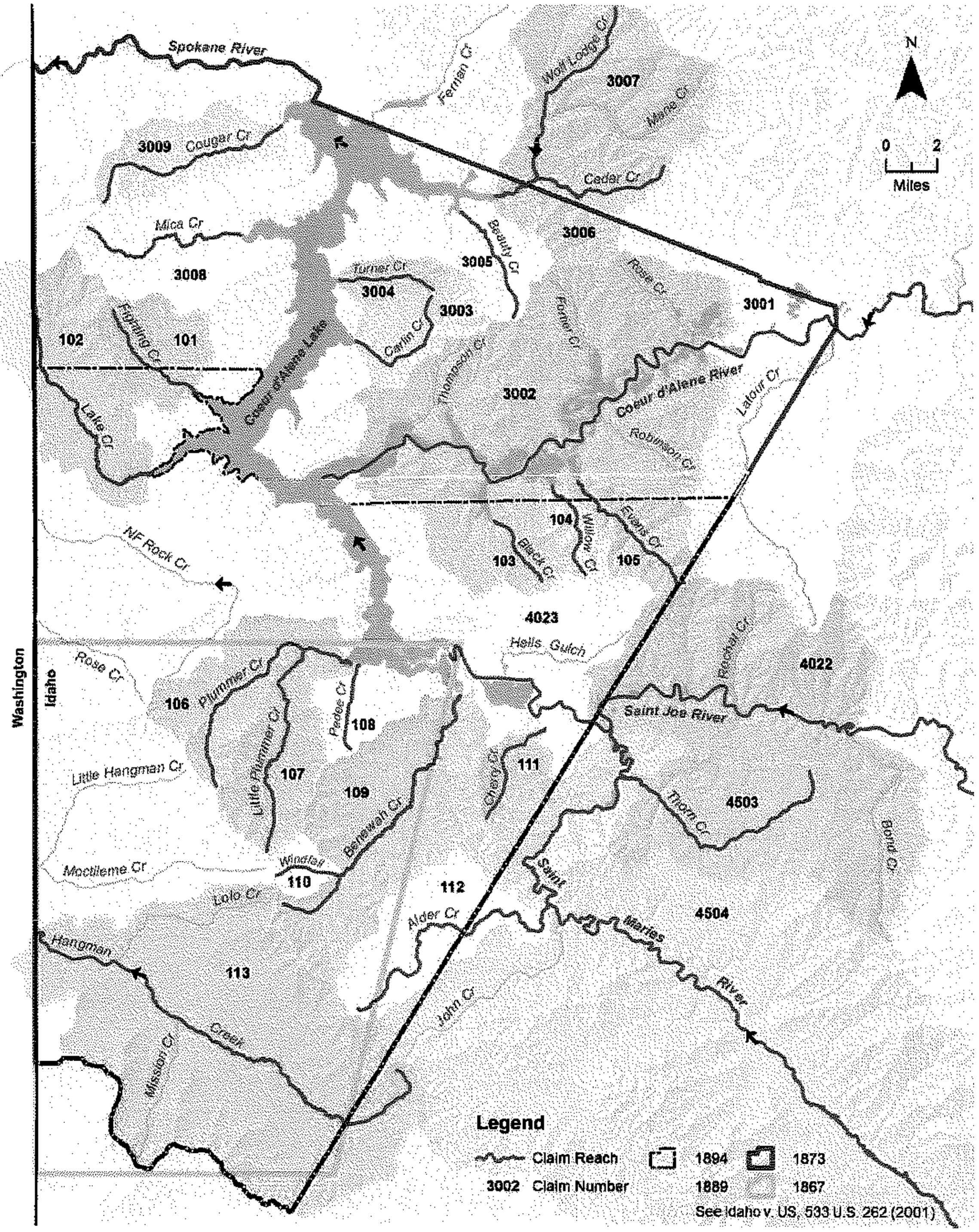


Figure 3. Map depicting the Instream Flow Claim reaches that would occur within the 1867, 1873, 1889 (1891), and 1894 boundaries of the Coeur d'Alene reservation.

1.3 Purpose of this Report and Question Addressed

When the 71 Instream Flow Claims were filed in January 2014, they were numbered and displayed on a map (Figure 1) that included not only the delineations of each of the 71 claim reaches, but also the delineation of an 1889 boundary of the CDT Reservation that was congressionally ratified in 1891 that defines the boundaries of the current reservation. Of the 71 claim reaches, 58 are located outside of the current CDT reservation boundary, 14 are located entirely within (Table 1). All 71 are located within watersheds of historical and current importance to the CDT in terms of their fishery resources.

Although the boundaries of the reservation are biologically non-existent to the target fish species and did not appreciably factor into the development of the Instream Flow Claims, I was asked on May 11, 2016 by the Department of Interior[8] (Grenham 2016) to report whether:

> *"... lands included in the Reservation boundaries as of 1891 include access to fisheries and, if so, explain the fish species and waterways through which those fish species migrate both on-and off-reservation."*

According to Mr. Grenham, the State of Idaho's historian (Stephen Wee) has concluded that even if the 1873 Reservation boundaries included important waterways for fisheries, this became less important when Congress ratified the 1891 boundaries that involved cession of the northern portion of the Reservation. Mr. Wee's implication is that since the northern portion of the lake and related streams and rivers were no longer within the reservation boundary (as defined in 1891), that the use of fish to the CDT and hence the fisheries, somehow became less important to the CDT in favor of the pursuit of agriculture.

1.4 Answer to the Question

Specific to Mr. Grenham's question, I can confidently affirm that the lands defined by the 1891 boundaries of the Reservation include access to fisheries valued by the CDT. Moreover, I can also affirm that the fish species that are accessible to the CDT within the 1891 boundaries of the Reservation can and do freely move to, utilize, and are dependent on portions of the lake and/or rivers and streams that are both inside and outside of the 1891 boundary. As I describe more fully below, fish populations do not recognize boundaries or borders etched on a map within which to confine their life cycle requirements. Rather, fish populations instinctually respond to a set of genetically programmed life cycle triggers that are purposely stimulated by certain environmental cues. These cues serve to guide the different life stages to habitats that afford them the best survival opportunity. It matters little whether those habitats reside within or outside of the reservation boundaries. It matters a lot that those habitats exist and that their quality and quantity is protected for use by the target populations.

[8] See attached letter (Attachment 2) of Brad Grenham, Assistant Regional Solicitor, United States Department of Interior, Portland, Oregon to Dr. Dudley Reiser. May 11, 2016.

The Instream Flow Claims were focused on providing for and protecting those habitats needed to promote and sustain, and in the case of bull trout, restore healthy populations of the target fish species.

Inspection of the CDT website (http://www.cdatribe-nsn.gov/natural/Fisheries/Fisheries.aspx) for the Natural Resource Department reveals a high-level of continued interest and commitment toward the fishery resources within the Coeur d'Alene Basin. The Mission Statement of the Program is

> *"to restore, protect, expand and reestablish fish populations to sustainable levels to provide harvest opportunities within the historical and cultural territories of the Coeur d'Alene Tribe. The Program's goals and objectives are accomplished through the implementation of fisheries management plans, and by working in a variety of cooperative, governmental and non-governmental arenas to address aquatic resource issues and needs."*

This indicates that the CDT remains committed to the preservation and sustainability of the native fishery resources within all waters of the CDR basin that were historically important to the Tribe. This includes waters both within and outside of the 1891 boundaries of the Reservation.

The technical basis and rationale behind my answer is described in the following five sections of the report. These include: Section 2 – Approach and Methods, that describes general methods used and information I relied upon in preparing this report and reaching my conclusion; Section 3 – Target Fishes of Importance to the CDT that includes a general discussion of their historic and current distributions, life history strategies, and life history characteristics; Section 4 – Considerations Relative to Determining Whether Lands Within the Existing 1891 Reservation Include Access to Fisheries, that highlights specific aspects of the fish populations that transcend the 1891 boundary limits and; and Section 5 – Summary and Conclusion, that contains my overall answer to Mr. Grenham's question and summarizes the basis thereof.

2. METHODS AND APPROACH

I used a variety of resources to gather information on the distribution of adfluvial Westslope Cutthroat Trout and Bull Trout in the Coeur d'Alene Basin, as well as general information on their life histories with particular emphasis on the distances these species and other similar salmonids have been shown to migrate to reach suitable spawning habitats. Acquired documents and articles were categorized as either "Basin-specific," or as "Species-specific," information. A total of 115 documents were reviewed.

Basin-specific information largely addressed information on the distribution of adfluvial Westslope Cutthroat Trout and Bull Trout in the Coeur d'Alene Basin. Documents were mostly acquired from reports from the Idaho Department of Fish and Game (IDFG), U.S. Fish and Wildlife Service (USFWS), CDT, universities, and from reports developed as part of the relicensing of the Spokane River Hydroelectric Project. A total of 53 documents were used to provide data points for the distribution of adfluvial Westslope Cutthroat Trout and Bull Trout in the CDR basin (Attachment 3). If not explicitly stated as adfluvial trout, all fish noted as greater than 300-mm in length were considered adfluvial fish. For bull trout, a number of the observations in the St. Joe River Basin were noted as Bull Trout redds recorded in IDFG reports of annual Bull Trout redd surveys. Additionally, the USFWS designation for Bull Trout Critical Habitat (USFWS 2010) was also included in mapping the distribution in the Coeur d'Alene Basin.

Three types of data points were used for the distribution of adfluvial Westslope Cutthroat Trout and Bull Trout in the Coeur d'Alene Basin: Observation Points, Upper Limits, and General Locations.

Observation Points

- Represent a specific location where an observation was reported during a survey. Some referenced documents include method (i.e., radio tag, screw trap, snorkel survey).
- Example 1: Adult 340 mm cutthroat in St Joe River, river mile 96.5.
- Example 2: St. Joe River near Game Creek, one Bull Trout observed snorkel, August 2004.

Upper Limit of Survey Range or Distribution

- Represents the upper limit of a described survey reach, range, or known fish distribution, but it is not necessarily the uppermost observation. Reference documents tend to include fish densities or counts observed within the survey reach.
- Example 1: Shoshone Creek, historic upper limit.
- Example 2: Bull Trout redds, St Joe River between Spruce Tree and Bean Creek. Upper limit is the St. Joe River at Bean Creek.
- Example 3: Cutthroat trout >300 mm observed in snorkeling transects NF01-13, in 2010. Upper limit is NF13.
- Example 3: One Bull Trout reported creeled between Little North Fork (LNF) mouth and Laverne Creek on 5/26/85. Upper limit is LNF Coeur d'Alene River at Laverne Creek.

General Location

- Represents an observation that was made on the named tributary, but other than tributary name, the location is unknown.
- Example 1: Cherry Creek, Bull Trout captured in migratory traps, 1986, 1 juvenile.
- Example 2: Thomas Creek, recent record 1984-87, upstream range not stated in report.
- Example 3: Quartz Creek, recorded Bull Trout redds during 1992-2008.

Species-specific information was collected to review the life histories of Cutthroat Trout and Bull Trout throughout the region, but was expanded to include a wider area in the surrounding states and provinces of Washington, Oregon, Montana, British Columbia, and Alberta. In addition, the literature was reviewed for recorded migration distances for both fluvial and adfluvial Cutthroat Trout and Bull Trout, and other salmonids such as Redband Trout, Rainbow Trout, and Bonneville Cutthroat Trout. Documents were acquired from a variety of online resources, utilizing online searches such as Google

Scholar, and the StreamNet Regional Library (http://catalog.streamnetlibrary.org/). Reports were also downloaded from the IDFG Fisheries Library database (https://collaboration.idfg.idaho.gov/FisheriesTechnicalReports/Forms/AllItems.aspx) using keywords such as "cutthroat," "bull trout," "migration," "telemetry," "Coeur d'Alene," and "Panhandle" to search for relevant annual reports. USFWS publications included those documents and reports related to the final ruling of critical habitat for bull trout, as well as the Bull Trout recovery plan (USFWS 2015a) and implementation plan (USFWS 2015b). A number of reports and theses were downloaded from several universities, including the University of Idaho, University of Montana, and Utah State University. Finally, searches included a number of fisheries journals, including North American Journal of Fisheries Management, Hydrobiologia, Transactions of the American Fisheries Society, Fisheries, and Ecology of Freshwater Fish.

3. TARGET FISH OF IMPORTANCE TO THE COEUR D'ALENE TRIBE

As was described in detail in the reports of Wee (2016), Hart (2015) and Smith (2015), the harvesting of fish was a crucial component to the survival of the CDT long before first contact with eastern-Europeans with historical records clearly showing a dependence on the fishery resources provided in Coeur d'Alene Lake and its tributaries. The CDT also would reportedly travel to portions of the Spokane River and its tributaries (e.g., Hangman Creek) to harvest salmon species that were naturally excluded (via Spokane Falls on the Spokane River) from the Coeur d'Alene Lake basin (Hart, 2015, Smith 2015). The contemporary Mission Statement of the CDT's Fishery Program affirms the continued importance of the fishery resources in the Coeur d'Alene Basin to the Tribe.

There are currently twelve native and sixteen introduced fish species (i.e., intentionally stocked or unintentionally or illegally introduced) inhabiting the Coeur d' Alene basin (Table 2). Although historical accounts provided by Coeur d'Alene Tribal members list salmon and steelhead (below Spokane Falls in the Spokane River), Westslope Cutthroat Trout, Bull Trout, Mountain Whitefish (Prosopium williamsoni), suckers (*Catostomus, sp.*), and Northern Pikeminnow (formally called squawfish) (*Ptychocheilus oregonensis*) as species traditionally harvested by the tribe, it can be assumed that any fish species that was in plentiful supply and could be caught would likely be harvested and consumed.

Of these species, three were considered for the Instream Flow Claims filed under the CSRBA: Westslope Cutthroat Trout, Bull Trout, and Chinook Salmon. These three species were of historical importance to the CDT in terms of harvest, and today represent species which the CDT actively manages and seeks to protect, restore and maintain sustainable populations. My discussion herein pertains to the fish native to the Coeur d'Alene Basin above Spokane Falls and includes Westslope Cutthroat Trout and Bull Trout, hereafter referred to as "target species." As noted above, although Chinook Salmon was also of historical importance to the CDT, they were not native to the Coeur d'Alene Lake basin above Spokane Falls[9].

Table 2. Fishes of the Coeur d'Alene Lake basin. (Source: NWPCC, 2004).

Common Name	Scientific Name	Native/Introduced
Longnose sucker	*Catostomus catostomus*	Native
Bridgelip sucker	*Catostomus columbianus*	Native
Largescale sucker	*Catostomus macrocheilus*	Native
Shorthead sculpin	*Cottus confuses*	Native
Torrent sculpin	*Cottus rhotheus*	Native
Westslope cutthroat trout	*Oncorhynchus clarki lewisi*	Native
Mountain whitefish	*Prosopium williamsoni*	Native
Northern pikeminnow	*Ptychocheilus oregonensis*	Native
Longnose dace	*Rhinichthys cataractae*	Native
Speckled dace	*Rhinichthys osculus*	Native
Redside shiner	*Richardsonius balteatus*	Native
Bull trout	*Salvelinus confluentus*	Native
Lake superior whitefish	*Coregonis clupeaformis*	Introduced
Northern pike	*Esox Lucius*	Introduced
Tiger muskie	*Esox masquinongy X E. Lucius*	Introduced
Black bullhead	*Ictalurus melas*	Introduced
Brown bullhead	*Ictalurus nebulosus*	Introduced
Channel catfish	*Ictalurus punctate*	Introduced
Pumpkinseed	*Lepomis gibbosus*	Introduced
Smallmouth bass	*Micropterus dolomieui*	Introduced
Largemouth bass	*Micropterus salmoides*	Introduced
Rainbow trout	*Oncorhynchus mykiss*	Introduced
Kokanee salmon	*Oncorhynchus nerka*	Introduced
Chinook salmon	*Oncorhynchus tshawytscha*	Introduced
Yellow perch	*Perca flavescens*	Introduced
Black crappie	*Pomoxis migromaculatus*	Introduced
Brook trout	*Salvelinus fontinalis*	Introduced
Tench	*Tinca tinca*	Introduced

[9] Chinook Salmon was introduced to Coeur d'Alene Lake in 1982 and since then have been managed by the Idaho Department of Fish and Game to provide a public sport fishery.

3.1 Historic and Current Distribution of Target Species within the Coeur d'Alene Lake Basin

Under historical conditions it is likely that all of the basins within the Coeur d'Alene watershed defined by the Instream Flow Claims supported viable populations of both target species. The current distribution and abundance of these species has been influenced by landscape level changes that have altered the species composition, physical and chemical habitat quality of the basin, and resulted in fragmentation of habitat and isolation of populations

3.1.1 Westslope Cutthroat Trout

Historically, Westslope Cutthroat Trout was the dominant salmonid species in streams of the Coeur d'Alene Basin (Behnke and Wallace 1986). Though limited data are available to describe its historic abundance, many accounts suggest that densities were high throughout the basin (NPPC 2000). This species exhibits three forms or life history strategies (resident, fluvial, and adfluvial) (explained further in Section 3.2) with the adfluvial form being the most diverse and involving both Coeur d'Alene Lake and riverine systems. As noted by the IDFG (2013), current populations of adfluvial Westslope Cutthroat Trout migrate between Coeur d'Alene Lake and the St. Joe, St. Maries, and Coeur d'Alene rivers, so populations are not independent of each other (IDFG 2013). Fluvial Westslope Cutthroat Trout populations in the CDA drainage (with exception of the South Fork Coeur d'Alene River) are generally in good health. However, adfluvial populations in the CDA basin are much reduced from historical levels (IDFG 2013). Factors affecting population decline include: shoreline development, loss of quality spawning and rearing habitat in tributary streams, and the interaction of non-native or predatory species. In particular, Northern Pike and Smallmouth Bass and non-native predator species that were illegally introduced and are now widespread throughout the lake and lower seasonally impounded reaches of the tributaries (IDFG 2013). The CDT is currently engaged in a large scale effort to restore adfluvial Cutthroat Trout populations. Primary goals include habitat restoration in key tributaries, estimating in-lake survival of juvenile Cutthroat Trout, and evaluating impacts of non-native predators (IDFG 2013).

In 1997, the U.S. Fish and Wildlife Service received a formal petition to list Westslope Cutthroat Trout as "threatened throughout its range" under the Endangered Species Act. A status review was conducted by the Service determining that a "threatened" listing was "not warranted" for Westslope Cutthroat Trout because "abundant, stable, and reproducing populations" remain well distributed throughout its historic range (U.S. Office of the Federal Register 2000). Subsequently, a lawsuit was brought against the Service on the basis that there were numerous flaws in the rationale they used for making the determination. However, for a second time in 2003, the Service decided the listing of Westslope Cutthroat Trout was "not warranted."

While not federally listed under the ESA, the Idaho Comprehensive Wildlife Conservation Strategy (Wildlife Action Plan) lists Westslope Cutthroat Trout as a Species of Greatest Conservation Need (IDFG

2006). Both the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) consider Westslope Cutthroat Trout to be a sensitive species. In Idaho, the Westslope Cutthroat Trout is officially classified and managed as a Game Species by IDFG and is noted as a "species of special concern" by the State of Idaho.

3.1.1.1 Coeur d'Alene River Subbasin

The Coeur d' Alene River drainage has an extensive history of mining. Development of the Silver Valley Mining District in the South Fork Coeur d'Alene River Valley began in the 1880s and has altered both the habitat and water quality of the subbasin since that time. While fluvial cutthroat trout populations in the drainage (the South Fork Coeur d'Alene River notwithstanding) are generally in good health, adfluvial stocks in the Coeur d'Alene Lake basin are a fraction of historical levels (IDFG 2013). Populations of adfluvial Westslope Cutthroat Trout reside in Coeur d' Alene Lake as adults and sub-adults, and disperse to tributaries lower in the Subbasin to spawn and rear through the juvenile life stage. Strongholds for both adfluvial and fluvial life forms are concentrated in Coeur d' Alene River and its tributaries upstream to the confluence of the North and South Forks Coeur d'Alene rivers (NPPC 2000).

The location of individual historic and current observations of large (>300 mm), migratory Westslope Cutthroat Trout in the Coeur d'Alene River subbasin are displayed on Figure 4. This figure includes observations made both within and beyond the current boundaries of the Reservation. Based on that information, the figure also presents the presumed distribution of the species reflective of connections between upper areas with known observations with those in downstream locations but through which fish must migrate to reach downstream habitats.

3.1.1.2 St. Joe River Subbasin

The upper St. Joe River (upstream of the North Fork) is widely considered to contain one of the strongest Westslope Cutthroat Trout populations in the State of Idaho (Rieman and Apperson 1989). Westslope Cutthroat Trout in the lower St. Joe River (downstream of the North Fork) are relatively abundant and widely distributed, although some hybridization with introduced rainbow trout is occasionally seen (IDFG 2013). The St. Joe River and its largest tributary the St. Maries River contain populations of resident, fluvial, and adfluvial cutthroat trout (NPPC 2000). Snorkel counts completed by IDFG since the early 1970s have shown Westslope Cutthroat Trout densities as much as three times higher in the St. Joe River subbasin as the Coeur d'Alene River subbasin (IDFG 2013).

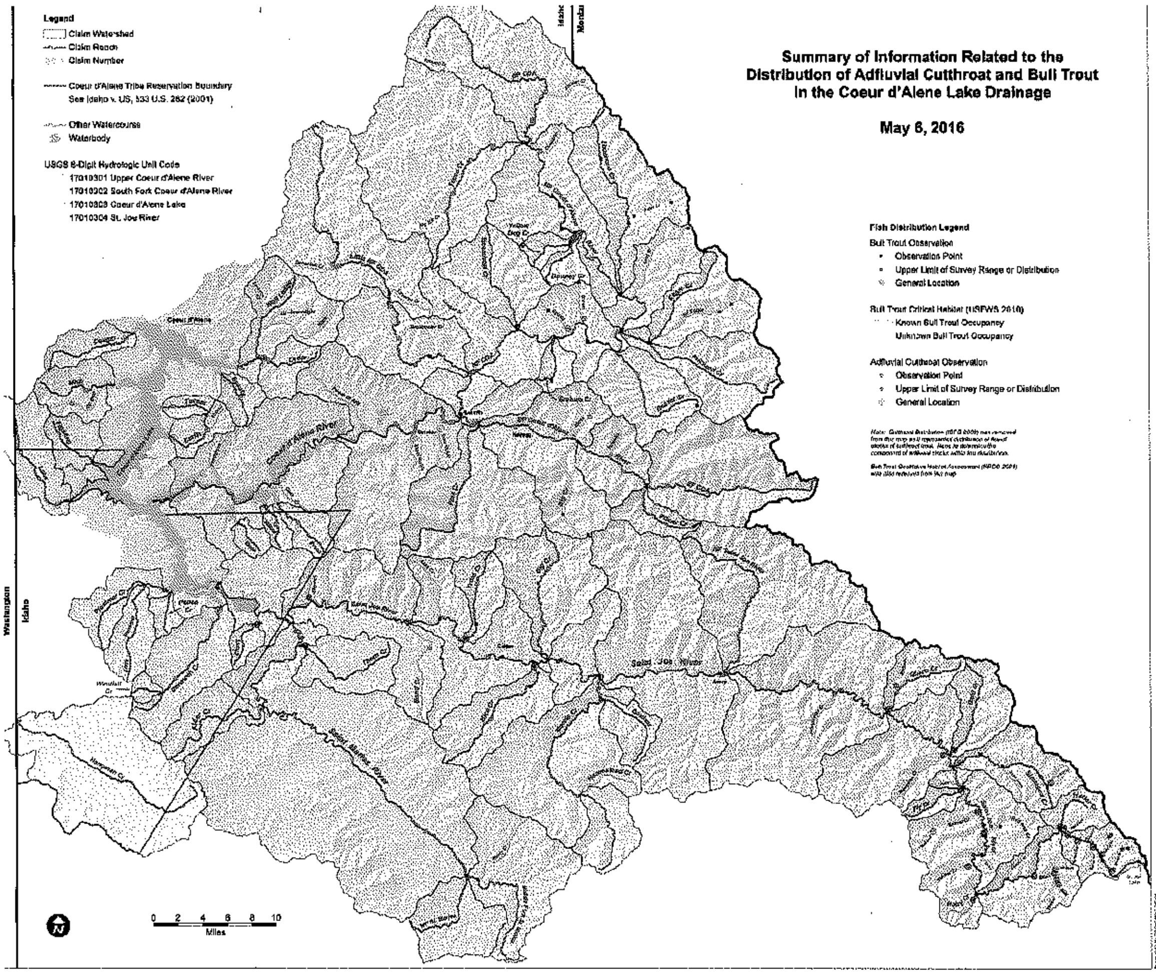


Figure 4. Summary map of information related to the distribution of adfluvial Westslope Cutthroat Trout and Bull Trout in the Coeur d 'Alene Lake Drainage, Idaho.

The location of individual historic and current observations of large (>300 mm), migratory Westslope Cutthroat Trout in the St. Joe River subbasin are displayed on Figure 4. This figure also presents the presumed distribution based on known upper observations connecting to downstream locations as explained above.

3.1.2 Bull Trout

The CDR basin is within the native range of Bull Trout; however, information concerning specific population distribution in the basin is scarce (GEI Consultants 2004). Historically, all three life history strategies (adfluvial, fluvial, and resident) were expressed with large, migratory Bull Trout abundant within the basin (NPPC 2000). Currently, the migratory Bull Trout (adfluvial and fluvial) are assumed to be limited within much of the Lake Coeur d' Alene basin. Population estimates based on 10 years of redd surveys indicate the average annual basin at an estimated 180 spawning adult Bull Trout (USFWS 2015b). Historically, Bull Trout were documented in more than 30 streams and river reaches throughout the Coeur d'Alene Basin. The USFWS now reports spawning and rearing appears to be concentrated in relatively few tributaries in the St. Joe River sub-basin (USFWS 2015b). The USFWS reports the current status of Bull Trout in the CDA basin as depressed and the population trend declining (USFWS 2015b). Habitat conditions in the migratory corridor are poor with high temperatures and low levels of dissolved oxygen (USFWS 2015b). Legal harvest of Bull Trout in the CDA subbasin has not been allowed since 1988 (GEI Consultants 2004) and current IDFG fishing regulations limit Bull Trout mortality associated with incidental capture.

Bull Trout was listed as threatened under the Federal ESA in 1998. In the final listing rule (63 FR 31647), the USFWS identified a single Bull Trout subpopulation in the Spokane River basin (USFWS 1998). The subpopulation contains migratory fish (fluvial and adfluvial) primarily spawning in tributaries of the upper St. Joe River (NPPC 2000). As part of the 2002 USFWS Bull Trout Draft Recovery Plan for the Coeur d'Alene Lake Recovery Unit, the agency stated:

> *"Currently, though no physical barriers exist and probably only seasonal or periodic instances occur when water quality potentially limits migration of bull trout through migratory corridors within the Coeur d'Alene Lake recovery unit, there is no evidence that bull trout from the St. Joe River subbasin readily access the Coeur d'Alene River subbasin to recolonize. Because bull trout exhibit a high degree of natal stream fidelity throughout their range (James et al., in litt., 1998; Spruell et al. 2000; Hvenegaard and Thera 2001) and because the current population size in the portion of the Coeur d'Alene Recovery Unit that is outside the Coeur d'Alene Lake and the St. Joe River is very small, the Coeur d'Alene River subbasin could be considered functionally fragmented from bull trout in the St. Joe River. This portion will probably not be recolonized naturally at any time during the expected time frames of the recovery plan."*

3.1.2.1 Coeur d'Alene River Subbasin

Historical observations of large, migratory Bull Trout are distributed throughout the Coeur d'Alene River subbasin with the highest concentration in the North Fork Coeur d'Alene River and its tributaries (Figure 4). Currently, the complete absence of Bull Trout from tributaries to the North Fork Coeur d'Alene River during recent fish population inventories suggests that Bull Trout have become essentially extirpated from the Coeur d'Alene River system (NPPC 2000). The location of individual historic observations of large (>300 mm), migratory Bull Trout in the St. Joe River subbasin are displayed on Figure 4. This figure also presents the presumed distribution (historic) of Bull Trout within the Coeur d'Alene River subbasin.

3.1.2.2 St. Joe River Subbasin

The St. Joe watershed is biologically the most important area for Bull Trout within the Coeur d'Alene Basin (USFWS 1998). However, there are no historic data available that would allow an estimate of the number of Bull Trout in the Coeur d'Alene Lake basin as a whole or within any particular subbasin. Some information on Bull Trout distribution collected during the 1930s (Maclay 1940) is available, but the records do not provide specific information on locations of observations or relative abundance.

Migratory Bull Trout also use the St. Joe River and Coeur d'Alene Lake for foraging, migrating, and overwintering habitat. Adfluvial Bull Trout typically spawn in September and October and then complete a relatively quick migration back to Coeur d'Alene Lake (Avista 2005). While residing in Coeur d'Alene Lake, Bull Trout are believed to occupy the deeper, cooler areas of the lake.

The location of individual historic and current observations of large (>300 mm), migratory Bull Trout in the St. Joe River subbasin are displayed on Figure 4; the figure also presents the presumed distribution (historic and current).

3.2 Life History Strategies Exhibited by Target Species

Westslope Cutthroat Trout and Bull Trout in the Coeur d'Alene Basin are capable of exhibiting three different life history strategies/forms including resident, fluvial and adfluvial defined as follows;

- **Resident-** populations that typically reside in smaller tributaries in which they are able to complete their entire life cycle, including spawning and rearing.
- **Fluvial-** migratory populations that utilize different habitats and sections of rivers in order to complete their life cycle; typically, the adult component of the population resides in larger river systems; adults migrate upstream into smaller tributaries in which to spawn; fry and juveniles may rear within the smaller tributaries for 2-3 years prior to maturation at which time they migrate downstream and assume residency in the larger rivers.
- **Adfluvial-** migratory populations that utilize different habitats in order to complete their life cycle; typically, the adult component of the population resides in a lake or reservoir system; adults migrate upstream (and in some cases downstream) into rivers and tributaries in which to spawn; fry and juveniles may rear within the tributaries for several years prior to maturation, at which time they migrate downstream and assume residency in the lake; alternatively or in combination, the fry and/or juveniles may outmigrate directly to the lake and rear therein.

Of these, it is the adfluvial and fluvial strategies that are most relevant to answering the questions posed by Mr. Grenham, in particular his request to "explain the fish species and the waterways through which those fish species migrate, both on – and off-reservation" (referring to the 1891 boundaries of the Reservation).

To the first point, the fish species central to the CDT that are part of the Instream Flow Claims are the Westslope Cutthroat Trout and Bull Trout as just noted. To the second point, the waterways through which the fish migrate require an understanding of the behavioral characteristics of the adfluvial and fluvial stocks of these two species.

3.2.1 Riverine Migration

In contrast to the resident populations of the target species that may move as little as a few hundred yards during their lifespan in headwater streams (Wydoski and Whitney 2003), fluvial and adfluvial fish may migrate over great distances (over 100 miles), particularly in relation to spawning or rearing behaviors. A review of reports and data specific to the Coeur d'Alene Basin as well as information from other systems reveals substantial variability in the migratory behaviors of adfluvial and fluvial stocks of cutthroat and bull trout. Table 3 summarizes the information relative to the migration distances that have been observed for adfluvial and fluvial stocks of Bull Trout, Westslope Cutthroat Trout, and Rainbow Trout in watersheds in Idaho, Montana, Oregon, Washington and British Columbia. Rainbow Trout were included because its habitat requirements, life history patterns and behaviors are similar to cutthroat. The table demonstrates that migration distances achievable by these species can be quite long.

For Westslope Cutthroat Trout, adult adfluvial fish have been shown to migrate from 5.3 miles (Salmon River to Redfish Lake – Idaho) to over 131 miles in Montana. In the Coeur d'Alene Basin, adult migrations have been documented that range from 8 miles (Benewah Creek to Coeur d'Alene Lake) to about 50 miles (Moon Creek to Coeur d'Alene Lake). Horton and Mahan (1988) reported that tagged outmigrants from Benewah Creek (a tributary to Coeur d'Alene Lake) were recaptured by anglers in Coeur d'Alene Lake, confirming the presence of an adfluvial stock in that system. The same researchers found one tagged cutthroat in the St. Joe River to travel nearly 40 miles before being recaptured (Horton and Mahan 1988). Cernera et al (1997) documented the post-spawning migrations of two adfluvial Westslope Cutthroat Trout captured and implanted with acoustic tags in Moon Creek, a tributary to the South Fork Coeur d'Alene River. These fish were then later detected downstream about 50 miles just below the Harrison Bridge at the confluence with Coeur d'Alene Lake. Reported migrations of fluvial fish are even longer with some distances exceeding 145 miles. Bjornn and Mallet (1964) reported that fluvial adult Cutthroat Trout in the Middle Fork Salmon River migrated an average of 20 miles to reach spawning habitats; the maximum distance recorded was 80 miles. In studies conducted in the upper Flathead River in Montana, Shepard et al. (1984) observed adfluvial Cutthroat Trout migrating an average of about 28 miles to reach spawning habitats; maximum migration distance was 188 miles.

Table 3. Reported migration distances for fluvial and adfluvial Bull Trout, Cutthroat Trout, Redband Trout, and Rainbow Trout in the Pacific Northwest region. Full citations of references are contained in Section 6.

Species	Type	River System / Basin	State	Distance (mi)	Range of Distances (mi)	Source	Notes
Westslope Cutthroat Trout	Adfluvial	Coeur d'Alene River	Idaho	37.5		Dupont et al. 2008	Two adfluvials from lake to CDA River at SF confluence
Westslope Cutthroat Trout	Adfluvial	St. Joe River	Idaho		8.1 - 11.8	Horton and Mahan 1988	From Benewah Creek
Westslope Cutthroat Trout	Adfluvial	Upper Salmon River	Idaho	5.3		Schoby and Curet 2007	To Redfish Lake
Westslope Cutthroat Trout	Adfluvial	St. Joe River	Idaho	9.9		Apperson et al. 1988	Browns Point to St. Joe R. at Hells Gulch
Westslope Cutthroat Trout	Adfluvial	Coeur d'Alene River	Idaho	29.8		Apperson et al. 1988	Browns Point to Coeur d'Alene River at Cataldo
Westslope Cutthroat Trout	Adfluvial	South Fork Coeur d'Alene River	Idaho		49.6	Cernera et al. 1997; R2 1996b	From Moon Creek to Coeur d'Alene Lake
Westslope Cutthroat Trout	Adfluvial	Coeur d'Alene River	Idaho		2.1 – 122.6	Goodnight and Watkins 1976	See Table 2. Tag recoveries
Westslope Cutthroat Trout	Adfluvial	Upper Flathead River	Montana	131.7		Shepard et al. 1984	
Westslope Cutthroat Trout	Adfluvial	Lake Washington	Washington		0 - 7.5	Nowak and Quinn 2002	In lake movements
Westslope Cutthroat Trout	Fluvial	Upper Salmon River	Idaho	41.9		Schoby 2006	Home Range
Westslope Cutthroat Trout	Fluvial	St. Joe River	Idaho	8.9		Bjornn and Thurow 1974	
Westslope Cutthroat Trout	Fluvial	Coeur d'Alene River	Idaho		0.6 – 19.9	Apperson et al. 1988	

Table 3. Reported migration distances for fluvial and adfluvial Bull Trout, Cutthroat Trout, Redband Trout, and Rainbow Trout in the Pacific Northwest region. Full citations of references are contained in Section 6.

Species	Type	River System / Basin	State	Distance (mi)	Range of Distances (mi)	Source	Notes
Westslope Cutthroat Trout	Fluvial	St. Joe River	Idaho		4.3 – 39.8	Apperson et al. 1988	
Westslope Cutthroat Trout	Fluvial	Coeur d'Alene River	Idaho		0 - 9.9	Horton and Mahan 1988	
Westslope Cutthroat Trout	Fluvial	St. Joe River	Idaho		0 - 39.8	Horton and Mahan 1988	
Westslope Cutthroat Trout	Fluvial	St. Joe River	Idaho		0 - 16	Rankel 1971	
Westslope Cutthroat Trout	Fluvial	Upper Salmon River	Idaho	52.3 (avg)	6.2 - 146.6	Schoby and Curet 2007	To Salmon River
Westslope Cutthroat Trout	Fluvial	Middle Fork Salmon River	Idaho	56.8 (avg)	1.2 – 120.5	Zurstadt and Stephan 2004	Bear Valley Creek drainage
Bonneville Cutthroat	Fluvial	Bear River	Idaho-Wyoming	36.7 (avg)	20.5 - 53.4	Colyer et al. 2005	
Snake River Finespotted Cutthroat Trout	Fluvial	Upper Snake River	Wyoming		0 – 62.8	Homel 2013	
Rainbow Trout	Adfluvial	Alagnak River	Alaska		26.1 - 63.4	Meka et al. 2003	Site fidelity, fish returned to same lake each year
Rainbow Trout	Fluvial	Upper Salmon River	Idaho	15.9 (avg)	2 - 28.6	Schoby and Curet 2007	To Salmon River
Rainbow Trout	Fluvial	Yakima River	Washington	9.3 (avg)	0.2 - 54.2	Hockersmith et al. 1995	71% travelled less than 15 km to spawn

Table 3. Reported migration distances for fluvial and adfluvial Bull Trout, Cutthroat Trout, Redband Trout, and Rainbow Trout in the Pacific Northwest region. Full citations of references are contained in Section 6.

Species	Type	River System / Basin	State	Distance (mi)	Range of Distances (mi)	Source	Notes
Redband Trout	Adfluvial	Sprague River	Oregon	129		Reiser 2009	From Klamath Lake to NF Sprague River
Redband Trout	Fluvial	Donner und Blitzen River	Oregon		0.6 - 56.5	Anderson et al. 2011	Possible adfluvial Malheur Lake
Bull Trout	Adfluvial	Columbia River, Arrow Lakes Reservoir	British Columbia		0.1 - 28.3	Decker and Hagen 2007	From reservoir, not explicit on spawner presence/locations
Bull Trout	Adfluvial	White River	British Columbia		126.8 - 129.2	Westover and Heidt 2004	Lake Koocanusa to White River
Bull Trout	Adfluvial	Upper Salmon River	Idaho	41.1 (avg)	25 - 44.7	Schoby and Curet 2007	To Redfish Lake
Bull Trout	Adfluvial	Pend Oreille River	Idaho	53.4		Dupont et al. 2007	East River to Priest River, to Pend Oreille River and lake
Bull Trout	Adfluvial	Salmon River	Idaho	6.2		Hogen and Scarnecchia 2006	
Bull Trout	Adfluvial	Boise River	Idaho	42.9 (avg)	11.5 - 72.7	Flatter 1999	Upstream migrations from Arrowrock Reservoir
Bull Trout	Adfluvial	Clark Fork River / Lake Pend Oreille	Idaho	52.8		Scholz et al. 2005	
Bull Trout	Adfluvial	Boise River	Idaho	> 26.1		Monnot et al. 2008	Fall migration to Arrowrock Reservoir
Bull Trout	Adfluvial	Secesh River / South Fork Salmon River	Idaho	70.4		Watry and Scarnecchia 2008	
Bull Trout	Adfluvial	Flathead River Basin	Montana		54.7 - 155.3	Fraley and Shepard 1989	

Table 3. Reported migration distances for fluvial and adfluvial Bull Trout, Cutthroat Trout, Redband Trout, and Rainbow Trout in the Pacific Northwest region. Full citations of references are contained in Section 6.

Species	Type	River System / Basin	State	Distance (mi)	Range of Distances (mi)	Source	Notes
Bull Trout	Adfluvial	Flathead River Basin	Montana		0.1 - 0.9	Meeuwig and Guy 2007	Distances to redds upstream of 17 lakes in Glacier National Park
Bull Trout	Adfluvial	Upper Flathead River	Montana	20.5 (avg)	3.7 - 80.2	Muhlfeld and Marotz 2005	Subadult movements
Bull Trout	Adfluvial	Kootenai (Kootenay) River	Montana / British Columbia	141.7		Paragamian et al. 2010	One adult.
Bull Trout	Adfluvial	Metolius River	Oregon	< 24.9		Thiesfeld et al. 1996	To Lake Billy Chinook
Bull Trout	Adfluvial	North Fork Skokomish River	Washington		0 - 3.7	Brenkman et al. 2001	From Lake Cushman
Bull Trout	Fluvial	Halfway River, Peace River	Alberta, Canada	170.9		Burrows et al. 2001	
Bull Trout	Fluvial	MacLeod River	Alberta, Canada		9.9 - 11.7	Carson 2001	
Bull Trout	Fluvial	Morice River	British Columbia	46.6		Bahr and Shrimpton 2004	
Bull Trout	Fluvial	Fraser River, Yalakom River	British Columbia	26.1 (avg)	4.3 - 51.6	Chamberlain 2002	Upstream spawning was 10-50 km
Bull Trout	Fluvial	Goat River	British Columbia		248.5 - 310.7	Pillipow and Williamson 2004	Fraser River as far as Quesnel; Nechako River as far upstream as Fraser Lake
Bull Trout	Fluvial	Upper Salmon River	Idaho	42.7		Schoby 2006	Home Range
Bull Trout	Fluvial	Upper Salmon River	Idaho	53.7 (avg)	6.8 - 136.7	Schoby and Curet 2007	To Salmon River

Table 3. Reported migration distances for fluvial and adfluvial Bull Trout, Cutthroat Trout, Redband Trout, and Rainbow Trout in the Pacific Northwest region. Full citations of references are contained in Section 6.

Species	Type	River System / Basin	State	Distance (mi)	Range of Distances (mi)	Source	Notes
Bull Trout	Fluvial	Salmon River	Idaho	62.1		Hogen and Scarnecchia 2006	Some evidence of site fidelity
Bull Trout	Fluvial	Blackfoot River	Montana	39.1 (avg)	8.1 - 69.6	Swanberg 1997a.	
Bull Trout	Fluvial	Clark Fork River	Montana		52.8 - 155.3	Swanberg 1997b.	
Bull Trout	Fluvial	Kootenai (Kootenay) River	Montana / British Columbia		21.3 - 51.7	Paragamian et al. 2010	
Bull Trout	Fluvial	Malheur River Basin	Oregon		6.8 - 13	Schwabe et al. 2003	
Bull Trout	Fluvial	Columbia River, Twisp River	Washington		60.9 - 72.1	BioAnalysts 2004	
Bull Trout	Fluvial	Tucannon River	Washington		21 - 28.6	Faler et al. 2004	
Bull Trout	Fluvial/ Adfluvial	Upper Kootenay River	British Columbia	51.2 (avg)	9.9 - 135.5	Westover and Heidt 2004	Average, min, max home range distances for 7 tributaries to Lake Koocanusa

Migration distances reported for adult adfluvial Rainbow Trout range from 2 miles (Lake Iliamna to unnamed tributary) to 129 miles (Klamath Lake to N. Fork Sprague River); for fluvial fish from 0.2 miles (Yakima River) to over 56 miles (Donner und Blitzen River).

Bull Trout in the Coeur d'Alene Basin are classified by the USFWS as part of the Columbia Headwaters Recovery Unit. Bull Trout in this Recovery Unit are unique in that the majority of the core populations exhibit an adfluvial life history, residing in lakes or reservoirs during much of their lives. Spawning and rearing streams for these populations may be 100 miles or more upstream from the lake of adult origin (USFWS 2015b, Bjornn and Mallet 1964). Because of the depressed population numbers of Bull Trout in the CDR basin, there have been no telemetry studies conducted to document migration patterns. In other systems, DuPont et al. (2007) reported complex and extensive migrations of over 50 miles in the Lake Pend Oreille basin. Shepard et al. (1984) and Fraley and Shepard (1989) reported migration distances averaging 93 miles (maximum migration distance observed was 188 miles) for adfluvial Bull Trout populations in the upper Flathead River, Montana. Information from other studies is presented in Table 3 and further documents migrations of adfluvial Bull Trout of more than 100 miles, and likewise in fluvial populations, although for one system in British Columbia fluvial migrations were reported of more than 300 miles.

The distances reported in Table 3 for adfluvial fish reflect those documented for adult migrations that have occurred either from tagged fish being tracked from a lake or reservoir upstream within a river, or vice versa with the tagging occurring in the river or stream and tracking occurring downstream to the lake or reservoir. The upstream migrations are most likely associated with movements to reach suitable spawning habitats. After spawning, these adults would then migrate back downstream to the lake. In addition, the resulting progeny would, after a period of riverine rearing, migrate downstream as juveniles and sub-adults and enter the lake where they would continue to feed and mature.

3.2.2 In-lake Movements

Adfluvial Westslope Cutthroat Trout and Bull Trout can move freely within a lake environment, with movement patterns largely governed by a complex of behavioral responses largely associated with changing water quality conditions, food availability, predator avoidance, and reproductive instincts.

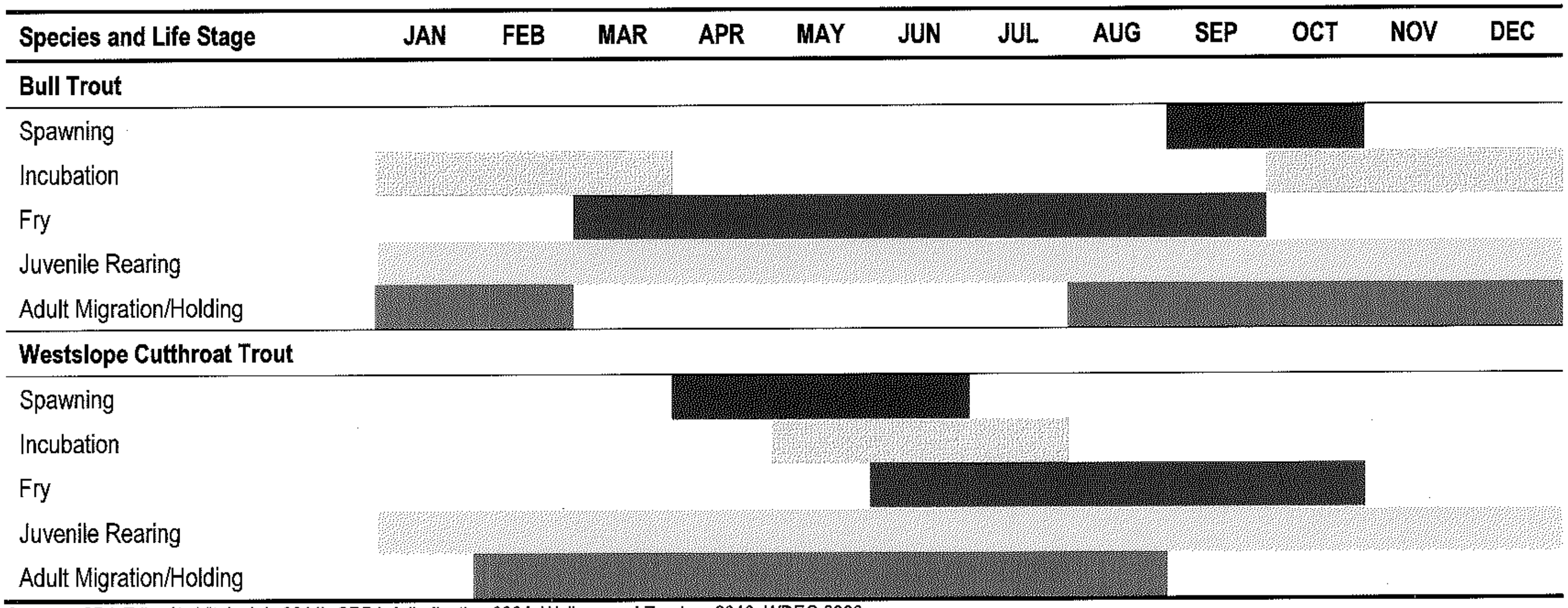
Nowak and Quinn (2002) tracked adfluvial Cutthroat Trout movements in Lake Washington in Seattle, Washington. As far as vertical movements, tracked Cutthroat Trout spent 94.6% of the time in the open water (limnetic) zone, rather than in shoreline areas (littoral zone). The Cutthroat Trout tracked in Lake Washington did not display site fidelity for any one region of the lake. During tracking sessions, trout often remained in the same vicinity, with little net travel. However, the fish often moved to the other end of the lake (up to 7.5 mi.) when relocated several days later. The lack of a home range was also evident from supplementary recapture data of externally tagged trout; fewer than a third of the recoveries were taken within 1 km of the release location, and over half were 6 km or farther from the release site.

Studies of Bull Trout lake movements also revealed extensive and diverse patterns. Bull Trout in Lake Wenatchee made migrations up to 86 miles for purposes other than spawning (Kelly Ringel et al. 2014). Radiotagging studies completed by Seattle City Light (R2 2009) in the upper Skagit River basin in Washington have shown that Bull Trout migrate from one end of Ross Reservoir to the other (a lake distance of over 23 miles) during spring/summer rearing periods and prior to fall migration/spawning periods. The Ross Lake Bull Trout were also observed staging for spawning in tributaries other than where they were captured the previous fall, including spawning several miles up the upper Skagit River, the main tributary to Ross Lake (R2 2009). Barnett and Paige (2013) evaluated movements of adfluvial Bull Trout in Chester Morse Lake, Washington during the spawning seasons of 2006–2011. They found that ninety-six percent of tracked individuals made multiple trips between the lake and one of two tributaries to the lake during the spawning season. Movement between the lake and a river occurred throughout the day, with the majority of time spent in the river per trip occurred during nighttime hours. Downstream movement to the lake peaked in the morning after dawn and upstream movement peaked in the evening around and after dusk. Gutowsky (2014) used acoustic telemetry to study the movements of 187 adult Bull Trout in Kinbasket Reservoir, British Columbia, during 2010-2012. He estimated that Bull Trout in that system can make monthly movements ranging from approximately 3 – 75 mi/month, depending on sex and body size, and season. Winter movement was low, especially for small males, but large fish, especially females, were estimated to make horizontal movements of at least 50 mi/month during that season. In the spring, adfluvial Bull Trout were most active, with large increases in vertical activity, large home range sizes, and large monthly horizontal movements. In the summer, Bull Trout were found to be evenly distributed throughout the reservoir, but in deeper, cooler waters, and with smaller home ranges and horizontal movements. By autumn, home ranges and horizontal movements increased, as adults travelled to tributaries to spawn. Furthermore, research indicates that Bull Trout exhibit fidelity to spawning areas. Spawning site fidelity has been observed in the Wenatchee system (Kelly Ringel 2014) and in other Bull Trout telemetry studies (McPhail and Baxter 1996; Bahr and Shrimpton 2004).

3.3 Life History Characteristics of Target Fish Species

3.3.1 Westslope Cutthroat Trout

Westslope Cutthroat Trout are widely distributed throughout the Coeur d'Alene (CDA) basin and may utilize every stream that contains appropriate habitat conditions (IDFG 2013). Headwaters and upper reaches of large river basins like the Coeur d'Alene and St. Joe are typically dominated by resident and fluvial forms with tributaries to lakes primarily supporting adfluvial fish (IDFG 2013). Adult Westslope Cutthroat Trout spawn predominantly in smaller tributary streams. They move into the tributaries with spring high flows and spawn from April to July as water temperatures near 10° C (USFWS 2015, IDFG 2013) (Figure 5). Egg incubation occurs from April to August with fry emergence occurring from June or later in colder water conditions (Graves et al. 1992).



Sources: CDA Tribe (A. Vitale July 2011), SRBA Adjudication 2004, Wallace and Zaroban 2013, WDEC 2009.

Figure 5. Life stage periodicities for Bull Trout and Westslope Cutthroat Trout (target fish species) within the Coeur d'Alene Lake Basin, Idaho.

Most post-spawn adfluvial Cutthroat Trout spend little time in the tributaries, migrating back to lakes shortly after spawning (Wydoski and Whitney 2003). Juvenile cutthroat typically spend 2-3 years in the stream before migrating during the summer months down to the lake. Rearing Cutthroat Trout typically select cold, nutrient-poor water, including headwater streams and alpine lakes (Wydoski and Whitney 2003). This habitat may result in a slow growth rate; however, migratory forms that spend time in larger rivers or lakes generally exhibit a greater growth rate due to abundant food sources and warmer water temperatures (IDFG 2013). After spending 1-3 years in the lake, sexual maturation occurs, typically at age 4 or 5 and lengths of 300-400 mm (Behnke 1992). Sexually maturing cutthroat may move towards nearby tributaries in the fall and winter prior to beginning upstream spawning migration (IDFG 2013).

In streams, Westslope Cutthroat Trout prefer pool habitats, subsequently streams with pool habitats support greater densities of fish (IDFG 2013). In lakes, Westslope Cutthroat Trout may utilize all areas of habitat but have been found to segregate when they occur along with Bull Trout, using nearshore, littoral areas while Bull Trout use the offshore, open-water habitats (Wydoski and Whitney 2003).

3.3.2 Bull Trout

The adfluvial life history form dominates the Bull Trout population in the Columbia River Headwaters Recovery Unit, of which Coeur d'Alene Lake Basin is included. However all variations of life history described above can be assumed to be present in the greater basin (USFWS 2015). Bull Trout generally mature between 5 and 7 years of age (Fraley and Shepard 1989). They typically spawn from August to November in relation to falling stream temperatures (USFWS 2015a, 2015b). However, upstream migration may begin as early as April if great distances are traveled (USFWS 2015a, 2015b) (Figure 5). Bull Trout spawn in low gradient streams with clean gravel, often in conjunction with cold water input from groundwater or springs (USFWS 2015a). Adult fish may spawn every year or every other year.

Bull Trout egg incubation is normally 100 to 145 days depending on water temperature (Pratt 1992). Fry typically emerge from the gravel starting in early April through May, depending on water temperatures and increasing stream flows (Pratt 1992; USFWS 2015a). Juvenile Bull Trout outmigrate from natal tributaries at age 2-3 (Batt 1996). Shepard et al. (1984) reported that most outmigrating juveniles move quickly downstream in the spring and early summer during freshets. However, some juvenile fish may migrate upstream to areas with low water temperatures and lack of adult fish (Graves et al. 1992). Juvenile Bull Trout select areas close to the substrate with cover present (Batt 1996). Migratory Bull Trout will rear for several years in larger rivers or lakes before returning to tributaries to spawn. Size varies according to life history pattern, with larger adfluvial fish, slightly smaller fluvial fish and much smaller resident Bull Trout (Batt 1996). Adfluvial spawning fish were found to measure from 300 to 875 mm in length and be 4 to 9 years old in the Flathead and Pend Oreille systems (Batt 1996). Bull Trout populations require cold water temperatures, although some individual fish can be found in larger, warmer river systems throughout the Columbia River basin (Fraley and Shepard 1989; Rieman and McIntyre 1993). Water temperature above 15 degrees Celsius (59 degrees Fahrenheit) is believed to limit juvenile Bull Trout distribution (Fraley and Shepard 1989; Rieman and McIntyre 1995, USFWS

2015a). Optimum water temperature for juvenile Bull Trout rearing is reported to be 7-8 degrees Celsius (Goetz 1989).

4. CONSIDERATIONS RELATIVE TO DETERMINING WHETHER LANDS WITHIN THE EXISTING 1891 RESERVATION INCLUDE ACCESS TO FISHERIES

Collectively the information provided concerning the historical and contemporary importance of fish to the CDT, and the distribution, life history strategies, and life history characteristics of the two target species is more than sufficient to affirmatively answer – yes, lands (including water bodies and waterways) within the existing 1891 boundaries of the Reservation include access to fisheries. In this section, I summarize the most important elements that factored into this conclusion.

4.1 Ecological Importance of Coeur d'Alene Lake

By far, the most visually prominent and geographically expansive component of the entire Coeur d'Alene watershed is Coeur d'Alene Lake proper. This waterbody encompasses an area of 49 square miles and serves as the receptacle of flows from all but one of the claim reaches, Hangman Creek which is a direct tributary to the Spokane River and which historically supported runs of Chinook salmon. The lake can be viewed anthropomorphically as a human body with arms and legs represented by different sections and branches of the lake that are nourished by flows stemming from an inter-connected network of streams and tributaries, much like arteries of a human body. Some of the streams enter the lake directly, while others contribute flows that originate in small stream courses higher up in the different watersheds that comingle with flows from other streams to form progressively larger and larger streams that finally enter the lake.

In addition to supporting assemblages of different fish species and other aquatic biota on a year-round basis, Coeur d'Alene Lake provides critical habitats that were/are used seasonally by the two target fish species for feeding, holding, overwintering, and staging (prior to spawning). As noted in Section 3.2, these fish exhibit what is called an "adfluvial" lift history strategy that quite simply means they spend a substantial period of time within the lake feeding and growing and maturing, but then they migrate upstream into (ad-) the rivers and streams (fluvial) seeking areas that contain the right combinations of water depth, velocity and substrate (gravel sizes) that are suitable for spawning. These areas are widely distributed within the Coeur d'Alene Basin and can be spatially quite distant from the lake proper requiring upstream excursions of fish that may range from a few to many tens or even more than 100 miles. The actual distances adfluvial fish may migrate has been discussed in Section 3.2.1 and depicted in Table 3. After spawning, the adults then move back downstream and re-enter the lake and the cycle is repeated. The resulting off-spring may reside in the streams for a short period before they also migrate downstream and enter the lake where they continue to feed, grow and ultimately mature.

Importantly, just as there are no human-imposed borders on the streams and rivers, Coeur d'Alene Lake has no borders and the target fish that are in the lake can and do move and migrate freely throughout different portions of the lake to fulfill their biological requirements. I discussed this further in Section

3.2.2 where I noted that in-lake movement patterns of target fish in other systems can be extensive, again ranging in tens of miles. Hence, target fish that spend a portion of their life cycle in the lake and that at a given time are within the 1891 boundaries of the Reservation, freely move to other parts of the lake in response to their biological needs.

4.2 Special Characteristics of Adfluvial Fish Populations

The characteristics of the adfluvial stocks of the target species warrant special attention as they clearly demonstrate that their life cycle requirements include but also extend beyond the 1891 boundaries of the Reservation. These characteristics include their use and reliance upon both lake and riverine habitats to full-fill important life history functions. Protecting both lake and riverine habitats is therefore vital to maintaining and or restoring healthy adfluvial fish populations.

In addition, adfluvial fish upon leaving a lake may migrate long distances in streams to find suitable spawning and egg incubation habitats. Migrations as long as 49.6 miles (rounded ≈ 50 miles) have been documented in the CDR; migrations of over 100 miles are likely based on documented accounts for other systems as reported in the literature. Figure 6 illustrates distances in increments of 10 miles upstream within each of the major waterways entering Coeur d'Alene Lake providing a means to translate reported migration distances in Table 3 to other streams in the basin. Using a conservative estimate of 50 miles which has been documented in the Coeur d'Alene Basin would encompass all of the streams within the 1891 boundaries of the Reservation as well as a substantial portion of the Coeur d'Alene River and Saint Joe River systems that lie outside of the boundary. Expansion to a migration distance of 100 miles would essentially bring in all but the very uppermost portions of those watersheds. Table 4 illustrates how the number of claims considered would be influenced by different migration distances. Protecting the connectivity to and availability of all habitats used by these adfluvial fish is important even if distal to the lake and beyond the 1891 boundaries of the Reservation.

Another important consideration is that adult adfluvial fish may utilize different stream systems to spawn during different years. Unlike salmon that "home" to their natal stream of origin, adfluvial fish are not as rigid in their migration patterns and although some site fidelity has been reported in some populations, they may also utilize different systems for spawning or different locations in a lake for rearing. This is conceptually illustrated in Figure 7. Thus, fish originating in Benewah Creek within the 1891 boundaries of the Reservation, upon entering Coeur d'Alene Lake will comingle with fish from other systems and upon maturation, may enter and migrate within an entirely different system, such as the SJR or CDR systems. Conversely, fish originating in Wolf Lodge Creek that are entirely outside of the 1891 boundaries of the Reservation may comingle and ultimately migrate to Benewah or Lake Creek (within the 1891 boundaries of the Reservation), or to the SJR or CDR. Figure 7 also serves to illustrate the unconstrained movement patterns of fish within the lake. As noted above, adult and juvenile fish will move freely within the lake to meet their biological needs and are not constrained by the 1891 boundaries of the Reservation. As a practical matter, then, adult and juvenile fish originating in off-reservation streams or portions of the lake will be indistinguishable (and therefore part of CDT fishery) from fish originating from on-reservation streams. Collectively, all of these fish are part of the CDT fisheries, and just as important is the protection of the habitats that these fish utilize and rely upon to complete their life cycle.

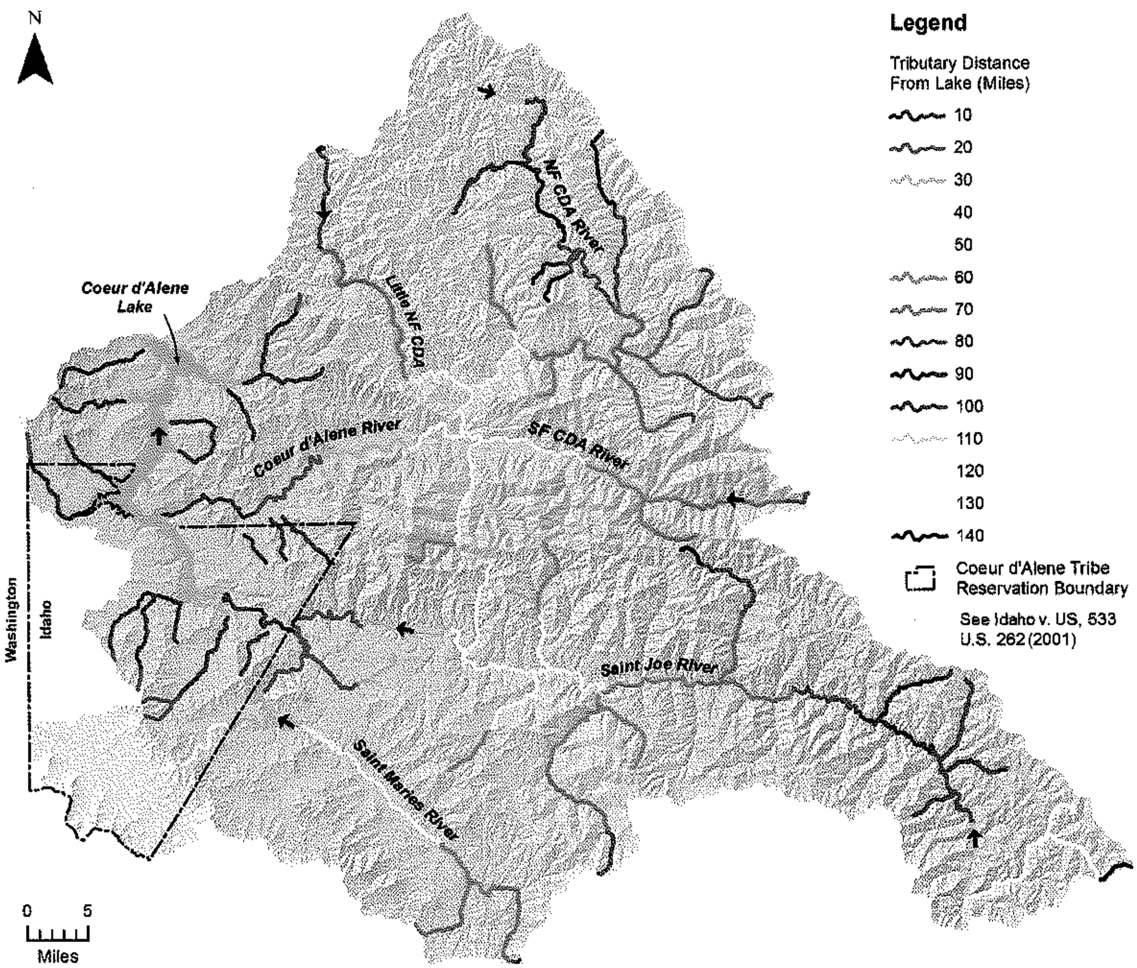


Figure 6. Map of the Coeur d'Alene Basin showing incremental distances (in increments of 10 miles) upstream from Coeur d'Alene Lake. The color coding serves to illustrate how far upstream from Coeur d'Alene Lake adfluvial Westslope Cutthroat Trout and Bull Trout may potentially migrate based on reported migration distances from the literature (see Tables 3 and 4).

Table 4. Influence of adfluvial migration distances of Westslope Cutthroat Trout and Bull Trout on the number and cumulative number of Instream Flow Claims. Distances are expressed in ten mile increments and encompass the range of migration distances reported in the literature for the two species (See Table 3). Figure 6 presents this information graphically.

Tributary Distance from Coeur d'Alene Lake (Miles)	Cumulative Number of Claims	Number of Claims	Claim Numbers
10	19	19	101-109, 111, 3002-3009, 4023
20	23	4	110, 4022, 4503, 4504
30	26	3	112, 3001, 4021
40	29	3	1016, 2006, 4020
50	36	7	1013, 1015, 2004, 2005, 4017-4019
60	44	8	1011, 1012, 2002, 2003, 4013, 4015, 4016, 4502
70	54	10	1007-1010, 1014, 2001, 4011, 4012, 4014, 4501
80	58	4	1003-1006
90	60	2	4009, 4010
100	66	6	1001, 1002, 4005-4008
110	67	1	4004
120	68	1	4003
130	70	2	4001, 4002
140	70	0	N/A

4.3 Importance of Habitat Diversity, Metapopulations and a Diverse Portfolio for Maintaining a Healthy Fishery for the CDT

Coupled with the "beyond-Reservation boundary" view that is necessary to fully understand the habitat requirements of the target fish of importance to the CDT, it is also prudent to consider the importance of maintaining a diversity of habitats as population sustainability insurance. Countless studies have reported on the complex of habitats that are needed to support the different life history functions of salmonid populations (Bjornn and Reiser 1991; Quinn 2005; Groot and Margolis 1991). This has been re-emphasized in the wake of a spate of federal ESA listings of various fish species, as population biologists have continued to recommend protecting or restoring habitat diversity as one mechanism for reducing extinction risk and providing population resilience (NMFS 2014). In addition, the concept of protecting metapopulations (Rieman and McIntyre 1993, Rieman and Dunham 2000) is now commonly accepted for maintaining population health and viability. In essence, metapopulations represent sub-populations in different locations that serve to buffer potential overall environmental impacts on a population.

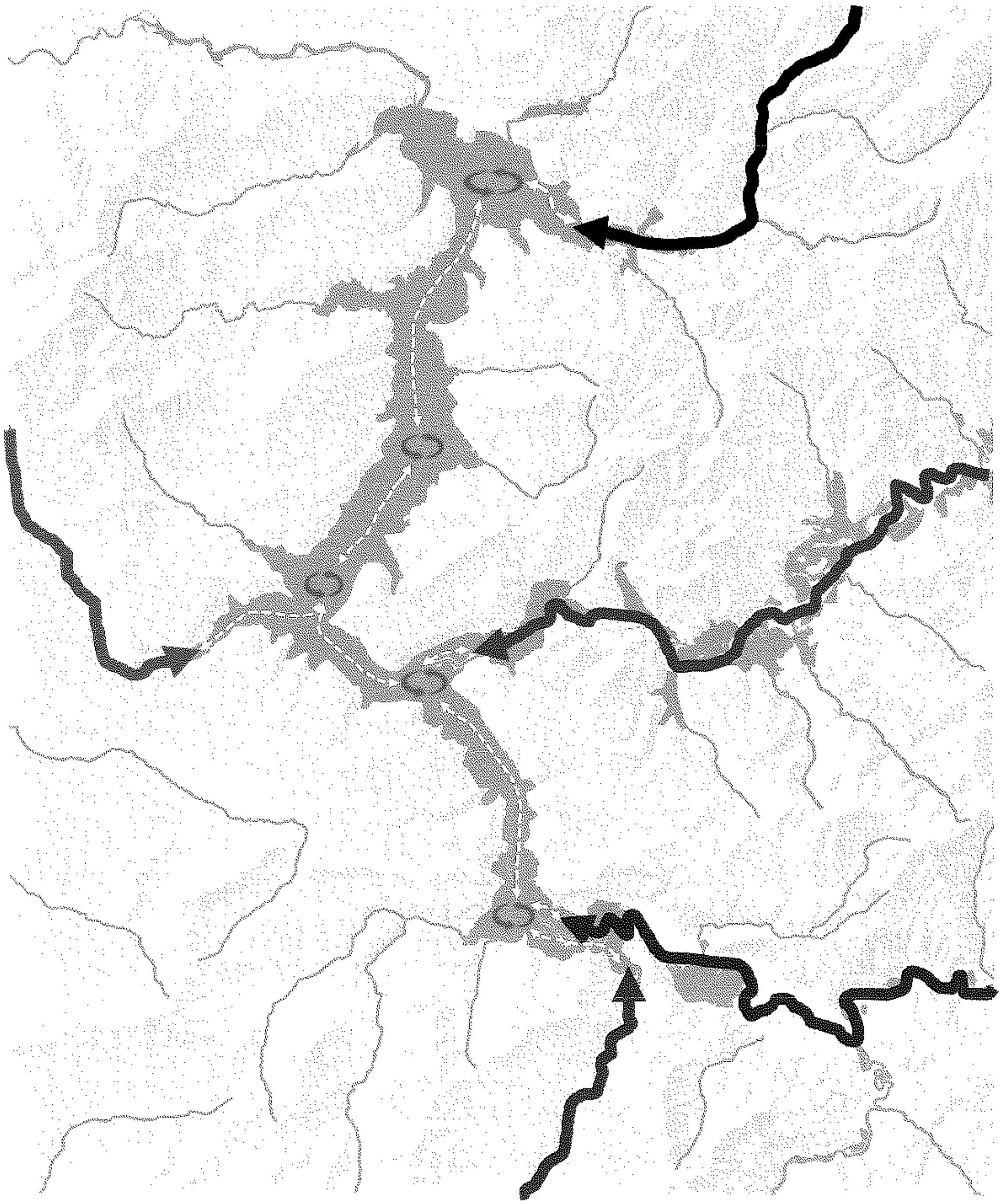


Figure 7. Conceptual illustration showing potential migration pathways of adfluvial Westslope Cutthroat Trout entering Coeur d'Alene Lake from different tributary/river systems, in-lake migration and movement patterns, and potential migration routes back into tributary/river systems. Adult and juvenile fish originating in on-reservation and off-reservation streams or portions of the lake will be indistinguishable from fish originating from other stream systems or portions of the lake. All of these fish are part of the Coeur d'Alene Tribe's fishery.

In the context of the Coeur d'Alene basin, the sub-populations of target species that exist in other portions of the basin and that may exhibit different life history strategies (e.g., Fluvial, Resident), represent metapopulations of those species and thus are of equal importance as the adfluvial stocks to the overall populations. These types of metapopulations in theory (Hutchings 2004) have an adaptive plasticity that would enable them to modify, without genetic change, a given life history strategy to accommodate changing environmental conditions. This was recently affirmed in a genetic study by Johnson et al. (2010) on Coastal Cutthroat Trout who concluded that individual life history strategies were predominantly determined by phenotypic plasticity rather than genotype. Thus, under long-term changing environmental conditions, it is reasonable to assume that metapopulations that exhibit primarily a Resident life history strategy may begin to exhibit Fluvial strategies; Fluvial metapopulations may begin to exhibit Adfluvial strategies, etc. This type of plasticity is geared toward the overall survival of the population as a whole. As noted by Watry and Scarnecchia (2014) who investigated different life history strategies of Bull Trout in the South Fork Salmon River (SFSR) basin, Idaho, the spatial diversity and range of life histories observed in the SFSR sub-basin may confer the greatest potential for long-term persistence, especially in highly variable environments. By extension then, if protection is only afforded streams and portions of Coeur d'Alene Lake within the 1891 boundaries of the Reservation, then the overall fishery of the CDT that is dependent on metapopulations in other parts of the basin would be at risk.

Even so, as noted above, a large proportion of the target fish species exhibit an adfluvial life history strategy that requires both lake and riverine habitats, and importantly, that those habitats are available, accessible and properly functioning. This means that both habitat types must be maintained and protected so they can continue to provide the mix of biophysical parameters (e.g., flow, water quality (temperature, dissolved oxygen, etc.), sedimentation, nutrient levels, physical structure, biological components) to which these sub-populations have evolved around. Failure to do so will most certainly, over time compromise the overall population sustainability and to the issue at hand, sustainability of the CDT fishery. Even the seemingly far-field streams and rivers that are on the fringes of the aboriginal lands used by the CDT and that are well beyond the 1891 boundaries of the Reservation contribute to the viability and future sustainability of the CDT fishery. In essence, these streams and their associated sub-populations of target fish are part of the overall population portfolio (Schindler et al. 2010; Schindler et al. 2015) that serves to temper interannual variability in abundance, provides further insurance of population persistence, and promotes the continuance of the CDT fishery.

5. SUMMARY AND CONCLUSION

The main points of my analysis can be summarized as follows:

- Based upon my review of three historical reports (Wee, 2015, Hart 2015, Smith 2015) it is apparent that the fisheries throughout the Coeur d'Alene basin were historically important to the sustainability of the CDT;

- The importance of those fisheries to the CDT continues today as evidenced by their commitment of resources and directed studies designed to protect, enhance and/or restore a number of fish species of historical significance;

- Notwithstanding physical barriers or confines, neither the CDT fisheries that existed in the waterways and lakes during aboriginal times, or those that exist today were/are in any way constrained by artificial boundaries such as those imposed by human accord;

- Westslope Cutthroat Trout and Bull Trout, two species of historical and contemporary importance to the fisheries of the CDT in waters above Spokane Falls, are the focus of the Instream Flow Claims filed on January 30, 2014. Both of these species exhibit an adfluvial life history strategy that depends on a combination of lake and riverine habitats within and external to the 1891 boundaries of the Reservation;

- As such, the CDT fisheries that exist today within the waterways and portions of Coeur d'Alene Lake defined by the 1891 boundaries of the Reservation are biologically dependent on waterways and portions of Coeur d'Alene Lake that are beyond the 1891 boundaries of the Reservation; these waterways include the two main river systems entering Coeur d'Alene Lake – Coeur d'Alene River and its tributaries, and the St. Joe River and its tributaries, as well as a number of streams that are directly confluent to Coeur d'Alene Lake, including Wolf Lodge Creek, Beauty Creek, Turner Creek and Carlin Creek;

- Migration distances of 120 miles or more have been reported in the literature for adfluvial stocks of these target species, which would extend to streams in the far reaches of the Coeur d'Alene basin and include the majority of the Instream Flow Claim reaches filed on January 30, 2014 as part of the CSRBA;

- Protection of the CDT fisheries via the provision of instream flows designed to protect and maintain habitats, must include all areas and waterways reliant upon by the target species to fulfill its life cycle requirements.

Thus, I conclude that the lands defined by the 1891 boundaries of the Reservation do include access to fisheries valued by the CDT. Moreover, I also conclude that the fish species that are accessible to the CDT within the 1891 boundaries of the Reservation can and do freely move to, utilize, and are dependent on portions of the lake and/or rivers and streams that are both inside and outside of the 1891 boundaries of the Reservation.

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ATTACHMENT 1

Resume of Dr. Dudley W. Reiser

Dudley W. Reiser, Ph.D.

President

Senior Fisheries Scientist

EDUCATION

- Ph.D. (Forestry, Wildlife, and Range Sciences - major in fishery resources) University of Idaho, 1981
- M.S. (Water Resources) University of Wyoming, 1976
- B.A. (Zoology) Miami University, Ohio, 1972

- Years of Experience - 39
- Primary Work Location - Redmond, Washington

MEMBERSHIPS & REGISTRATIONS

- American Fisheries Society (AFS), Certified Fisheries Scientist (No. 1447); re-certified 2002
- Certified USFWS IFIM Course - Computer Modeling (201), IFIM:IFG210, SNTEMP (310)
- Member, Independent Science Panel (ISP) - Washington State - appointed by Governor Gary Locke to serve on Salmon Recovery Science Panel, Term: 1999-2003; reappointed through 2006.
- Member, Independent Scientific Review Panel: 2005. Appointed by the USFWS to evaluate risk of extinction of Lost River and Shortnose suckers in Klamath Basin.

BIO

Dr. Reiser is a fisheries scientist and the President of R2 Resource Consultants, and has more than 39 years experience designing, implementing, and managing fisheries and aquatic ecology projects, and habitat and instream flow assessments. His particular areas of expertise include fish ecology (anadromous and resident species), habitat assessments and criteria development, endangered species evaluations, assessments of flow regulation on fish populations and habitats, fisheries habitat enhancement, fisheries engineering, instream flow studies, assessments of sedimentation impacts on aquatic ecosystems, and flushing flow studies (related to sediment deposition). Dr. Reiser is a recognized expert in the area of instream flow needs for aquatic ecosystems. Since his doctoral research that involved defining spawning and egg incubation flow needs of steelhead trout and Chinook salmon, he has conducted numerous studies and published many papers related to determining instream flow needs and assessing effects of flow regulation on aquatic biota. He has been involved in instream flow projects in Washington, Oregon, Alaska, California, Colorado, Idaho, Maine, Montana, New Mexico, New York, Vermont, and Wyoming, and has applied a variety of different instream flow methods including the USFWS IFIM/PHABSIM, Tennant (Montana) Method, Habitat Mapping, Wetted Perimeter (WP), Trout Cover Rating (TCR), R-2 Cross Method, and the New England Method.

EMPLOYMENT HISTORY

R2 Resource Consultants, Inc., Redmond, Washington, President, Senior Fisheries Scientist, 1992-Present

EA Engineering, Science, and Technology, Redmond, Washington, Vice President, Senior Fisheries Scientist, 1987-1992

Bechtel Corporation, San Francisco, California, Senior Fisheries Scientist, 1982-1987

Camp Dresser and McKee Inc., Denver, Colorado, Senior Fisheries Scientist, 1980-1982

Idaho Cooperative Fishery Research Unit, Moscow, Idaho, 1977-1980

Wyoming Water Resources Research Institute, Laramie, Wyoming, 1974-1977

Exhibit 1 to Affidavit of Dudley W. Resier, Ph.D.

Testimony at Hearings, Trials, and Depositions

Hearing on Water Right Application of the El Sur Ranch (before the State of California, State Water Resources Control Board)

1. Provided testimony during hearings on behalf of the El Sur Ranch during July 8, 2011 hearings.

Nunamta Aulukestai, et al. vs State of Alaska and Pebble Limited Partnership (Case No. 3AN-09-09173C1)

1. Provided testimony during depositions - (Seattle, Washington) (September 10, 2010)
2. Provided testimony during trial in Superior Court for the State of Alaska, Third Judicial District at Anchorage (December 16, 2010)

Klamath Basin Adjudication (before the Office of Administrative Hearings, State of Oregon)

1. Provided Affidavit and Direct Testimony for Cases 277, 279, 280 and 281 related to the Determination of the relative rights of the waters of the Klamath River, a tributary to the Pacific Ocean; submitted on behalf of the Bureau of Indian Affairs, 2010.
2. Provided Rebuttal Testimony for Cases 277, 279, 280 and 281, 2010.

Klamath Basin Adjudication (before the Water Resources Director of Oregon)

1. Provided Affidavit in support of instream flow claims for Klamath River; submitted on behalf of Bureau of Indian Affairs, 2006.
2. Provided Affidavit in support of instream flow claims for streams in the Upper Klamath River Basin, submitted on behalf of Bureau of Indian Affairs, 2006.
3. Provided Affidavit in support of instream flow claims developed on behalf of the Bureau of Indian Affairs, 1997

State of Washington, Shoreline Hearings Board; Daybreak Mining and Habitat Enhancement Project; Provided testimony on behalf of the J.L. Storedahl Company, August 2005.

Clark County, Washington, Public Land Use Hearings regarding Daybreak Mining and Habitat Enhancement; Case No. REZ98-011; CUP20004-00002. Provided testimony on behalf of the J.L. Storedahl Company, May and June 2004.

United States of America vs. ASARCO Inc. et al. (Case No. 96-0122-N-EJL and Case No. 91-9342-N-EJL) (District of Idaho) (Testimony provided on behalf of the United States, Department of Justice, U.S. Fish and Wildlife Service).

1. Provided testimony during depositions - (Seattle, Washington) (December 15-16, 1999).
2. Provided testimony during trial in United States District Court, District of Idaho, Boise Idaho, February 28-March 1, 2001.

State of Montana vs. Atlantic Richfield Company (No. CF-83-317-HLN-PGH) (District of Montana) (Testimony provided on behalf of Atlantic Richfield Company)

1. Provided testimony during depositions - (Seattle, Washington) (January 18-20, 1996).
2. Provided testimony during trial (United States District Court, District of Montana - Great Falls, Montana) (April 21-24, 1997).

Snake River Basin Adjudication (Case No. 39576) (District Court of the Fifth Judicial District of the State of Idaho, in and for the County of Twin Falls) (Testimony provided on behalf of the United States, Department of Justice, Bureau of Indian Affairs).

1. Provided testimony during depositions - (Lynnwood, Washington) (April 27-30, 1999).
2. Provided Declarations/Affidavits in support of instream flow claims developed on behalf of the Bureau of Indian Affairs, June 1995 and April 1998.

Selected Publications and Technical Reports

Reiser, D.W., K.L. Fetherston, S. Beck, M. Gagner, T. Nightengale, C. Yoder and M. Ramey. 2012. Determination of aquatic and riparian habitat-flow requirements of the Lower Rio Chama, New Mexico. Prepared by R2 Resource Consultants, for Bureau of Indian Affairs, Southwest Region, Albuquerque, New Mexico.

Reiser, D.W. 2008. Enhancing Salmonid Populations via Spawning Habitat Restorative Actions. 2008. Pp 349-376. In. D. Sear and P. DeVries, (eds). Salmonid Spawning Habitat in Rivers: Physical Controls, Biological Responses, and Approaches to Remediation. American Fisheries Society, Symposium Publication No. 365. Bethesda, Maryland.

Souchon, Y., C. Sabaton, R. Deibel, D. Reiser, J. Kershner, M. Gard, C. Katopodis, P.Leonard, N.L. Poff,, W.J. Miller, and B. Lamb. 2008. Detecting biological response to flow management: missed opportunities; future directions. River Research and Applications. 24: 506-518.

Reiser, D.W., M. Gagner, C. Huang, T. Sullivan, S. Beck, T. Nightengale, and C. Morello. 2008. Determination and evaluation of habitat - flow relationships in the Sultan River, Washington. Sultan River Instream Flow Study. Prepared by R2 Resource Consultants, for Public Utility District No. 1 of Snohomish County and City of Everett.

Sullivan, T.J., D.W. Reiser, M. Gagner, and S.M. Beck. 2008. Penny Creek fish passage feasibility study: Phase 2 - assessment of Penny Creek anadromous salmonid production potential and fish passage technical considerations. Report prepared for U.S. Fish and Wildlife Service, under contract to MWH Americas.

Reiser, D.W, T. Nightengale, N. Hendrix, and S. Beck. 2008. Effects of pulse-type flows resulting from hydroelectric operations on aquatic biota. Hydro Review. May Issue.

Reiser, D.W. 2007. Species distributions, life history strategies and habitat-flow requirements of anadromous salmonid populations in the Yukon River Basin, Alaska. Report prepared for the Native American Rights Fund. Anchorage, Alaska.

DeVries, P., D. Reiser, C. Huang, S. Beck, M. Ramey, A. Olson, N. Hendrix, K. Oliver, T. Nightengale, J. Reilly, T. Kenward, and M. Palmer. 2007. North Coast instream flow policy: scientific basis and development of alternatives protecting anadromous salmonids. Task 3 Report - Administrative Draft. Prepared for California State Water Resources Control Board.

Reiser, D.W., C. Morello, and A. Olson. 2006. Monitoring the Green River Natural Resource Area for salmonid utilization - 2005/2006 survey results. Report prepared by R2 Resource Consultants for City of Kent, Washington.

DeVries, P., D. Reiser, and N. Hendrix. 2006. Tests of regional Habitat Suitability Index curves: validation of Snake River Basin Adjudication curves with empirical data and comparison of curves developed independently for the Big Creek and Upper American River projects, Sierra Nevada, California. Technical Memorandum No. 2. Prepared for U.S. Forest Service, Fort Collins, Colorado.

Reiser, D.W., C. Morello, M. Gagner, and T. Nightengale. 2006. Fish, habitat, and benthic macroinvertebrate surveys of selected streams within the City of Kent, Washington. Technical Report prepared for City of Kent, Washington.

Exhibit 1 to Affidavit of Dudley W. Resier, Ph.D.

Selected Publications and Technical Reports *(continued)*

Reiser, D.W., C. Huang, S. Beck, M. Gagner, and E. Jeanes. 2006. Defining flow windows for upstream passage of adult anadromous salmonids at cascades and falls. Transactions of the American Fisheries Society; 135:668-679.

Beck, S. and D. Reiser. 2006. Monitoring of gravel quality in the Sultan River, Washington. Report prepared by R2 Resource Consultants for Snohomish County Public Utility District.

Reiser, D.W, T. Nightengale, N. Hendrix, and S. Beck. 2005. Effects of pulse-type flows on benthic macroinvertebrates and fish: a review and synthesis of information. Report prepared by R2 Resource Consultants for Pacific Gas and Electric Company, San Ramon, California.

Harvey, B., S. McBain, D. Reiser, L. Rempel, and L. Sklar. 2005. Key uncertainties in gravel augmentation: geomorphological and biological research needs for effective river restoration. Prepared by CALFED Science Program and Ecosystem Restoration Program and Gravel Augmentation Panel, Sacramento, California.

Nightengale, T., and D. Reiser. 2005. Comparison of benthic macroinvertebrates in spring- vs run-off dominated streams in the Upper Klamath Basin, Oregon. Report prepared by R2 Resource Consultants for Bureau of Indian Affairs, Portland, Oregon.

Nightengale, T., N. Hendrix, S. Beck, and D. Reiser. 2005. Macroinvertebrate data analysis for Tule River and Rock Creek-Cresta (FERC No. 1962) Projects. Prepared for Pacific Gas and Electric Company, San Ramon, California. Prepared by R2 Resource Consultants, Inc. Redmond, Washington.

Reiser, D.W. 2005. Instream flows for fish and aquatic biota: a review of technical considerations and commonly applied methodologies. Technical Paper, R2 Resource Consultants, prepared for Seattle City Light and Seattle Public Utilities.

Reiser, D.W., C. Morello, M. Appy, E. Jeanes, and A. Olson. 2005. Monitoring the Green River Natural Resource Area for salmonid utilization. Report prepared by R2 Resource Consultants for City of Kent, Washington.

Loftus, M.E., and D. Reiser. 2004. Evidence of Repetitive Spawning Activity of Lost River and Shortnose Suckers from USBR Radio-telemetry Studies, 1993 - 1999, Technical Memorandum; in R2 Resource Consultants. 2004. A compendium of technical memoranda related to water quality and shortnose (*Chasmistes brevirostris*) and Lost River (*Delistes luxatus*) suckers population demographics in Upper Klamath Lake, Oregon. Prepared for Bureau of Indian Affairs, Portland, Oregon.

Helser, T., M. Loftus, and D. Reiser. 2004. A Statistical Model of Upper Klamath Lake Adult Sucker Depth Utilization; Technical Memorandum; in R2 Resource Consultants. 2004. A compendium of technical memoranda related to water quality and shortnose (*Chasmistes brevirostris*) and Lost River (*Delistes luxatus*) suckers population demographics in Upper Klamath Lake, Oregon. Prepared for Bureau of Indian Affairs, Portland, Oregon.

Helser, T., M. Loftus, N. Hendrix, and D. Reiser. 2004. Risk Analysis of Unsuitable Dissolved Oxygen Concentrations in Upper Klamath Lake: Model Development and Application; Technical Memorandum; in R2 Resource Consultants. 2004. A compendium of technical memoranda related to water quality and shortnose (*Chasmistes brevirostris*) and Lost River (*Delistes luxatus*) suckers population demographics in Upper Klamath Lake, Oregon. Prepared for Bureau of Indian Affairs, Portland, Oregon.

Selected Publications and Technical Reports

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ATTACHMENT 2

Letter to Dr. Dudley Reiser from Mr. Brad Grenham (dated May 11, 2016) Regarding Rebuttal Report on Coeur d'Alene Tribal Entitlement to Water

United States Department of the Interior

OFFICE OF THE SOLICITOR
Pacific Northwest Region
805 S.W. Broadway Street, Suite 600
Portland, Oregon 97205-3346

May 11, 2016

Dudley Reiser
R2 Resource Consultants Inc.
15250 NE 95th Street
Redmond, WA 98052

Re: Rebuttal Report on Coeur d'Alene Tribal Entitlement to Water

Dear Dr. Reiser:

The State of Idaho's February, 2016 Historical Report *Establishment of the Coeur d'Alene Reservation and the Transformation of Coeur d'Alene Land and Water Use, from Contact Through Allotment*, by Stephen Wee, suggests that the United States and Tribe delineated the Coeur d'Alene Reservation with a focus on boundaries that would promote agriculture instead of fisheries or other traditional uses of resources. Mr. Wee asserts that, even if the 1873 Reservation boundaries included important waterways for fisheries, this became less important when Congress ratified changes to boundaries in 1891 that involved cession of areas of the Reservation. Sample excerpts from Mr. Wee's report are provided below. In order to provide context for the Reservation boundary changes, I have also included some excerpts from the United States Supreme Court's summary of the changing boundaries over time.[1]

In response to Mr. Wee's assertions, please report whether lands included in the Reservation boundaries as of 1891 include access to fisheries and, if so, explain the fish species and the waterways through which those fish species migrate both on- and off- reservation.

<u>Stephen Wee Report Excerpts</u>

"The ceded reservation land contained some 184,960 acres, or 289 square miles... The ceded area included the Coeur d'Alene's dense forests, rich mining areas, and navigable waterways desired by the federal negotiators, while preserving for the tribe its lands best suited to agriculture – not only in the Hangman Creek area, but also in the smaller valleys north of Hangman Creek and due west of Lake Coeur d'Alene, as well as the lower St. Joe River, a portion of the lake, and the lands on the west shore of the lake used by the tribe to ship agricultural products." (p. 81)

[1] My earlier April 6, 2016 letter did not provide background on negotiations to alter the boundaries of the Reservation. In order to better explain the relevance of various dates cited by Mr. Wee, this letter provides further detail and replaces the April 6 letter.

"The tribal leadership, particularly by the late 1880s when younger chiefs came to the fore, were willing to cede with compensation land that at one time had been tribal village sites and land important to aboriginal subsistence activities but were no more." (p. 99)

"The Coeur d'Alene furthermore since the 1870s had sought to secure the most agriculturally advantageous land within their aboriginal territory for themselves, forestalling non-Indian use and development in the lands south and west of Lake Coeur d'Alene that touched upon the rich wheat lands of the Palouse region." (p. 99)

"By the late 1870s, nearly the entire tribe (approximately 500 people) had moved from their scattered villages along the lake and rivers of the Coeur d'Alene region to lands west and south of the lake – the most agriculturally-advantageous areas within their aboriginal territory." (p. 101)

"Tribal devotion to Euro-American agriculture had been the linchpin of the Coeur d'Alene argument for a reservation, and many Coeur d'Alene had already transformed themselves into agriculturalists, abandoning aboriginal ways, decades before allotment." (p. 147)

"Coeur d'Alene such as Seltice largely abandoned traditional customs in favor of Catholicism, Euro-American style clothing, and permanent settlement on lands within their aboriginal territory on which they could raise wheat, oats, and stock animals." (p. 167)

"Their petition to federal authorities for a reservation in the early 1870s identified lands that would accommodate not only the tribe's growing farming enterprises but also "for a while yet" their traditional subsistence use of the lake, rivers, and streams for hunting, fishing, and gathering. The 1873 executive-order reservation was thus larger than the 1867 one, and reflected the tribe's continued mixed land and water uses. It took in the lake, and portions of Spokane River, and the lower Coeur d'Alene and St. Joe rivers as well as the rich agricultural lands of west and south of the lake into which much of the tribe had already relocated to farm." (p. 167)

"Seltice and the other tribal leaders thus relinquished aboriginal lands in 1887, 1889, and 1894 once used for hunting and fishing and now sought for commerce, mining, and timber purposes by Euro-Americans: a 12-mile-wide strip of the land adjacent to the south bank of the Spokane River, much of the northern part of Lake Coeur d'Alene, the Coeur d'Alene River including its mouth and channel to the head of navigation, and the Wolf Lodge area. The Coeur d'Alene ceded these lands desired by the United States in favor of protecting and securing a reservation that included portions of the Palouse region within Idaho that they had already developed; access to Lake Coeur d'Alene by which they could deliver their agricultural commodities to non-Indian communities; and the bottomlands on the southern part of the lake and along St. Joe River that they had aboriginally occupied for portions of the year, and where a small number of tribal members still resided." (p. 168).

United States Supreme Court Summary from *Idaho v. United States*, 533 U.S. 262, 265-71 (2001)

The Court provided the following summary:

> The Coeur d'Alene Tribe once inhabited more than 3.5 million acres in what is now northern Idaho and northeastern Washington, including the area of Lake Coeur d'Alene and the St. Joe River. Tribal members traditionally used the lake and its related waterways for food, fiber, transportation, recreation, and cultural activities. The Tribe depended on submerged lands for everything from water potatoes harvested from the lake to fish weirs and traps anchored in riverbeds and banks.
>
> ... In 1867, in the face of immigration into the Tribe's aboriginal territory, President Johnson issued an Executive Order setting aside a reservation of comparatively modest size, although the Tribe was apparently unaware of this action until at least 1871, when it petitioned the Government to set aside a reservation. The Tribe found the 1867 boundaries unsatisfactory, due in part to their failure to make adequate provision for fishing and other uses of important waterways....
>
> Following further negotiations, the Tribe in 1873 agreed to relinquish (for compensation) all claims to its aboriginal lands outside the bounds of a more substantial reservation that negotiators for the United States agreed to "set apart and secure" "for the exclusive use of the Coeur d'Alene Indians, and to protect . . . from settlement or occupancy by other persons." The reservation boundaries described in the agreement covered part of the St. Joe River (then called the St. Joseph), and all of Lake Coeur d'Alene except a sliver cut off by the northern boundary.
>
> Although by its own terms the agreement was not binding without congressional approval, later in 1873 President Grant issued an Executive Order directing that the reservation specified in the agreement be "withdrawn from sale and set apart as a reservation for the Coeur d'Alene Indians." Exec. Order of Nov. 8, 1873, reprinted in 1 C. Kapler, Indian Affairs: Laws and Treaties 837 (1904). The 1873 Executive Order set the northern boundary of the reservation directly across Lake Coeur d'Alene, which, the District Court found, was contrary "to the usual practice of meandering a survey line along the mean high water mark...."
>
> As of 1885, Congress had neither ratified the 1873 agreement nor compensated the Tribe. This inaction prompted the Tribe to petition the Government again, to "make with us a proper treaty of peace and friendship . . . by which your petitioners may be properly and fully compensated for such portion of their lands not now reserved to them; [and] that their present reserve may be confirmed to them." In response, Congress authorized new negotiations to obtain the Tribe's agreement to cede land outside the borders of the 1873 reservation. Act of May 15, 1886, ch. 333, 24 Stat. 44. In 1887, the Tribe agreed to cede
>
> > "all right, title, and claim which they now have, or ever had, to all lands in said Territories [Washington, Idaho, and Montana] and elsewhere, except the portion of land within the boundaries of their present reservation in the Territory of Idaho, known as the Coeur d'Alene Reservation."

The Government, in return, promised to compensate the Tribe, and agreed that

> "in consideration of the foregoing cession and agreements . . . the Coeur d'Alene Reservation shall be held forever as Indian land and as homes for the Coeur d'Alene Indians . . . and no part of said reservation shall ever be sold, occupied, open to white settlement, or otherwise disposed of without the consent of the Indians residing on said reservation."

As before, the agreement was not binding on either party until ratified by Congress....

Congress was not prepared to ratify the 1887 agreement, however, owing to a growing desire to obtain for the public not only any interest of the Tribe in land outside the 1873 reservation, but certain portions of the reservation itself....

But Congress did not simply alter the 1873 boundaries unilaterally. Instead, the Tribe was understood to be entitled beneficially to the reservation as then defined, and the 1889 Indian Appropriations Act included a provision directing the Secretary of the Interior "to negotiate with the Coeur d'Alene tribe of Indians," and, specifically, to negotiate "for the purchase and release by said tribe of such portions of its reservation not agricultural and valuable chiefly for minerals and timber as such tribe shall consent to sell." Act of Mar. 2, 1889, ch. 412, § 4, 25 Stat. 1002. Later that year, the Tribe and Government negotiators reached a new agreement under which the Tribe would cede the northern portion of the reservation, including approximately two-thirds of Lake Coeur d'Alene, in exchange for $500,000. The new boundary line, like the old one, ran across the lake, and General Simpson, a negotiator for the United States, reassured the Tribe that "you still have the St. Joseph River and the lower part of the lake." And, again, the agreement was not to be binding on either party until both it and the 1887 agreement were ratified by Congress.

...On March 3, 1891, Congress "accepted, ratified, and confirmed" both the 1887 and 1889 agreements with the Tribe. Act of Mar. 3, 1891, ch. 543, §§ 19, 20, 26 Stat. 1027, 1029.

Thank you for your assistance in preparing a rebuttal report.

Sincerely,

For the Regional Solicitor

Brad Grenham
Assistant Regional Solicitor

ATTACHMENT 3

List of Documents Referenced for Bull Trout and Adfluvial Cutthroat Trout Distributions in the Coeur d'Alene and St. Joe River Basins

List of documents referenced for bull trout and adfluvial cutthroat trout distributions in the Coeur d'Alene and St. Joe River basins. Compiled by R2 Resource Consultants, Inc., April 2016. Numbers in column one refer to sources identified in the associated ArcView map.		
1	Parametrix 2005	Parametrix. 2005. Habitat use and movement of adult westslope cutthroat trout in Coeur d'Alene Lake, and lower St. Joe, St. Maries, and Coeur d'Alene rivers, 2003-04. Final Report March 2005. Prepared for Avista Corporation, Spokane WA by Parametrix, Kirkland, WA.
2	Parametrix 2003	Parametrix. 2003. St. Joe River juvenile adfluvial bull trout out-migration evaluation. Final Report October 2003. Prepared for Avista Corporation, Spokane, WA by Parametrix, Kirkland, WA.
3	Audet, D. 2001	Audet, Daniel. 2001. Testimony regarding historic and current bull trout fish distributions in the Coeur d'Alene River basin. United States of America vs. Asarco Inc. et al. U.S. District Court, Boise, Idaho. CV 96-0122-N-EJL, Vol. XXXI, pages 6422-6562; Exhibit 1684. March 9, 2001. Testimony references: Maclay, D.J. 1940. Tentative Fish Management Plan, Coeur d'Alene National Forest. USDA Forest Service, February 1940.
4	Liter and Horner 2008	Liter, M. and N. Horner. 2008. Panhandle region bull trout redd counts 2005. Chapter 6 *in* Fishery management annual report IDFG 09-103, pages 124-165. Idaho Department of Fish and Game. November 2008.
5	DuPont and Horner 2008a	DuPont, J. and N. Horner. 2008a. Panhandle region bull trout redd counts 2004. Fishery management annual report IDFG 07-60. Idaho Department of Fish and Game. November 2008.
6	USFWS 2002	USFWS. 2002. Chapter 15, Coeur d'Alene Lake basin recovery unit, Oregon. 92 p. *In* U.S. Fish and Wildlife Service Bull trout (*Salvelinus confluentus*) draft recovery plan. Portland, OR.
7	Apperson et al. 1988	Apperson, K.A., M. Mahan, and W.D. Horton. 1988. North Idaho streams fishery research. River and stream investigations. Study completion report, project no. F-73-R-10. Idaho Department of Fish and Game. Volume 067, Article 04, July 1988.
8	Horton 1987	Horton, W.D. 1987. North Idaho streams fishery research. River and stream investigations. Job performance report F-73-R-8. Idaho Department of Fish and Game. Volume 068, Article 11, December 1987.
9	Horton 1985	Horton, W.D. 1985. North Idaho streams fishery research. River and stream investigations. Job performance report F-73-R-7. Idaho Department of Fish and Game. Volume 063, Article 10, December 1985.
10	Bauer 1975	Bauer, S. 1975. Coeur d'Alene River fishery studies. Project performance report 1974. Idaho Department of Fish and Game. Volume 032, Article 02, March 1975.
11	Averett 1962	Studies of two races of cutthroat trout in northern Idaho. Federal aid to fish restoration project completion report F-47-R-1. Idaho Department of Fish and Game.
12	Averett and MacPhee 1971	Averett, R.C. and C. MacPhee. 1971. Distribution and growth of indigenous fluvial and adfluvial cutthroat trout *Salmo clarki*, St. Joe River, Idaho. Northwest Science, Volume 45, No. 1, p 38-47.
13	DuPont and Horner 2008b	DuPont, J. and N. Horner. 2008b. St. Joe River and North Fork Coeur d'Alene River snorkel surveys use of Coeur d'Alene River cutthroat trout panhandle region 2004. Idaho Department of Fish and Game fishery management annual report IDFG 07-61. November 2008.
14	DuPont et al. 2008	DuPont, J., E. Lider, M. Davis, and N. Horner. 2008. Movement, mortality, and habitat use of Coeur d'Alene River cutthroat trout, panhandle region 2004. Idaho Department of Fish and Game fishery

List of documents referenced for bull trout and adfluvial cutthroat trout distributions in the Coeur d'Alene and St. Joe River basins. Compiled by R2 Resource Consultants, Inc., April 2016. Numbers in column one refer to sources identified in the associated ArcView map.		
		management annual report IDFG 07-57. November 2008.
15	Cernera et al. 1997	Cernera, P., L. Campbell, and J. Gunderman. 1997. Monitoring migration of post spawned adfluvial cutthroat trout *(Oncorhynchus clarki lewisi)* in the Coeur d'Alene River. Coeur d'Alene basin natural resource damage assessment. The Coeur d'Alene Tribe. Plummer, Idaho.
16	NPCC 2004	Northwest Power and Conservation Council (NPCC). 2004. Coeur d'Alene Subbasin Plan. *In*: Intermountain Province Subbasin Plan, Columbia River Basin Fish and Wildlife Program. Portland, Oregon, May 2004. Available at: http://www.nwcouncil.org/fw/subbasinplanning/admin/level2/intermtn/plan/
17	Thurow and Bjornn 1978	Thurow, R.F. and T.C. Bjornn. 1978. Response of cutthroat trout populations to the cessation of fishing in St. Joe River tributaries. Final Report, Project F-60-R. Idaho Cooperative Fishery Research Unit, Bulletin 25, University of Idaho, Moscow.
18	Fredericks et al. 2009	Fredericks, J., M. Liter, M. Maiolie, R. Hardy, R. Ryan, D. Ayers, and C. Gidley, 2009. 2008 Panhandle Fishery Management Report. Idaho Department of Fish and Game, Report IDFG 07-57. September 2009.
19	Horton and Mahan 1988	Horton, W.D. and M.F. Mahan. 1988. North Idaho streams fishery research. River and stream investigations. Job performance report F-73-R-9. Idaho Department of Fish and Game. March 1998.
20	USFWS 2009	USFWS. 2009. Draft Map. Bull Trout Seasonal Habitat in the St. Joe River Area. Northern Idaho Field Office, April 17, 2009.
21	USFWS 2010b	USFWS. 2010b. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States; Final Rule. 50 CFR Part 17. Federal Register 75(200): 63898-64070. October 18, 2010.
22	USFWS 2010a	USFWS. 2010a. Columbia Headwaters Recovery Unit – Coeur d'Alene River Basin Critical Habitat Unit. Chapter 29 *in:* Bull Trout Final Critical Habitat Justification: Rationale for why habitat is essential, and documentation of occupancy. U.S. Fish and Wildlife Service, Idaho Fish and Wildlife Office, Boise, Idaho. September 2010.
23	Corsi 2007	Corsi, C. 2007. Memorandum to John Blair, FERC. RE: FERC 10(j) Response. April 3, 2007. Idaho Department of Fish and Game, Coeur d'Alene, Idaho.
24	Cochnauer 1977	Cochnauer, T. 1977. Stream flow investigations. Job Performance Report. Project F-66-R-2. Idaho Department of Fish and Game. April 1977.
25	Goodnight & Watkins 1976	Goodnight, W.H. and T.L. Watkins. 1976. Lake and reservoir investigations. Job Performance Report. Project F-53-R-11. Idaho Department of Fish and Game. February 1976.
26	Goodnight & Mauser 1978	Goodnight, W.H. and G.R. Mauser. 1978. Regional fishery management investigations. Job Performance Report. Project F-71-R-2. Idaho Department of Fish and Game. May 1978.
27	R2 1996a	R2 Resource Consultants. 1996a. Coeur d'Alene Basin Natural Resource Damage Assessment: Aquatic Resource Injury Determination and Quantification. 1995 Data Report. Draft. Prepared for U.S. Fish and Wildlife Service by R2 Resource Consultants. Redmond. WA. January

List of documents referenced for bull trout and adfluvial cutthroat trout distributions in the Coeur d'Alene and St. Joe River basins. Compiled by R2 Resource Consultants, Inc., April 2016. Numbers in column one refer to sources identified in the associated ArcView map.		
28	R2 1996b	R2 Resource Consultants, Inc. 1996b. Radio Telemetry Field Data.
29	R2 1995	R2 Resource Consultants. 1995. Coeur d'Alene Basin Natural Resource Damage Assessment: Aquatic Resource Injury Determination and Quantification. 1994 Data Report. Draft. Prepared for US. Fish and Wildlife Service by R2 Resource Consultants, Redmond, WA. May
30	Ortmann 1972	Ortmann, D.W. 1972. Fish population sampling – South Fork Coeur d'Alene River. Inter-departmental Memo to Stacy Gebhards. June 13, 1972.
31	IDFG 1993	Idaho Department of Fish and Game (IDFG). 1993. Summary of 1993 Electrofishing, South Fork of the Coeur d'Alene River.
32	Bowler 1974	Bowler, B. 1974. Coeur d'Alene River Study. Lake and Reservoir Investigations. Job Performance Report F-53-R-9. Idaho Department of Fish and Game. April 1974.
33	Thurow 1976	Thurow, R.F. 1976. The effects of closure to angling on cutthroat trout populations in tributaries of the St. Joe River, Idaho. Master's Thesis. University of Idaho, Moscow, Idaho.
34	DuPont et al. 2009	DuPont J., M. Liter, and N. Horner. 2009. Regional fisheries management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, IDFG 09-109, 2006 Job Performance Report, Boise.
35	Hardy et al. 2010	Hardy, R., R. Ryan, M. Liter, M. Maiolie, and J. Fredericks. 2010. Fishery management annual report, 2009 Panhandle Region, IDFG 10-112. Idaho Department of Fish and Game, Boise.
36	Maiolie et al. 2011	Maiolie, M., R. Hardy, M. Liter, R. Ryan, K. Carter-Lynn, J. Fredericks. 2011. Regional fisheries investigations, 2010 Job Performance Report, IDFG 11-17. Idaho Department of Fish and Game, Boise.
37	Fredricks et al. 2013	Fredericks, J., M. Maiolie, R. Hardy, R. Ryan, and M. Liter. 2013. Fisheries management annual report, 2011 Panhandle Region, IDFG 12-110. Idaho Department of Fish and Game, Boise.
38	Maiolie et al. 2013	Maiolie, M., K. Carter-Lynn, J. Fredericks, R. Ryan, and M. Liter. 2013. Regional fisheries management investigations. Idaho Department of Fish and Game, Federal Aid in Fish Restoration, IDFG 13-116, 2012 Job Performance Report, Boise.
39	Ryan et al. 2014	Ryan, R., M. Maiolie, K. Yallaly, C. Lawson, and J. Fredricks. 2014. Fisheries management annual report, 2013 Panhandle Region, IDFG 14-102. Idaho Department of Fish and Game, Boise.
40	Lillengreen et al. 1993	Lillengreen, K.L., T. Skillingstad, and A.T. Scholz. 1993. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation. 1992 Annual Report. Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR. Project # 90-44. 218p
41	Lillengreen et al. 1996	Lillengreen, K.L., A.J. Vitale, and R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation, 1993-1994 annual report. USDE, Bonneville Power Administration, Portland, OR. 260p.
42	Peters et al. 1998	Peters, R., A. Vitale, and K. Lillengreen. 1998. Supplementation Feasibility Report on the Coeur d' Alene Indian Reservation. 1994-1997 Technical Report. Coeur d' Alene Tribe Fish, Water, and Wildlife Program. Project No. 199004400, 169 electronic pages, (BPA Report DOE/BP-10544-5).

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43	Vitale et al. 1999	Vitale, A.J., D.A. Bailey, R. Peters, and K. Lillengreen. 1999. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. Progress Report 1996-1998. Project No. 90-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
44	Vitale et al. 2003a	Vitale, A.J., D. Lamb, R. Peters, M. Stanger, C. Moore, and D. Chess. 2003a. Annual report 1999-2001 with review of annual scopes of work, 1995-2001. Coeur d'Alene Tribe Fisheries Program Technical Report. USDE, Bonneville Power Administration, Portland, OR. 278 p.
45	Vitale et al. 2003a	Vitale, A.J., D. Lamb, and J. Scott. 2003a. Implementation of Fisheries Enhancement Opportunities on the Coeur d'Alene Reservation. 2002 Annual Report. Project No. 1990-04400, 111 electronic pages, (BPA Report DOE/BP-00010885-1)
46	Vitale et al. 2004	Vitale, A.J., D.W. Chess, D.S. Lamb, and M.H. Stanger. 2004. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. 2003 Annual Report. Project No. 1990-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
47	Chess et al. 2006	Chess, D.W., A.J. Vitale, S.A. Hallock, and M.H. Stanger. 2006. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. 2004 Annual Report. Project No. 1990-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
48	Vitale et al. 2007	Vitale, A.J., D.W. Chess, S.A. Hallock, and M.H. Stanger. 2007. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. 2005 Annual Report. Project No. 1990-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
49	Vitale et al. 2008	Vitale, A.J., S.A. Hallock, J.A. Firehammer, R.L. Peters, and D.W. Chess. 2008. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. 2006 Annual Report. Project No. 1990-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
50	Firehammer et al. 2009	Firehammer, J.A., A.J. Vitale, and S.A. Hallock. 2009. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. 2007 Annual Report. Project No. 1990-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
51	Firehammer et al. 2010	Firehammer, J.A., A.J. Vitale, and S.A. Hallock. 2010. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation. 2008 Annual Report. Project No. 1990-044-00. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
52	Firehammer et al. 2011	Firehammer, J.A., A.J. Vitale, and S.A. Hallock. 2011. Implementation of fisheries enhancement opportunities on the Coeur d'Alene Reservation, 2009 Annual Report. Project No. 1990-044-00; Contract No. 00047583. U.S. Department of Energy, Bonneville Power Administration, Portland, OR.
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