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Clackamas River Bull Trout Reintroduction Project

FY 2012 Annual Report

Patrick M. Barry, J. Michael Hudson, Marci L. Koski, and Shaun P. Clements

Oregon Department of Fish and Wildlife
Native Fish Investigations Program

U.S. Fish and Wildlife Service
Columbia River Fisheries Program Office

On the cover: *The confluence of Pinhead Creek with the Clackamas River (Photo by C. Allen, USFWS).*

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CLACKAMAS BULL TROUT REINTRODUCTION PROJECT
2012 ANNUAL REPORT

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Bull trout were last documented in the Clackamas River in 1963. A 2007 feasibility study indicated the Clackamas River could biologically support bull trout and would be a good candidate for a reintroduction effort. Implementation of a reintroduction began in 2011, with the goal of establishing a naturally reproducing population of between 300 – 500 spawning adults by the year 2030. In 2012, we continued efforts to reintroduce bull trout into the Clackamas basin by collecting and transferring 509 juveniles, 43 subadults, and 17 adults from the Metolius Basin. In addition, we conducted monitoring and evaluation of the reintroduction to 1) ensure that the proposed action does not threaten the donor stock population, 2) assess the effectiveness of the reintroduction strategy for re-establishing a self-sustaining bull trout metapopulation, and 3) evaluate the effects of the reintroduction on Endangered Species Act-listed salmonids that currently occupy the Upper Clackamas River Subbasin. To meet these objectives, we used redd count data for the donor population and monitored the behavior and survival of tagged fish in the Clackamas using fixed and mobile radio telemetry and fixed passive integrated transponder tag interrogation. Through the first two years of the project, 1) the donor population has remained healthy (>1200 spawning adults); 2) transferred bull trout have dispersed throughout the Clackamas, all but one subadult and one adult have remained in the Clackamas and its tributaries, and some bull trout have exhibited spawning behavior in the first two years of the reintroduction; and 3) bull trout have generally not occupied areas of the Portland General Electric Clackamas River hydroelectric facility in which anadromous smolts may be vulnerable to predation. Implementation and monitoring of the reintroduction project will be evaluated on an annual basis and the strategy will be adaptively managed.

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1) Introduction

Bull trout (*Salvelinus confluentus*) are native to the Pacific Northwest, and currently occupy habitat in Oregon, Washington, Idaho, Montana, Nevada, and Canada. Bull trout prefer cold, clean water in complex stream habitats, and populations have been negatively affected by several factors including habitat degradation (e.g., Fraley and Shepard 1989), barriers to migration (e.g., Rieman and McIntyre 1995), and the introduction of non-native trout species (e.g., Leary et al. 1993). As a result, the abundance of bull trout has declined in many populations across their native range (Rieman et al. 1997) leading to their listing under the Endangered Species Act in 1999 (64 FR 58910).

The restoration of bull trout to historic habitat is one of the primary recovery goals in the U.S. Fish and Wildlife Service's (USFWS) Draft Recovery Plan (USFWS 2002a), and is particularly relevant to habitats in the western portion of the species' range due to the extensive loss of distribution and the documented extirpation of multiple bull trout populations. The Willamette River, a tributary of the lower Columbia River, has experienced extirpations of bull trout from four major subbasins, including the Clackamas River (Figure 1). Although the overall recovery strategy is to reduce and minimize threats affecting bull trout and their habitat in the Willamette River Basin, the establishment of self-sustaining populations will likely require reintroduction into some areas given the size of the basin and low probability of natural recolonization following widespread extirpations. Reintroduction of bull trout in the Clackamas River will help to achieve distribution in the Clackamas River core habitat (defined as habitat that contains, or if restored would contain, all of the essential physical elements to provide for the security of and allow for the full expression of life history forms of one or more local populations of bull trout) (recovery criterion 1 and recovery objective 1) and will increase abundance of adult bull trout in the Willamette River Recovery Unit (recovery criterion 2 and recovery objective 2; USFWS 2002b).

This report documents the progress in the second year (2012) of the joint effort between the State of Oregon, USFWS, U.S. Forest Service (USFS), and other collaborators (e.g., the Confederated Tribes of Warm Springs Reservation (CTWSR), National Marine Fisheries Service (NMFS), Portland General Electric (PGE), and the U.S. Geological Survey (USGS)) to reintroduce bull trout into the Clackamas River. The implementation phase of the project began following publication of a final rule establishing a nonessential experimental population of bull trout in the Clackamas River under section 10(j) of the ESA (76 FR 35979 on June 21, 2011). Following publication of the 10(j) rule, the first transfers of bull trout to the Clackamas Basin occurred during the spring and summer of 2011 (ODFW 2011). This report format will be structured, where appropriate, to answer the questions listed in sections 3.2 and 3.3 of the Implementation, Monitoring, and Evaluation Plan developed by the USFWS Oregon Fish and Wildlife Office and Columbia River Fisheries Program Office (2011). Additional project background on the reintroduction and project management strategy can be found in that plan (http://www.fws.gov/oregonfwo/Species /Data/BullTrout /Documents/ClackamasBT_IME_Plan.pdf).

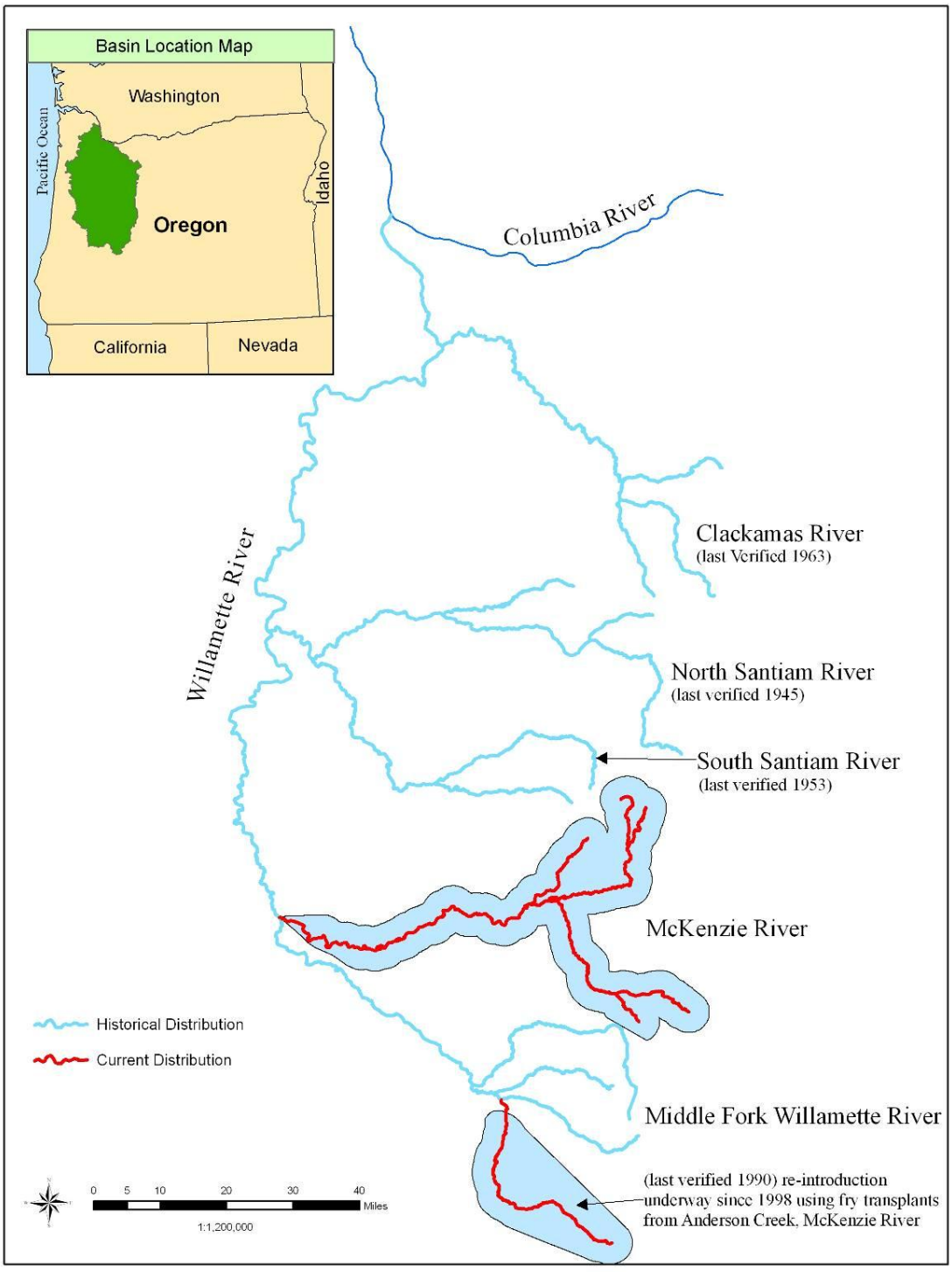

Figure 1. Historical and current bull trout distribution in the Willamette Basin.

The goal of the project is to re-establish a self-sustaining bull trout population of 300-500 spawning adults in the Clackamas River by 2030. If successful, this project will contribute to the conservation and recovery of bull trout in the Willamette Basin and to the overall recovery criteria outlined in the Draft Bull Trout Recovery Plan (USFWS 2002b). We define a self-sustaining population as one that maintains a minimum adult annual spawning abundance of 100 individuals, contains a level of genetic diversity representative of the donor stock, and requires little or no additional transfers. The numerical goal of 300-500 spawning adults is consistent with draft recovery planning targets for the abundance necessary to achieve these characteristics. Although the amount of suitable habitat in the Clackamas River suggests there is sufficient capacity to support a population of this size, bull trout distribution across the species' range, even within areas of suitable habitat, is patchy; thus, the true capacity of the Clackamas Subbasin for bull trout is unknown.

The actions described in the remainder of this report are intended to address the following three objectives:

(1) Ensure that the proposed action does not threaten the donor stock population;

(2) Monitor and evaluate the effectiveness of the bull trout reintroduction strategy for re-establishing a self-sustaining bull trout metapopulation in the Clackamas River; and

(3) Evaluate the effects of bull trout reintroduction on ESA-listed salmonids that currently occupy the Upper Clackamas River Subbasin.

2) Methods

2.1) Study Area

The study area for the purposes of this report includes the Clackamas River basin upstream of Rivermill Dam (Figure 2).

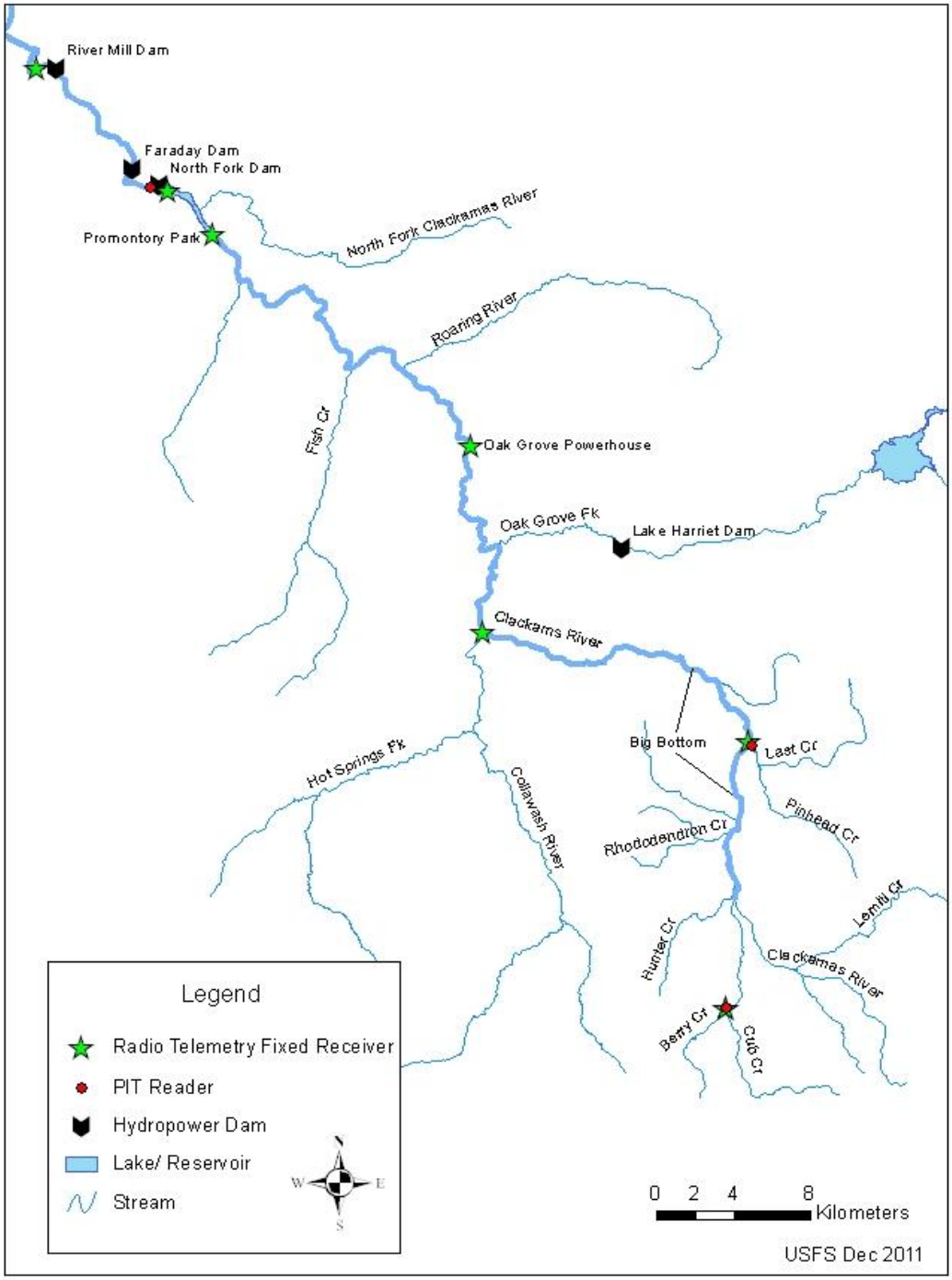

Figure 2. Study area, illustrating the location of fixed monitoring sites. See Table 1 for site descriptions and operational dates of each station.

2.2) Implementation

2.2.1) Donor stock availability

Oregon Department of Fish & Wildlife conducted an annual redd count survey in October/November 2011 on the Metolius River and its tributaries (Jack Creek, Heising Springs, Canyon Creek/Roaring Creek, Candle Creek, Jefferson Creek, and the Metolius River; see Harrington and Wise 2011). The threshold for determining whether the donor population is sufficiently healthy to allow transfers to the Clackamas (as determined through redd counts) is currently 800 spawning individuals (USFWS 2002c, USFWS 2011).

2.2.2) Pathogen screening

Per requirements in the Clackamas Bull Trout Reintroduction Implementation, Monitoring and Evaluation Plan (IM&E Plan) protocols (USFWS and ODFW 2011), bull trout fry (N=150) were collected by PGE at the Monty screw trap between March and April, 2012. In 2012, we collected 60 bull trout juveniles (70 to 250 mm) from the Monty Screw trap (courtesy of PGE). Screening for pathogens was conducted by ODFW (fry) and USFWS (juveniles). Fish health staff screened for IHNV, IPNV, VHSV, OMV, ISAV, and *M. cerebralis*, as well as other treatable pathogens and parasites (Appendix 1).

2.2.3) Donor stock collection

Juveniles - Juvenile bull trout were collected between April 26 and July 14, 2012. The principal method of collection was with 1.5 m rotary screw traps in Jack (10T 0607241 4927765 - NAD 83) and Canyon (10T 0606994 4928695 - NAD 83) creeks. The rotary screw traps were checked Monday through Friday by a crew from the Confederated Tribes of the Warm Springs and catch was enumerated daily, sorted by year class (e.g., 1, 2, and 3 year old), and placed into perforated cages (1 cage per year class) that were placed in-stream in proximity to the screw trap. Bull trout fry and all by-catch were enumerated and immediately released. Once per week, ODFW staff transferred juvenile bull trout from the in-stream cages to ODFW's Wizard Falls hatchery. In addition, bull trout were collected from Candle Creek via backpack electrofishing in several reaches between the confluence and where the lava flow crosses the stream above the trail head. Sampling occurred between June 4-7, 2012. With the exception of one reach, all collections occurred from the north bank of the stream. Reach lengths varied and effort ranged from 446-1452 seconds of electrofishing per reach. Electrofisher settings varied with stream conditions and time of day (450-550 volts, 15-17 % duty cycle, 24-25 Hz). All bull trout collected during this effort were transferred to Wizard Falls Hatchery each day. A few juvenile bull trout were also incidentally captured in the trap nets during subadult and adult collection efforts (see below).

Subadults and Adults - Subadult (250 – 450 mm FL) and adult (451 – 650 mm) bull trout were captured using a variety of methods to maximize the likelihood of capturing both sufficient individuals and putative different life history forms. The principal method of collection was Oneida trap nets that were set and checked Monday, Tuesday, and Wednesday each week from

June 11 – July 14 in the Metolius arm of Lake Billy Chinook (downstream of the Eyerly property). No nets were set the week of July 4th. Fish were also collected via angling by the CTWSR from the Eyerly property where the Metolius River meets Lake Billy Chinook, angling by ODFW in the Metolius arm of Lake Billy Chinook and at Monty Campground. An attempt was also made to collect subadult and adult bull trout from the PGE operated surface water collector (SWC), although none were captured here in 2012. Following capture, bull trout were transported in oxygen-supplemented tanks to Round Butte Fish Isolation Facility where they were held in circular tanks (2500 L) supplied with flow through water from Lake Billy Chinook (9 – 10 °C). Each fish was checked for injury before being placed in the tanks and fish of the appropriate size (250 - 650 mm) were held for a minimum 48 h depuration period as a precaution against transfer of New Zealand mud snails that have been recently documented in Lake Billy Chinook. Bull trout that exhibited injury or other prior trauma after visual inspection by USFWS Fish Health staff on site at Round Butte Isolation Facility were returned later the same day to their original capture location and released.

2.2.3.a Tagging

Each Tuesday or Wednesday during the collection period, the subadult and adult fish were tagged with a radio transmitter and PIT tag. Subadult/adult fish were tagged with one of two sizes of radio tags (4.5 and 10 g (in air): Models NTC-6-2 and MCFT2-3EM, Lotek Wireless). Fish were anesthetized via electronarcosis or MS-222 (3 ml/L of a 20 g/L MS-222 stock solution) buffered with $NaHCO_3$ (3 ml/L of a 50 g/L $NaHCO_3$ stock solution). Appropriately sized tags were inserted in the body cavity through a small incision just large enough to accommodate the tag, and sutured shut with dissolvable sutures (4-0 Ethilon nylon suture- black monofilament) sufficient to close the incision (3 - 4 stitches). The 4.5 g tags were inserted in 290 - 355 mm and 10 g tags were inserted in 325 - 645 mm bull trout.

All bull trout were PIT-tagged using a half-duplex (HDX) tag (ORFID, Portland, USA). Each fish was anesthetized as above (subadults and adults were PIT tagged at the time of radio tagging) and individuals $\geq$300 mm (fork length) received a dorsal sinus implant of a 23 mm tag, bull trout 151 – 299 mm received an abdominally implanted 23 mm tag, and bull trout 70 – 150 mm received an abdominally injected 12 mm HDX PIT tag. All tags were sanitized in ethanol and betadine, then rinsed with distilled water prior to insertion. The fish were also administered a prophylaxis of 20 mg/kg azithromycin via intraperitoneal injection.

Following tag insertion, the fish were allowed to recover for 18 – 48 h before being transported to the Clackamas River.

2.2.3.b Transport

We transferred the fish to release sites in the upper Clackamas River using a 700-1100 L water tank with supplemental oxygen. Juveniles were transported concurrently with subadults and adults but held in 15 L buckets with small holes drilled in the sides and top to allow water exchange. The buckets were suspended in the transport tanks to prevent injury to any fish. The

fish were netted from their holding tanks in the morning and transported for approximately two to five h by highway to the release sites. Water temperature was monitored in transit with an Oakton Temp 5 thermistor thermometer. Frozen blocks of Lake Billy Chinook water were added to the transport tank periodically during transport to ensure that the temperature did not increase and to slowly acclimate fish to the temperature at the release location. The Clackamas was always within 1.5°C of holding temperatures at the Round Butte Fish Isolation Facility.

2.2.4) Release locations and timing

All juvenile bull trout were released in habitat identified in the Feasibility Assessment (Shively et al. 2007) as suitable for spawning and early juvenile rearing (Patch 2 in Figure 3, and Figure 4 below). Subadult and adult bull trout were released in the Big Bottom area (Figure 5). When releasing juveniles into habitat patches (i.e., Pinhead and Last creeks, Figure 2), fish were distributed widely (as opposed to releasing them in 1-2 locations). This was an attempt to minimize intra-specific predation and/or competition. In general, we backpacked juveniles into habitat patches, using approximately 10 L of oxygen supplemented water per backpack, with no more than 25 similarly-sized bull trout per pack (e.g., year class). After reaching a release site, the location of the site was recorded using a hand held global position system device and fish were acclimated to the ambient stream temperature by placing a bag in the stream until the temperature was within $\pm$1°C of ambient (generally <35 min). To maintain dissolved oxygen levels, the bag remained closed until fish were released.

Subadults and adults were transferred individually from the transport tank to the river using a rubber bagged dip net. Every effort was made to release fish in slow moving water in close proximity to cover (large woody debris). Fish were never out of the water for more than several seconds.

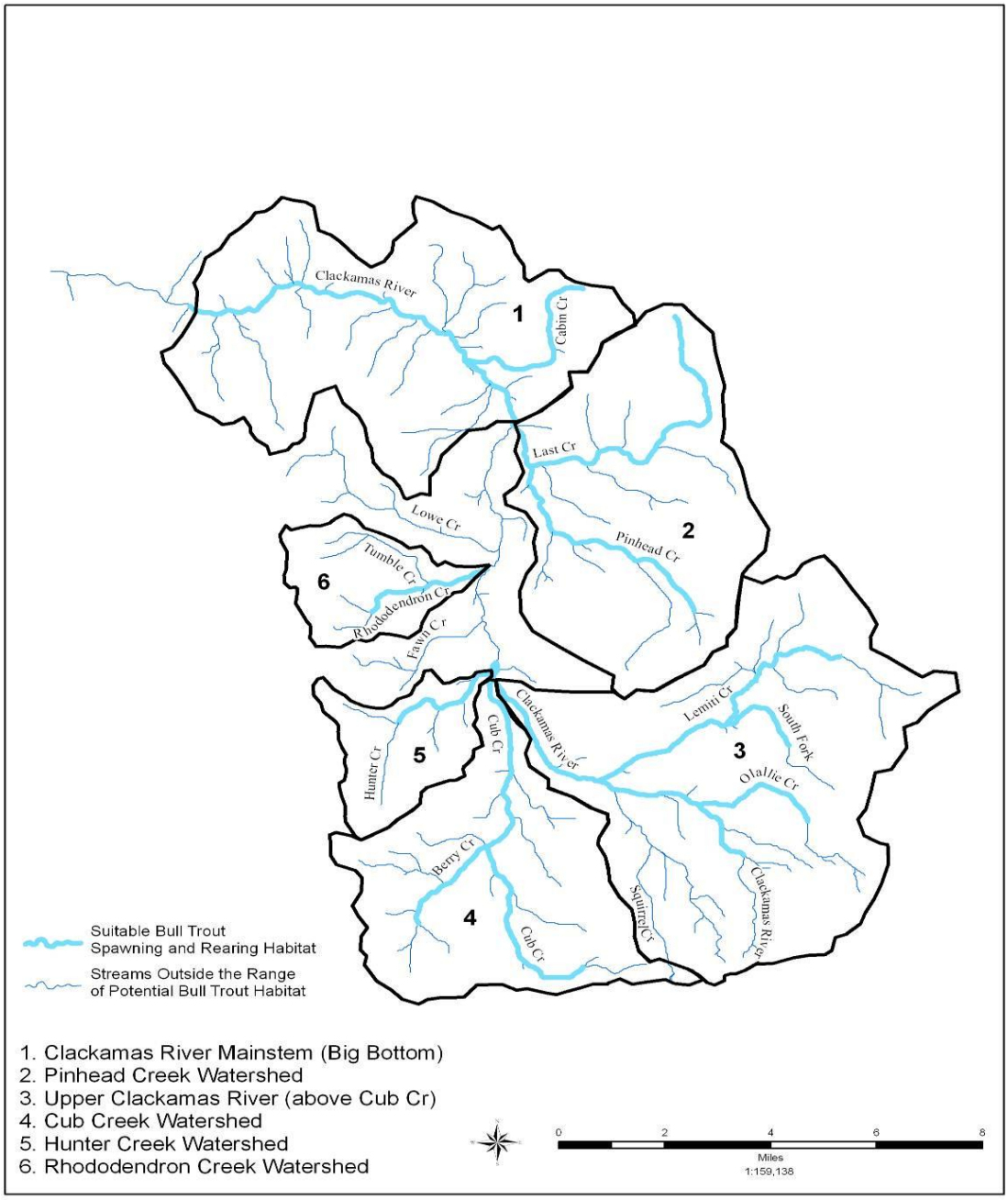

Figure 3. Suitable habitat patches for spawning and juvenile rearing based on Shively et al. 2007.

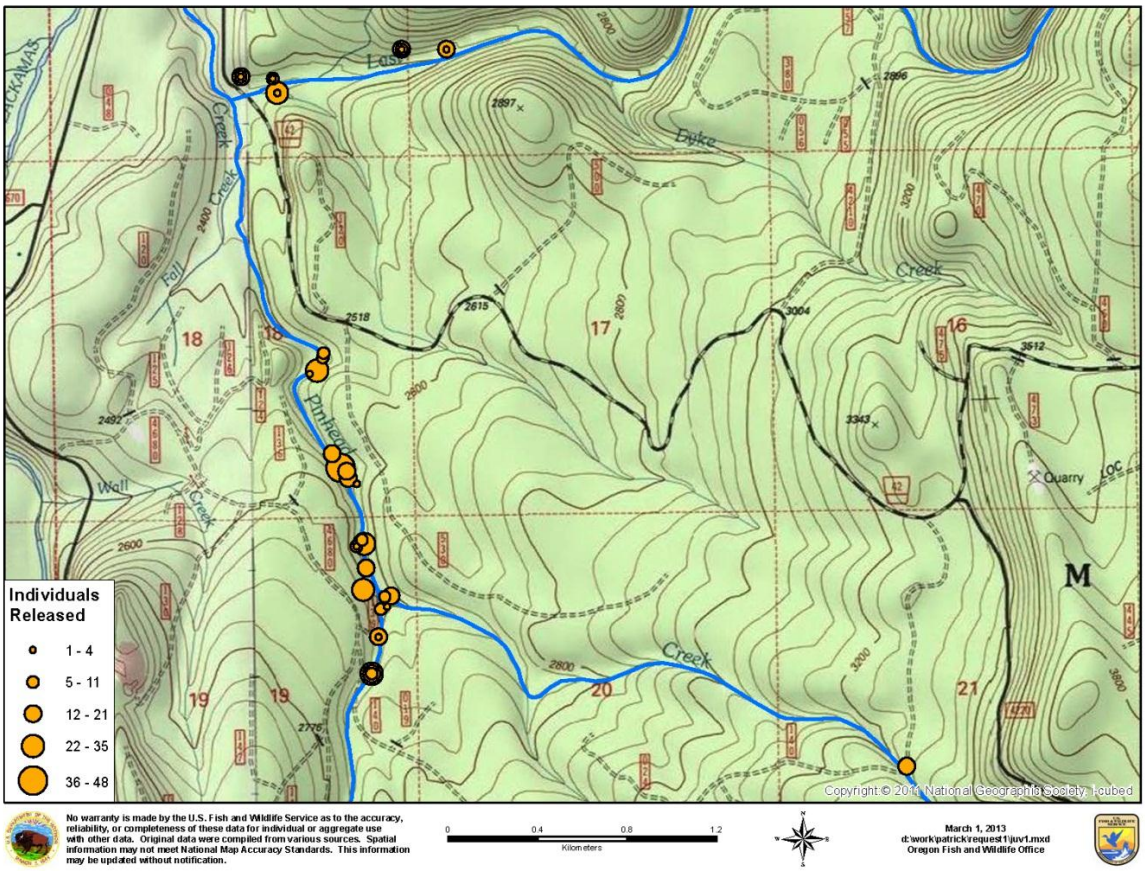

Figure 4. Release locations and count of juvenile bull trout released in the upper Clackamas River tributaries, Pinhead and Last creeks. Each circle represents a release event of one, two, or three year old juvenile bull trout collected from Metolius tributaries Jack, Canyon, and Candle creeks (see Table 3).

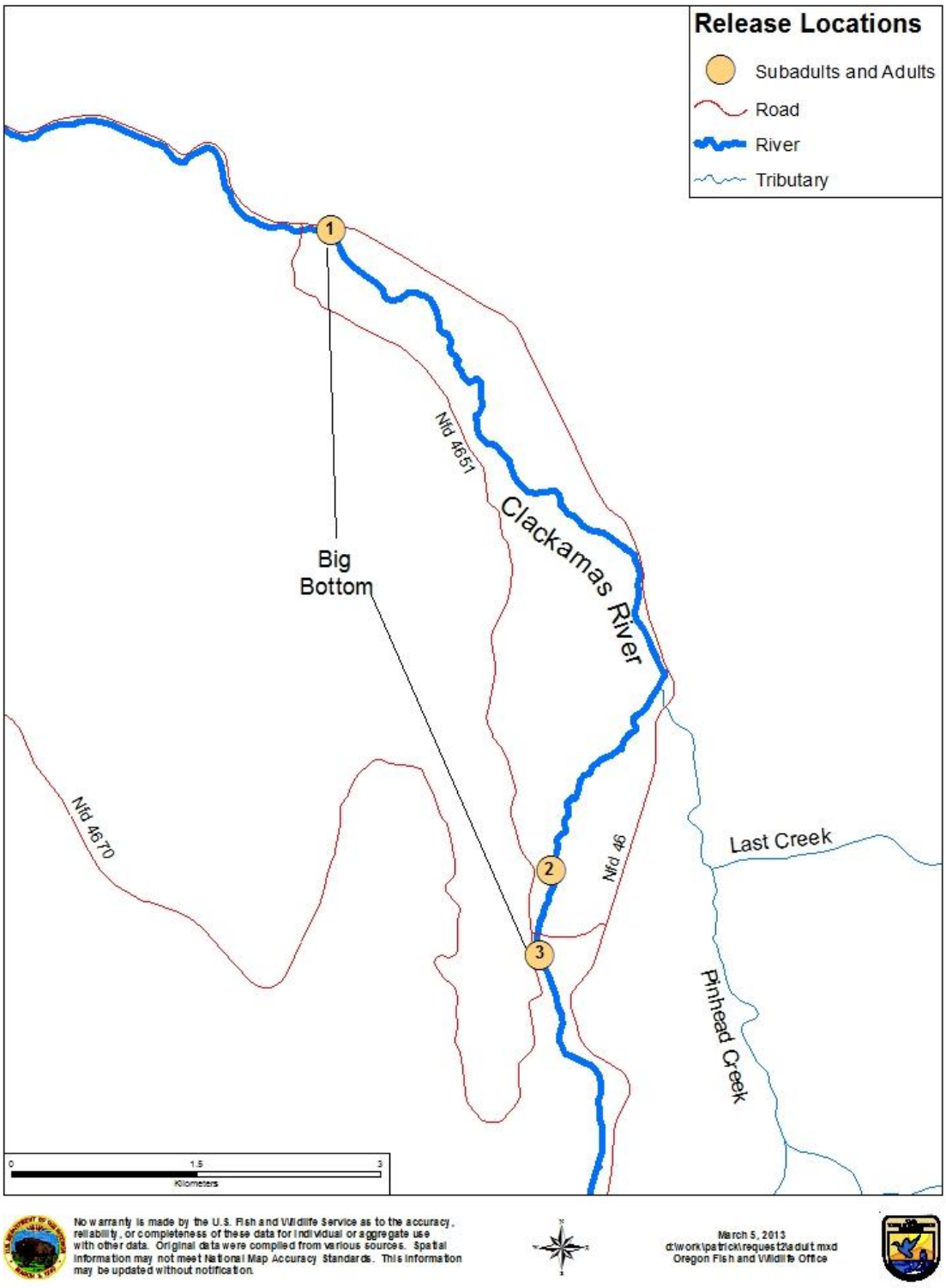

Figure 5. Release locations of subadult and adult bull trout in the upper Clackamas River within the Big Bottom reach. Each circle represents a release event of subadult and adult bull trout collected from the Metolius arm of Lake Billy Chinook (see Table 4).

2.3) Monitoring and Evaluation

2.3.1) Bull trout reintroduction effectiveness

We used a combination of fixed monitoring sites and mobile tracking to document the survival, behavior, and retention of juvenile, subadult, and adult fish to address the following questions (IM&E Plan, USFWS and ODFW 2011):

1) Do translocated subadult and adult bull trout remain in the upper Clackamas Basin (above Rivermill Dam)?

    1a) If yes, what is their seasonal distribution?
    1b) If yes, is there evidence of spawning activity? If no, does changing the release timing/location provide a different result?

2) Do juveniles remain in the habitat patches in which they are outplanted in the short-term or do they move relatively quickly out or into other habitat patches?

    2a) If they stay, how are juveniles distributed within tributaries?

Fixed telemetry and PIT tag monitoring sites were operated throughout the Clackamas River from the downstream most site, Rivermill Dam, upriver to the Pinhead Creek confluence (Figure 2). Sites were chosen to adequately cover the expected distribution of subadult and adult bull trout in the Clackamas River (Table 1), and to determine whether anadromous salmonids were being opportunistically predated by radio-tagged bull trout. Each fixed monitoring site was powered by AC power, or DC power when AC power was unavailable. All sites were housed in waterproof environmental enclosures and logged data continuously. The DC powered sites consisted of two 12-V 104 Amp hour (Ah) batteries that had enough stored power to run for approximately 21 days in the absence of power generation. Battery banks were charged via hydroelectric generators and/or photo voltaic charging systems. Each site was visually checked at least once per week to prevent data loss or monitoring interruption. Each battery charge was also checked at that time using a hand- held voltmeter to ensure there was an adequate charge to run until the next weekly service check. During the expected peak outmigrations of anadromous salmonids (e.g., October 15 – December 15, and April 15 – June 15) the fixed telemetry sites in the High Vulnerability Zones (HVZs) were checked and downloaded once weekly to determine whether bull trout were overlapping in space with smolts migrating from the upper Clackamas River, as determined by the Stepwise Impact Reduction Plan (SIRP, NMFS 2011; USFWS and ODFW 2011).

Table 1. Site names, brief rational of site inclusion, operational dates, and distribution of fixed telemetry sites in the Clackamas River watershed.

Site Name	Site Purpose	Operational Dates	River Kilometer
Rivermill Dam	River emigration/anadromous predation prevention	June 30, 2011 – Present	37
North Fork Dam	Anadromous predation prevention	June 30, 2011 – Present	48
Promontory Park	Reservoir occupancy	June 30, 2011 – Present	51
Oak Grove Powerhouse	Downstream/upstream occupancy	June 30, 2011 – Present	77
Collawash/Clackamas river confluence	Downstream/upstream occupancy	June 30, 2011 – Present	92
Pinhead Creek	Downstream/upstream occupancy, spawning indication	June 30, 2011 – Present	109
Cub/Berry creek confluence	Downstream/upstream occupancy, spawning indication	August 25, 2011- October 19, 2011	127[1]

[1]This is an estimated linear measurement for descriptive purposes because it is a tributary to the Clackamas River and runs somewhat parallel to the mainstem of the river (see Figure 2).

2.3.1a Adult life stage retention

Determination of whether subadult and adult fish remained in the study area was based on the detection of radio tagged individuals below North Fork dam either at fixed sites (Rkm 48 - Table 1) or by mobile detection of fish between North Fork Dam and Rivermill Dam. Because individuals that passed downstream of North fork Dam were unlikely to return above the dam, individuals that were detected below North fork Dam were assumed to have permanently left the study area.

We estimated the survival of each release cohort of subadults and adults combined to the beginning of the putative spawning season. Survival was estimated by dividing the number of presumed alive individuals by the number of released individuals. Handling procedures, surgical techniques, and radio tags have been variable among years, so these statistics are not directly comparable between release cohorts, but have been included here for simple comparison between years. It is important to note that discovery of a tag is no certain indication of the fate of the individual that had been implanted and released with that tag, and does not attempt to quantify tag loss. Mortality is only a likely scenario of an individual's particular fate surmised by the date of mortality, geographic location of the mortality/disappearance, and the circumstances surrounding recovery of the tag for each individual. It is included in this report

because the authors feel that it is pertinent for the purposes of modifying our methods in subsequent years of the project in an attempt to reduce undesirable fates and to provide some estimation of the number of subadults and adults likely still alive in the system. For these reasons, it should be considered minimum survival estimation. Apparent sources of mortality were categorized by most probable cause. Categories include 1) predation, as determined by recovery of a tag that has been chewed or found in close proximity to several other tags and salmon carcass remnants under a log jam, 2) unknown, which includes mortalities that do not clearly fit into any other category, i.e., over-winter/spring mortality, 3) angling, including tags that have been reported from anglers and tags that have disappeared from large pools in close proximity to roads, 4) transport related, which include mortalities observed within three weeks of release, 5) post spawn, which include mortalities observed one month after emigration from a spawning tributary, 6) hydroelectric spill, which include individuals spilled over North Fork Dam, and 7) volitional emigration, which include individuals that have left the study area by swimming through the PGE bypass pipe that provides downstream passage below the hydroelectric project.

Minimum survival of subadult and adult bull trout within the study area was evaluated using detections of radio tagged fish. Mortalities were determined after collecting repeated observations of an individual in one location (typically over the course of several weeks). Suspected mortalities were confirmed (by retrieval of the tag or observation that no bull trout or carcass was present) as soon as lack of movement became apparent. If the individual was dead, it was considered dead on the date and time the fish first arrived at that location. Survival was estimated for 2011 and 2012 based on observations of mortalities and upon confirmation that the signal was detected within the study area. If a signal was not detected for more than a month and the entire study area had been surveyed, it was assumed to have been removed by an angler and considered mortality at the date of the last detection.

2.3.1b Subadult/adult seasonal distribution

We monitored the seasonal distribution of radio-tagged fish using the fixed sites (see above) and by mobile tracking from a truck, plane, and on foot. A location census of radio-tagged individuals was conducted at least once weekly during the suspected spawning season (late August - October). This census was typically made by driving from the downstream most point in the study area (North Fork Reservoir), to the upstream most point in the study area (upper Cub Creek) in an attempt to locate each radio-tagged adult. These censuses were conducted three to four days apart. When individuals were not located during this survey, the remainder of the week's effort was focused on locating each missing fish. Each tributary believed capable of accommodating bull trout at any life stage (70 – 650 mm bull trout) was searched because if an area was not searched, we could not confirm fish presence or absence for that region. A record was maintained of the time spent searching each region. These tributaries include but were not limited to: Oak Grove Fork of the Clackamas River, Collawash River, Cabin, Pinhead, Lemiti, Olallie, Squirrel, Cub, Hunter, Fawn, Rhododendron, Lowe, and Kansas creeks. Due to concerns of anadromous predation and interest in reintroduction success (Monitoring Objectives 2 & 3; USFWS and ODFW 2011), missing fish were located as soon as possible, particularly during

anadromous smolt congregation/emigration and suspected bull trout spawning migration i.e., April 15 – June 15 and October 15 – December 15.

Tracking of individual bull trout was prioritized based on the project goals. The highest priority was to detect fish in the HVZ. The next priority was to obtain relatively precise (accurate enough to observe paired bull trout) locations of fish in tributaries during the spawning season. Throughout the suspected spawning season (late August - October), priority was given to precisely locating individuals that were utilizing tributaries and Clackamas headwater reaches. These individual locations were given a higher priority than precisely locating individuals in downstream reaches, or individuals that were suspected mortalities downstream of Big Bottom (Figure 2). Other criteria that designated individuals' higher priority than others included (based on observations obtained during weekly location censuses): directional movement toward or occupancy of HVZs, long upstream migrations, close proximity to suspected spawning tributaries, and suspected staging behavior (occupancy of the same location for several censuses).

2.3.2) Juvenile life stage retention and seasonal distribution

Juvenile bull trout retention in the Pinhead/Last creeks patch (see Patch 2 in Figure 3) was monitored using HDX PIT tag arrays. Two arrays, each with two antennas, were located at the confluence with the Clackamas River on the mainstem of Pinhead Creek and an associated side channel. These arrays were operated from spring through fall in 2012.

Occupancy and distribution of juvenile bull trout was monitored using the approach identified in the bull trout reintroduction IM&E plan (USFWS and ODFW 2011). The sample design consists of surveying random selected, spatially-balanced 50 m reaches. Reaches were sampled from bottom to top by electrofishing using a Smith-Root LR-24. Voltage, frequency, and duty cycle were dependent on water temperature and duty cycle. Reaches were diagrammed to illustrate riffles, runs, pools, braids, and cover in 2012 to provide a qualitative baseline of habitat complexity against which to compare across years. Field sampling in the Pinhead/Last creeks patch occurred between July 31 and August 21, 2012. Sampling occurred in 18 of the 21 reaches previously sampled in 2011 (Figure 7). The remaining three sites were eliminated due to no water present or poor habitat quality.

2.3.3) Reproduction

Foot surveys were conducted in tributaries in which bull trout were suspected of spawning based on observations of radio-tagged fish in close proximity. Hunter, Rhododendron, Lowe, Cabin, and Pinhead creeks were surveyed for the presence of redds by single pass counts on October 13 and 14 by crews of two to three individuals per reach or stream looking for redds, live bull trout spawning, or bull trout carcasses. Bull trout redds were identified by: 1) observed presence of bull trout via radio telemetry or 2) by size. Surveys were conducted after bull trout had likely concluded spawning for the year but while coho and Chinook salmon were spawning. Due to the temporal and spatial overlap among bull trout and salmon redds, we used redd size to help

differentiate bull trout and salmon redds. Redds that ranged in size from 0.3 – 0.7 m in length measured from the upstream margin of the excavated pit to the downstream end of the depositional mound were considered bull trout redds whereas redds 1-2 m in length or larger were considered coho or Chinook salmon redds.

2.3.4) Genetics

Caudal fin tissue (approximately $1cm^2$) was collected from each bull trout transferred to the Clackamas. These samples have been archived at the USFWS Abernathy Fish Technology Center (Longview, Washington). This sample archive will provide the opportunity for a parentage analysis in subsequent years of the reintroduction.

2.3.5) Impacts to listed salmon and steelhead

The total time each subadult and adult bull trout spent in HVZ areas was monitored using fixed and mobile telemetry, as described above. Individuals that spent longer than a three consecutive day period in HVZ areas were assumed to be preying on salmon/steelhead juveniles.

3) Results

3.1) Implementation

3.1.1) Donor stock availability

A total of 532 redds were documented in the redd surveys in the Metolius sub basin in 2011 (Harrington and Wise 2011). Assuming an average of 2.3 adult bull trout/redd (a ratio which falls within the range of those found by Dunham et al. 2001) yielded a population estimate of 1,223 spawning adults (Figure 6). Annual redd surveys in the Metolius sub basin in 2012 documented the presence of 544 redds (M. Harrington, ODFW pers. Comm.), yielding a population estimate of 1,251 spawning adults, again satisfying the criteria (>800 spawning adults) to continue transfers to the Clackamas in 2013.

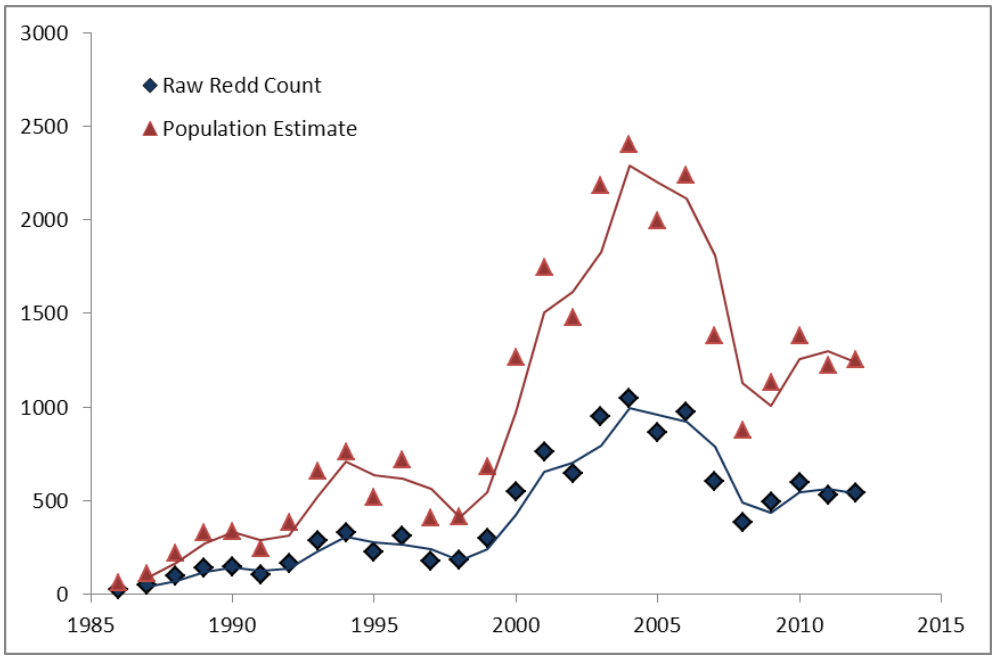

Figure 6. Raw redd counts and population estimates through 2012 for the Metolius bull trout population.

3.1.2) Pathogen screening

All samples screened in 2012 tested negative for IHN, IPN, VHS, paramyxo, and aquareo virus. However, all 60 juveniles tested positive for BKD. BKD was treated with a prophylaxis of azithromycin.

3.1.3) Donor stock collection

A total of 100 subadult and adult bull trout (~250 – 650 mm) were captured for translocation (9 via angling, 91 via trap net) (Table 2). Of these, 40 were not used for various reasons (e.g., scars from apparent raptor interaction, hook injury, deformed jaw, missing fins, blind in one or both eyes, opercle deformity, scale loss, >650 mm, etc.). We transferred 43 subadult and 17 adult bull trout to the Clackamas River.

We transferred 509 juveniles (70 - 250 mm TL) to the Clackamas. In addition, 5 juveniles died on May 10, 2012 (2 prior to transport, and 3 during transport) that are not included in the total (Table 3). Two suspected, hybrid bull × brook trout were captured during juvenile trapping efforts and euthanized.

Table 2. Origin of subadult and adult bull trout collected in the Metolius River system for transport to the Clackamas River. Fish were either collected from the Portland General Electric operated surface water collector (SWC) at Round Butte Dam, by angling for fish (The Confederated Tribes of Warm Springs) in the lower Metolius River, or from Oneida trap nets set in the upper Metolius arm of Lake Billy Chinook.

Capture dates (2012)	SWC	Angling	Trap Nets
June 11 – 14	0	0	24
June 18 – 21	0	1	6
June 25 – 28	0	6	3
July 9 – 12	0	2	18

Table 3. Dates, quantity released, capture source in the Metolius drainage, and release location of juvenile bull trout in the Clackamas drainage in 2012. Juveniles were captured in 1.5 meter rotary traps deployed near the mouth of Jack and Canyon creeks, backpack electrofishing near the mouth of Candle Creek, or in Oneida trap nets in the Metolius arm of Lake Billy Chinook.

Release Date	Juvenile count and collection location	Count transferred	Release Location
5/3/12	31 Jack Cr; 23 Canyon Cr	54	Last Cr
5/10/12	36 Jack Cr; 52 Canyon Cr	90	Pinhead Cr
5/17/12	48 Jack Cr; 13 Canyon Cr	61	Pinhead Cr
5/24/12	52 Jack Cr; 68 Canyon Cr	120	Pinhead Cr
5/30/12	41 Jack Cr; 48 Canyon Cr	87	Pinhead Cr
6/7/12	12 Jack Cr; 7 Canyon Cr; 33 Candle Cr	52	Last Cr
6/14/12	17 Lake Billy Chinook	17	Last Cr
6/21/12	16 Lake Billy Chinook	17	Last Cr
6/28/12	9 Lake Billy Chinook	9	Last Cr
7/12/12	2 Lake Billy Chinook	2	Last Cr

3.1.4) Release locations and timing

There were ten releases of juvenile and four releases of subadult and adult bull trout in 2012 (Tables 3 & 4; Figures 3 & 4). Juveniles were outplanted to more than 43 different reaches spread over 12 weeks (Figure 3). Subadults and adults were released at three different locations spread over five weeks (Figure 4).

Table 4. Date of release, quantity by capture method, total released, and release location of subadult and adult bull trout. All fish were collected in the Metolius arm of Lake Billy Chinook in Oneida trap nets, or by angling in the Metolius arm or upstream at the Confederated Tribes of the Warm Springs "Eyerly" property, or by angling at the US Forest Service Monty Campground. All fish were released in the Clackamas River in slow moving water upstream of the 4670 bridge at the location of the 2011 media event and release location, downstream of the 4670 bridge just upstream of the side channel containing a large (200 meter long) log jam, or just upstream of the 4650 bridge in a spring fed, backwater side channel (Figure 5).

Release Date	Subadult/adult count and collection method	Count transferred	Release Location
6/14/12	19 subadults trap net; 1 adult trap net	20	10 upstream of 4670 bridge; 10 upstream of 4650 bridge
6/21/12	4 subadults trap net; 2 adults trap net; 1 adult angling	7	7 downstream of 4670 bridge
6/28/12	7 subadults trap net; 1 adult trap net; 4 adults angling	12	12 downstream of 4670 bridge
7/12/12	13 subadults trap net; 6 adults trap net; 2 adults angling	21	21 downstream of 4670 bridge

3.2) Monitoring and Evaluation

3.2.1) Bull trout reintroduction effectiveness

3.2.1a Adult life stage retention:

Zero individuals from the 2011 or 2012 cohorts left the study area in 2012. For the 2012 cohort, the estimated minimum survival of the remaining subadult/adult fish to the time of spawning (August) was 95%. For the 2011 cohort, the estimated minimum survival of subadult/adult fish to the time of spawning in 2012 (from the time of release in 2011) was 28% (Table 5).

Sources of probable mortality (see explanation 2.3.1a) include (2011 and 2012 cohorts combined); predation (17%), unknown (10%), angling (7%), transport related (6%), post spawn (4%), hydroelectric spill (3%), volitional emigration (2%) (Table 5).

Table 5. Counts of individuals released, fates of mortalities by cohort, and number of individuals presumed alive at the beginning of each spawning period. Spawning period was assumed to begin August 5 each year based on detections of fish crossing PIT arrays in Pinhead Creek in 2011. Fates were determined based on best judgment of PIT tag interrogation, mobile telemetry and observations from fixed telemetry sites.

		Release cohort			
		2011		2012	
		adult	subadult	adult	subadult
Individuals released		32	26	17	43
Fate	Volitional emigration	2	0	0	0
	Angler	4	3	1	0
	Predation	10	2	1	7
	Unknown	6	5	0	0
	Transfer stress	4	3	0	0
Number presumed[1] alive at beginning of spawning period	2011	22	22[2]	-	-
	2012	3	13[3]	17	43[2]

[1]individuals presumed alive by confirmation of upstream movement or varied telemetry signal intensity observed from a fixed location

[2]all of these fish likely were not mature during the first year but may mature in subsequent years

[3]transmitter battery expired for two individuals 8/22/12

3.2.1b Seasonal Distribution

Visual observation of distribution data suggests there was no difference in the distribution of the 2011 and 2012 cohorts, so the data are pooled in subsequent analyses. In general, the surviving members of the 2011 cohort over-wintered (Jan-Feb 2012) in large pools between the upper reaches of Big Bottom downstream to North Fork Reservoir. Five individuals occupied the reservoir in 2012 (never more than one at a time), and occupancy ranged from 11 d in January for one individual to 33 min for another on October 11. No bull trout occupied the North Fork fore bay for more than two h total, and typically only one to six minutes at a time. Beginning in February 2012, bull trout that were residing downriver (below rkm 92, or downstream of the confluence of the Collawash and Clackamas rivers) began to move upriver toward Big Bottom, where the majority of individuals (80%) remained throughout the summer. After the 2012 cohort was released in June and July, the majority (97%) of individuals remained within 800 m of the release site for two weeks before dispersing from the release sites to habitat throughout Big Bottom and upstream beyond the FS 4670 bridge. In late July, 2012, two bull trout began to stage 100 m downstream of Pinhead Creek's confluence with the Clackamas River, until one individual (from the 2011 cohort) moved into Pinhead Creek on August 7. Through October 31, 2012, 18 individual subadult and adult bull trout occupied Pinhead. Individual bull trout spent

between 1- 56 d in Pinhead Creek (median occupancy = 32.5 days). Pinhead Creek was the only tributary to the Clackamas confirmed to have bull trout occupancy in 2012, however occupancy was suspected (based on mobile telemetry observation of individuals near the confluence with the Clackamas) in several other tributaries including Hunter, Lowe, Kansas, Fawn, and Rhododendron creeks. Bull trout that did not enter Pinhead Creek during the suspected spawning season (August-October) remained largely dispersed throughout the Big Bottom reach. This distribution persisted until mid-November. During November bull trout distributed into pools from the lower end of Big Bottom and down river to the confluence of the Collawash and Clackamas rivers. Throughout December there was little movement of any bull trout. No bull trout occupied the HVZs from October 15 through December 15, 2012. No bull trout moved through the hydroelectric project in a downstream direction in 2012, leaving the study area. To date only two bull trout have left the study area through volitional emigration (in 2011).

3.2.2) Juvenile life stage retention and seasonal distribution

Whether and how many juvenile bull trout remained in the Pinhead/Last creeks patch is unknown. Detection inefficiencies and PIT antenna operational down times throughout 2012 resulted in an incomplete data set. Therefore, the number of juvenile bull trout that left the patch is unknown. However, seven juveniles out-planted in 2012 and four juveniles out-planted in 2011 were detected at these PIT tag arrays in May through November 2012. A collaborative multi-agency approach is being implemented in 2013 to improve and maintain optimum detection efficiency.

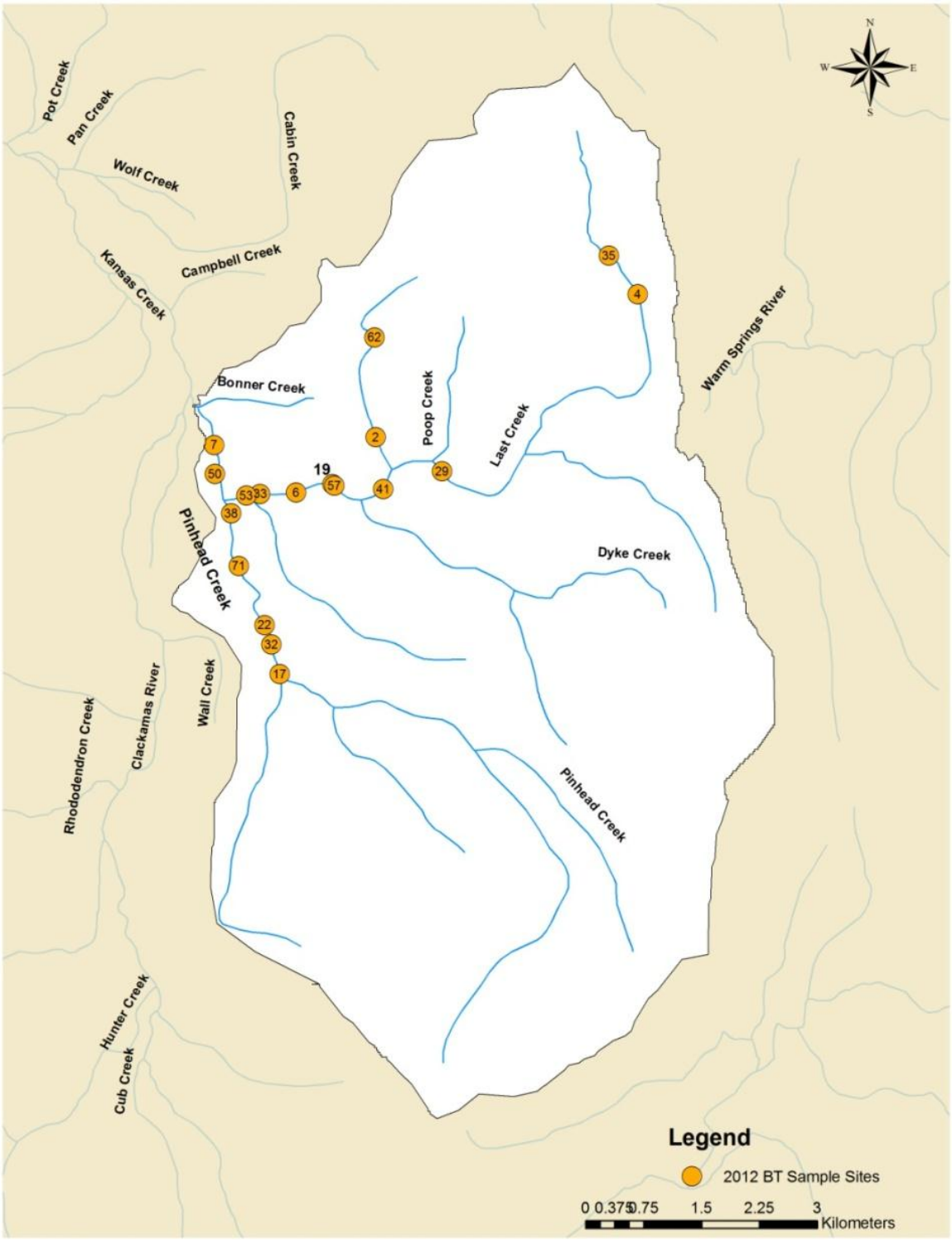

Figure 7. Sites surveyed via backpack electrofishing for the presence of outplanted juvenile bull trout.

No bull trout were captured during 2012 sampling (Figure 7). Because no bull trout were captured, site specific detection probability would likely be no greater than 5.3% (USFWS 2008), resulting in a maximum confidence of only 73% that bull trout were not present in the Pinhead/Last creeks patch (see USFWS 2008).

3.2.3) Reproduction

Similar to 2011, 68 (89%) bull trout were in the Big Bottom reach of the Clackamas River and in Pinhead Creek during the putative spawning period. Between August 7 and October 31, 18 individual (2011 and 2012 cohorts combined) subadults and adults were detected at the PIT arrays located near the confluence of Pinhead Creek with the Clackamas. Based on total length (TL) measured at release, the range in length of the eleven 2012 bull trout known to move into Pinhead Creek was 381 - 633 mm. Seven 2011 cohort bull trout were also detected in Pinhead in 2012. These fish were 340 - 550 mm TL when released in 2011. Pinhead was the only tributary where evidence of spawning was observed. Based on radio tracking, bull trout were also suspected of spawning in Hunter, Lowe, Kansas, Fawn, and Rhododendron creeks. However redd surveys did not reveal any evidence of bull trout spawning anywhere other than the Pinhead Creek patch. Eight suspected (based on size) and three confirmed (through mobile telemetry and visual observation) bull trout redds in the Pinhead Creek patch were found between 400 m downstream of the Last Creek confluence upstream to the Fall Creek confluence (9 of 11), and in Last Creek up to the confluence of Dyke Creek (2 of 11).

3.2.4) Genetics

Tissues were collected from 569 fish. All samples were archived at USFWS operated Abernathy Fish Technology Center (Longview, Washington).

3.2.5) Impacts to listed salmon and steelhead – (section 3.4)

One bull trout entered the HVZs in 2012 (April 15 – June 15, and October 15 – December 15). One subadult bull trout (420 mm TL) was detected for a total of 29 min on May 23rd and 25th in the North Fork Dam fore bay. Otherwise the established zones were unoccupied by bull trout.

4) Conclusions

Monitoring and evaluation of project effectiveness relative to bull trout has revealed that recently reintroduced subadult and adult bull trout have largely remained in the Clackamas River within the study area. In particular, some of the subadult and adult outplants from 2011 remained in the subbasin and migrated into Pinhead Creek more than one year after being translocated from the Metolius River. Some of these 2011 fish were outplanted as subadults that were not sexually mature upon release and may have reached sexual maturity in the Clackamas River Subbasin. Overall, only two individual subadult and adult bull trout of the 118 transferred to date have emigrated from the system.

Evidence for spawning has been observed in each year since reintroduction implementation. While the majority of spawning activity appears to be focused in Pinhead Creek, there is some suggestion that spawning may be occurring in other tributaries as well. Low post spawning mortality (estimated by confirmation of mortality of adults less than one month after they were observed spawning) has been observed (4%). Not unexpectedly, no wild progeny have been captured to date. If successful spawning did occur in 2011, the only wild bull trout that would exist would be young-of-the year from relatively few spawners.

It is unclear whether translocated juveniles remained in Pinhead Creek. In general, PIT tag arrays have operated with highly variable detection efficiency. Some PIT tag detections indicated that translocated juveniles did remain in the subbasin. However, it was not possible to quantify how many remained in Pinhead Creek. In addition, no juvenile bull trout have been recovered by electrofishing. It is possible that the current occupancy protocol is not sensitive enough to detect bull trout at the low density potentially present. At summer low flows, the Pinhead Creek patch contains approximately 85,000 m^2 of spawning and rearing habitat (see Shively et al. 2007). Thus, if all the juvenile bull trout outplanted since 2011 stayed in the patch and there were no mortalities, the maximum density would have been approximately 7 $x10^{-3}$ bull trout/m^3. Alternatively, juvenile bull trout may have left the patch through dispersal or mortality and the patch may not have been occupied. Efforts to improve PIT detection efficiency and potentially expand juvenile monitoring are being planned and should improve the state of knowledge of transferred juvenile bull trout.

The effects to salmon and steelhead predation to this point can only be inferred from bull trout distribution data. There has been little to no occupancy of areas deemed vulnerable to anadromous smolt predation by bull trout. Further, counts conducted annually by PGE of outmigrating smolts and juvenile anadromous salmonids have indicated no correlated reductions in population abundance since implementation of the reintroduction in 2011.

The results of the annual disease screening suggest that there was low risk for transferring pathogens of concern to the Clackamas basin. In 2012, we modified the testing protocols because of concern over the sampling of spawning adults. Lethal testing of the juvenile bull trout life stage was added in lieu of non-lethal seminal and ovarian fluids collected from gravid adults. Given the healthy status of the Metolius bull trout population and the relatively high abundance of the juvenile life stage, the annual sacrifice of 60 juveniles, in addition to the 150 fry, is expected to have no measurable impact on the overall population.

The Metolius spawning population is currently more than 1,200 spawning individuals. However, bull trout prey base population abundance in the Metolius system (kokanee) is currently in decline. Thus, donor stock population abundance will be closely monitored as the reintroduction and donor stock collection continues.

Overall, the reintroduction to date has observed encouraging results. Confirmation of spawning in more than one tributary, detection of wild progeny, and the fate of the juvenile outplants remain high priorities in future monitoring efforts.

5) Acknowledgements

We'd like to acknowledge the following agencies/organizations for their assistance in planning, implementation, and monitoring efforts: the Confederated Tribes of the Warm Springs Reservation, Portland General Electric, U.S. Forest Service, U.S. Geological Survey, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Oregon Department of Fish and Wildlife staff at Round Butte Fish Hatchery, Wizard Falls Hatchery, and Trout Unlimited. We would also like to thank Bobby Brunoe, Brad Houslet, Jens Lovtang, Jen Graham, Julie Keil, Don Ratliff, Doug Cramer, Megan Hill, Cory Quesada, Nick Ackerman, Jim Bartlett, Shivonne Nesbit, Tony Amandi, Susan Gutenberger, Ken Lujan, Matt Stinson, Rollie White, Paul Henson, Chris Worth, Gary Larsen, Tom Horning, Jack Williamson, Katie Serres, Brad Goering, Dan Shively, Matt Anderson, Greg Wanner, Jason Dunham, Peter Lickwar, Brett Hodgson, Mike Harrington, Mike Gauvin, Todd Alsbury, Jeff Boechler, Chris Wheaton, Hal Boldt, Jeff Fulop, Justin Zweifel, Steve Starcevich, Mike Meeuwig, Brian Bangs, Kyle Bratcher, Brook Silver, Howard Schaller, Darek Staab, Mike Riehle, Chris Allen, Bianca Streif, Jeff Everett, Rob Walton, Rich Turner, Brad Malone, and many others for their support and assistance. This report was substantially improved through review by Chris Allen and Tim Whitesel. We also thank David Hines for assistance creating the database and Larry Reigel for map construction.

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Appendix 1: Revised Fish Health Sampling for the Clackamas River Bull Trout Reintroduction Project

3/20/2012

Developed by: Susan Gutenberger USFWS Lower Columbia River Fish Health Center; Tony Amandi, ODFW Fish Health Services; Patrick Barry ODFW; Chris Allen USFWS Oregon Fish & Wildlife Office; Marci Koski USFWS Columbia River Fisheries Program Office; Shivonne Nesbit ODFW

Background

The U.S. Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW) and additional partners have recently completed the first year of a reintroduction of bull trout to the Clackamas River (hereafter "Project"). A critical component of the Project is screening of bull trout to minimize risk of pathogen transmission from Metolius River donor stock to native fish populations in the Clackamas River. Pathogen screening protocols for the Project, which were implemented 2009-2011, were initially developed by ODFW's Fish Health Services Division and are outlined in the USFWS's Implementation, Monitoring and Evaluation Plan (IMEP) (USFWS 2011). Both agencies recently evaluated the pathogen screening protocols and determined, for reasons described below, that revisions to portions of the protocols were warranted. The revisions represented in this document were developed with contributions from the USFWS and ODFW staff listed above and entail: 1) justification for revisions; 2) revisions to the existing pathogen screening protocols; 3) alternatives to meeting the revised protocols including a preferred alternative for 2012; 4) additional fish health recommendations; and 5), agency roles/responsibilities and a decision framework to be implemented if warranted by pathogen screening findings.

Annually, the numbers and size classes of bull trout to be translocated from the Metolius River to the Clackamas River are: 1000 juveniles (70 – 250 mm); 30 subadults (250 – 450 mm) and 30 adults (450 – 650 mm) (USFWS 2011). Collections and translocation will occur in the spring and early summer. Juvenile bull trout are proposed for annual releases into the Clackamas River through the first phase of the project (7 years). Continuation of the transfer of adults and subadults beyond year two of the project, and each subsequent year in Phase 1, will be assessed by the Clackamas Bull Trout Project Implementation Committee.

Fry Pathogen Screening

Collections of 150 bull trout fry sample will continue as stated in the original IMEP protocols (USFWS 2011): each year of transfer will continue to require the lethal testing of 150 fry in the spring, preferably with samples being obtained from more than one spawning tributary (collections from the lower mainstem Metolius will accomplish this objective). The bull trout

fry life stage is the most susceptible life stage to infectious hematopoietic necrosis virus (IHNV) making it a logical choice for virus detection. The small size of fry limits testing to viruses unless DNA techniques (polymerase chain reactions, PCR) are employed to test for other pathogens. As in previous years, Rick Stocking, ODFW Fish Health Service's pathologist working at the Pelton-Round Butte Project, will test and report on the fry samples. All fry sampling (and juvenile sampling outlined below) must be completed and negative for virus before bull trout are released in the Clackamas River.

Justification for Revisions

In addition to the fry sampling, the original screening protocols included non-lethal testing of 60 ripe bull trout adults for ovarian fluid/milt for virus detection the fall prior to the year of transfer. While collecting the fry was a relatively easy endeavor in 2011, obtaining the 60 adult samples for testing in 2009 and 2010 proved logistically challenging and imposed risk to the Metolius bull trout population. In 2010, over 700 adults were handled as they entered spawning tributaries in order to obtain 60 fish that had gonads mature enough to express ovarian fluid or milt. Based in part on potential impacts to the population from excessive handling, overall cost of collections, and the relatively low risk from virus dissemination based on previous analysis by ODFW, a decision was made by ODFW in 2011, in consultation with the USFWS Oregon Fish and Wildlife Office, to discontinue the adult pathogen screening component of the protocols in the near-term.

In response to this decision, the Lower Columbia River Fish Health Center (LCRFHC), USFWS, developed an alternative to the adult pathogen screening component that meets the intent of the Fish Health Policies for ODFW and the USFWS, eliminates pre-spawning handling risks to the adult bull trout population, and reduces financial costs of the pathogen screening program (costs are being paid for by the USFWS). The pathogen screening revisions developed by LCRFHC were reviewed and are supported by ODFW Fish Health Services.

Revisions to the Adult Pathogen Screening Component

We propose to replace the adult pathogen screening component with lethal testing of the juvenile bull trout life stage. The juvenile life stage represents the best possibility of detecting many of the reportable pathogens in the population and numerically is the largest life stage to be transferred to the Clackamas River. Given the healthy status of the Metolius bull trout population and the relatively high abundance of the juvenile life stage, the sacrifice of 60 juveniles, in addition to the 150 fry, is expected to have no measurable impact on the overall population.

We propose that bull trout juveniles (70 to 250 mm) from more than one spawning tributary (excluding White River) be sacrificed and tested for potential pathogens two weeks prior to any transfers of bull trout to the Clackamas River. Because environmental factors and pathogen interactions may differ between tributaries and throughout the capture of the juveniles, two weeks of quarantine on clean water is recommended until health assays are completed. The number of fish sampled should meet a 95% confidence level that a pathogen(s) would be detected if in 5% of the population (assumed pathogen prevalence level, APPL, Table 2.3). The health testing and quarantine could be accomplished in several ways:

1. Two weeks of quarantine for the entire cohort of juveniles to be transferred while a 60 (or 5% APPL) fish health sample is processed (see table 2.3).

2. Two week quarantines for each collection of juveniles while a sub-sample of fish is assayed for health (see table 2.3). Each cohort would be released from quarantine when health sampling was completed for that cohort.

3. In 2012 only: if quarantine of the fish is not feasible due to space limitations or other logistics in a hatchery or other captive setting, 60 juveniles should be sampled and the two weeks of testing completed before any bull trout are moved to the Clackamas Basin. After spring 2012, anadromous salmonid adults will be passed above the Pelton Round Butte Project for the first time since the early 1960's and will pose additional pathogen risks (Appendix A). For that reason, alternative #3 is limited to 2012 only. *Note: current discussions with staff from Wizard Falls Hatchery suggest alternatives #1 and #2 above will likely not be possible in 2012. For that reason our preferred alternative for 2012 is #3.*

The quarantine(s) should occur in the manner that best accommodates safe holding of the bull trout. Additional tanks and/or a divided raceway may be required to reduce piscivory and to allow easy identification of tributary cohorts.

The two week holding period will allow completion of health testing to include the salmonid pathogens listed in Table 2.1, (from the Handbook of Aquatic Animal Health: Protocols and Procedures, USFWS, Chapter 2.2 Sampling, 2003). Detection of *Renibacterium salmoninarum,* the causative agent of bacterial kidney disease (BKD), will be by direct fluorescent antibody test (DFAT) or enzyme-link immunosorbent assay (ELISA) with confirmation by PCR. In addition, some additional parasites of interest, such as *Ichthyophonus* and *Nucleospora salmonis* will be included in the testing. The tissues collected for pathogen testing would be: skin and gills (for external parasites), gills, spleen and kidney (for viruses and bacteria), the intestine, heart and head (for parasites).

The USFWS also proposes to take advantage of the fishing season on Lake Billy Chinook and collect sample tissues from adult bull trout that are legally harvested in the recreational fishery that peaks in March/April/May. Mortalities collected at the Fish Transfer Facility at Round Butte Dam will also provide opportunities for pathogen testing. Staff from agencies assisting in this effort will need to ensure that mortalities/tissues are immediately put on ice, bagged, dated and delivered to Fish Health personnel within 24 hours of collection [Lower Columbia River FHC, 201 Oklahoma Rd., Willard (Bingen) WA 98605]. Contact Susan Gutenberger or Ken Lujan at 509.538.2400 for Fed Ex account information. The sample tissues and pathogens will be tested as mentioned above.

Additional Fish Health Recommendations

It is recommended that all bull trout be treated with azithromycin and oxytetracycline during PIT tagging to help control BKD and Gram negative bacterial septicemias. The Metolius bull trout have a notable incidence of *R. salmoninarum,* and the azithromycin will help reduce pre-spawning mortality and vertical transmission of the bacterium to the progeny. The oxytetracycline will help control pathogens such as *Aeromonas salmonicida* and *Flavobacterium psychrophilum* that may become patent during the handling events. Prior to transfer, a one hour bath of formalin (1:6000), with supplemental aeration, will be used to eliminate debilitating parasites on the skin and gills.

Health Findings and Consequences

If untreatable/uncontrollable pathogens (IHNV, IPNV, VHSV, OMV, ISAV, or *M. cerebralis)* are detected in any life stage, the LCRFHC and/or ODFW Fish Health Services will present a written health report and risk assessment to the Clackamas Manager's Committee for review and deliberation. During the interim period between a "stop transfer" recommendation from pathology and the Clackamas Manager's Committee review, no fish will be transferred to the Clackamas River until a decision has been made as to how to proceed.

Roles and Responsibilities Associated with the Revised Pathogen Screening Protocols

Through 2011, ODFW's Fish Health Services led the effort to implement the pathogen screening protocols for the Project. As agreed to by ODFW in February 2012, the USFWS (Lower Columbia River Fish Health Center) will be responsible for the lab testing and reporting for bull trout juveniles and adults, the supply of antibiotics and training in their use, and some of the collection of samples in the field. ODFW will continue to test the fry and report their findings to the LCRFHC and members of the Project's Implementation Committee.

D. Sample Number

Unless otherwise dictated by the receiving jurisdiction, the number of fish to be collected from each lot must be in accordance with a plan that provides 95% confidence that at least one infected fish will be collected if the minimum assumed pathogen prevalence level (APPL) of infection equals or exceeds 5%. Examples of the number of fish to sample for various population sizes are listed in Table 2.3. Table 2.3 also includes examples of the number of fish to sample if a 2% or 10% APPL is required by the requesting authority. If the population size is estimated to be between two grouping levels, the sample is taken from the next higher population class (Amos 1985; OIE 2000; Ossiander and Wedemeyer 1973; Thoesen 1994).

Table 2.3. Sample number based on an assumed pathogen prevalence level (APPL) in the population of 10%, 5 %, or 2%.

Lot Size	Number of Fish Required for Sample		
(number of fish)	10% APPL	5% APPL	2% APPL
50	20	35	50
100	23	45	75
250	25	50	110
500	26	55	130
2000	27	60	145
>100,000	30	60	150

Revision 2, 9/2003

From the Handbook of Aquatic Animal Health: Protocols and Procedures, USFWS, Chapter 2.2 Sampling. 2003

Appendix A. Passage of adult salmon above the Round Butte Dam

NEWS RELEASE
Oregon Department of Fish and Wildlife

Contact: Mike Gauvin (541) 325-5347
Jessica Sall (503) 947-6023

Feb. 23, 2012

Adult salmon, steelhead will be released above Round Butte Dam

BEND, Ore. -- This fall adult salmon and steelhead could migrate and spawn in the upper Deschutes, Metolius, and Crooked river basins for the first time in more than 50 years under a one-year strategy recently developed by the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Warm Springs Reservation of Oregon and others.

The return of adult summer steelhead and sockeye and chinook salmon to these basins would be a major milestone in the ambitious fish reintroduction effort aimed at re-establishing anadromous fish populations that were cut off by the construction of the Pelton Round Butte Dam complex on the Deschutes River in the early 1960s.

Biologists anticipate the first significant number of adult fish to return to the dam complex this summer and fall. According to Mike Gauvin, ODFW Pelton Round Butte mitigation coordinator, approximately half of the expected returning adults will be released into Lake Billy Chinook to continue their upstream migration. Many of these fish will be fitted with radio tags so biologists can study their migration behavior and spawning locations.

The other half of the fish will be taken to the Round Butte Hatchery and used as brood stock to produce young fish for release into upstream habitats in 2013.

“While we have developed a strategy for 2012, it’s been difficult to come up with a long-term approach because there are still so many unknowns,” Gauvin said. “Having this interim strategy will give us an additional year to better understand the behavior and migration of returning fish before we develop a multi-year proposal.”

The fish passage strategy was developed in conjunction with the Pelton Round Butte Fish Committee, which includes representatives from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Portland General Electric, and non-governmental organizations .

The adult salmon and steelhead returning to the dam this year were released as young fish into upstream habitats beginning in 2007. Portland General Electric and the Confederated Tribes of Warm Springs, co-owners of the Pelton Round Butte Hydroelectric Project, constructed and began operating a fish collection facility at Round Butte Dam in 2009 to capture the outmigrating smolts and release them below the dam so they could continue their migration to the ocean.

Oregon Department of Fish and Wildlife
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