

RECLAMATION

Managing Water in the West

Utah Valvata and Bull Trout Monitoring and Implementation Plan

Bureau of Reclamation Operations and Maintenance in the Snake
River Basin Above Brownlee Reservoir



U.S. Department of the Interior
Bureau of Reclamation
Pacific Northwest Region
Snake River Area

March 2006

Table of Contents

I.	Introduction.....	1
II.	Utah Valvata.....	2
	A. Summary of the Utah Valvata Incidental Take Statement.....	2
	B. Monitoring Plan for Utah Valvata.....	3
	Identifying and Monitoring Operational Conditions.....	3
	Monitoring Surveys.....	5
	C. Implementation Plan for the Reasonable and Prudent Measure	6
III.	Bull Trout	7
	A. Summary of the Bull Trout Incidental Take Statement	7
	B. Monitoring Plan for Bull Trout	7
	Monitoring Operational Indicators.....	7
	Monitoring Population Sizes and Trends	9
	Monitoring Incidental Take.....	9
	C. Implementation Plan for Reasonable and Prudent Measures.....	12
	Arrowrock Dam and Reservoir	12
	Anderson Ranch Dam and the South Fork Boise River.....	18
	Deadwood Dam and the Deadwood River.....	19
	Agency Valley Dam and Beulah Reservoir	23
IV.	Reporting	25
V.	Literature Cited	25

List of Tables

Table 1.	Summary of amount or extent of anticipated take of Utah valvata associated with Reclamation facility operations.....	4
Table 2.	Summary of amount or extent of anticipated take of bull trout associated with Reclamation facility operations.	10
Table 3.	Summary of bull trout implementation and evaluation activities designed to meet the incidental take statement’s terms and conditions.....	13
Table 4.	Thresholds of initiation and effort for trap and haul of bull trout.....	25

I. Introduction

The Bureau of Reclamation (Reclamation) consulted with the U.S. Fish and Wildlife Service (FWS) on 12 proposed actions involving the effects of future operations and routine maintenance at 12 Federal projects in the upper Snake River basin. The FWS completed a non-jeopardy biological opinion in March 2005 for Reclamation operations and maintenance activities in the Snake River basin above Brownlee Reservoir. The biological opinion contains a 30-year incidental take statement and corresponding reasonable and prudent measures that outline nondiscretionary actions for Utah valvata (*Valvata utahensis*) and bull trout (*Salvelinus confluentus*).

Section 9 of the Endangered Species Act (ESA) defines take as any action that can harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in such conduct toward a listed species. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be a prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of the incidental take statement. The incidental take statement has two main components: a monitoring component to ensure the action agency does not exceed the amount or extent of incidental take described in the incidental take statement, and reasonable and prudent measures to minimize the amount or extent of take (without altering the basic design, location, scope, duration, or timing of the action). Reclamation must comply with the reasonable and prudent measures to receive Section 9 coverage under the ESA.

This document provides a plan for Reclamation to monitor activities and document the amount or extent of take associated with the operation of upper Snake River facilities through 2035. Reclamation will monitor take using operational criteria and guidelines outlined in the incidental take statement. This document also describes the activities Reclamation will implement to meet the incidental take statement's reasonable and prudent measures and associated terms and conditions. Reclamation will use methods and results from previous work, where applicable, to evaluate the effectiveness of operational changes.

The FWS distinguished each of the reasonable and prudent measures and associated terms and conditions by the facility where take is anticipated. The reasonable and prudent measure for Utah valvata requires Reclamation to minimize incidental take related to Reclamation's operations at American Falls Dam and Reservoir and Minidoka Dam and Lake Walcott. The reasonable and prudent measures for bull trout require Reclamation to minimize incidental take related to Reclamation's operations at Arrowrock, Anderson Ranch, Deadwood, and Agency Valley Dams and associated reservoirs in the upper Snake River basin.

This document tiers to Reclamation's decision document (2005) concerning the FWS's biological opinion and incidental take statement. The decision document contains more information about the proposed actions, Reclamation's findings and commitments, and Reclamation's response regarding conservation recommendations for the species.

II. Utah Valvata

A. Summary of the Utah Valvata Incidental Take Statement

The FWS determined that the proposed action does not jeopardize the continued existence of Utah valvata. However, the FWS found that Reclamation's proposed action will result in take of Utah valvata, in the form of death associated with exposure and desiccation, in the upper Snake River (Figure 1 shows the location of Utah valvata in the action areas). The FWS determined that Reclamation's proposed action will harm Utah valvata by dewatering habitat and making it inhabitable over the short term. Due to the uneven distribution of Utah valvata, Reclamation was unable to provide the FWS with take estimates related to water surface elevations associated with Reclamation's actions. The FWS determined incidental take at each reservoir and river reach using operational indicators (various reservoir and river stage elevations) and the population impacts that are expected to result when exceeding these operational thresholds (the percent of snails affected based on the estimated amount of benthic habitat that may be exposed at a specific reservoir or river stage elevation). The FWS further determined that all snails exposed in dewatered habitat will be subject to lethal take. Table 1 on page 4 summarizes the anticipated take, operational indicators, and expected frequency and timing of the take.

The FWS determined effects from Reclamation's proposed action to Utah valvata separately for these river segments:

1. American Falls Reservoir – Incidental take in the form of stranding and desiccation was anticipated for up to 85 percent of the Utah valvata population resident to American Falls Reservoir in 2 of the next 30 years; 40 to 85 percent for an additional 2 years; and between 5 and 40 percent for the remaining 26 years.
2. Snake River, Neeley Reach – Incidental take in the form of stranding and desiccation was anticipated for up to 54 percent of the Utah valvata population resident to the Neeley reach when minimum winter flows reach 350 cfs, which is anticipated to occur in 9 of the next 30 years.
3. Lake Walcott – Incidental take in the form of stranding and desiccation was anticipated for 0.5 percent of the Utah valvata population in Lake Walcott due to the annual drafting of 1.5 vertical meters of the reservoir (anticipated to occur in 28 of the next 30 years) and for up to 10.5 percent of the population due to a periodic drafting of 2.1 vertical meters of the reservoir (anticipated to occur in 2 of the next 30 years).
4. Snake River, Minidoka Reach – Incidental take in the form of stranding and desiccation was anticipated for all Utah valvata located in the substrates above the area submerged by the annual minimum flow of 400 cfs and for all Utah valvata located in the spillway section.

No incidental take was anticipated for the upper Snake River reach, the Milner Pool, or the reach from Milner to Thousand Springs.

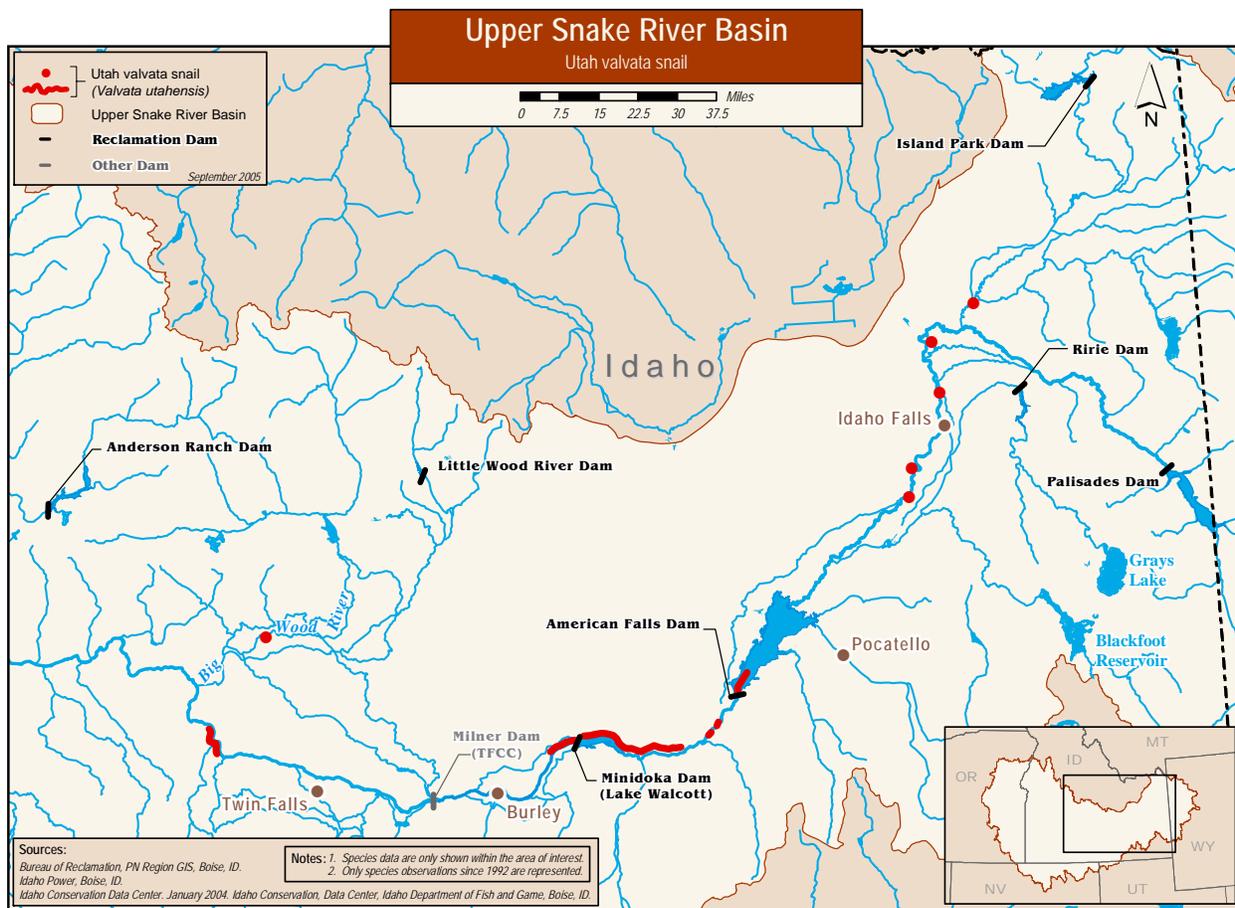


Figure 1. Known distribution of Utah valvata populations associated with Reclamation facilities in the upper Snake River basin.

B. Monitoring Plan for Utah Valvata

The incidental take statement requires Reclamation to develop a draft incidental take monitoring plan for the FWS by December 31, 2005, for review, comment, and approval. This draft plan defines how Reclamation proposes to monitor Utah valvata take to ensure that Reclamation does not exceed the take exemption. In its Utah valvata monitoring plan, Reclamation will identify and monitor operational conditions that trigger incidental take and will continue annual monitoring surveys.

Identifying and Monitoring Operational Conditions

Reclamation will identify the operational conditions that trigger incidental take, include them in facility Standing Operating Procedures (SOPs), and then monitor operational conditions for Utah valvata. Reclamation will report instances when these operational conditions have resulted in incidental take in its annual monitoring report. When discussing the upcoming year's operations with the FWS, Reclamation will identify the potential that operational conditions may result in take.

Table 1. Summary of amount or extent of anticipated take of Utah valvata associated with Reclamation facility operations.

Facility	Anticipated Take	Operational Indicators	Critical Season	Percent of Expected Occurrence
American Falls Dam and Reservoir	Up to 85 percent of Utah valvata in the reservoir are affected by stranding and desiccation when the reservoir is drafted to its lowest levels.	Reservoir storage volume falls to 0 percent of capacity (475 acres of wetted habitat).	Summer and early fall	7 percent (2 of 30 years)
	Between 40 and 85 percent of Utah valvata in the reservoir are affected by stranding and desiccation when the reservoir is drafted to low levels.	Reservoir surface elevation ranges between 4,295.6 and 4,303.4 feet.	Summer and early fall	13 percent (4 of 30 years)
	Between 5 and 40 percent of Utah valvata in the reservoir are affected by stranding and desiccation when the reservoir is drafted as part of normal operations.	Water stored in and released from American Falls Reservoir.	Year-round	100 percent (30 of 30 years)
	Up to 54 percent of Utah valvata in the Snake River, Neeley reach, are affected by stranding and desiccation when river flows are at their lowest levels.	Minimum winter flows at the Snake River at Neeley gage reach 350 cfs.	Winter	30 percent (9 of 30 years)
Minidoka Dam and Lake Walcott	Up to 0.5 percent of Utah valvata in the lake are affected by exposure and desiccation when the lake is drafted annually.	Lake Walcott is drafted up to 1.5 vertical meters below full pool.	Summer and early fall	95 percent (28 of 30 years)
	Up to 10.5 percent of Utah valvata in the lake are affected by exposure and desiccation when the lake is drafted beyond typical operations.	Lake Walcott is drafted up to 2.1 vertical meters below full pool.	Summer and early fall	5 percent (2 of 30 years)
	Any Utah valvata present in the Snake River, Minidoka reach, above the area submerged by the minimum flow of 400 cfs are affected by stranding and desiccation.	Minimum flows at the Snake River near Minidoka Dam gage falls to 400 cfs.	Winter	100 percent (30 of 30 years)
	Any Utah valvata in the spillway are affected by stranding and desiccation.	Flows through the spillway are shut off.	Late fall and winter	100 percent (30 of 30 years)

Monitoring Surveys

Reclamation will continue its annual Utah valvata monitoring surveys using the same methods and techniques already employed. Reclamation will continue to monitor Utah valvata colonies located in upper and lower Lake Walcott, the Snake River near Neeley, and American Falls Reservoir. Reclamation will add a monitoring site in the upper Snake River between Sunnyside Bridge in Idaho Falls and the confluence of the Henrys Fork and South Fork Snake River (the exact location of this site has not yet been determined). Eight transects have been established at each of the four established monitoring sites, based on data Reclamation collected from 2001 to 2004. The transects encompass known Utah valvata colonies. Reclamation will establish eight transects at the upper Snake River site, consistent with the lower four sites.

Sampling at each site will consist of randomly selecting two transects and collecting eight evenly spaced 0.25 meter² (m) plots along each transect, for a total of 16 samples. In the river reaches, transects extend from the geometric center of the river to the high-water line (not merely the water's edge). In each reservoir, the transects will extend from the center of the historical channel to the high-water line (full pool elevation). The center of the historical channel is typically indicated by the deepest point along a cross-sectional profile of the reservoir at each respective location.

Plots will be sampled with a Venturi suction dredge. A 0.25 m² plot will be excavated approximately 2.5 centimeters deep by the vacuum dredge. The sample will be transported through flexible tubing and collected in a 1,000-micrometer sieve. Dewatered sites will be sampled by scraping the same volume of materials into the sieve and washing the sediment with river water. Samples will be obtained by either diving or wading, depending upon water depth and velocity. All samples will be either sorted on site and released or transported to the Reclamation snail lab at Minidoka Dam. Utah valvata will be enumerated, placed into separate containers, and released to their original collection location.

Beginning in 2006, Reclamation will end annual monitoring surveys for each site and will begin conducting monitoring surveys on an alternate year schedule. Utah valvata monitoring surveys will occur at Lake Walcott and the Neeley reach of the Snake River in June and September of even years (beginning 2006) and at American Falls Reservoir and the upper Snake River site in June and September of odd years (beginning 2007). June collections represent a period when Reclamation reservoirs (and their respective river reaches) are typically at their highest annual level. Collections during this period will determine maximum Utah valvata expansion within the respective river segment for that particular water year. Utah valvata colony expansion will be a direct factor of the previous year's minimum water level. It should be noted, however, that June collections may not always be possible due to high runoff levels or extreme drought, resulting in earlier or later peaks. During high and low years, the early (June) collection period may be conducted in either May or July. Monitoring in September along each transect to the high-water line will allow Reclamation to determine relative densities of Utah valvata at each colony. Snails

are seasonally abundant and more likely to be present in detectable numbers during late summer and early fall. September surveys in the river reaches and Lake Walcott are critical because they will follow the reproductive cycle when the respective local population/colony would have sufficient time to increase, but precede the period when the local population/colony is expected to decline to lower winter densities.

Utah valvata collected during the June collection period in any given year that occur above the minimum water level for the September collection period of that year will be regarded as incidental take. This will allow Reclamation to estimate incidental take at each site following the irrigation season. In Lake Walcott, all Utah valvata estimated to be present in the 5-foot annual drawdown zone will be considered as incidental take.

Surveys conducted in American Falls Reservoir during September will also be critical because they will follow the reproductive cycle when the respective local population/colony would have sufficient time to increase. Incidental take for American Falls Reservoir operations will be determined by the presence of snails during the June sample period located above the minimum pool elevation for the respective water year (which will likely occur in September).

The irrigation season typically ends in late September. Following the irrigation season, American Falls Reservoir is at its lowest annual elevation. Lake Walcott and the river reaches decline to their over-winter levels. This sample regime will provide a more accurate estimate of Utah valvata snails incidentally taken due to project operations by collecting Utah valvata data just prior to the end of the irrigation season along the transects previously described.

C. Implementation Plan for the Reasonable and Prudent Measure

The incidental take statement includes one reasonable and prudent measure and two terms and conditions for Reclamation to implement measures to minimize the amount and effect of take of Utah valvata from stranding, exposure, and desiccation within American Falls Reservoir and downstream reaches associated with operation of American Falls Dam and Reservoir.

Term and Condition 1.a: Within the range of operations defined in the proposed action, minimize the frequency, extent, and duration of drawdown of American Falls Reservoir to levels below 50,000 acre-feet for the period of the proposed action.

Activities: Reclamation will use available storage from upstream reservoirs to increase or maintain inflow to American Falls Reservoir and will use water from Lake Walcott earlier in the season to meet downstream irrigation needs when American Falls Reservoir drops below 100,000 acre-feet. Reclamation will annually provide the FWS with reservoir elevation data resulting from operations and a description of operational actions taken, if needed, to minimize drawdown below 50,000 acre-feet.

Duration: Reclamation will continue this effort for the duration of the incidental take statement.

Term and Condition 1.b: When Reclamation drafts American Falls Reservoir to less than 50,000 acre-feet, Reclamation shall report to the Service when the operations occurred, the duration, and the conditions leading to such operation.

Activities: Reclamation will report to the FWS when American Falls Reservoir drops below 50,000 acre-feet.

Duration: Reclamation will continue this effort for the duration of the incidental take statement.

III. Bull Trout

A. Summary of the Bull Trout Incidental Take Statement

The FWS determined that the proposed actions do not jeopardize the continued existence of bull trout in the Columbia River distinct population segment. However, the FWS found that Reclamation's proposed actions will result in take of bull trout in the Boise, Payette, and Malheur River basins (Figure 2 shows the location of bull trout in the action areas). The FWS determined incidental take by correlating frequencies and magnitudes of streamflow and reservoir conditions at specific facilities with an estimate of population effects during critical seasonal time periods in the bull trout's life history. The FWS then described the amount or extent of incidental take at each facility based on operational thresholds. Table 2, beginning on page 10, summarizes the anticipated take related to these operational thresholds and their expected frequency and timing. The incidental take statement defines these time periods and operational criteria as relevant to take because they represent when the probability of take is highest due to the life history of bull trout and their presence in an associated water body.

B. Monitoring Plan for Bull Trout

The incidental take statement requires Reclamation to develop a draft incidental take monitoring plan for the FWS by December 31, 2005, for review, comment, and approval. This draft plan defines how Reclamation proposed to monitor bull trout take to ensure that Reclamation does not exceed the take exemption. In its bull trout monitoring plan, Reclamation will evaluate the operational conditions that lead to take during the critical time periods at the facilities outlined in the incidental take statement; determine the population size and annual trend to allow for analysis and estimates of the total fish taken; and estimate the proportion of annual take.

Monitoring Operational Indicators

The first element of monitoring addresses operations at Reclamation facilities where take of bull trout was anticipated to occur. Reclamation will monitor each operational indicator (as described in Table 2, beginning on page 10) to ensure the take does not exceed Reclamation's incidental take exemption. Reclamation will use current precipitation levels developed for flood control forecasting, Hydromet data, and hydrologic models to monitor the operation of its facilities

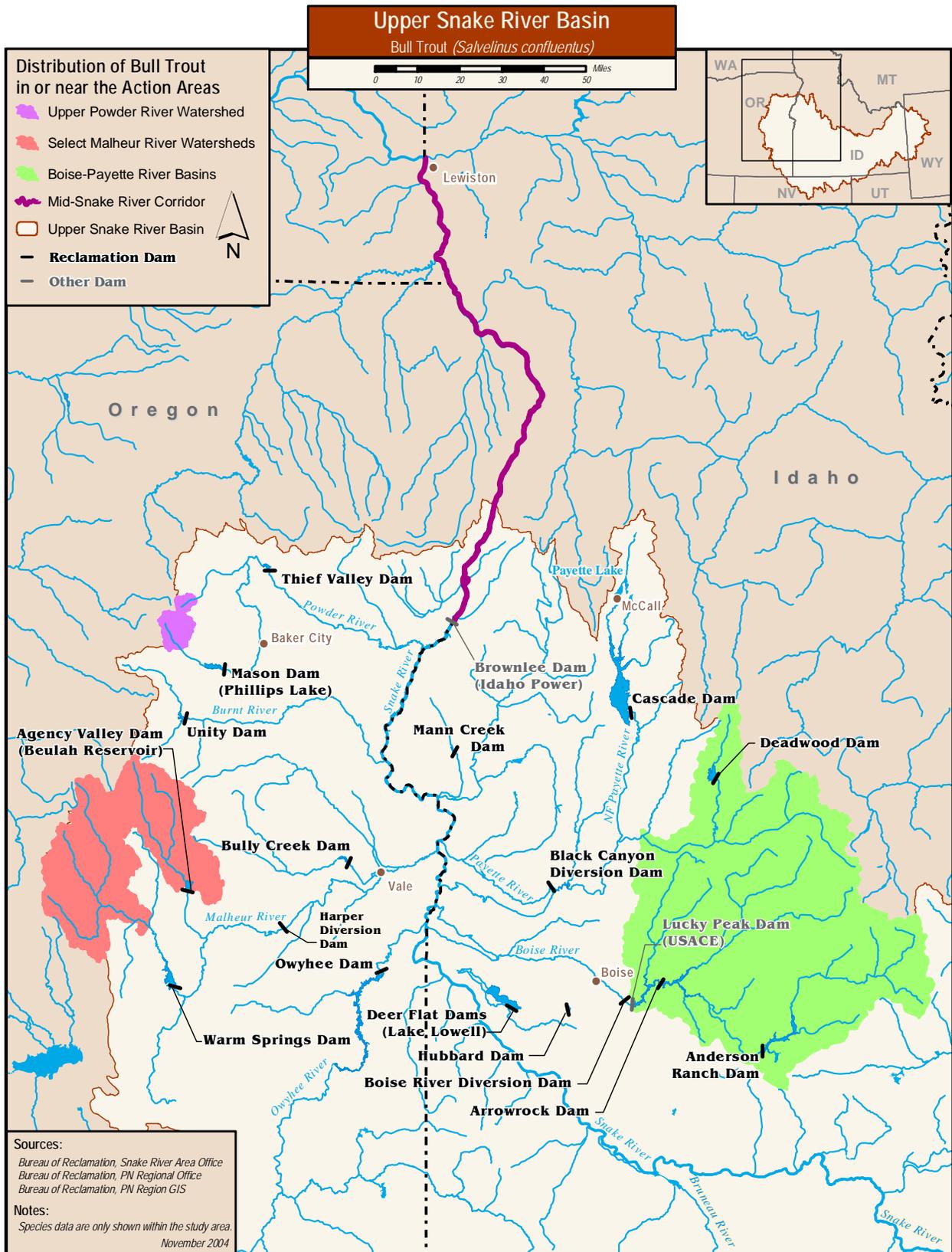


Figure 2. Known distribution of bull trout populations associated with Reclamation facilities in the upper Snake River basin (Reclamation 2004).

during the critical seasonal periods outlined in the incidental take statement. Reclamation will evaluate and summarize these data to ensure that operations do not exceed the thresholds defined in the incidental take statement. When reporting to the FWS, Reclamation will describe the operational thresholds for anticipated take, instances of exceedance, and the duration of exceedance for each year's operation. If conditions appear to potentially exceed the allowed take, Reclamation will notify the FWS and determine if reinitiation of consultation is required.

Monitoring Population Sizes and Trends

The second element of monitoring addresses population size and trend (increasing or decreasing). Reclamation must first determine the population size in order to calculate the total numbers of fish taken in the populations and the proportion of take due to operations of the facilities.

Reclamation will continue to participate in yearly basin-wide population monitoring and trend data collection activities by working with other Federal and state partners. This coordination encompasses Reclamation's involvement in operating and maintaining weir traps at Anderson Ranch, Arrowrock, and Deadwood facilities and surveying redds in the North Fork Malheur River basin. Reclamation will use weir count and redd count data to monitor long-term trends in population size for downstream migrants and spawning fish as correlated to reservoir operations. Reclamation will also use catch per unit effort information from its trap-and-haul programs at Arrowrock and Agency Valley Dams as an indication of levels of entrainment related to operational conditions.

Monitoring Incidental Take

The third element of monitoring addresses the kind of take and estimates a proportion of fish taken. Previously, Reclamation and the FWS determined the kind of take incurred and the proportions of the population affected by tagging a sample of migratory fish with radio or acoustic tags. Proportions of the population taken were determined by extrapolating percentages of mortality and entrainment found in the test sample to the population level based on the number of tagged fish in the total estimated population (Reclamation 2004). These telemetry investigations are invasive and should be limited in application. Salow (2005) found that bull trout growth in the Boise River declined dramatically at 7 years of age and suggested that this was caused by both the shift in assimilation of energy to reproduction and the stress of migration. Based on this information, Reclamation will regularly assess the levels of take due to operations using telemetry investigations at about a 7-year interval.

Specific proportions of the populations of bull trout will be defined as taken by various elements (*e.g.*, predation, angling, environmental conditions, etc.) through the use of telemetry data at the various facilities; these proportions will be used to estimate take in any year. Reclamation will tag and monitor a proportion of the population over a 2-year interval. Telemetry work will later be repeated to account for the dynamic nature of the system, but no earlier than 7 years following the last year of monitoring at each facility. Each investigation shall encompass a minimum of 2 years of movement and mortality data collection, and no more than 10 percent of the adult estimated population will be tagged each year to reduce the impact of tagging.

Table 2. Summary of amount or extent of anticipated take of bull trout associated with Reclamation facility operations.

Facility	Anticipated Take	Operational Indicators	Critical Season	Percent of Expected Occurrence
Arrowrock Dam and Reservoir	Up to 50 percent of the Middle and North Fork populations are affected by low reservoir productivity and decreased prey.	Reservoir elevations less than 2,184 feet or a volume of less than 200,000 acre-feet by the end of June.	June 30	10 percent (3 of 30 years)
	Up to 8 percent of bull trout in the reservoir are entrained into Lucky Peak Reservoir, as averaged over any consecutive 5-year period.	Water is discharged through the spillway.	March through June	50 percent (15 of 30 years)
	Up to 2 percent of bull trout in the reservoir are entrained into Lucky Peak Reservoir.	Discharge exceeds 695 cfs while the reservoir water surface elevation is less than 3,111 feet.	July through September	100 percent (30 of 30 years)
	Up to 20 percent of bull trout in the reservoir, as averaged over any 5 consecutive years, experience habitat degradation and predation.	Mean daily reservoir elevation falls below 3,100 feet.	September 15 through October 31	60 percent (18 of 30 years)
	Up to 5 percent of bull trout in the reservoir are entrained into Lucky Peak Reservoir, as averaged over any consecutive 5-year period.	Discharge exceeds 695 cfs while the reservoir water surface elevation is less than 3,111 feet.	Winter	65 percent (20 of 30 years)
Anderson Ranch Dam	Up to 50 percent of the North and Middle Fork Boise Rivers' spawning population are affected by spillway discharges that disrupt timing of migration and spawning and that alter metabolic rates.	Water is discharged over the spillway.	Spring	20 percent (6 of 30 years)
	Up to 50 percent of the North and Middle Fork Boise Rivers' spawning population are affected by the altered flow and temperature regime that disrupts migration and spawning and that increases metabolic rates.	Water is stored and released at Anderson Ranch Dam.	Spring through Fall	100 percent (30 of 30 years)
	Up to 10 percent of bull trout in the reservoir are entrained into the South Fork Boise River.	Storage and release operations at Anderson Ranch Dam alter the natural flow regime.	Spring	20 percent (6 of 30 years)
	Up to 4 percent of bull trout in the reservoir experience degraded water quality.	Reservoir storage volume falls below 62,000 acre-feet.	Summer	7 percent (2 of 30 years)

Facility	Anticipated Take	Operational Indicators	Critical Season	Percent of Expected Occurrence
Deadwood Dam	Up to 2 to 4 percent of bull trout in Deadwood Reservoir are entrained into the Deadwood River below the dam.	Water discharged over the spillway.	Spring	37 percent (11 of 30 years)
	Up to 2 to 4 percent of bull trout in Deadwood Reservoir are affected by degraded water quality.	Reservoir storage volume falls below 50,000 acre-feet.	August through October	7 percent (2 of 30 years)
	All bull trout in the Deadwood River downstream from the dam are affected by spillway discharges that disrupt timing of migration and spawning and that alter metabolic rates.	Water is discharged over the spillway	May through July	35 percent (11 of 30 years)
Agency Valley Dam	All bull trout in the Deadwood River downstream from the dam are affected by low winter streamflows and temperatures that affect bull trout movement and growth and reproduction of bull trout and the prey base.	Deep water releases at Deadwood Dam and low flows below the dam.	Spring increases, fall reductions, winter discharge	100 percent (30 of 30 years)
	Up to 10 percent of bull trout in Beulah Reservoir are entrained into the North Fork Malheur River below the dam.	Water is discharged over the spillway.	May through June	7 percent (2 of 30 years)
	All bull trout that return to Beulah Reservoir to overwinter are affected by a reduced prey base.	Reservoir storage volume falls below 2,000 acre-feet.	August through October	32 percent (10 of 30 years)

Reclamation and the FWS have discussed the need for a dynamic monitoring plan that reflects changes in water resource demands and supply through time. The need to conduct telemetry studies will be discussed and coordinated with the FWS and a determination made considering new technologies, current population size and trend, and progress of implementation activities.

C. Implementation Plan for Reasonable and Prudent Measures

The incidental take statement includes four reasonable and prudent measures to minimize incidental take of bull trout related to Reclamation's operations at four of its facilities: Arrowrock, Anderson Ranch, Deadwood, and Agency Valley Dams and associated reservoirs. In this section, Reclamation describes implementation and evaluation activities and the estimated duration of work. Table 3, beginning on page 13, summarizes these activities.

Periodically, Reclamation and the FWS will need to determine areas of additional data needs and evaluate the efficacy of long-term monitoring programs under this 30-year period. Reclamation will conduct a 10-year programmatic review to address the dynamic nature of water resource supply and demand related to natural resource needs. Spreading the activities throughout the duration of the incidental take statement will allow Reclamation to implement the terms and conditions and evaluate the effectiveness of the completed work to minimize take without causing further risk to the bull trout populations; it will also allow Reclamation to maintain reasonable constraints on costs and staffing while incorporating stakeholders' interests. The sequence of activities reflects the watershed priorities identified by the FWS in the incidental take statement.

Arrowrock Dam and Reservoir

The FWS identifies one reasonable and prudent measure and five terms and conditions for Reclamation to implement measures to minimize the effect and/or amount of take associated with the operation of Arrowrock Dam. Table 3, beginning on page 13, summarizes the activities, duration, and expected completion dates for these terms and conditions.

Future operating decisions will be based, in part, on biological benefits expected (as measured by weir population trend and community composition data with productivity), costs and other tradeoffs involved, and legal, contractual, and other applicable considerations.

Term and Condition 1.a. Within the range of proposed operations, decrease the frequency, duration, and extent of drawdowns below 3,100 feet in Arrowrock Reservoir during the fall migratory period (September 15 to October 31) in order to reduce the level of take of bull trout from habitat loss and death from predation.

Activity: Reclamation will evaluate options for using available operational flexibility of the Boise River system facilities (Arrowrock, Anderson Ranch, and Lucky Peak Dams and Reservoirs), including assessing the possibility of maintaining a water surface elevation above 3,190 feet prior to June 30 and ensuring refill of Arrowrock Reservoir to bring the water surface elevation back to 3,100 feet for the period from September 15 to October 31.

Table 3. Summary of bull trout implementation and evaluation activities designed to meet the incidental take statement's terms and conditions.

Term and Condition	Activity	Duration	Completion Date	Evaluation
Reasonable and Prudent Measure 1: Arrowrock Dam				
I.a. Decrease the frequency, duration, and extent of draw downs below water surface elevation of 3,100 feet in Arrowrock Reservoir during the fall migratory period.	Operations flexibility investigation, emphasis on 3,100-foot water surface elevation, September 15 through October 31. Implement any feasible options.	3 to 5 years	2015, based on population recovery.	Weir population trend and community composition with productivity. Also, telemetry investigation with emphasis on fall mortality to commence in 2011.
I.b. Decrease the rate and extent of drafting at Arrowrock Reservoir during the summer months (June through September) to address take associated with reduced reservoir productivity and prey.	Operations flexibility investigation, emphasis on 200,000 acre-feet volume end of June and drafting rates on productivity. Implement any feasible options.	3 years	2015, based on population recovery.	Population trend data combined with community composition and reservoir productivity analysis.
I.c. Minimize conditions that increase the risk of entrainment of bull trout through clamshell outlet conduits in Arrowrock Dam.	Operations flexibility investigation, emphasis on discharge greater than 695 cfs and reservoir water surface elevation below 3,111 feet. Implement any feasible options. Trap and haul.	5 years	2015, based on population recovery.	Telemetry investigation and entrainment rates.
I.d. Implement a trap-and-haul program below Arrowrock Dam	Trap and haul.	15 to 30 years	Will be assessed and evaluated as needed.	Catch per unit effort, telemetry investigation, and entrainment rates.
I.e. Minimize discharge of water over the spillway at Arrowrock Dam to avoid and reduce the effects of entraining bull trout.	Avoid spillway use under all feasible scenarios.	30 years	Annual use assessed and evaluated in monitoring.	Catch per unit effort, telemetry investigation, and entrainment rates.

1. No completion date specified in the incidental take statement. Reclamation has scheduled this work to occur between 2009 and 2014, pending staff and funding availability.

Term and Condition	Activity	Duration	Completion Date	Evaluation
Reasonable and Prudent Measure 2: Anderson Ranch Dam				
2a. Determine and implement ramping rates.	Operations flexibility investigation, emphasis on biologically significant ramping rates. Implement any feasible options.	4 years	March 31, 2012	Weir population trend data and South Fork habitat use comparison. Also, telemetry investigation with emphasis on winter habitat use.
2b. Determine if there is flexibility to manage flows to minimize biological disruption.	Operations flexibility investigation, emphasis on reducing fluctuating flows and temperature effects. Implement any feasible options.	4 years	March 31, 2012	Weir population trend data and South Fork habitat use comparison. Also, telemetry investigation with emphasis on migration cues and movement.
Reasonable and Prudent Measure 3: Deadwood Dam				
3a. Determine if there is flexibility to manage winter flows to minimize effects.	Operations flexibility investigation, emphasis on winter discharge and habitat. Implement changes where feasible.	2 years for baseline and threshold development work; 4 years for operational flexibility work in conjunction with terms and conditions 3.a, 3.b, 3.c, and 3.d.	March 31, 2014	Assessment of fish movement and stream conditions using methods in practice (Koetsier 2005; Rose and Dare 2005). Comparison of conditions 5 years following implementation of any feasible options.
3b. Determine if there is flexibility to manage flows to alleviate low temperatures.	Operations flexibility investigation, emphasis on temperature and lack of variation. Implement any feasible options.		March 31, 2014	
3c. Determine and implement ramping rates.	Operations flexibility investigation, emphasis on biologically significant ramping rates. Implement any feasible options.		March 31, 2014	
3d. Determine if there is flexibility to manage flows to minimize biological disruption.	Operations flexibility investigation, emphasis on reducing fluctuating flows and temperature effects to migration. Implement any feasible options.		March 31, 2014	
3e. Minimize the frequency, duration, and extent of spillway use.	Avoid spillway use under all feasible scenarios.	30 years	Annual use assessed and evaluated in monitoring.	Weir population trend data and, if needed, telemetry investigation to determine entrainment rates.

Term and Condition	Activity	Duration	Completion Date	Evaluation
Reasonable and Prudent Measure 4: Agency Valley Dam				
4a. Reduce the frequency and extent of drawdowns.	Minimum pool investigation, water conservation and leasing program.	2 years for baseline and threshold development work, immediate work to develop water conservation and leasing program	March 31, 2010	Assessment of fish community composition and conditions for prey related to pool size to compare with work planned for this purpose in 2006 and 2007. Comparison of conditions 5 years following the implementation of a minimum pool. Population trends will be monitored using redd counts and used to evaluate effectiveness of implementation activities.
4b. Explore opportunities to supplement the food base.		Varied based on discussions.	Will be assessed and evaluated as needed.	
4c. Identify and implement mechanism to reduce effects of drawdowns.	Minimum pool investigation, water conservation and leasing program.	Will begin immediately and continue through duration of the incidental take statement (30 years).	March 31, 2010	
4d. Continue trap-and-haul efforts.	Trap and haul.	7 of 30 years (when the reservoir volume falls below 2,000 acre-feet) and in 2 of 30 years when spill occurs.	Will be assessed and evaluated as needed.	Catch per unit effort between years.

Reclamation will evaluate the operational flexibility in the context of impacts to other water uses (resident fish, power, and water deliveries) and against existing administrative agreements between partners (the Boise National Forest, the Army Corps of Engineers, and the Idaho Departments of Fish and Game and Parks and Recreation). Reclamation's ability to maintain surface elevations in Arrowrock Reservoir is limited by its legal and contractual obligations to deliver irrigation storage water, meet flood control rule curves, meet State water law, and provide salmon flow augmentation water within the flow augmentation period.

Duration: Reclamation will evaluate the operational flexibility beginning in 2009. This evaluation may take 3 to 5 years. Implementation of any feasible options will begin as soon as possible after the examination is completed, as early as 2011 and no later than 2014. The implementation date for this term and condition is contingent on other bull trout priorities and funding constraints.

Term and Condition 1.b. Within the range of proposed operations, decrease the rate and extent of drafting at Arrowrock Reservoir during the summer months (June through September) to minimize harm associated with reduced reservoir productivity and reduced prey abundance that result from extreme drawdown of Arrowrock Reservoir.

Activity: Arrowrock Reservoir is generally considered oligotrophic with low water residence time. Rates of mortality and sufficient data were not available at the time of the completion of the biological assessment and opinion. However, Reclamation and the FWS speculated that take occurs when early and mid-summer drafting rates lead to reduced surface area, low primary productivity, and a documented loss of zooplankton (Reclamation 2004; Welch 1968). Criteria outlined in the incidental take statement are based on optimizing reservoir surface area during the longest daylight time period (June) to promote primary productivity, including maintaining no less than 200,000 acre-feet of volume at the end of June. More information is necessary to understand the impacts of altered habitat on the bull trout prey base. Understanding these impacts is necessary to make operational decisions that can minimize impacts to bull trout while still meeting contractual and other obligations for water deliveries.

Reclamation will evaluate the impact of an array of reservoir drafting rates (incremental changes in feet per day) on the fishery using historical data to identify rates that harm bull trout or their prey through loss of productivity and entrainment. Reclamation will use this information to take steps to avoid those rates, if possible. Reclamation will also evaluate the Arrowrock Reservoir fish community composition and reservoir productivity related to dam operations. Reclamation will work with the Idaho Department of Fish and Game to monitor the overall community composition within the reservoir to facilitate an understanding of the prey availability and reservoir conditions that lead to decline in the densities of available prey for bull trout. Reclamation will identify and monitor thresholds and quantifications of take associated with those thresholds.

Duration: Reclamation will evaluate a range of drafting rates and their effect on reservoir productivity beginning in 2009. Implementation of any feasible options will begin as soon as possible after the examination is completed and no later than 2015. The implementation date for this term and condition is contingent on other bull trout priorities and funding constraints.

Term and Condition 1.c. Minimize conditions that increase the risk of entrainment of bull trout through clamshell outlet conduits in Arrowrock Dam. Within the range of operations described in the proposed action, reduce the frequency and duration of conditions (associated with reservoir elevation and discharge rates) that result in harassment, injury, and death of bull trout entrained through the dam.

Activity: The new clamshell gates provide the capacity for Reclamation to discharge greater volumes of water from deeper in the reservoir. Since entrainment rates were correlated with the high volumes of water discharged within close proximity to the old outlet works of the dam, future operations with the clamshell gates may minimize incidental take due to entrainment. Reclamation will reevaluate and identify conditions that pose risks of entrainment associated with operations of the clamshell gates. This work will be accomplished in association with term and condition 1.b.

Reclamation will collect telemetry data to validate assumptions of incidental take associated with entrainment. Work will be completed so that previous estimates of entrainment are comparable. If entrainment rates are considerably lower than those anticipated in the incidental take statement, Reclamation will work with the FWS to adjust the trap-and-haul program accordingly.

Duration: Reclamation will reevaluate thresholds for entrainment through the new clamshell gates as part of the evaluation of the effects of drawdown rates on reservoir productivity for a 5-year period (see term and condition 1.b). Reclamation will not conduct telemetry validation work until bull trout populations show stable or increasing trends in size based on weir count data in the Boise River basin and not before 2009.

Term and Condition 1.d. Implement a trap-and-haul program below Arrowrock Dam. Transport to and release all captured or trapped bull trout in Arrowrock Reservoir. Trapping should take place in late spring when bull trout cue to spawn and will likely stage to move upstream below the dam. Trap and haul bull trout in all years when conditions under which entrainment is expected are met. Reclamation and the Service will work together to develop agreed-upon protocol and guidelines for implementing the trap-and-haul program. All injury and death of bull trout associated with trapping and transporting from Lucky Peak Reservoir to Arrowrock Reservoir are covered under a permit issued to Reclamation by the Idaho Department of Fish and Game for purposeful take (permit number F-10-99).

Activity: Reclamation will continue to conduct a trap-and-haul program below Arrowrock Dam to minimize take of bull trout by entrainment. Entrainment is anticipated in years when use of the spillway cannot be avoided (in 15 of 30 years at Arrowrock Dam) and in years when summer and winter operations pass through certain risk zones (in 30 of 30 years).

Some level of entrainment, which varies between 2 and 4 percent, is anticipated in every year. In an effort to maximize available resources, Reclamation will conduct the trap-and-haul program in alternating years. The trap-and-haul program will be conducted during May and early June.

Trap-and-haul activities are currently evaluated for effectiveness by using catch per unit effort calculations from methods of capture. These criteria will continue to be used to maintain comparative estimates of effectiveness (see Salow 2004). Reclamation and the FWS will evaluate the need to conduct trap-and-haul activities more or less frequently based on actual operations for the previous years, the duration and extent of spillway use, and the duration of operation within the critical thresholds outlined in the incidental take statement.

Duration: The trap-and-haul program will be effective for the duration of the incidental take statement and will be completed every other year unless otherwise determined by Reclamation and the FWS.

Term and Condition 1.e. Minimize the frequency, duration, and extent of discharge of water over the spillway at Arrowrock Dam to avoid and reduce the effects of entraining bull trout.

Action: Reclamation will continue to operate Arrowrock Dam to reduce the use of the surface spillway when feasible. Reclamation will evaluate this activity in conjunction with terms and conditions 1.c and 1.d.

Duration: Reclamation will continue this effort for the duration of the incidental take statement.

Anderson Ranch Dam and the South Fork Boise River

The FWS identifies one reasonable and prudent measure and two terms and conditions for Reclamation to implement measures to minimize the effect and/or amount of take associated with the operation of Anderson Ranch Dam. Table 3, beginning on page 13, summarizes the activities, duration, and expected completion dates for these terms and conditions.

Future operating decisions will be based, in part, on biological benefits expected (as measured by weir population trend data, habitat use, and telemetry investigations), costs and other tradeoffs involved, and legal, contractual, and other applicable considerations.

Term and Condition 2.a. Determine and implement ramping rates for both increases and decreases of flows that reduce harassment and harm of bull trout in the South Fork Boise River below Anderson Ranch Dam. Cooperate with the Service to develop a strategy for ramping rates associated with the action as proposed. This term and condition shall be implemented no later than March 31, 2012.

Activities: Reclamation will evaluate options for using available operational flexibility of the Boise River system facilities (Arrowrock, Anderson Ranch, and Lucky Peak Dams and Reservoirs) to modify ramping rates at Anderson Ranch Dam that will minimize operational impacts to bull trout. Reclamation will evaluate possible optional ramping rates for impacts to

other water uses (resident fish, power, and water deliveries) and against existing administrative agreements between partners (the Boise National Forest, the Army Corps of Engineers, and the Idaho Departments of Fish and Game and Parks and Recreation). Reclamation, in cooperation with the Idaho Department of Fish and Game and the FWS, will propose relevant ramping rates and durations for flow increases and decreases at Anderson Ranch Dam.

This evaluation will be in conjunction with activities to meet terms and conditions 1.a, 1.b, and 1.c, including the collection of telemetry data, to validate the assumptions of incidental take associated with altered migration cues and habitat use. Reclamation will not conduct telemetry validation work in the Boise River basin before 2009.

Duration: Reclamation will investigate ramping rates in 2009 and will implement any feasible options upon completion of the evaluation, but no later than March 31, 2012. The implementation date for this term and condition is contingent on other bull trout priorities and funding constraints.

Term and Condition 2.b. Determine whether there is flexibility within the action as proposed to manage flows from Anderson Ranch Reservoir, particularly during the spring, to minimize harassment associated with disruption of bull trout biological processes, particularly migratory cues. Cooperate with the Service to identify and implement any actions that can be taken to associate with this term and condition. Efforts associated with this term and condition shall be completed by March 31, 2012.

Activities: Reclamation will evaluate options for using available operational flexibility of the Boise River system facilities (Arrowrock, Anderson Ranch, and Lucky Peak Dams and Reservoirs) to develop options for managing releases from Anderson Ranch Reservoir to minimize disruption of bull trout biological processes under a range of water availability conditions (including ramping rates, peak discharge, and flow duration). Reclamation will define and describe the extent of habitat available for the assemblage of native fishes using Anderson Ranch Reservoir and the downstream South Fork Boise River habitats under varying water release scenarios within the current range of operations (volume or discharge, timing, and flow duration) over a period of 2 years. Reclamation will evaluate possible options for impacts to other water uses (resident fish, power, and water deliveries) and against existing administrative agreements between partners (the Boise National Forest, the Army Corps of Engineers, and the Idaho Departments of Fish and Game and Parks and Recreation). This evaluation will be in conjunction with activities to meet term and condition 2.a.

Duration: Reclamation will evaluate the operational flexibility beginning in 2009 and will implement any feasible options upon completion of the evaluation.

Deadwood Dam and the Deadwood River

The FWS identifies one reasonable and prudent measure and five terms and conditions for Reclamation to implement measures to minimize the effect and/or amount of take associated

with the operation of Deadwood Dam. Table 3, beginning on page 13, summarizes the activities, duration, and expected completion dates for these terms and conditions.

Because operations at Reclamation's Payette River system facilities are interrelated and integrated, Reclamation will evaluate options for using the available operational flexibility at Deadwood, Cascade, and Black Canyon Diversion Dams and associated reservoirs with the goal of developing an optimal operations scenario to meet the objectives of all five terms and conditions. Future system operating decisions will be based, in part, on the results of such evaluation, the biological benefits expected, the costs and other tradeoffs involved, and legal, contractual, and other applicable considerations. Reclamation's ability to implement an optimal operations scenario is limited by its legal and contractual obligations to deliver irrigation storage water, meet State water law, meet flood control objectives, and provide salmon flow augmentation water within the flow augmentation period.

Term and Condition 3.a. Determine whether there is flexibility within the action as proposed to operate Deadwood Dam to reduce the effects to bull trout when winter streamflows in the Deadwood River below Deadwood Dam are less than inflows to Deadwood Reservoir upstream. Cooperate with the Service to identify and implement any actions that can be taken to facilitate winter flows that more closely approximate reservoir inflows to reduce effects to bull trout. This term and condition shall be implemented no later than March 31, 2014.

Activity: Reclamation and the FWS do not have sufficient information to quantify thresholds for incidental take associated with winter discharge from Deadwood Dam. Discharge from Deadwood Dam during winter is generally slightly less than inflow, allowing storage ranging from 2,750 to more than 13,000 acre-feet of water from September 1 to April 1 each year. Hypolimnetic discharge of low water volumes can lead to conditions that allow formation of frazzle ice below dams. Though these conditions are possible, studies have not been conducted to determine if these adverse conditions occur. Due to the scant data available at the time of the completion of the biological assessment and opinion, the FWS speculated that take would occur due to loss of habitat and potential frazzle ice formation as discussed in Annear (1987). Criteria outlined in the incidental take statement are based on comparing inflow and discharge rates in the winter.

Reclamation has begun evaluating instream habitat conditions and operational effects on movement patterns of fish and stream productivity (Koetsier 2005; Rose and Dare 2005). Reclamation will complete this assessment following the methods currently in practice. Reclamation will incorporate these findings in its evaluation of operational flexibility to determine if it is appropriate and reasonable to adjust operations to reduce anticipated harm and harassment to bull trout resulting from low winter flows downstream from the dam. Reclamation will evaluate the operational flexibility in the context of impacts to other water uses (resident fish, power, and water deliveries) and against existing administrative agreements. Following this evaluation, Reclamation will identify and monitor thresholds and quantifications of take associated with those thresholds. Reclamation will compare conditions 5 years after implementing any feasible option using methods similar to those outlined in

Koetsier (2005) and Rose and Dare (2005) for the creation of baseline assessments. Reclamation will coordinate these activities with terms and conditions 3.b, 3.c, 3.d, and 3.e.

Duration: Reclamation began evaluating discharge rates and the effect on migration cues and river productivity in 2005; Reclamation expects to complete this evaluation in December 2006 and will then begin to study possible operational flexibilities. Implementation of any feasible options will begin by March 31, 2014.

Term and Condition 3.b. Determine whether there is flexibility within the action as proposed to operate Deadwood Dam to reduce harm and harassment of bull trout associated with extreme low temperatures in the river below the dam. Cooperate with the Service to identify and implement any actions that can be taken to increase water temperatures from their present range of 3 to 7 °C to a range that better supports an adequate and diverse prey base for bull trout. Efforts associated with this term and condition shall be completed by March 31, 2014.

Activity: Reclamation has partnered with Boise State University, the Idaho Department of Fish and Game, and the Boise National Forest to investigate the effects of discharge from Deadwood Dam on the community downstream from the dam (as described under term and condition 3.a). Reclamation will incorporate these findings in its evaluation of operational flexibility to determine if adjustments can be made to reduce effects to bull trout associated with low temperatures downstream from the dam. Part of this investigation will address temperature recommendations, including investigating the feasibility of split discharge (combined spillway and valve discharge) and adding selective withdrawal systems. After Reclamation has identified the thresholds described in term and condition 3.a, Reclamation will evaluate the operational flexibility of implementing these thresholds in the context of impacts to other water uses (resident fish, power, and water deliveries) and against existing administrative agreements. Reclamation will compare conditions 5 years after implementing any feasible option in conjunction with term and condition 3.a. Reclamation will coordinate these activities with terms and conditions 3.a, 3.c, 3.d, and 3.e.

Duration: Reclamation expects to complete this work 3 to 4 years following the collection of data described in term and condition 3.a. Implementation of possible options could begin as soon as 2011 and no later than 2014.

Term and Condition 3.c. Determine and implement ramping rates for both increases and decreases of flows that reduce harassment and harm of bull trout in the Deadwood River below Deadwood Dam. Cooperate with the Service to develop a strategy for ramping rates associated with the action as proposed. This term and condition shall be implemented no later than March 31, 2014.

Activities: Reclamation will evaluate options for using the available operational flexibility at Deadwood, Cascade, and Black Canyon Diversion Dams and associated reservoirs to assess our ability to implement ramping rates; this evaluation will be in conjunction with activities for term and condition 3.b. Reclamation will then, in cooperation with the FWS and the Idaho Department of Fish and Game, propose relevant ramping rates and durations for flow increases and decreases at Deadwood Dam to minimize operational impact to bull trout.

Reclamation will evaluate the ramping rates in the context of impacts to other water uses (resident fish, power, and water deliveries) and against existing administrative agreements. Reclamation will compare conditions 5 years after implementing any feasible option in conjunction with terms and conditions 3.a, 3.b, and 3.d.

Duration: Reclamation will begin addressing ramping rates in 2007 and will implement any feasible options upon completion of the evaluation in 2011 and no later than 2014.

Term and Condition 3.d. Determine whether there is flexibility within the action as proposed to manage flows from Deadwood Dam, particularly during the spring, to minimize take (harassment) associated with disruption of bull trout biological processes, particularly migratory cues. Cooperate with the Service to identify and implement any actions that can be taken to associate with this term and condition. Efforts associated with this term and condition shall be completed by March 31, 2014.

Activity: As described earlier, Reclamation will evaluate options for using available operational flexibility at Deadwood, Cascade, and Black Canyon Diversion Dams and associated reservoirs to assess our ability to implement biologically appropriate release regimens for a range of water availability conditions to minimize anticipated harassment of bull trout. This work will be completed in conjunction with the work currently underway for terms and conditions 3.a and 3.b. Reclamation will compare conditions 5 years after implementing any feasible option in conjunction with terms and conditions 3.a, 3.b, and 3.c.

Duration: Reclamation began evaluating discharge rates and the effect on migration cues and river productivity in 2005 (as described in term and condition 3.a). Reclamation expects to complete this evaluation in 2006 with a subsequent study of possible operational flexibilities between 2007 and 2011. Implementation of any feasible options will begin by March 31, 2014.

Term and Condition 3.e. Minimize the frequency, duration, and extent of discharge of water over the spillway at Deadwood Dam to avoid and reduce the effects of entraining bull trout. If, in implementing actions for terms and conditions 3a through 3d, the risk of entrainment changes, coordinate with the Service to determine the feasibility of this term and condition.

Activity: Reclamation will continue to operate facilities to reduce the use of surface spill of water when feasible. Reclamation will consider spillway use and flow duration when evaluating the operational flexibility of the system.

Reclamation will assist the Idaho Department of Fish and Game in operation of the kokanee weir in order to collect information for bull trout population size and condition. Based on previous work, the population size and condition of adfluvial fish using the reservoir to overwinter can be determined using the fish capture data from the Deadwood River weir trap that is installed upstream from Deadwood Reservoir and is operated by the Idaho Department of Fish and Game for kokanee salmon management. The trap can be used to determine post-spawning adult fish condition and juvenile-to-adult capture ratios. Reclamation may seek to validate assumptions on entrainment levels used in the incidental take statement before implementing any feasible options stemming from the evaluation of the operations flexibility.

If this is necessary, Reclamation will use telemetry to track fish to determine the amount or extent of take associated with entrainment through Deadwood Dam.

Duration: Reclamation will continue this effort for the duration of the incidental take statement.

Agency Valley Dam and Beulah Reservoir

The FWS identifies one reasonable and prudent measure and four terms and conditions for Reclamation to implement measures to minimize the effect and/or amount of take associated with operation of Agency Valley Dam. Table 3, beginning on page 13, summarizes the activities, duration, and expected completion dates for these terms and conditions.

Reclamation will measure biological benefits using redd counts, community composition and density analysis, and catch per unit effort.

Term and Condition 4.a. Reduce the frequency and extent of drawdown of Beulah Reservoir to reduce harm and harassment associated with reduced or eliminated prey. Coordinate with the Service annually in implementing this Term and Condition until the parties reach agreement on a specific pool volume that would be a target level to minimize take effects from reservoir drawdown. Work to identify that target reservoir elevation should be completed by March 31, 2010.

Action: Reclamation will evaluate the impact of specific reservoir volumes or levels on the fishery to identify the threshold at which bull trout and their prey are harmed. Any recommended volumes will become targets for water conservation projects by water leasing and conservation agreements. Reclamation will then work with the FWS and other willing cooperators to implement programs and activities to try to maintain this volume of water in Beulah Reservoir. If an annual minimum pool can be maintained, Reclamation will compare conditions 5 years after implementing a minimum pool.

Duration: Reclamation will conduct its minimum pool study through 2007. Programs and activities to try to maintain some residual pool at Beulah Reservoir will then begin immediately.

Term and Condition 4.b. When conditions preclude maintaining water levels that will support a viable bull trout prey base, Reclamation shall work with the Service and other parties to explore opportunities to reduce take by supplementing the food base by stocking Beulah Reservoir with fish species suitable as prey for bull trout. Stocking of additional fish to supplement the bull trout prey base shall be done in every year that Beulah Reservoir is reduced below the level identified as part of Term and Condition 4.a.

Action: Reclamation will initiate discussions with the FWS and the Oregon Department of Fish and Wildlife to identify and explore stocking options. If feasible options are identified and agreed upon by all parties, Reclamation will develop and implement a contingency plan

for supplemental stocking in years when the residual pool identified as part of term and condition 4.a is not maintained.

Duration: Reclamation will begin these discussions and the development of a contingency plan in 2006. The exact implementation of this work will be contingent on discussions with the FWS and the Oregon Department of Fish and Wildlife.

Term and Condition 4.c. Work with the Service and other willing participants to identify and implement any potential mechanism available to reduce the effects of anticipated take of bull trout from reservoir drawdown for the duration of the action. The mechanism shall be consistent with Reclamation authorities and capabilities, shall be carried out in cooperation with interested parties and willing participants, and should ensure that reservoir drawdown does not go below a level sufficient to maintain some habitat for bull trout prey. Efforts associated with this term and condition shall be completed by March 31, 2010.

Action: Reclamation will continue to promote and implement the water conservation and Water 2025 programs in the Malheur River basin to support activities that benefit bull trout. Reclamation will accomplish this work in association with term and condition 4.a.

Duration: Reclamation will implement this activity immediately and will continue this effort for the duration of the incidental take statement.

Term and Condition 4.d. For the term of the proposed action, continue all existing efforts to trap and return bull trout that are entrained at Agency Valley Dam back to Beulah Reservoir or the North Fork Malheur River upstream from the dam. Maintain all protocols aimed at minimizing the likelihood of injury during this effort and maintain the existing scale and scope of the effort. Efforts to move bull trout shall take place in all years when the spillway is used at Agency Valley Dam.

Action: Reclamation will continue to operate Agency Valley Dam in such a way so as to reduce the use of surface spillway of water when feasible. In addition, Reclamation will conduct trap-and-haul operations below Agency Valley Dam for the purpose of reducing take of bull trout by entrainment in years when entrainment is expected. Reclamation will evaluate operations and anticipated entrainment annually to determine the need for trap-and-haul operations. Reclamation will provide a program to trap and haul bull trout below the facility in years when use of the spillway cannot be avoided (expected in 2 of 30 years) or when reservoir elevation are below 2,000 acre-feet (expected in 7 of 30 years). Effort will be focused on late May and June, and the amount of effort will be based on catch per unit effort each year as outlined in Table 4.

Duration: Reclamation will trap and haul bull trout, in accordance with the criteria outlined in Table 4, for the duration of the incidental take statement.

Table 4. Thresholds of initiation and effort for trap and haul of bull trout.

Threshold	Effort anticipated	Time period of trapping
Spill	Each year spill occurs, 160 hours of angling	6 weeks; April through May (can occur in March if spilling)
Reservoir pool volumes below 2,000 acre-feet	80 hours; increase effort if fish are captured	5 weeks; May through June

IV. Reporting

The incidental take statement requires that Reclamation provide an annual report to the FWS. Reclamation will submit the report by December 31 of each year. The report will include three components:

1. A summary of the operations, results from bull trout population size and trend work, results from Utah valvata survey work, and analysis of estimated incidental take of bull trout and Utah valvata for that year. This report will include the operational thresholds for take, instances of exceedance, the duration of exceedance, a detailed description of methods used, analyses performed, and assumptions and limitations of all statistical models used.
2. A summary of the results and progress on the implementation of the reasonable and prudent measures and terms and conditions in the incidental take statement. When Reclamation completes an implementation program, Reclamation will evaluate the results and conditions and work with the FWS to determine the need for and duration of any additional (or future) activities. All programs will be refined as additional data for conditions conducive to bull trout entrainment are collected at both Arrowrock and Agency Valley Dams.
3. A summary of any work completed for conservation recommendations and recovery.

Reclamation will provide an annual project plan to the FWS by March 1 of each year. The plan will summarize all proposed implementation and monitoring activities, including partnerships and their relationship to the consultation. Reclamation will also inform the FWS before April 15 of each year of opportunities to discuss forecasted operations for the coming water year.

V. Literature Cited

Parenthetical Reference

Annear 1987

Bibliographic Information

Annear, T.C. 1987. Snake River instream flow studies. Wyoming Department of Game and Fish, Project IF-1087-0s9-8701. Laramie, Wyoming.

**Parenthetical
Reference**

Bibliographic Information

- FWS 2005 U.S. Fish and Wildlife Service. 2005. Biological opinion for Bureau of Reclamation operations and maintenance in the Snake River basin above Brownlee Reservoir. File #1008.0151.05; OALS #1-4-05-F-432. March 31, 2005. Snake River Basin Office, Boise, Idaho.
- Koetsier 2005 Koetsier, P. 2005. Macroinvertebrate, periphyton, and organic material collections of the Deadwood Reservoir system: a work plan. Contract report submitted to U.S. Bureau of Reclamation, Snake River Area Office West. Reference No. 051S1200060.
- Reclamation 2004 U.S. Bureau of Reclamation. 2004. Biological assessment for the Bureau of Reclamation operations and maintenance activities in the Snake River basin above Brownlee Reservoir. Snake River Area Office, Boise, Idaho.
- Reclamation 2005 U.S. Bureau of Reclamation. 2005. Decision document concerning the U.S. Fish and Wildlife Service biological opinion and incidental take statement; consultation for the operations and maintenance of 12 Bureau of Reclamation projects in the Snake River basin above Brownlee Reservoir – March 2005. November 29, 2005. Snake River Basin Office, Boise, Idaho.
- Rose and Dare 2005 Rose, S. M. and M. Dare. Bull trout habitat investigation in the Deadwood River. Interim report submitted to the U.S. Bureau of Reclamation, Snake River Area Office West. August 2005.
- Salow 2004 Salow, T. 2004. Trap and transport of bull trout (*Salvelinus confluentus*) from Lucky Peak Reservoir to Arrowrock Reservoir, Idaho. Summary report submitted to the U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Snake River Area Office, Boise, Idaho.
- Salow 2005 Salow, T. 2005. Inferences from weir counts of population size and environmental influence on migration timing for adfluvial bull trout (*Salvelinus confluentus*). Summary report for 1999-2004 Field Work submitted to the U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Snake River Area Office, Boise, Idaho.
- Welch 1968 Welch, D. J. 1968. Lake and reservoir investigations. Idaho Department of Fish and Game. Job Completion Report. F 53-R-2.