



**Lewis River Bull Trout (*Salvelinus confluentus*)
Annual Operations Plan**

North Fork Lewis River – 2010

Merwin Hydroelectric Project (P-935)
Yale Hydroelectric Project (P-2071)
Swift No. 1 Hydroelectric Project (P-2111)
Swift No. 2 Hydroelectric Project (P-2213)

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I. INTRODUCTION

Monitoring of bull trout populations in the North Fork Lewis River (Figure 1.0) has occurred annually since 1989. Monitoring activities are a collaborative effort between PacifiCorp and Public Utility District No. 1 of Cowlitz County, Washington (Cowlitz PUD), federal and state resource agencies, and local resource groups.

On September 15, 2006, the U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion including associated incidental take statements for the operation of the Lewis River hydroelectric projects. Though there are no specific monitoring plan requirements included within the Biological Opinion, there are specified annual monitoring activities and reporting requirements with respect to bull trout within the basin.

On June 26, 2008, the Federal Energy Regulatory Commission (FERC) issued new 50-year operating licenses for all Lewis River hydroelectric projects. Article 401(a) of the new licenses require completion of an all encompassing Monitoring & Evaluation Plan (M&E Plan) for the North Fork Lewis River to be implemented in year two from the effective date. Within this M&E Plan are provisions for the annual monitoring of bull trout specifically addressed by 9.6.2 of the Lewis River Settlement Agreement (SA) which states,

“The Licensees shall include in the M&E Plan elements to monitor and evaluate PM&E Measures relating to bull trout, including specific methods and measures to be used in monitoring bull trout populations, including, but not limited to, tagging and snorkel surveys.”

Section 9.6 of the SA also states;

“Until the M&E Plan is implemented, the Licensees shall monitor and evaluate Cougar Creek and Swift Reservoir bull trout populations following the Threatened and Endangered Species Annual Plan”

Though not required after the completion of the M&E Plan, the Utilities intend that this Lewis River Bull Trout Annual Operations Plan will continue to be submitted to the USFWS for consultation, and implemented annually in coordination with objectives as written in the M&E Plan.

For 2010, the following eight programs are proposed.

1. Swift Reservoir Bull Trout Estimate
2. Yale Tailrace Collection and Transportation
3. Swift Bypass Reach Collection and Transportation
4. Swift No. 2 Power Canal Collection and Transportation
5. Cougar Creek Spawning Estimate
6. Bull Trout Redd Surveys of Pine Creek Mainstem and Pine Creek Tributary P8
7. Swift Creek Bull Trout Presence/Absence Surveys
8. Lewis River Bull Trout Trophic Interactions

A schedule of activities and estimated effort to complete each task is provided in the task descriptions below. Many of the tasks or programs are designed to estimate the number of bull trout present in either known spawning locations (i.e. Cougar Creek) or in tailrace areas (i.e. Yale). Spawner survey data are used to identify population risks (e.g., sharp declines in numbers) and, if necessary, to help develop appropriate management actions to protect these populations and stem any declines.

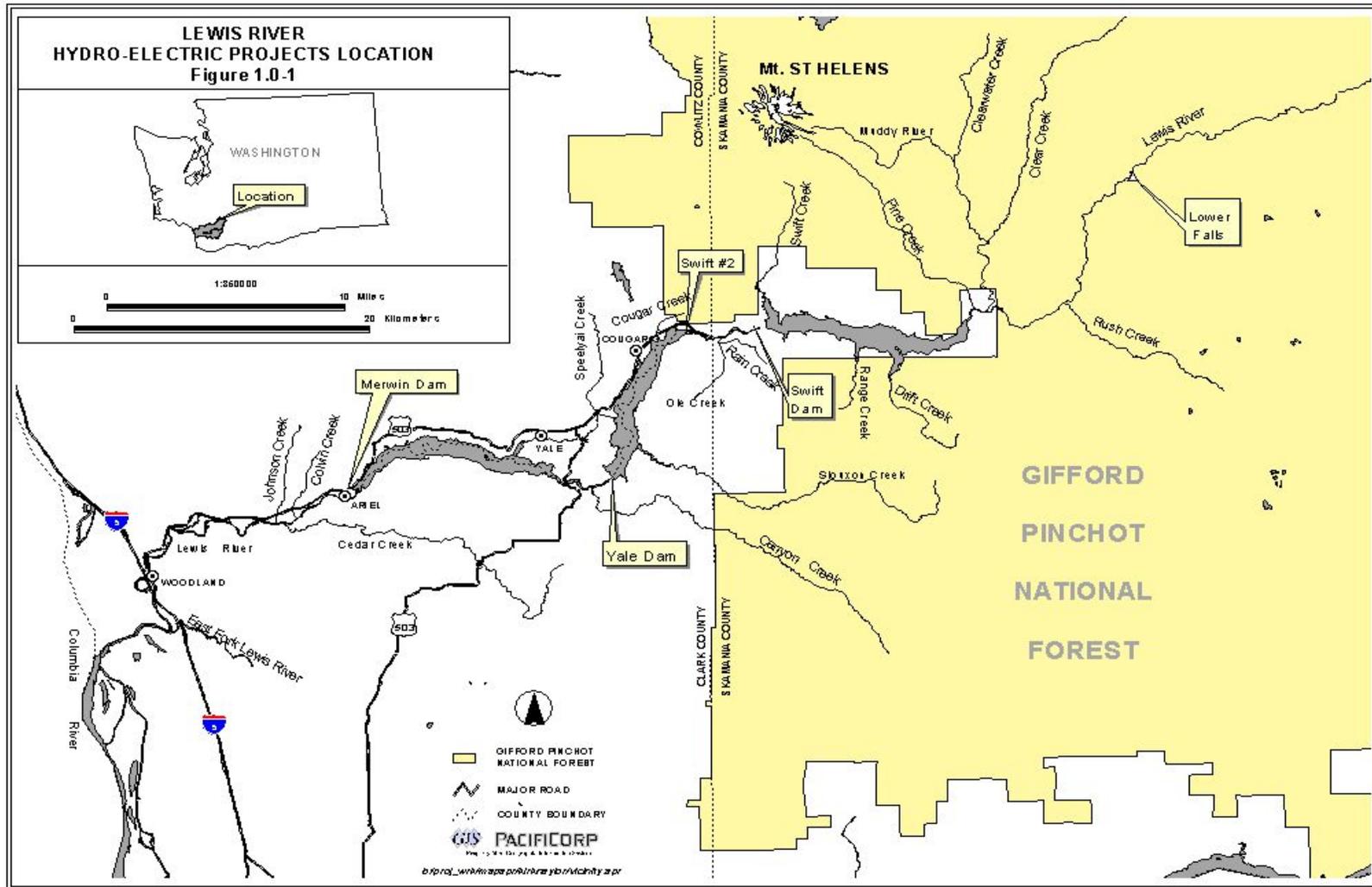


Figure 1.0 – Map of study area

II. PROPOSED MONITORING PROGRAMS

2.1 ESTIMATE OF BULL TROUT THAT STAGE AT EAGLE CLIFFS IN THE SPRING/SUMMER AND MIGRATE UPSTREAM TO PINE AND RUSH CREEKS

Radio tracking studies in 1990, 1991 and 1994 revealed a pre-migrant congregation of bull trout at the Swift reservoir headwaters. The studies further indicated that most tagged bull trout migrated into either Rush or Pine Creeks (tributaries to the Lewis River mainstem), with Rush Creek being preferred. These behavioral patterns have allowed the use of a Peterson estimator to document the number of migrants ascending the North Fork Lewis River (Lewis River) from the Eagle Cliffs area of Swift reservoir. Historically the annual estimate of bull trout migrants is a joint effort between PacifiCorp, the U.S. Forest Service (USFS), the Washington Department of Fish and Wildlife (WDFW) and the USFWS.

The Peterson estimator uses a mark-revisual observation technique. In May, June, and July pre-migrant bull trout are captured using variable mesh (0.75 to 2.5 inch stretch) tangle nets. With the use of boats, nets are drifted along the bottom at the headwaters of Swift reservoir (Eagle Cliffs area) or set and allowed to passively fish unattended for no more than 15 minutes. Once a bull trout becomes entangled in the net, the net is retrieved and the captured bull trout is freed and placed in a live well. Bull trout 360 millimeters (mm) or larger (or as stipulated by the USFWS) will be marked with a Kelly green colored 3-inch Floy® anchor tag (six-year Floy® tag color rotation: Kelly Green, White, Chartreuse, Florescent Orange, Florescent Yellow, and Florescent Pink). The goal of this activity is to capture and Floy® tag 100 individual bull trout larger than 360mm.

In addition to floy marking, the WDFW initiated a PIT-tagging program for captured bull trout in 2002. All bull trout larger than 120mm are tagged with a full-duplex 11mm PIT-tag in the dorsal sinus. PIT-tags are an alternative marking tool for captured bull trout with the intent to provide long-term survival, abundance, biological, and migratory data for individual fish.

In conjunction with tangle netting activities, PacifiCorp will weigh each captured bull trout larger than 120mm. This information will serve three purposes: First, weight-length ratios can be calculated (K factors) for each fish; secondly, this information can be compared to previous years to determine if changes in the annual average K-factor exist and whether these changes can be correlated with any population trends observed; and thirdly, with previously PIT-tagged bull trout, researchers will be able to determine individual length and weight gain which may provide information on reservoir conditions and productivity since an individual's last capture.

To determine the number of "recaptures" as required by the Peterson estimator, snorkel surveys are conducted from August through September in Rush and Pine creeks (Table 2.1-1). Snorkel surveys are used to visually identify marked fish – no fish are handled. Typically, snorkel surveys are conducted weekly alternating between Rush and Pine creeks, a total of eight snorkels are performed (four in Pine Creek and four in Rush Creek). To estimate migration escapement, individual survey results are calculated and then averaged. A 10 percent in-season tag loss is assumed in the estimate.

Table 2.1-1 Proposed Schedule, Tasks and Effort for the Swift Reservoir Migration Estimate

Task	Schedule	Effort (person days)
Capture, mark and release pre-migrant bull trout at the head of Swift reservoir	10 May- 15 July	20 (or as needed to mark sufficient number of migrants)
Conduct snorkel surveys in Rush and Pine creeks	1 Aug – 30 Sep	40
Total Effort = 80 person days		

2.2 YALE TAILRACE COLLECTION AND TRANSPORTATION

PacifiCorp, in cooperation with the WDFW, annually collects and transports bull trout from the Yale powerhouse tailrace (Merwin reservoir) to the mouth of Cougar Creek, a Yale reservoir tributary. A total of 134 bull trout have been captured at the Yale tailrace since the program began in 1995. Of these, 104 have been transferred to Cougar Creek, some have been left in Merwin reservoir for various monitoring efforts, and some were mortalities.

To capture bull trout from the Yale tailwaters, monofilament tangle nets (2.5 inch stretch), trammel nets, beach seines, and hook & line have all been used. Tangle nets have proven to be the most effective and remain the method employed to date. Tangle nets are tied to the powerhouse wall or shoreline and then stretched across the tailrace area using a jet boat. The nets are then allowed to sink to the bottom (about 30 feet). Depending on conditions or capture rate, the nets are held by hand on one end or allowed to fish passively. The maximum time nets are allowed to fish, before being pulled, is 15 minutes. Upon capture of a bull trout, the fish is immediately removed from the net (usually by cutting the monofilament strands) and placed in a live well. Once biological information is gathered (length, weight, general fish condition) and a Floy® and PIT-tag inserted, the bull trout are placed in a flexible inner-tube (closed on one end) partially filled with water. A rope is tied to the other end, which allows hatchery staff on the powerhouse deck to hoist the bull trout out of the tailrace area and into fish transport trucks. The entire process, from capture to hatchery truck, takes only a few minutes.

In past collection activities, bull trout placed into hatchery trucks were transported to Cougar Creek. New in 2010, similar to Swift Bypass Reach collection and transportation, all Yale tailrace bull trout captures will be transported to a holding facility (to be determined by USFWS) and held while genetic analysis of each individual is performed at the USFWS Abernathy genetics lab. Bull trout found to be genetically endemic to Swift reservoir will be transported and released at the Swift Forest Camp boat launch, while bull trout determined to be of Yale reservoir ancestry will be released at the mouth of Cougar Creek.

Netting activities begin the first week of June and continue on a weekly basis until mid-August (Table 2.2-1). Frequency of visits may change due to capture efficiency or operational constraints. For example, if no bull trout are captured on a particular week, researchers may skip a week to allow bull trout to re-congregate in the tailwaters.

Netting typically occurs between the hours of 0800 and 1200; however powerhouse generation schedules may cause netting activities to occur in the afternoon. During the time of fish collection, powerhouse generators are taken off-line to enable deployment of the nets. In years past researchers have netted for longer periods, however, capture efficiency drops substantially and very few if any fish are captured after about four hours of effort in the tailrace.

Alternative Capture Methodology

At this time no other capture method has been as feasible or efficient as tangle nets in capturing bull trout from the Yale tailrace waters. Currently PacifiCorp is investigating the feasibility of a floating upstream collector to trap and transport bull trout from the Yale tailrace.

Table 2.2-1 Proposed Schedule, Task and Effort for the Yale Tailrace Netting and Transportation Program

Task	Schedule	Effort (person days)
Netting and Transportation of bull trout from the Yale tailrace to Yale reservoir	June 1 – Aug 15	20
Total Effort = 20 person days		

2.3 SWIFT BYPASS REACH COLLECTION AND TRANSPORTATION

Since 2006 and unless the project was spilling water at the Swift No. 1 dam, water entering the Swift Bypass Reach was limited to the amount passing through the canal drain and into the constructed channel. That amount is approximately 47 cubic-feet-per-second (cfs). Lower in the reach some tributary inflow is provided from Ole Creek. The presence of this cold water attracts bull trout (as well as other fish species) into the reach from Yale reservoir. Fish can also enter the bypass from either the canal wasteway or Swift No. 1 spillway. Capture/mark surveys and collection and transport of the Swift Bypass Reach are all proposed for 2010.

In 1999, PacifiCorp and the WDFW began netting the Swift No. 2 powerhouse tailrace as part of Yale enhancement measures filed as part of the Yale license application with FERC in April 1999. However, due to the canal breach in May 2002 and low reservoir conditions, there was no netting at the Swift No. 2 powerhouse from 2001-2005; netting resumed in 2006. Due to the low capture numbers at Swift No. 2 (two fish in 1999 and zero since then) and the presence of multiple bull trout in the Swift Bypass Reach from July through October, the Swift No. 2 tailrace netting effort was relocated in 2007 with the intent to capture and mark fish from the Swift Bypass Reach.

Since netting activities began in 2007, 46 individual bull trout have been captured and tagged in the Swift Bypass Reach (Figure 2.3-1). The Utilities propose sampling the Swift Bypass Reach in 2010 consistent with efforts conducted in 2009. Weekly or bi-weekly surveys (depending on catch rate) using a combination of tangle nets, beach seines, and hook and line techniques will be performed June through August in the Swift Bypass Reach (Table 2.3-1). Biological information (length, weight, and general condition) will be recorded for all captured bull trout. In addition, tissue sampling for genetic assignment and marking with a uniquely coded PIT and uniquely

colored Floy® tag will occur to assist in future transportation activities. Once all information is gathered and tagging accomplished, the fish will be returned to the point of capture.

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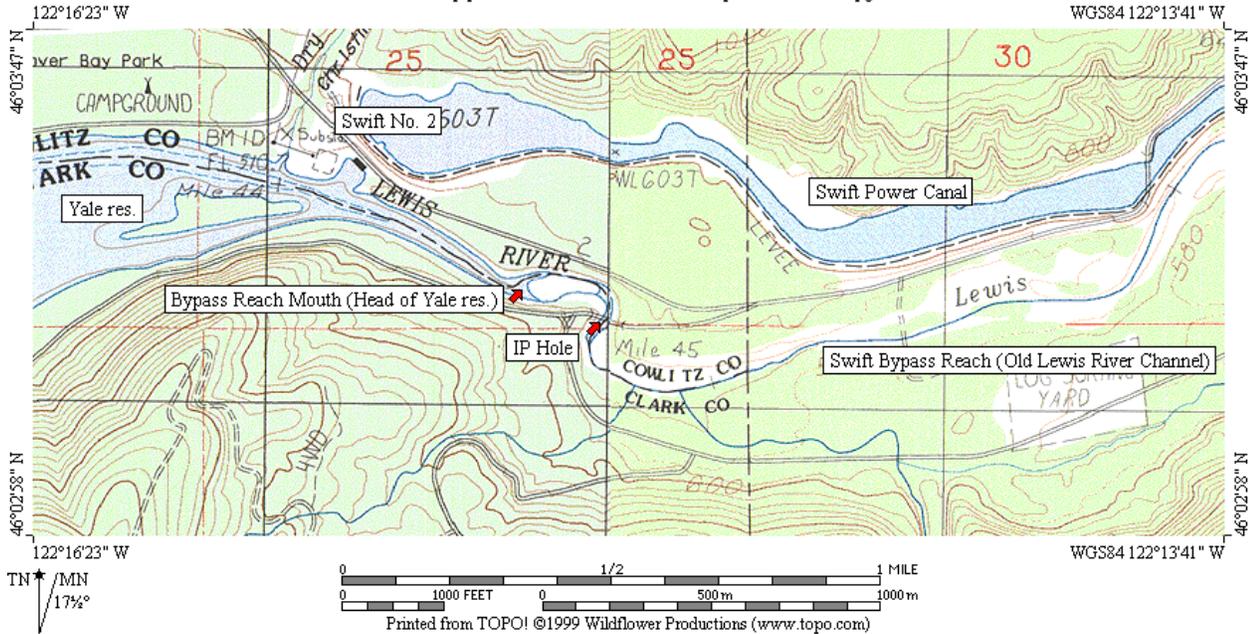


Figure 2.3-1 Area map showing location of bull trout capture sites within the Swift Bypass Reach.

Table 2.3-1 Proposed Schedule, Task and Effort of the Swift Bypass Reach Survey Program

Task	Schedule	Effort (person days)
Netting of areas within the Swift Bypass Reach	June - August	20
Total Effort = 20 person days		

2.4 SWIFT NO. 2 POWER CANAL COLLECTION AND TRANSPORTATION

Per the direction of the USFWS, as discussed at the annual Bull Trout Coordination Meeting on March 20, 2009, bull trout will be collected from the Swift No. 2 power canal and transported above Swift No. 1 dam in May and June of 2010 (Table 2.4-1). As in 2009, a total of four netting days will be conducted, once every two weeks May through June.

The Swift No. 2 power canal is a 3.2 mile-long earthen structure that begins at the Swift No. 1 tailrace and terminates at the forebay of the Swift No. 2 project (Figure 2.4-1). Water from the Swift No. 1 powerhouse directly discharges into the Swift No. 2 power canal. Theoretically, bull trout residing in the power canal are all of Swift reservoir ancestry (likely Rush or Pine subpopulations) because the only means of bull trout entrance into the canal is from entrainment through the Swift No. 1 powerhouse. Therefore, all bull trout captured during netting activities will be returned upstream to Swift reservoir.

In May and June, tangle nets and hook & line will be employed to capture bull trout from the power canal. Similar to Yale tailrace collection and transport activities, the Swift No. 1 and 2 powerhouses will be taken offline during times of sampling. Tangle nets will be stretched across

2.5 COUGAR CREEK SPAWNING ESTIMATE

Since 1979, PacifiCorp biologists, along with various state and federal agencies, have conducted annual surveys to estimate spawning escapement of kokanee (*O. nerka*) in Cougar Creek, a tributary to Yale reservoir. Along with the kokanee counts, bull trout (since 1979) and bull trout redds (since 2007) are also counted, as their spawn time overlaps with that of kokanee.

Surveys are performed by one or two biologists, each enumerating the number of kokanee, bull trout, and bull trout redds on one half of the creek. The entire length of Cougar Creek is surveyed – a distance of about 1.5 miles. All bull trout are observed for tags to identify bull trout transported from the Yale tailrace or bull trout tagged during Swift Bypass Reach sampling activities. Bull trout population estimates have ranged from 0 to 40 fish for foot surveys (since 1979) and 38 to 58 fish based on redd counts (since 2007). This variability is due in part to sampling error, but is also indicative of a low spawning run size. Results of Cougar Creek kokanee surveys are reported annually and provided to the WDFW.

Sampling in 2010 will be consistent with the amount of sampling effort in 2009. Surveys will consist of weekly bull trout redd counts from September to November; or until no bull trout and no new redds are observed (Table 2.5-1). Bull trout will continue to be enumerated, but the surveys will focus on locating redds. Redds will be mapped using a GPS and flagged until no longer visible to avoid double counts. Along with a population estimate, these surveys will also allow for a better understanding of preferred spawning habitat within the stream.

Data from an underwater video camera employed in 2008 and 2009 will help to refine spawner estimates and provide empirical data to a bull trout redd expansion factor. As this video data is currently being analyzed and not yet available, the current expansion factor will remain two fish per redd.

Table 2.5-1 Proposed Schedule, Task and Effort of the Cougar Creek Survey Program

Task	Schedule	Effort (person days)
Preliminary survey to identify and document migration barriers (debris survey)	July	2
Redd surveys of Cougar Creek (weekly)	Sep – Nov	16
Additional surveys if “new redds” are present in the creek.	December	2
Total Effort = 20 person days		

2.6 BULL TROUT REDD SURVEYS OF PINE CREEK MAINSTEM (PILOT) AND PINE CREEK TRIBUTARY P8

During the past few monitoring seasons, Pine Creek tributary P8 (Figure 2.6-1) has been identified as an area of focus in relation to bull trout spawning habitat within the Pine Creek drainage. Bull trout juveniles were first encountered in P8 in 2005 during an electrofishing survey performed by PacifiCorp and NOAA Fisheries staff in an attempt to capture rainbow trout for a Lewis River rainbow trout genetic evaluation.

Based on these results, PacifiCorp and WDFW staff electrofished this stream for bull trout juveniles again in 2006 and captured a 145mm bull trout juvenile. USFWS staff also electrofished P8 in 2006 in conjunction with Patch Model activities; bull trout juveniles again were captured in that effort as well (pers. comm. Mike Hudson, USFWS). WDFW staff has been performing bull trout redd surveys on stream P8 since 2007 and along with these redd surveys, also electrofished the stream in October of 2008 capturing 32 bull trout juveniles (pers. comm. Jim Byrne, WDFW).

PacifiCorp proposes the continuation of bull trout redd surveys within P8 in 2010. Surveys will be conducted in the first one mile of the stream and performed once every two weeks in September and October (Table 2.6-1). New in 2010, along with the redd surveys performed on P8; the mainstem of Pine Creek will also be surveyed during peak bull trout spawn time (September 21 – October 5) for the presence of redds.

Mainstem surveys will be performed based on observations of multiple redds within Pine Creek during a snorkel survey conducted on September 30, 2009. Redd surveys will be conducted during the September 21 – October 5 time-frame and will consist of the index areas used during Swift reservoir mark/recapture snorkel surveys, a distance of approximately 2.5 miles. At a minimum, this area will be surveyed twice during the stipulated time-frame (Sep 21-Oct 5) but most likely will occur at a greater frequency. If a concentration of bull trout redds are identified, that area will be surveyed every other day until it is determined the redds are no longer visible. Being that this endeavor has never been performed on the mainstem of Pine Creek, no data on the life of a bull trout redd (how long a redd remains visible) within Pine Creek is known. By visiting a redd(s) at a greater frequency, an accurate redd-life can be extrapolated. Once redd-life is understood within Pine Creek, the frequency of redd surveys will be adjusted as necessary. All redd surveys will be consistent with methodologies performed on Cougar Creek for bull trout. Care will also be taken during P8 and Pine Creek mainstem redd surveys to identify any adult coho (*O. kisutch*), and any observed coho/bull trout interactions.

Estimates of bull trout spawner abundance within Pine Creek mainstem and tributary P8 will then be compared to the total number of bull trout observed in Pine Creek mainstem during mark/recapture snorkeling activities performed in August and September. Spawner abundance estimates will be extrapolated using a two fish per redd expansion factor.

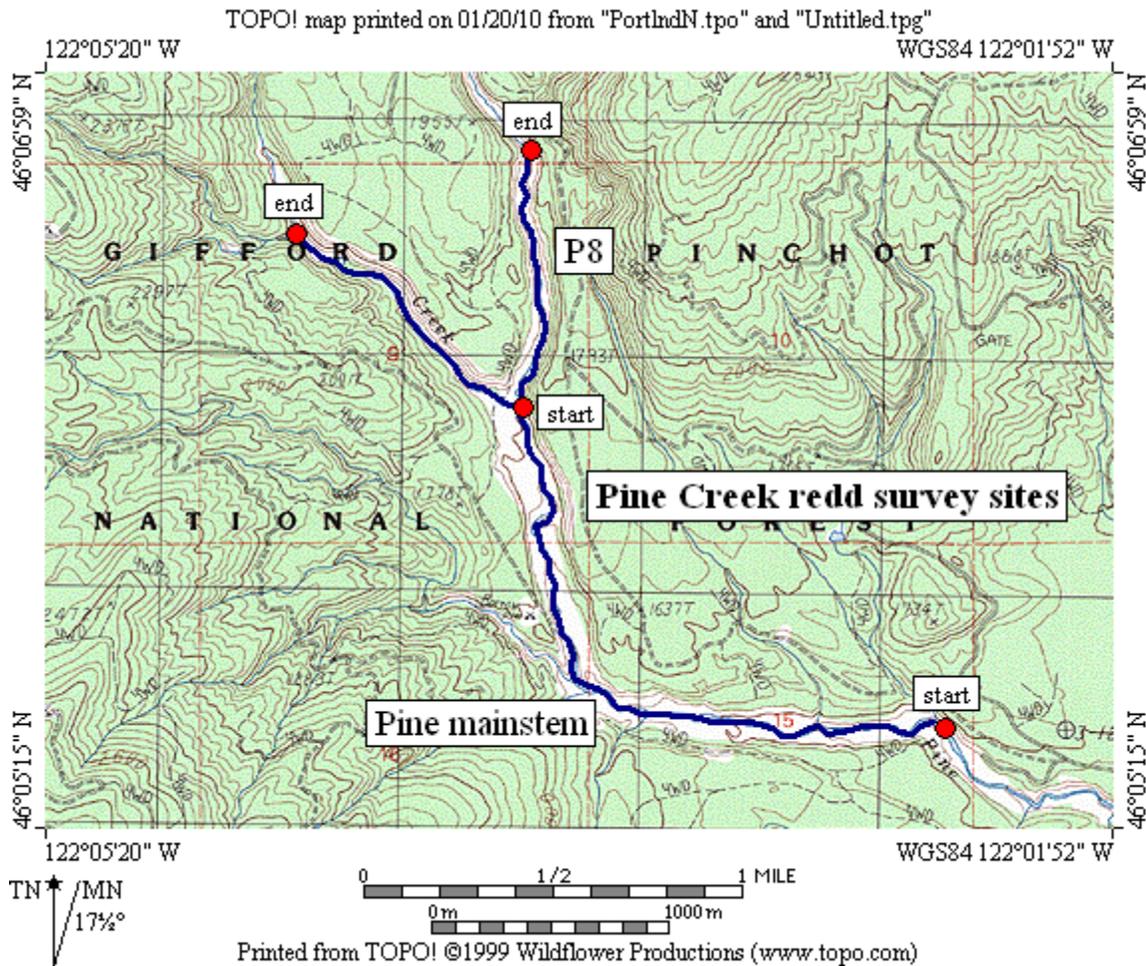


Figure 2.6-1. Redd survey sites of Pine Creek mainstem and tributary P8.

Table 2.6-1 Proposed Schedule, Tasks and Effort for P8 bull trout redd surveys.

Task	Schedule	Effort (person days)
Bull trout redd surveys in P8	September - October	8
Bull trout redd surveys of Pine Creek mainstem	September 21 – October 5	4
Total Effort = 12 person days		

2.7 SWIFT CREEK BULL TROUT PRESENCE-ABSENCE SURVEYS

Since August of 2006 bull trout have been observed in Swift Creek and Swift Creek Cove during the late summer and early fall. Though bull trout are present in Swift Creek, the extent of their use of this stream is still not fully understood. Temperature data shows the water to be cold (7° C in August) and based on past surveys, forage is abundant. The presence of bull trout during spawn time (September-October) indicates this stream may not only be used as refugia but as spawning habitat as well. Electrofishing surveys of Swift Creek performed in 2009 captured one

juvenile bull trout as well as numerous coho juveniles. Past surveys have also documented coho adults, whose spawn time overlaps that of bull trout, and large redds in the stream during October and November. As part of the continuing goal to find an additional local bull trout population, PacifiCorp proposes performing several snorkel and hook and line surveys of Swift Creek for bull trout in 2010.

Snorkel and hook & line surveys of Swift Creek and Swift Creek Cove will be performed intermittently during July-October to document the presence of bull trout within the cove and stream (Table 2.7-1). During surveys, care will be taken to document the morphometric condition of any fish observed as well as the presence, if any, of redds. All handled bull trout will be inspected for any Floy® and PIT tags, if no tags are found, a PIT tag will be inserted. Also at time of capture, all biological data (length, weight, genetic sample, and general condition) will be collected.

Table 2.7-1 Proposed Schedule, Tasks and Effort for the Swift Creek Presence – Absence Surveys

Task	Schedule	Effort (person days)
Snorkel and hook & line surveys	August - September	6
Total effort = 6 person days		

2.8 LEWIS RIVER BULL TROUT TROPHIC INTERACTIONS

Based on the Lewis River Settlement Agreement section 9.7, which focuses on elements of monitoring interactions between resident fish species and reintroduced anadromous fish species after full anadromous reintroduction, PacifiCorp proposes to gather baseline trophic information of adult bull trout encountered in the North Fork Lewis River basin during monitoring activities set forth in this annual monitoring plan. It is assumed these activities will not substantially add to the existing work-load, they will simply be one more piece of data gathered whenever a bull trout is handled during other monitoring activities.

Analysis of what bull trout are consuming, with regards to piscivory, will be evaluated by gathering tissue samples from all captured bull trout and tissue samples from a sub-sample of all other fish species encountered during bull trout collection activities at Eagle Cliffs, Yale powerhouse tailrace, and the Swift Bypass Reach. Tissue samples will be analyzed for their tracer stable isotopes (SIA), specifically distinct nitrogen ($\delta^{15}\text{N}$) and carbon ($\delta^{13}\text{C}$) isotopic signatures. The composition of nitrogen ($\delta^{15}\text{N}$) and carbon ($\delta^{13}\text{C}$) isotopes are unique to each species and individuals within each species. When one species consumes another, the consumed species unique nitrogen ($\delta^{15}\text{N}$) and carbon ($\delta^{13}\text{C}$) isotopic signature can be traced within the tissue of the predator (McIntyre 2006).

To perform stable isotope analysis, a ½ gram wet weight of tissue from each organism is needed. This roughly equates to a medium-size fin-clip (upper or lower lobe of the caudal) from an adult-sized bull trout (>350mm). If bull trout smaller than 350mm are encountered, care will be taken in the amount of tissue collected or, if researchers think it prudent, no tissue sample will be

removed. To inhibit bacteria growth which can skew the SIA analysis, all samples must be immediately frozen in the field with the use of dry-ice. As long as they remain frozen, samples can be kept indefinitely. At the end of collection activities, frozen samples will be sent to a lab for preparation and stable isotope analysis.

After full anadromous fish reintroduction, SIA analysis will be performed again and compared to the baseline information gathered in 2010. Nitrogen and carbon isotopic signatures unique to the marine environment will be used for a detailed assessment of trophic changes, specific to bull trout, occurring from anadromous fish nutrient contribution to the ecosystem above Merwin Dam (Michener et al 1994, Phillips et al 2003, Winter et al. 2000).

III. Reporting

With regard to reporting of bull trout monitoring activities, per the direction of the USFWS issued Biological Opinion, FERC issued operating licenses, and the Lewis River SA; an annual report detailing all activities and corresponding data gathered, concerning this 2010 Annual Bull Trout Monitoring Plan, will be included in the ACC/TCC Annual Report submitted to FERC in the spring of 2011.

IV. References

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V. Comments

Agency	Comment	PacifiCorp Response
WDFW	Will the analysis of the Cougar Creek underwater video be accomplished this year?	The goal is for this analysis to be performed in 2010.
WDFW	Do we have a precision goal this year for the Swift reservoir mark/revisual estimate?	This estimate of migrating adults will not have a defined “precision level” but will continue to be performed in the manner that WDFW has been conducting for the last 10 years, that being that to decrease statistical bias within a mark/recapture estimate, you increase your sample size. The sample size goal in 2010 will be the same as in 2009, to capture and mark 100 adult bull trout. There will also be 95% confidence levels associated with the final migration estimate.
WDFW	<p>Per Section 2.1 in the 2010 AOP: WDFW raised the issue of why changing to 23mm tag PIT tag at this time, when antenna arrays are not in place. WDFW anticipated one tag in system used for detecting both bull trout and salmon at all fish passage facilities, comparable with the Columbia Basin 12mm standard. This issue needs to be resolved in the M&E Plan development. Current M&E planning stipulates 12mm tags. We have not tested both 12 and 23mm tags with the Rush Creek Destron/Fearing detector. Sufficient justification was not provided for the change to a second tag. WDFW believes we should wait until antennas are actually in place and a dual detector becomes available. We have already invested nearly \$10K into our systems. Don’t want them to become obsolete, because PacifiCorp late in the game decides to change systems.</p>	<p>Per discussions with WDFW, PacifiCorp has decided to forego double PIT-tagging bull trout in Swift reservoir in 2010. This discussion will be revisited for the 2011 Bull Trout Annual Operating Plan.</p>

Agency	Comment	PacifiCorp Response
WDFW	<p>Per Section 2.1 in the 2010 AOP: Charlie Cochran says avoid dark green Floy tags. Dual color tags can also be added to the proposed rotation. WDFW believes a 100 Floy tags deployment is necessary to provide the precision required to make meaningful management decisions. It will be unlikely for one boat to capture and tag 100 fish, since we have been unable to meet this goal in the last two years using two boats. How many staff will be available to work up fish? Will USFWS personnel eliminate WDFW staff?</p>	<p>Comment noted concerning the Floy tag color rotation. PacifiCorp believes that Kelly green is light enough that using this color will not be a problem especially considering the water clarity in the streams that are surveyed. PacifiCorp also maintains that the goal should be 100 Floy tagged bull trout during Eagle Cliffs netting activities. We believe that one boat will be sufficient to perform this endeavor based on the amount of available netting area. Sufficient staff will be available to net and work-up captured fish.</p>
WDFW	<p>Per Section 2.4 of the 2010 AOP: Since it has not been stipulated, we assume we will continue using 12mm PIT tags. Attempting to successfully net in a slack water condition is difficult. If it is at all possible to provide flow, by motoring units or other means, it should be attempted.</p>	<p>12mm FDX PIT tags will be used in 2010. The safety of the crew is paramount during Swift No. 2 power canal netting activities. During this time, the powerhouse units are tagged-out and inoperable. This may be re-evaluated prior to work commencing during the 2010 field season.</p>
WDFW	<p>Per Section 2.5 of the 2010 AOP: There are several potential sources of bias in redd expansion to adult numbers and these need to be addressed.</p>	<p>PacifiCorp believes that the potential sources of bias as laid out in the scientific paper by Dunham et al. (temporal, spatial, observer variability) have been addressed and answered by the proposed 2010 survey methodology located in Section 2.5 of the 2010 bull trout AOP. Until the Cougar Creek underwater video is analyzed, a two-fish-per-redd expansion will continue to be applied. As with any estimate, precision is not 100%. Based on direct observations in the field of bull trout on or near redds in Cougar Creek, PacifiCorp believes the expansion to be very near two-fish-per-redd.</p>

Agency	Comment	PacifiCorp Response
WDFW	Per Section 2.6 of the 2010 AOP: Redd life within Pine mainstem needs to be addressed as it may be very short.	Agreed. Plan changed to address this issue.
WDFW	Per Section 2.7 of the 2010 AOP Snorkel surveys should be conducted in the cove and creek with multiple snorkelers to assure complete coverage of Swift area.	Due to safety concerns snorkeling is not a solitary activity. A minimum of two people will perform all snorkels of Swift Creek and Swift Cove.
WDFW	Per Section 2.8 of the 2010 AOP: What level of detail in trophic interaction will this study provide? Will it allow determination of specific prey species, or just determine insect feeders from piscivorous fish?	The level of detail is determined by the sample that is acquired. Analysis of bull trout tissue for stable C and N will show everything that the fish has consumed in the recent past. We will not be able to identify the specie unique stable C and N unless we take a sample from the species that it belongs to. If we take a sample from a whitefish and are able to identify its unique stable C and N isotopes and then identify those same stable C or N isotopes within the tissue sample from a bull trout, then we know that that bull trout recently consumed a whitefish. This analysis will deal only with piscivory as large adult bull trout primarily consume fish. Samples are only being taken from captured fish (all species) and not macro-inverts.