

**BULL TROUT MONITORING AND MANAGEMENT PLAN  
2009 ANNUAL REPORT**

**WELLS HYDROELECTRIC PROJECT**

**FERC PROJECT NO. 2149**

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## EXECUTIVE SUMMARY

The goal of the Wells Hydroelectric Project (Wells Project) Bull Trout Monitoring and Management Plan (Bull Trout Plan) is to identify, develop, and implement measures to monitor and address potential project-related impacts on bull trout (*Salvelinus confluentus*) associated with the operations of the Wells Project and associated facilities (Douglas PUD 2004). The Bull Trout Plan was prepared and implemented to meet monitoring requirements stipulated in a U.S. Fish and Wildlife Service (USFWS) Biological Opinion (USFWS 2004) regarding implementation of the Wells Project Anadromous Fish Agreement and Habitat Conservation Plan (Wells HCP). The USFWS Biological Opinion monitoring requirements were also incorporated by the Federal Energy Regulatory Commission (FERC) into the existing Wells Project license in 2004. The Bull Trout Plan was developed in collaboration with the USFWS, National Marine Fisheries Service (NMFS), Washington Department of Fish and Wildlife (WDFW), the Colville Confederated Tribes, and the Yakama Nation, and was approved by the FERC. The Bull Trout Plan has four objectives, addressed by implementing various field study components from 2004 to 2008 at the Wells Project.

In accordance with Article 62 of the FERC license for the Wells Project, Douglas PUD is required to prepare and file with the Commission an annual report describing the activities required by the Bull Trout Plan. In December 2008, Public Utility District No. 1 of Douglas County (Douglas PUD) filed with the FERC, a final comprehensive report summarizing the results of all activities conducted under the Bull Trout Plan between January 2005 and July 2008.

In a letter to the FERC on December 29, 2008, Douglas PUD requested that the 2008 annual report filing (due March 31, 2009) be eliminated and instead include all remaining 2008 activities (August to December 2008) within the 2009 annual report that is scheduled to be filed with the FERC on March 31, 2010. This document summarizes the results of any additional activities conducted in 2008 that were not included in the Bull Trout Plan 2005-2008 Final Report (LGL and Douglas PUD, 2008) and any ongoing Bull Trout Plan activities that were conducted in 2009.

Results of ongoing implementation of Bull Trout Plan activities between August 2008 and December 2009 remain consistent with the previous 8 years of monitoring and evaluation. Stranding and entrapment surveys indicate that infrequent Project operations that result in lowering of the reservoir have not impacted adult or sub-adult bull trout in the Wells Project. Off-season fishway monitoring continues to indicate that adult and sub-adult bull trout are not passing Wells Dam during the winter months. To date, no sub-adult bull trout have been observed in Wells Dam fishways. Data collected from Methow River basin smolt collection operations confirm that sub-adult bull trout are present outside of the Wells Project. During these operations, a total of 41 sub-adult bull trout were captured and biological information recorded. Forty of these fish were PIT tagged. Six additional sub-adult bull trout were incidentally captured in the Methow River basin during hook and line sampling for residual steelhead with one of these fish being PIT tagged. Tag codes for all PIT tagged fish were uploaded to the PTAGIS database. Queries of the PTAGIS database show that none of the bull trout PIT tagged in the Methow Basin have since been detected at Wells Dam or outside the Methow Basin. In 2009, genetic samples were taken from 15 fish during the implementation of

off-site smolt collection activities and provided to the USFWS for future genetic analysis. In addition to coordinating monitoring effort and information exchanges of Project-specific bull trout data, Douglas PUD continues to participate in regional activities that support bull trout conservation and recovery.

## 1.0 INTRODUCTION

In August 1993, Douglas, Chelan, and Grant Public Utility Districts (collectively, “mid-Columbia PUDs”) initiated discussions to develop a long-term, comprehensive program for managing fish and wildlife that inhabit the mid-Columbia River basin (the portion of the Columbia River from the tailrace of Chief Joseph Dam to the confluence of the Yakima and Columbia rivers). These discussions first explored the possibility of developing an ecosystem-based plan for managing fish and wildlife resources inhabiting the mid-Columbia River basin. Due to the scope and scale of this conceptual plan, the negotiating parties decided to focus on an agreement for aquatic species inhabiting the mid-Columbia River basin including fish, plants, and animals. After extensive review, the negotiating parties determined that the best basin-wide approach would be to develop an agreement for anadromous salmonids, specifically: spring and summer/fall Chinook salmon (*Oncorhynchus tshawytscha*); sockeye salmon (*O. nerka*); coho salmon (*O. kisutch*); and steelhead (*O. mykiss*) (collectively, “Plan Species”) which are under the jurisdiction of the National Marine Fisheries Service (NMFS).

On July 30, 1998, Public Utility District No. 1 of Douglas County (Douglas PUD), which operates the Wells Hydroelectric Project (Wells Project), submitted an unexecuted form of an Application for Approval of the Wells Project Anadromous Fish Agreement and Habitat Conservation Plan (Wells HCP) to the FERC and NMFS. To expedite the FERC’s completion of formal consultation, Douglas PUD prepared a biological evaluation of the effects of implementing the Wells HCP on listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

In a letter to the FERC, the USFWS 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 USFWS, the FERC noted that there was virtually no information on bull trout in the mainstem Columbia River. To begin to address this information gap, an initial radio telemetry study of bull trout in the mid-Columbia basin was requested by USFWS in 2000 and implemented from 2001 to 2004 by Douglas, Chelan, and Grant PUDs (BioAnalysts, Inc. 2004).

On November 24, 2003, Douglas PUD filed an application with the FERC for approval of the executed Wells HCP. The 2003 application for approval replaced the 1998 application with the executed form of the Wells HCP. On December 10, 2003, the USFWS received a request from the FERC for formal Section 7 ESA consultation to determine whether the proposed incorporation of the Wells HCP into the FERC license for operation of the Wells Project was likely to jeopardize the continued existence of the Columbia River distinct population segment (DPS) of ESA-listed bull trout, or destroy or adversely modify proposed bull trout critical habitat. In response to the FERC request, the USFWS issued a Biological Opinion (BO) pursuant to Section 7 of the ESA to assess the effects of implementing the HCP on bull trout and other listed species under the jurisdiction of the USFWS. The BO included an Incidental Take Statement outlining reasonable and prudent measures (RPMs) and associated terms and conditions to monitor and limit bull trout take at the Wells Project. On June 21, 2004, the FERC issued orders amending the license for the Wells Project to implement the terms of the Wells

HCP. The FERC incorporated the USFWS bull trout RPMs and terms and conditions into the existing Wells Project license, which are detailed in license articles 61, 62, and 63.

Article 61 of the license requires Douglas PUD to file with the FERC a Bull Trout Plan for implementing the USFWS bull trout RPMs and terms and conditions, which were designed to monitor and limit bull trout take associated with Wells Project operations. Article 61 further requires that Douglas PUD prepare the Bull Trout Plan in consultation with the USFWS, NMFS, Washington Department of Fish and Wildlife (WDFW), and interested Indian Tribes (Colville Confederated Tribes and the Yakama Nation). Following consultation with these stakeholders, on February 28, 2005, Douglas PUD filed with the FERC the "*Wells Hydroelectric Project Bull Trout Monitoring and Management Plan, 2004-2008*" (Douglas PUD 2004), which is referred to as the "Bull Trout Plan" in this document. The Bull Trout Plan was approved by the FERC on April 19, 2005.

Article 62 of the license requires Douglas PUD to prepare and file with the FERC an annual report of the status of activities required by the Bull Trout Plan. On March 26, 2008, Douglas PUD with approval from USFWS filed a request for an extension of time to submit the 2007 annual bull trout monitoring report and to consolidate the 2007 annual report with the final bull trout monitoring report, required to be filed with the FERC by December 31, 2008. On April 16, 2008, the FERC issued an order granting this request and per the order, Douglas PUD filed with the FERC a 2005-2008 final monitoring report that summarized all data collected to meet the Bull Trout Plan objectives outlined in the USFWS bull trout RPMs and terms and conditions, and the Wells Project license articles 61 and 62.

The next reporting deadline associated with the Bull Trout Plan was March 31, 2009 (2008 Annual Report). However, because the 2005-2008 final report contained bull trout monitoring activities for most of 2008, Douglas PUD requested and was granted permission, via the FERC's April 16, 2008 letter to Douglas PUD, to eliminate the March 2009 filing of the 2008 Annual Report and instead include all remaining 2008 activities within the 2009 annual report. This document serves as the 2009 annual report and summarizes the results of any additional bull trout activities in 2008 (that were not included in the Bull Trout Plan 2005-2008 Final Monitoring Report (LGL and Douglas PUD, 2008)).

Article 63 was a reservation of authority by the FERC to require the licensee to carry out specified measures for the purpose of participating in the development and implementation of a bull trout recovery plan. The USFWS has only recently reactivated the bull trout recovery planning process following a multi-year hiatus. In response to compliance with article 63 of the Wells Project license, Douglas PUD has and will continue to participate in the development of future recovery planning documents for bull trout.

## **2.0 GOALS AND OBJECTIVES**

The goal of the Bull Trout Plan is to identify, develop, and implement measures to monitor and address potential project-related impacts on bull trout from Wells Project operations and facilities. The Bull Trout Plan was intended to be an adaptive approach, where strategies for meeting the goals and objectives may be negotiated under a collaborative effort with

stakeholders based on new information and ongoing monitoring results. The plan was designed specifically to: (1) address ongoing project-related impacts through the life of the existing operating license; (2) provide consistency with recovery actions as outlined in the USFWS Draft Bull Trout Recovery Plan; and (3) monitor and minimize the extent of any incidental take of bull trout consistent with Section 7 of the ESA.

The Bull Trout Plan has four main objectives including: (1) identify potential project-related impacts on upstream and downstream passage of adult bull trout through the Wells Dam and reservoir and implement appropriate measures to monitor any incidental take of bull trout; (2) assess project-related impacts on upstream and downstream passage of sub-adult bull trout; (3) investigate the potential for bull trout entrapment or stranding in off-channel or backwater areas of Wells Reservoir; and (4) identify the core areas and local populations, as defined in the USFWS Draft Bull Trout Recovery Plan, of the bull trout that utilize the Wells Project Area.

Note that activities to support some objectives identified in the Bull Trout Plan were intended to be conducted in only the early phases of plan implementation (i.e., radio-tagging of bull trout at Wells Dam between 2005-2008 and comprehensive incidental take calculation for monitoring years 2001-2004 and 2005-2008). The results of these activities can be found in the Bull Trout Plan 2005-2008 Final Monitoring Report (LGL and Douglas PUD, 2008) and are considered completed tasks with the filing of that final report. For the purposes of continued annual reporting per Article 62, only ongoing Bull Trout Plan activities are reported herein.

Below is a brief summary of the Bull Trout Plan objectives. A more detailed strategic framework to implement each objective is summarized in the Bull Trout Plan 2005-2008 Final Monitoring Report (LGL and Douglas PUD, 2008).

## **2.1 Objective 1 - Adult Bull Trout Passage Monitoring**

Strategy 1-1: Implement an adult bull trout telemetry program to monitor adult upstream and downstream passage in the Wells Project Area and implement appropriate measures to monitor any incidental take of bull trout.

Strategy 1-2: Analyze passage results and operational data to determine if correlations exist between passage times and passage events and project operations.

Strategy 1-3: Determine off-season adult bull trout passage through the adult fishway (numbers and times of year) at Wells for an experimental period 2004-2005. Per request by the USFWS, off-season fishway monitoring for adult bull trout passage has continued to date.

Strategy 1-4: Should upstream or downstream passage problems be identified, pursue the feasibility of options to modify upstream passage facilities or operations that reduce the impact to bull trout passage.

## **2.2 Objective 2 - Sub-adult Bull Trout Passage Monitoring**

Strategy 2-1: The stakeholders agree at this time<sup>1</sup> that because of the inability to collect a sufficient sample size of sub-adult bull trout, it is not feasible to assess sub-adult passage at Wells. However, when encountered at the Wells Project, or in tributary traps, sub-adult bull trout will be PIT tagged.

Strategy 2-2: Determine off-season sub-adult bull trout passage through the adult fishway (numbers and times of year) at Wells for an experimental period from 2004 to 2005. Per request by the USFWS, off-season fishway monitoring for sub-adult bull trout passage has continued to date.

## **2.3 Objective 3 - Bull Trout Entrapment and Stranding Evaluation**

Strategy 3-1: Evaluate Wells inflow patterns, reservoir elevations, and backwater curves to determine if stranding or entrapment of bull trout may occur.

## **2.4 Objective 4 - Identification of Core Area and Local Populations of Bull Trout that Utilize the Wells Project Area**

Strategy 4-1: Gather genetic samples from radio-tagged and PIT tagged bull trout for comparison to baseline genetic samples from local populations and core areas.

Strategy 4-2: Work cooperatively with other agencies to obtain locations of radio-tagged fish outside the Project area.

## **3.0 STUDY AREA**

### **3.1 Wells Bull Trout Plan Study Area**

The study area for this report included all waters within the Wells Project, including the lower Okanogan and Methow rivers, the Wells Reservoir, Wells Dam, and Wells Tailrace, downstream to the “Gateway” location set at approximately 3 miles downstream from Wells Dam. Additional monitoring also took place at downstream hydroelectric projects and other accessible reaches of the mid-Columbia Basin including the Methow, Wenatchee, Entiat, Wenatchee and Okanogan rivers. PIT tagging activities also occurred in the Methow and Twisp rivers.

### **3.2 General Description of the Wells Hydroelectric Project Area**

The Wells Project is located at river mile (RM) 515.6 on the Columbia River in the State of Washington. Wells Dam is located approximately 30 river miles downstream from the Chief Joseph Hydroelectric Project, owned and operated by the United States Army Corps of Engineers (COE), and 42 miles upstream from the Rocky Reach Hydroelectric Project owned and operated

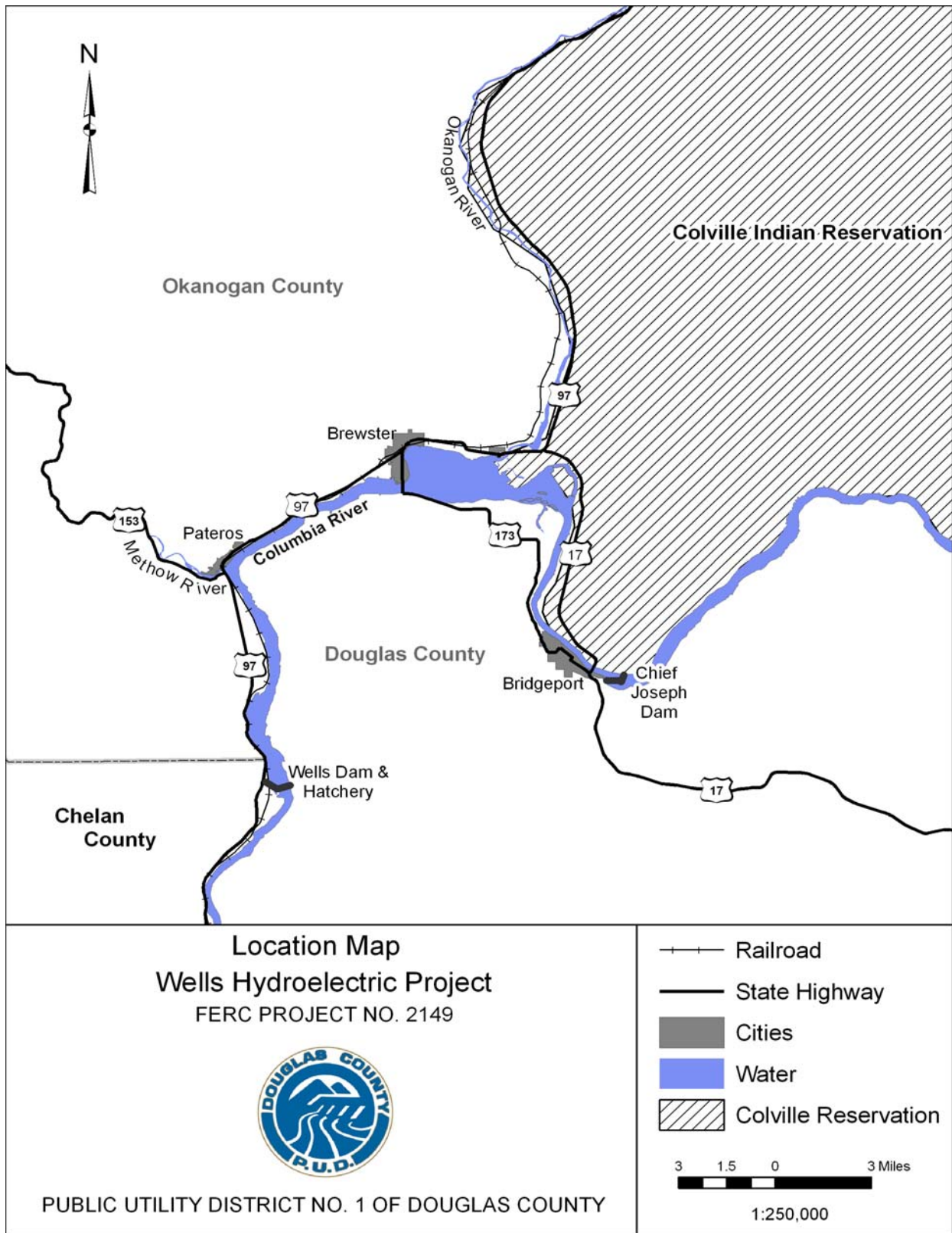
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<sup>1</sup> At the time that the Bull Trout Plan was prepared in 2004.

by Public Utility District No. 1 of Chelan County (Chelan PUD). The nearest town is Pateros, Washington, which is located approximately 8 miles upstream from the Wells Dam.

The Wells Project is the chief generating resource for Douglas PUD. It includes 10 generating units with a nameplate rating of 774,300 kW and a peaking capacity of approximately 840,000 kW. The design of the Wells Project is unique in that the generating units, spillways, switchyard, and fish passage facilities were combined into a single structure referred to as the hydrocombine. Fish passage facilities reside on both sides of the hydrocombine, which is 1,130 feet long, 168 feet wide, with a crest elevation of 795 feet mean sea level (msl) in height.

The Wells Reservoir is approximately 30 miles long. The Methow and Okanogan rivers are tributaries of the Columbia River within the Wells Reservoir. The Wells Project boundary extends approximately 1.5 miles up the Methow River and approximately 15.5 miles up the Okanogan River. The normal maximum surface area of the reservoir is 9,740 acres with a gross storage capacity of 331,200 acre-feet and usable storage of 97,985 acre-feet at elevation of 781 feet msl. The normal maximum water surface elevation of the reservoir is 781 feet msl (Figure 3.2-1).



**Figure 3.2-1 Location map of the Wells Project.**

## **4.0 BACKGROUND AND EXISTING INFORMATION**

### **4.1 Bull Trout Biology**

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 Washington, Montana, Idaho, 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 Mackenzie 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 a member 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 a small portion of the Coastal-Puget Sound region of Washington State.

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 clean, cold, connected, and complex instream habitat (USFWS et al. 2000), 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 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), although each form is not present everywhere. 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 (less than 1 year old) may migrate directly to lakes, but it is unknown if this emigration is a result of density dependent effects from limited stream rearing habitat, or if these young-of-the-year actually survive in the lake environment (Riehle et al. 1997). Juvenile bull trout in streams frequently inhabit side channels, stream margins and pools with suitable cover (Sexauer and James 1993) with maximum summer water temperatures generally less than 16°C (Dunham et al. 2003) and areas with cold hyporheic zones or groundwater upwellings (Baxter and Hauer 2000).

## 4.2 Status

On June 10, 1998, the USFWS listed bull trout within the Columbia River basin as threatened under the ESA (FR 63(111)). Later (November 1, 1999), the USFWS listed bull trout within the coterminous United States as threatened under the ESA (FR 64(210)). The USFWS 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 (FR 63(111)). The USFWS believes many populations are now isolated and disjunct. In October 2002, the USFWS completed the first draft of a bull trout recovery plan intended to provide information and guidance that will lead to recovery of the species, including its habitat (USFWS 2002). Threatened bull trout population segments are widely distributed over a large area and because population segments were subject to listing at different times, the USFWS adopted a two-tiered approach to develop the draft recovery plan for bull trout (USFWS 2002). In November 2002, the USFWS published in the federal register a proposed rule for the designation of critical habitat for the Klamath River and Columbia River distinct population segments of bull trout (67 FR 71235). In October 2004, the USFWS published a final rule in the Federal Register designating critical habitat for the Klamath River and Columbia River populations of bull trout (69 FR 59995). New critical habitat was proposed throughout the range of bull trout in January 14, 2010 (75 FR 2270), including all of the Wells Project waters except the Okanogan River.

In April 2008, the USFWS completed the 5-year status review for Columbia River bull trout with two recommendations: maintain “threatened” status for the species, and determine if multiple distinct population segments exist within the Columbia River that merit protection under the ESA. The recommendations intend to facilitate analysis of project effects over more specific and biologically appropriate areas, ultimately allowing a greater focus of regulatory protection and recovery resources (USFWS 2008a). The review also identified specific issues that limit the overall ability to accurately and quantitatively evaluate the current status of bull trout. Seven recommendations were made to improve future evaluation and management decisions, all of which are largely based on improvement and standardization of monitoring and evaluation

techniques, better delineation and agreement of core areas and Recovery Units, and multi-agency cooperation and management (USFWS 2008b).

The Wells Project is situated within the Upper Columbia River Recovery Unit<sup>2</sup> and the USFWS has identified the Wenatchee, Entiat, and Methow rivers as its core areas. A core area represents the closest approximation of a biologically functioning unit for bull trout. A core area may function as a metapopulation for bull trout. Not all core areas are equal and each has specific functions that are unique. For example, the Entiat Core Area depends heavily on the mainstem Columbia River to provide overwintering, migration, and foraging habitats. The Wenatchee Core Area has populations using lake and riverine habitat (both the Wenatchee and Columbia rivers) for overwintering, migration, and foraging. Within a core area, many local populations may exist. A local population is assumed to be the smallest group of fish that is known to represent a regularly interacting reproductive unit. Nineteen local populations have been identified in the Wenatchee (7), Entiat (2), and Methow (10) core areas (USFWS 2002).

### **4.3 2001-2004 Mid-Columbia Bull Trout Radio Telemetry Study**

Bull trout have been counted at Wells Dam since 1998. In 2000, due to the potential for operations at mid-Columbia dams to affect the movement and survival of bull trout, the USFWS requested that the three mid-Columbia PUDs evaluate the movement and status of bull trout in their respective project areas. At that time, 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 bull trout within the mid-Columbia, a three PUD coordinated radio telemetry study was implemented beginning in 2001. The goal of the study was to monitor the movements and migration patterns of adult bull trout in the mid-Columbia River using radio telemetry (Figure 4.3-1). The number of bull trout to be collected and tagged at each dam (Rock Island, Rocky Reach, and Wells) was based on the proportion of fish that migrated past those dams in 2000.

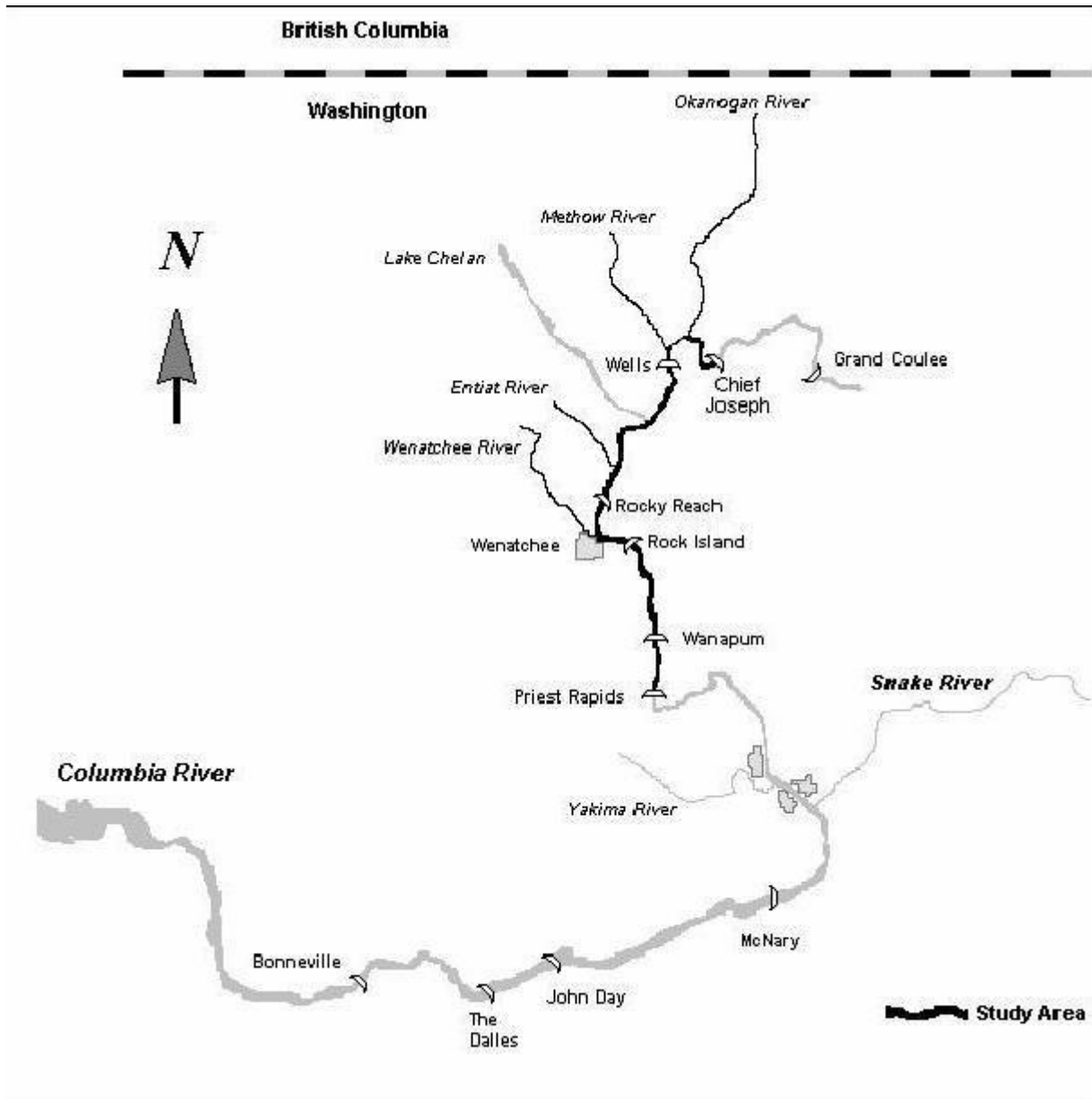
From 2001 to 2003, bull trout were collected from the Wells, Rocky Reach, and Rock Island dams, radio-tagged, and monitored through 2004. Multiple-telemetry techniques were used to assess the movement of tagged bull trout within the study area. At Wells Dam, a combination of aerial and underwater antennas was deployed. The primary purpose for this system was to document the presence of bull trout at the project, identify passage times and determine their direction of travel (i.e., upstream/downstream). In addition to these systems, a number of additional telemetry systems were deployed to address specific questions posed by the USFWS and Douglas PUD. At Wells Dam, several additional systems were installed to identify whether tagged bull trout could enter, ascend, and exit specific gates and fish ladders. All possible access points to the adult fish ladders and the exits were monitored individually during the study period from 2001-2004, allowing the route of passage to be determined as well as the ability to establish the exact time of entrance and exit from the ladder system.

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<sup>2</sup> Note that while the USFWS refers to the area encompassing the Wells Project as the Upper Columbia Recovery Unit for bull trout, the section of the Columbia River from Chief Joseph Dam to the confluence of the Yakima and Columbia rivers is generally termed the "mid-Columbia" for other watershed and salmon and steelhead recovery planning, and is the term used in this document when referring to the reach.

To assess bull trout movements into and out of the Wells Reservoir, fixed-telemetry monitoring sites were established at the mouth of the Methow and Okanogan rivers and periodic aerial telemetry surveys were conducted on the reservoir and throughout both watersheds (English et al. 1998, 2001). English et al. (1998, 2001) provide a detailed description of the telemetry systems at each of the dams and within the tributaries.

Overall, successful bull trout upstream and downstream passage was observed at the Wells Project. No bull trout injury or mortality was observed associated with the Wells Project. Radio-tagged bull trout that migrated upstream past Wells Dam utilized the Methow River subbasin during the bull trout spawning period. Key findings of the 2001 to 2004 study are used in this document to assess the 6-year average take analysis as stipulated in the Bull Trout Plan (Objective 1, Strategy 1-1) and are summarized in the results section of this document.



**Figure 4.3-1 Study area for assessing migration patterns of bull trout in the mid-Columbia River (2001-2004).**

#### **4.4 2005-2008 Bull Trout Monitoring and Management Plan Activities**

The goal of the Wells Project Bull Trout Plan is to identify, develop, and implement measures to monitor and address potential project-related impacts on bull trout associated with the operations of the Wells Project and associated facilities (Douglas PUD 2004). The Bull Trout Plan has four objectives, addressed by implementing various field study components from 2004 to 2008 at the Wells Project.

The first objective was to identify potential project-related impacts on upstream and downstream passage of adult bull trout (fish  $\geq 400$  mm in length) through Wells Dam and reservoir, and implement appropriate measures to monitor any incidental take of adult bull trout. To meet the first objective, radio telemetry was used to monitor upstream and downstream passage, and off-season video counting was done in the Wells Project fishways during the winter. Between 2005 and 2008, 26 adult bull trout were trapped at Wells Dam and radio-tagged. Concurrent with the implementation of the Bull Trout Plan, the USFWS and Chelan PUD radio-tagged and released 136 adult bull trout at other mid-Columbia River basin locations including the Methow River, and Rock Island and Rocky Reach dams (50 USFWS tags 2006-2008, 86 Chelan PUD tags 2005-2007).

From 2005 to 2008, 25 downstream passage events and 52 upstream passage events by 40 individual bull trout were recorded at Wells Dam. Of these, 17 downstream and 41 upstream passage events occurred within one year of tagging and release. Of all tags released from 2001 to 2004, there were 2 downstream passage events and 41 upstream passage events. Of these, 2 downstream and 38 upstream passage events occurred within one year of release. The take estimates for the Wells Project were based upon the number of unique upstream and downstream passage events that took place within one year of each bull trout being tagged and released. During the six-year study and eight years of monitoring, 19 downstream and 79 upstream passage events took place at Wells Dam by radio-tagged bull trout within one year of release. Taking into account all observed passage events a total of 27 downstream and 93 upstream passage events took place at Wells Dam. Radio-tagged bull trout passed downstream through the turbines or spillways as no downstream passage events were recorded via the fishways. Out of the 19 downstream passage events that occurred within one year of tagging, zero bull trout injury or mortality was observed at the Wells Project. Out of the 79 upstream passage events that occurred within one year of tagging, zero bull trout injury or mortality was observed at the Wells Project.

Upstream passage of adult bull trout through the fish ladders at Wells Dam has historically occurred between early May and late October, with peak passage typically occurring in May and June. During the 2005 and 2008 study, 214 adult bull trout were counted passing upstream through Wells Dam. The proportion of the bull trout population at Wells Dam that was radio-tagged was 24% ( $52/214 = 0.24$ ).

Project operations did not appear to influence the movements of adult bull trout. Instead, adult bull trout passage events appeared to be more closely associated with water temperature, photoperiod and time of year with rather predictable patterns of upstream and downstream

movement. Because no take (injury or mortality) was observed during the study, there was no need to investigate how Project operations affected take at Wells Dam.

During the 2005-2008 monitoring period, no adult bull trout were counted during the 24-hour off-season fishway counting period (November 16 to April 30).

No upstream or downstream passage problems were identified during this study. Passage times upstream through the fishway appeared reasonable relative to the species migration and spawn timing. Because no passage problems were identified during the study, there was no need to develop recommendations to change or modify the fishway operations at Wells Dam.

The second objective was to assess project-related impacts on upstream and downstream passage of sub-adult bull trout (fish <400 mm in length). During the development of the Bull Trout Plan, stakeholders agreed that because of the inability to collect a sufficient sample size of sub-adult bull trout at Wells Dam, it was not feasible to assess sub-adult passage. However, when encountered at Wells Dam, or in tributary traps, sub-adult bull trout would be PIT tagged. Douglas PUD provided funding, equipment, training, and coordination for the sub-adult bull trout PIT tag program. From 2004 to 2008, 67 sub-adult bull trout were PIT tagged in the Methow River sub-basin during standard tributary smolt trapping operations. Douglas PUD operated PIT tag detection systems year-round within the Wells Dam fishways during the study period (2005 to 2008) and no PIT tagged sub-adult bull trout were detected. Additionally, sub-adult bull trout were to be PIT tagged opportunistically when encountered at the Wells Project; however, no sub-adult bull trout were encountered at Wells Dam during the study period.

Off-season (November 16 to April 30) video monitoring of the Wells Dam fishways for sub-adult bull trout was conducted during each of the years of this study including the winter of 2004 and 2005 as required by the Bull Trout Plan. Additional off-season counting took place during the winters of 2006 and 2007. To date, no sub-adult bull trout have been observed utilizing the fishways at Wells Dam.

The third objective was to investigate the potential for sub-adult entrapment or stranding in off-channel or backwater areas of Wells Reservoir. Field surveys were conducted at potential bull trout stranding sites during a period of low reservoir elevation. High resolution bathymetric information, reservoir elevations, backwater curves, and inflow patterns were used to identify potential stranding sites for the survey. No stranded or entrapped bull trout of any size were found during the field surveys conducted in 2006 and 2008. No surveys were conducted during 2005 or 2007 because river operations were not low enough to warrant a survey.

The fourth objective was to identify the core areas and local populations of bull trout that utilize the Wells Project. Data from radio-tagged bull trout tracked during the 2005 to 2008 study period were analyzed with data from the 2001 to 2004 study. Bull trout that pass Wells Dam (either upstream or downstream) migrated into the Methow, Entiat, and Wenatchee rivers during the spawning period. Observed tributary entrances of bull trout detected at Wells Dam from 2005 to 2008 were 86% Methow River, 10% Entiat River, and 2% Wenatchee River. Genetic samples of all fish tagged at Wells Dam were submitted to the USFWS for analysis. The USFWS is responsible for analyzing the genetic samples and providing those results. To further

support this objective (Strategy 4-2: Work cooperatively with other agencies to obtain locations of radio-tagged fish outside the project area), Douglas PUD regularly coordinated bull trout data and monitoring activities with other agencies including the USFWS, and Chelan PUD.

In summary, no mortality or injury was observed for bull trout (adult and sub-adult) passing through or interacting with the operations of the Wells Project during the take monitoring studies conducted between 2001 and 2008. No incidental take of bull trout was observed at the Wells Project, and the Wells Project is presumed to be within the incidental take levels authorized by the USFWS Biological Opinion Incidental Take Statement (USFWS 2004).

## **5.0 METHODOLOGY**

For a more detailed description of the methodology to implement each Bull Trout Plan objective-strategy, please refer to the Bull Trout Plan 2005-2008 Final Monitoring Report (LGL and Douglas PUD, 2008).

## **6.0 RESULTS**

### **6.1 Strategy 1-1: Adult bull trout telemetry program**

#### **6.1.1 Bull trout tagged by Douglas PUD**

The telemetry program goal was to capture and radio-tag 10 adult bull trout at Wells Dam each year for three years (2005-2007). All tagging and monitoring data from January 2005 to July 2008 are included in the Bull Trout Plan 2005-2008 Final Monitoring Report (LGL and Douglas PUD, 2008).

An evaluation of station receiver data for the period of August 2008 to December 2009 at Wells Dam, Wells Dam tailrace, the gateway location, and at stations located at the Methow and Okanogan river mouths yielded no additional detection data. During the latter half of 2008, bull trout would have already entered the Methow River to access spawning and overwintering habitat located outside of the Wells Project Area. By 2009, most of the tags activated in earlier years would have expired and been unavailable in providing additional data.

### **6.2 Strategy 1-2: Correlations between passage events and Project operations**

Between August 2008 and December 2009, no additional detections of tagged fish were observed at Wells Dam or within the Wells Project Area. Therefore no additional analysis between correlations of passage events at Well Dam and Project operations were conducted.

### **6.3 Strategy 1-3: Off-season fishway passage of adult bull trout**

Off-season video monitoring of both Wells Dam fishways continued for the 2008-2009 and 2009-2010 winter periods (November 16 - April 30). During these monitoring periods, no adult bull trout were observed utilizing the fishways. Consistent with observations from year round

fishway counts 2005-2008, adult bull trout passage through Wells Dam occurs between May and July each year.

#### **6.4 Strategy 1-4: Modifications to passage facilities or operations**

There has been no passage issues identified that limit upstream or downstream passage of adult bull trout at Wells Dam. Therefore, there is no need for modifications to current passage facilities or operations.

#### **6.5 Strategy 2-1: Sub-adult PIT tagging program**

Douglas PUD passively collected information from all PIT tagged fish, including bull trout, as they passed through the fishways at Wells Dam. Douglas PUD also scanned all bull trout incidentally captured at rotary screw traps and adult brood collection facilities. The information collected at the dam and in the tributaries was posted on the PTAGIS website, which is operated and maintained by the Pacific States Marine Fisheries Commission.

Between August 2008 and December 2009, no sub-adult bull trout were observed or captured at Wells Dam. Douglas PUD continues to provide support to WDFW for PIT tagging bull trout incidentally collected at off-site smolt collection facilities (Table 6.4-1). During the monitoring period at the Methow River basin trap sites, 41 sub-adult bull trout were captured and 40 of those 41 captured fish were PIT tagged. Tag information for all tagged fish was posted on the PTAGIS website (Charlie Snow, pers. comm.). The PTAGIS database shows that none of these PIT tagged bull trout have since been detected at Wells Dam or outside the Methow Basin at other Columbia Basin dams. One bull trout PIT-tagged in the Entiat River by the USFWS in 2008 was detected passing upstream through Wells Dam in June 2009. This is the first adult PIT-tagged bull trout to be detected at Wells Dam since monitoring started in 2001.

Within the Methow Basin there are 13 separate PIT-tag interrogation facilities, one of the most extensive PIT-tag interrogation networks in the Columbia Basin. Of the 107 bull trout that have been PIT-tagged by WDFW using Douglas PUD tags, numerous within basin detections have taken place. In 2008, 10 observations of PIT-tagged sub-adult bull trout took place at four different monitoring locations within the Methow Basin. Seven of these observations were at the one Twisp River in-stream interrogation site. In 2009, 11 observations of PIT-tagged sub-adult bull trout took place with all but one of these fish observed at the Twisp River monitoring station. The vast majority of tagging and recapture/observations have taken place within the Twisp River. Other detection sites where sub-adult bull trout have been observed include the lower Methow, middle Methow, Chewuch, Gold Creek and Eightmile detection sites.

In addition to bull trout sub-adults captured at these two Methow River basin trap sites, a total of 3, 2, and 1 fish were captured in the Twisp River, Early Winters Creek, and the Methow River, respectively, via hook and line sampling by WDFW. Only the fish captured in the Methow River was PIT tagged and the information posted on the PTAGIS website. No genetic samples were taken from any of these fish.

**Table 6.4-1 Sub-adult bull trout PIT tagged in the Methow Basin, 2008-2009 (data from C. Snow, WDFW).**

Year	Collection/tag site	# PIT tagged/# captured	# DNA sampled
2008*	Methow River trap	0/0	0
2008*	Twisp River trap	13/14	0
2009	Methow River trap	6/6	5
2009	Twisp River trap	21/21	10

\*August to December only.

## **6.6 Strategy 2-2: Off-season fishway passage of sub-adult bull trout**

Similar to off-season video monitoring of adult bull trout (Section 6.3), off-season video monitoring of the Wells Dam fishways for sub-adult bull trout (Section 6.3) continued for the 2008-2009 and 2009-2010 winter periods (November 16 - April 30). During these monitoring periods, no sub-adult bull trout were observed utilizing the fishways. To date, no sub-adult bull trout have been observed utilizing Wells Dam fishways at any time during the year.

## **6.7 Strategy 3-1: Inflow patterns, reservoir elevations, and backwater curves**

On November 5, 2008, Douglas PUD conducted stranding surveys intended to document whether or not bull trout are becoming stranding in the Wells Reservoir during lower than normal reservoir surface elevation operations. The survey locations were selected based upon an analysis of detailed bathymetric maps produced in 2005 combined with Wells Reservoir hydraulic information. This effort identified several locations where stranding of sub-adult bull trout could potentially occur. Six total potential stranding locations were identified. These locations were the Methow River mouth, the Okanogan River mouth, the Kirk Islands, the shallow water habitat in the Columbia River directly across from the mouth of the Okanogan River, Schluneger Flats and the off-channel areas of the Bridgeport Bar Islands. Boat and foot surveys were conducted and included a combination of shoreline transects and inspection of isolated sanctuary pools. Similar to previous bull trout stranding surveys, no bull trout were observed during the 2008 survey which suggests that bull trout are able to avoid stranding and entrapment areas in the event of a Wells reservoir drawdown.

## **6.8 Strategy 4-1: Genetic sampling program**

During the latter half of 2008 (August to December), no additional genetic samples were collected as a result of Bull Trout Plan activities. In 2009, 15 genetic samples were collected from sub-adult bull trout captured during off-site smolt collection activities in the Methow River basin (Table 6.4-1). All samples will be sent to the USFWS Abernathy Fish Technology Center for analysis. Genetic analysis results are not yet available.

## **6.9 Strategy 4-2: Participation in information exchanges and regional efforts**

Douglas PUD continues to coordinate with regional tribal, state, and federal agencies, to promote the exchange of bull trout information and to ensure that local and regional bull trout monitoring efforts are coordinated in the Upper Columbia River.

## **7.0 CONCLUSIONS**

Six years of tagging results and eight years of monitoring results, as reported in the Bull Trout Plan 2005-2008 Final Report, demonstrate no project-related impacts to adult or sub-adult bull trout from passage through the Wells Project, nor by stranding/entrapment due to lowering of the reservoir elevation. Douglas PUD has also determined there are no apparent correlations between project operations and downstream passage events, and that there is no upstream movement of adult or sub-adult bull trout through the Wells Dam fishways during the off-season period of November 16 through April 30. Bull trout captured and tagged at Wells Dam were radio-tracked to the Methow and Entiat Core Areas during spawning periods, and have also demonstrated movement between these systems by successfully passing upstream and downstream through Wells Dam.

Results of ongoing implementation of Bull Trout Plan activities between August 2008 and December 2009 remain consistent with the previous 8 years of monitoring and evaluation. Stranding and entrapment surveys indicate that infrequent Project operations that result in lowering of the reservoir have not impacted adult or sub-adult bull trout in the Wells Project. Off-season fishway monitoring continues to document that adult and sub-adult bull trout are not passing Wells Dam during the winter months. To date, no sub-adult bull trout have been observed in Wells Dam fishways. Data collected from Methow River basin smolt collection operations indicate that sub-adult bull trout are present outside of the Wells Project. During these operations, a total of 41 sub-adult bull trout were captured and biological information recorded. Forty (98%) of these fish were PIT tagged. Six additional sub-adult bull trout were captured in the Methow River basin via hook and line sampling with 1 of these fish being PIT tagged. Tag codes for all PIT tagged fish were uploaded to the PTAGIS database. Queries of the PTAGIS database show that none of these PIT tagged bull trout have since been detected at Wells Dam but have been detected moving within the many tributaries to the Methow River. Only one PIT-tagged bull trout has been detected at Wells Dam. This fish was detected moving upstream through the fishways at Wells Dam during June 2009, one year after being tagged in the Entiat River by the USFWS. In 2009, genetic samples were taken from 15 fish during the implementation of off-site smolt collection activities and provided to the USFWS for future genetic analysis. In addition to coordinating monitoring effort and information exchanges of Project specific bull trout data, Douglas PUD continues to participate in regional activities that support bull trout conservation and recovery.

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