
ROCKY REACH COMPREHENSIVE BULL TROUT MANAGEMENT PLAN

First Draft

**ROCKY REACH HYDROELECTRIC PROJECT
FERC Project No. 2145**

October 21, 2003



**Public Utility District No. 1 of Chelan County
Wenatchee, Washington**

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SECTION 1: INTRODUCTION

The Public Utility District No. 1 of Chelan County (Chelan PUD) owns and operates the Rocky Reach Hydroelectric Project (Project). Chelan PUD is permitted to operate the Project according to terms and conditions contained in an existing Federal Energy Regulatory Commission (FERC) license, No. 2145, that was issued on July 12, 1956. On September 1, 1966, the Chelan PUD filed an application with the Federal Power Commission (FPC) to amend the Project license for the addition of four generating units. The FPC, later FERC, issued the license amendment on May 23, 1968. The existing license expires on June 30, 2006.

Chelan PUD intends to seek a new federal license to operate the Rocky Reach Project and has begun preparation for the process referred to as “relicensing.” The FERC relicensing process is based on laws and regulations that require years of extensive planning, including environmental studies, agency consensus and public involvement. The process to obtain a new license has changed considerably since the existing licensee was issued in 1956. The Federal Power Act (FPA) was amended in 1986 by the Electric Consumers Protection Act (ECPA). The amendment requires the FERC, in addition to power and development purposes, to give equal consideration to the purposes of enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality.

Chelan PUD initiated the alternative relicensing process for the Rocky Reach Project in 1999. A Natural Sciences Working Group (NSWG) was then established for the Project. The NSWG for the Rocky Reach Project consisted of the U.S.D.A. Forest Service (USDA-FS), National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), NOAA Fisheries (NOAA), Washington Department of Ecology (WDOE), Washington Department of Fish and Wildlife (WDFW), the U.S. Bureau of Land Management (BLM), the Colville Confederated Tribes, the Yakama Nation and other interested parties.

A relicensing baseline study to assess the effects of Rocky Reach Project operations was conducted in the Project area in 2001 and 2002 (Figure 1). The study is described in greater detail in Section 2.

Figure 1: Rocky Reach Hydroelectric Project Area Map (Placeholder)

SECTION 2: BIOLOGY AND ENHANCEMENT HISTORY

Bull trout are native to northwestern North America, historically occupying a large geographic range extending from California north into the Yukon and Northwest Territories of Canada, and east to western Montana and Alberta (Cavender 1978). They are generally found in interior drainages, but also occur on the Pacific Coast in Puget Sound and in the large drainages of British Columbia.

Bull trout currently occur in lakes, rivers and tributaries in Montana, Idaho, Washington, Oregon (including the Klamath River basin), Nevada, two Canadian Provinces (British Columbia and Alberta) and several cross-boundary drainages in extreme southeast Alaska. East of the Continental Divide, bull trout are found in the headwaters of the Saskatchewan River in Alberta, and the McKenzie River system in Alberta and British Columbia (Cavender 1978; McPhail and Baxter 1996; Brewin and Brewin 1997). The remaining distribution of bull trout is highly fragmented.

Bull trout are members of the char group within the family Salmonidae. Bull trout closely resemble Dolly Varden (*Salvelinus malma*), a related species. Genetic analyses indicate, however, that bull trout are more closely related to an Asian char (*Salvelinus leucomaenis*) than to Dolly Varden (Pleyte et al. 1992). Bull trout are sympatric with Dolly Varden over part of their range, most notably in British Columbia and the Coastal-Puget Sound region of Washington State.

Bull trout exhibit four distinct life history types: resident, fluvial, adfluvial, and anadromous. The fluvial, adfluvial, and resident forms exist throughout the range of the bull trout (Rieman and McIntyre 1993). These forms spend their entire life in freshwater. The anadromous life history form is currently known only to occur in the Coastal-Puget Sound region within the coterminous United States (Volk 2000; Kraemer 1994; Mongillo 1993). Multiple life history types may be expressed in the same population, and this diversity of life history types is considered important to the stability and viability of bull trout populations (Rieman and McIntyre 1993).

The majority of growth and maturation for anadromous bull trout occurs in estuarine and marine waters, adfluvial bull trout in lakes or reservoirs, and fluvial bull trout in large river systems. Resident bull trout populations are generally found in small headwater streams where fish remain their entire lives.

For migratory life history types, juveniles tend to rear in tributary streams for 1 to 4 years before migrating downstream into a larger river, lake, or estuary and/or nearshore marine area to mature (Rieman and McIntyre 1993). In some lake systems, age 0+ fish may migrate directly to lakes (Riehle et al. 1997). Juvenile and adult bull trout frequently inhabit side channels, stream margins and pools with suitable cover (Sexauer and James 1993) and areas with cold hyporheic zones or groundwater upwellings (Baxter and Hauer 2000).

Bull trout are believed to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Growth, survival, and long-term persistence are dependent upon habitat characteristics such as cold water, complex instream habitat, a stable substrate with a low percentage of fine sediments, high channel stability, and stream/population connectivity. Stream temperature and substrate type, in particular, are critical factors for the sustained long-term persistence of bull trout. Spawning is often associated with the coldest, cleanest, and most complex stream reaches within basins. However, bull trout may exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1995), and should not be expected to occupy all available habitats at the same time (Rieman et al. 1997).

Bull trout are present in both Rocky Reach and Rock Island reservoirs, including the Wenatchee, Entiat and Methow Rivers. Three life history forms, adfluvial, fluvial, and resident, are believed to occur in the action area. Bull trout are observed each year using the adult fish passage facilities to pass both Rocky Reach and Rock Island dams, affirming their presence and use of the mainstem Columbia River. Juvenile bull trout have been observed in the juvenile sampling facilities at both dams as well, although very infrequently. Juvenile bull trout were sampled in the prototype juvenile bypass collector in 1998, 1999, 2000, 2001 2002, with 23, 30, 8, 4, and 5 fish observed, respectively. In 2003, no juvenile bull trout were sampled at the new Rocky Reach juvenile collector sampling facility.

Both adult and juvenile bull trout are routinely observed (and counted) by Chelan PUD employees while passing through the fish ladder at Rocky Reach. Before the installation of computer video monitoring, salmon and steelhead were observed by direct observation at fish ladder windows. Since 1992, fish have been counted utilizing round-the-clock computer video recordings during adult salmon passage periods. Counts prior to 1998 did not differentiate bull trout from other trout.

Chelan PUD began enumerating bull trout using the adult passage facilities in 1998. A total of 83 bull trout passed Rocky Reach dam between May 3 and July 31 that year (Chelan PUD, 2002a unpublished data). In 1999, 2000 and 2001, counts of bull trout using the fish ladder from May 1 and July 31 were 93, 183 and 176, respectively. In 2002, a total of 204 bull trout passed Rocky Reach from April 14 to November 14, with the most (177) passing from May 1 to July 31. In 2003 (April 14 – August 19), 202 bull trout passed Rocky Reach dam. In all years on record, the majority of the bull trout passed the Project in May and June (75 to 90 percent). Although the extent of bull trout passage at other times of the year is unknown, some bull trout do use fish ladder facilities to pass Rocky Reach in September, October and November. Fish counting ends around November 15 each year.

On June 10, 1998, the U.S. Fish and Wildlife Service (Service) listed bull trout (*Salvelinus confluentus*) within the Columbia River basin as threatened under the Endangered Species Act (ESA) (50 CFR 63(111)). Later (November 1, 1999), the Service listed bull trout within the coterminous United States as threatened under the ESA (50 CFR 64(210)). The Service identified habitat degradation, fragmentation and alterations associated with dewatering, road construction and maintenance, mining, and grazing; blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment into diversion channels; and introduced non-native species as major factors affecting the distribution

and abundance of bull trout. They noted that dams (and natural barriers) have isolated population segments resulting in a loss of genetic exchange among these segments (50 CFR 63(111):31657). The Service believes many populations are now isolated and disjunct.

In a letter to the Federal Energy Regulatory Commission (FERC), the Service requested consultation under Section 7 of the ESA regarding the effects of hydroelectric project operations on bull trout in the Columbia River (letter from M. Miller, USFWS, to M. Robinson, FERC, dated January 10, 2000). The request for consultation was based on observations of bull trout in the study area. In its reply to the Service, the FERC noted that there was virtually no information on bull trout in the mainstem Columbia River.

Because bull trout within the mid-Columbia River area are listed under the, and they may be affected by the operation of hydro-projects owned and operated by Chelan, Douglas, and Grant PUDs (Mid-Columbia PUDs), the Mid-Columbia PUDs decided to evaluate the status of bull trout in the project area. Prior to relicensing studies, little was known about the life-history characteristics (e.g., movements, distribution, habitat use, etc.) of bull trout in the mid-Columbia River. Therefore, in order to assess the operational effects of hydroelectric projects on adult bull trout and adult bull trout migratory behavior in the mid-Columbia River region, radio tags were inserted into adult sized bull trout collected at three Mid-Columbia River dams. These fish were tracked to describe their movements and migration patterns within the mid-Columbia Basin (Figure 2).

Specific study objectives were to: (1) describe the movements and migration patterns of adult bull trout in the mid-Columbia system and (2) assess the effects of hydroelectric operations on the movement and migration patterns of adult bull trout in the mid-Columbia River. Results presented here represent the first year of a two-year study. Therefore, any conclusions drawn from this work at this time are tentative.

A 3-year radio telemetry study was initiated in 2001 (BioAnalysts, 2002, 2003 draft). A total of 79 bull trout were tagged in 2001 and 2002 (15 fish at Rock Island Hydroelectric Project, 45 fish at Rocky Reach Hydroelectric Project and 19 fish at Wells Hydroelectric Project). Approximately half of the fish were released upstream of the dam where they were captured, and the other half were released downstream of the respective project.

Study results indicate that some bull trout reside for considerable periods of time in the mainstem reservoirs and pass upstream through the adult fish ladders to enter tributary habitats. All of the tagged fish, despite their release location, migrated into the Wenatchee, Entiat or Methow rivers, presumably to spawn. Only one fish entered the Okanogan River for a brief period. It then exited, swam downstream and entered the Methow River. Most of the tagged bull trout had entered tributaries by mid to late June in both years (BioAnalysts 2002, 2003 draft). Some of the tagged fish moved downstream passed Rocky Reach and Rock Island dams after exiting tributaries in the late fall. After exiting tributaries in late fall, some of the tagged bull trout moved downstream of Rocky Reach dam through turbines. One fish passed downstream through turbines at both Rocky Reach and Rock Island dams after exiting the Entiat River in November 2001. This fish overwintered downstream of Rock Island dam, then migrated back through adult

ladders at Rock Island and Rocky Reach in May of 2002. Again, it entered the Entiat River in mid-June 2002, three days later than it did in 2001.

None of the tagged adult bull trout were killed during upstream or downstream passage through Rock Island, Rocky Reach or Wells dams. Of all 79 bull trout tagged in 2001 and 2002, only one mortality occurred, and it was not related to project operations. The radio telemetry study identified no adverse effects on movement or survival of tagged bull trout. Detailed results are available in the 2002 final report (BioAnalysts 2002), and the draft report completed in 2003 (BioAnalysts 2003 draft).

Relicensing baseline studies have not demonstrated a reduction in suitable habitat or density of forage species that bull trout rely upon to over winter and grow in Rocky Reach reservoir. The mainstem Columbia River does not contain all of the necessary habitat elements to sustain the entire life history of adfluvial or fluvial bull trout. There is no documentation or indication that the mainstem action area ever contained spawning habitat for bull trout. However, Rocky Reach reservoir does provide other important habitat features, such as a productive forage base, a migration corridor, and a more stable deep water environment for over wintering. Therefore, it is important that these habitat elements enhanced by project operations be maintained through the license term.

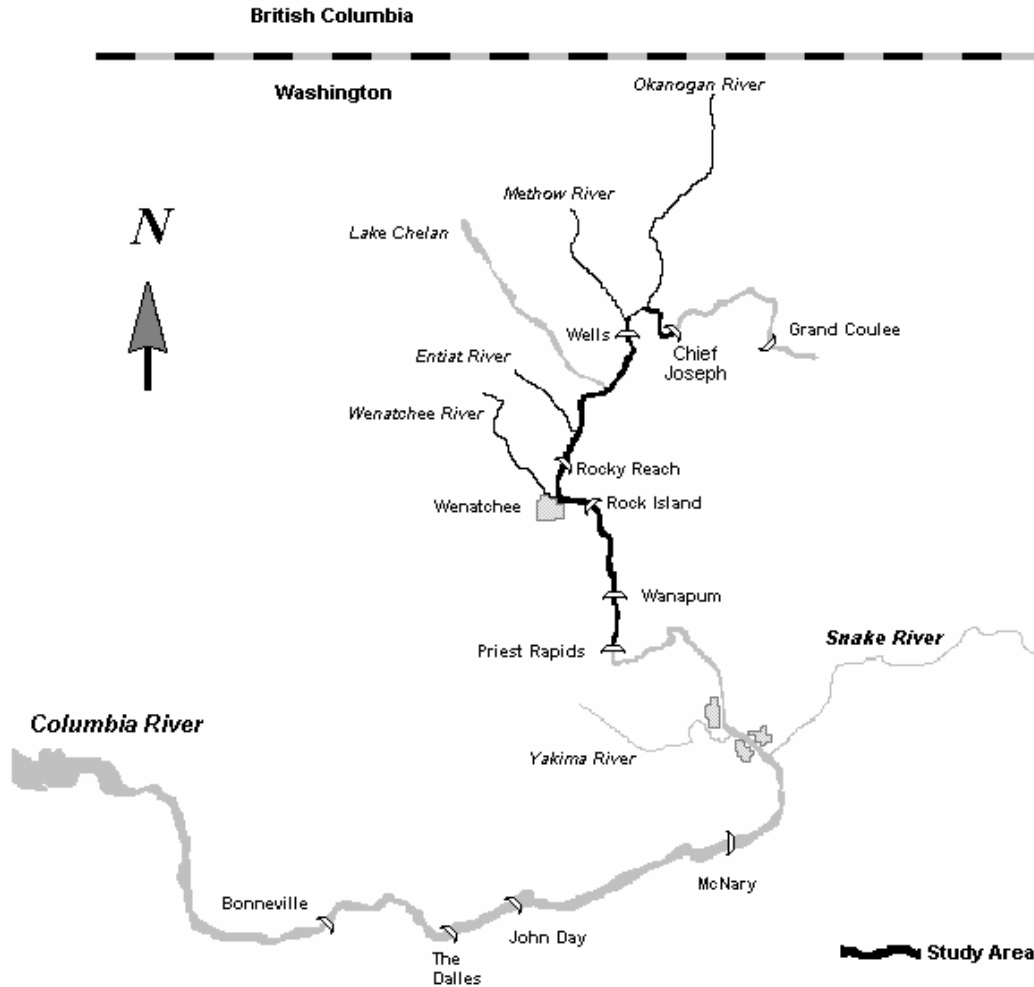


Figure 2: Study area for assessing migration patterns of bull trout in the mid-Columbia River. Fixed radiotelemetry sites monitored the movement of bull trout near Priest Rapids, Wanapum, Rock Island, Rocky Reach and Wells dams. Fixed sites placed in the Wenatchee, Entiat, Methow and Okanogan rivers monitored time of entry and exodus of bull trout in large tributaries of the mid-Columbia River.

SECTION 3: CRITICAL UNCERTAINTIES

3.1 Project Affects

Based on data collected in 2001-2003, operations of hydroelectric facilities on the mid-Columbia River, specifically Rocky Reach dam, did not negatively affect the survival of adult bull trout (BioAnalysts 2002, 2003). No adult bull trout were killed during upstream or downstream passage through the mid-Columbia dams. However, the dams experienced fairly homogenous operating conditions during the study.

Although hydroelectric operations did not appear to affect the survival of adult bull trout, the presence of dams may have slowed migration rates. On average, it took bull trout longer to pass dams than it did for them to move through reservoirs. In general, bull trout spent more time passing Wells dam than Rocky Reach or Rock Island dams (BioAnalysts 2002, 2003).

Rocky Reach dam may affect upstream and downstream movements of adult and juvenile bull trout. Downstream passage routes available to bull trout include passage over spillways during spill periods (generally April 20 to August 15), the juvenile fish bypass system comprised of one surface collector entrance (6 kcfs flow) and screened turbine units number 1 and 2 (generally operated April 1 to August 31), one adult fish ladder and turbine units 3 through 11. Upstream passage is provided by a single fish ladder with three separate entrances in the tailrace and a single exit in the forebay.

The frequency, timing and route of downstream passage by bull trout through Rocky Reach dam is not known. Juvenile downstream passage may occur any time, and the routes available to juvenile fish is dependent on the time of year. From results of telemetry studies, adult bull trout in the action area are more likely to move downstream of Rocky Reach dam after spawning and re-entering the mainstem Columbia River from tributaries in the mid to late fall. Because Columbia River migratory bull trout are resident fish, present in very low densities, and have relatively unpredictable migration behavior (especially juveniles), effective study methods to evaluate downstream passage may not be available.

SECTION 4: PROTECTION, MITIGATION AND ENHANCEMENT MEASURES

4.1 Plan Goal

The goal of the Rocky Reach Comprehensive Bull Trout Management Plan is: To protect and enhance, to the extent feasible, bull trout populations in the Rocky Reach Project area according to the guiding principles of the USFWS recovery plan and/or by mitigating any specific adverse impacts shown to be caused by continued operation of the Rocky Reach Project.

4.2 Protection, Mitigation, and Enhancement Measure Development Guidelines

PME measures for bull trout were developed using the following criteria:

- Is the impact directly caused by the Project facilities or operation?
- Is the measure an enhancement?
- Is the measure a Chelan PUD responsibility?
- Is the measure consistent with or a result of relicensing studies?
- Has the issue been previously addressed?
- Is the measure reasonable, attainable, or measurable?

4.3 Protection, Mitigation, and Enhancement Measures

(a) **Bull Trout Monitoring and Evaluation Program.** Chelan PUD shall make available \$20,000 per year for 10 years, and 5,000 each year thereafter, for the term of the license, to be used by the USFWS or WDFW, pursuant to a plan developed and adopted by the USFWS and WDFW, for monitoring and evaluation and/or enhancements. The USFWS and WDFW plan to consult with the RRF in the course of developing a monitoring and evaluation plan. If, in any year, the USFWS and WDFW fail to develop and adopt such a plan, and submit it to Chelan PUD by January 10, Chelan PUD shall carry over that year's funding until such plan has been developed, adopted, and submitted to Chelan PUD. If a project effect is identified through the M&E program for the remainder of the Rocky Reach license term., the Chelan PUD will consult with the appropriate agencies and interested parties to address the effect. Funding may be applied off-site where appropriate.

(b) **Adult Passage Monitoring.** Chelan PUD shall conduct the following to monitor adult bull trout passage at Rocky Reach dam: (1) continue ladder counts; (2) maintain adult fishways in accordance with anadromous fish criteria; and (3) expand video counts to off-season for an experimental period of 1 year. Off-season video counting shall be continued throughout the remainder of the new license term if deemed necessary by the RRF.

(c) **USFWS Recovery Plan.** Chelan PUD shall participate in the USFWS bull trout recovery plan for areas affected by project operations.

SECTION 5: LITERATURE CITED

- Baxter, C. V., and F. R. Hauer. 2000. Geomorphology, hyporheic exchange, and the selection of spawning habitat by bull trout (*Salvelinus confluentus*). *Canadian Journal of Aquatic Science*. 57:1470-1481.
- BioAnalysts, Inc. 2002. Movements of bull trout within the mid-Columbia River and tributaries, 2002-2003. Final Report. Report prepared for the Public Utility No. 1 of Chelan County. Wenatchee, Washington. November 2002.
- BioAnalysts, Inc. 2003. Movements of bull trout within the mid-Columbia River and tributaries, 2002-2003 - draft. Draft report prepared for the Public Utility No. 1 of Chelan County. Wenatchee, Washington. July 2003.
- Brewin P. A. and M. K. Brewin. 1997. Distribution maps for bull trout in Alberta. Pages 206-216 *in*: Mackay, W.C., M. D. Brewin and M. Monita, editors. Friends of the Bull Trout Conference Proceedings. Bull Trout Task Force (Alberta), c/o Trout Unlimited Calgary, Alberta, Canada.
- Cavender, T. M. 1978. Taxonomy and distribution of the bull trout, *Salvelinus confluentus* (Suckley) from the American Northwest. *California Fish and Game* 64:139-174.
- Chelan PUD. 2002b. Unpublished fish ladder count data for Rocky Reach. Public Utility District No. 1 of Chelan County.
- Kraemer, C. 1994. Some observations on the life history and behavior of the native char, Dolly Varden (*Salvelinus malma*) and bull trout (*Salvelinus confluentus*) of the North Puget Sound Region. Washington Department of Wildlife. Draft.
- McPhail, J. D. and J. S. Baxter. 1996. A review of bull trout (*Salvelinus confluentus*) life-history and habitat use in relation to compensation and improvement opportunities. Fisheries management report no. 104. University of British Columbia. Vancouver, B.C.
- Mongillo, P. E. 1993. The distribution and status of bull trout/Dolly Varden in Washington State. Washington Department of Wildlife. Fisheries Management Division, Report 93-22. Olympia, Washington. 45 pp.
- Pleyte, Kay A., S. D. Duncan, and R. B. Phillips. 1992. Evolutionary relationships of the fish genus *Salvelinus* inferred from DNA sequences of the first internal transcribed spacer (ITS 1) of ribosomal DNA. *Molecular Phylogenetics and Evolution*, 1(3): 223-230.

- Riehle, M. W. Weber, A. M. Stuart, s. L. Thiesfeld and D. E. Ratliff. 1997 Progress report of the multi-agency study of bull trout in the Metolius River system, Oregon. *In Friends of the Bull Trout Conference Proceedings*. Bull Trout Task Force. Calgary, (Alberta). Pages 137-144.
- Rieman, B. E., and J. D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. U.S. Forest Service, Intermountain Research Station. General Technical Report INT-302.
- Rieman, B. E., and J. D. McIntyre. 1995. Occurrence of bull trout in naturally fragmented habitat patches of varied size. *Transactions of American Fisheries Society*. Vol. 124 (3): 285-296.
- Rieman, B. E., D. C. Lee and R. F. Thurow. 1997. Distribution, status and likely future trends of bull trout within the Columbia River and Klamath Basins. *North American Journal of Fisheries Management*. 17(4): 1111-1125.
- Sexauer, H. M. and P. W. James. 1993. A survey of the habitat use by juvenile and pre-spawning adult bull trout, *Salvelinus confluentus*, in four streams in the Wenatchee National Forest. Ellensburg, WA, Central Washington University.
- Volk, E. C. 2000. Using otolith strontium to infer migratory histories of bull trout and Dolly Varden from several Washington State rivers. Submitted to Olympic National Park in fulfillment of Contract #2550041. Washington Department of Fish and Wildlife, Olympia.