- Summary

Proposal Summary

This page provides a read-only view of a Proposal. The sections below are organized to help review teams quickly and accurately review a proposal and therefore may not be in the same order as the proposal information is entered.

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Proposal RMECAT-00177 - B-run Steelhead Supplementation Monitoring Project

PDF View

Project Number: 2010-057-00

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Proposal Number:	RMECAT-00177
Proposal Status:	ISRP - Pending First Review
Review:	RME / AP Categorical Review
Portfolio:	RM&E Cat. Review - Artificial Production
Type:	Existing Project: 2010-057-00
Primary Contact:	Jay Hesse (jayh@nezperce.org)
Created:	7/14/2010 by Jay Hesse (jayh@nezperce.org)
Proponent Organizations:	Idaho Department of Fish and Game (IDFG) Nez Perce Tribe

Project Title: B-run Steelhead Supplementation Monitoring Project

Proposal Short Description:

This project will monitor the effectiveness of B-run steelhead hatchery (supplementation) in the Clearwater River subbasin. Short term productivity will be assessed through Relative Reproductive Success (RRS) in Lolo Creek. Comparative performance of conventional and supplemental production strategies will be evaluated in the South Fork Clearwater River. This project will also validate PIT tag array-based status and trend estimates and facilitate a run-reconstruction of Snake Basin steelhead.

Proposal Executive Summary:

This project provides: 1) hatchery (supplementation and conventional) monitoring on B-run steelhead (Oncorhynchus mykiss) released in the Clearwater River subbasin, 2) incorporation and validation of PIT tag array-based status and trend estimates of adult abundance, 3) descriptive biological data on natural-origin returns, and 4) facilitation of a run-reconstruction of Snake Basin steelhead to known and unknown areas (formally proposal 2010-04-800). Carried out by co-managers, the Nez Perce Tribe (NPT) and the Idaho Department of Fish and Game (IDFG), this project will play a critical role in increasing the existing understanding of two significant populations of B-run steelhead in the Clearwater River major population group (MPG), the Lolo Creek and the South Fork Clearwater River (SFCR) populations. Data generated through the implementation of this project is required under the FCRPS BiOp (RPAs 63.1, 71 and 72) and is consistent with the Coordinated Anadromous Workshop Snake Basin strategy for high precision abundance data, hatchery effectiveness monitoring, and data management.

The 2008-2017 U.S. vs Oregon Management Agreement designated 200,000 unclipped (supplementation) steelhead reared at Dworshak National Fish Hatchery (DNFH) released into Lolo Creek and 330,000 unclipped steelhead reared at the Clearwater Anadromous Fish Hatchery (CAFH) released into tributaries of the South Fork Clearwater River (SFCR). These releases are in addition to the 840,000 conventionally reared, AD-clipped, steelhead smolts released into the SFCR each year. The motivation behind the unclipped fish releases is escapement from down-river fisheries and increased contribution to natural production to bolster natural steelhead population abundances. The brood stock composition of the supplementation releases (e.g., integration of natural adults into the brood stock) and the increase of these releases from the current level of 60,000 into Lolo Creek to full production (200,000) will be decided by tribal, state, and federal co-managers. Therefore, this project is structured as an observational study of management actions, as per the recommendation of ISRP/ISAB.

This project aims to evaluate the efficacy of these actions by 1) monitoring the population abundances of Lolo Creek and SFCR steelhead, 2) assessing the relative productivity, survival and behavior of natural and hatchery fish in Lolo Creek, and 3) comparing the relative performance of supplementation and conventional hatchery steelhead in the SFCR. Furthermore, the spatial distribution of returning natural, supplementation, and conventional adults in the SFCR will be followed to determine spatial overlap in the spawning distribution of these fish and to verify or refute the believed presence of a velocity barrier (near Golden) to returning steelhead in the SFCR. Finally, working in coordination with all co-managers in the Snake River Basin, including the U.S. Fish and Wildlife Service, The Shoshone-Bannock Tribe, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, Washington Department Fish & Wildlife, and The Confederated Tribes of the Umatilla Indian Reservation, the data collected through the activities of this project will be intergrated with that of other monitoring projects to account for the final disposition of adults upstream of Lower Granite Dam for the purposes of run-reconstruction.

To perform these tasks the project will utilize existing resources and facilities as well as implement new monitoring activities. Within Lolo Creek, the permanent weir construction approved through the Fast Track proposal process (2010-038-00) will be used to monitor returning adults and to collect biological data such as age at return, size at return, and sex ratio. Genetic sampling conducted at the weir will be used to conduct relative reproductive success analyses. The weir will also serve to validate the passage data collected through the use of PIT tag arrays (installed and operated under Project 2003-017-00) located above and below the weir. Screw trap operation in Lolo Creek currently implemented under the Nez Perce Tribal Hatchery Monitoring and Evaluation Project (1983-350-03) will serve to collect data used to calculate juvenile abundance, assess size and condition at emigration, and sample individuals for age and genetic analysis. Under this project, a screw trap would be installed in the SFCR to monitor juveniles leaving that system and, similar to Lolo Creek, PIT tag arrays located near the mouth of the SFCR and downstream of release tributaries (installed and operated under Project 2003-017-00) would be used to collect data on returning adults.

In addition to these activities, this project will incorporate a suite of tagging technologies to improve the information currently available on the status of steelhead populations in the Clearwater River subbasin. Supplementation juveniles will be coded wire tagged to distinguish these individuals from natural fish as adults. Juveniles will be PIT tagged at the Lolo Creek and SFCR screw traps to determine juvenile abundance and survival through the hydrosystem using mark-recapture analyses. Finally, a subset of the adults returning to SFCR will be captured, utilizing Separation by Code at Lower Granite Dam of know SFCR destined fish, and with the assistance of volunteer anglers and radio tagged to evaluate the spatial distribution of these fish in the SFCR.

An important goal of this project is the timely reporting of science-based data. The Nez Perce Tribe Department of Fisheries Resource Management (DFRM) now has the equipment infrastructure necessary to ensure that this will be achieved. With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

Deliverables accomplished through the implementation of this project include:
1) Determine and compare the relative reproductive success of natural and supplementation B-run steelhead in Lolo Creek.
2) Determine and compare life-stage specific survival rates for Lolo Creek (natural and supplementation) and South Fork Clearwater River (natural, supplementation, and conventional).
3) Determine the adult and juvenile life history characteristics of natural and supplementation B-run steelhead.
4) Determine the influence, proportion, and rates of naturally spawning fish that are stray (conventional hatchery origin) fish in the stream.
5) Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the brood stock.
6) All hatchery production marked with CWT, a portion with ad-clips (conventional), and a representative sample with PIT tags.
7) Determine and compare the in-stream and in-hatchery productivity of natural, supplementation, and conventional hatchery fish.
8) Determine and compare the adult distribution of hatchery (conventional and supplementation) and natural origin steelhead in the South Fork Clearwater River.
9) Run reconstruction of steelhead over Lower Granite Dam (annually)- comanagement task.
10) Provide annual reports, metadata and performance measure data to DFRM database.

The hypotheses to be tested through the work of this project include:
1) The annual abundance of natural B-run steelhead in Lolo Creek and the South Fork Clearwater River are increasing (annual monitoring for 15 years).
2) Lolo Creek natural and supplementation B-run steelhead relative reproductive success is not different, calculated at three life stages (young of the year, smolts, and adult returns) (annual monitoring for 15 years).
3) Lolo Creek natural and supplementation steelhead survival, behavior, and performance are not different. Performance measures to be tested include: juvenile survival to Lower Granite Dam, mainstem arrival timing, smolt-to-adult return rates (SARs), and adult run-timing (10 years).
4) Supplementation and conventional steelhead survival, behavior, and performance in the SFCR is not different. Performance measures to be tested include: juvenile survival to Lower Granite Dam, mainstem arrival timing, smolt-to-adult return rates (SARs), adult run-timing, in-hatchery life-stage specific survival, fecundity, size at release, and conversion rates of adults between Lower Granite Dam and the SFCR (10 years).
5) The spatial distribution of natural, supplementation, and conventional adults in the SFCR is not different (5 years).
6) Relative natural production between Lolo Creek and SFCR remains constant over time. Measured as juveniles per recruit (15 years).
7) Abundance of steelhead counted at Lower Granite Dam can be reasonably accounted for to known states of final disposition (harvest, broodstock collection, escapement to populations) upstream of Lower Granite Dam (15 years).

Purpose: Artificial Production
Emphasis: RM and E
Species Benefit: nadromous: 100.0% Resident: 0.0% Wildlife: 0.0%
2009 F&W Progra es
Fish Accords: <none>
Biological Opinions:
- FCRPS 2008 (RPA 63.1, RPA 50.5, RPA 71.2, RPA 72)

Proposal Histor

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Date	Time	Type	From	To	By	Archive
7/14/2010	8:15 AM	Status		Draft	Jay Hesse	
7/30/2010	4:15 PM	Status	Draft	ISRP - Pending First Review	Jason Vogel	Download

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Location

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Project Region:

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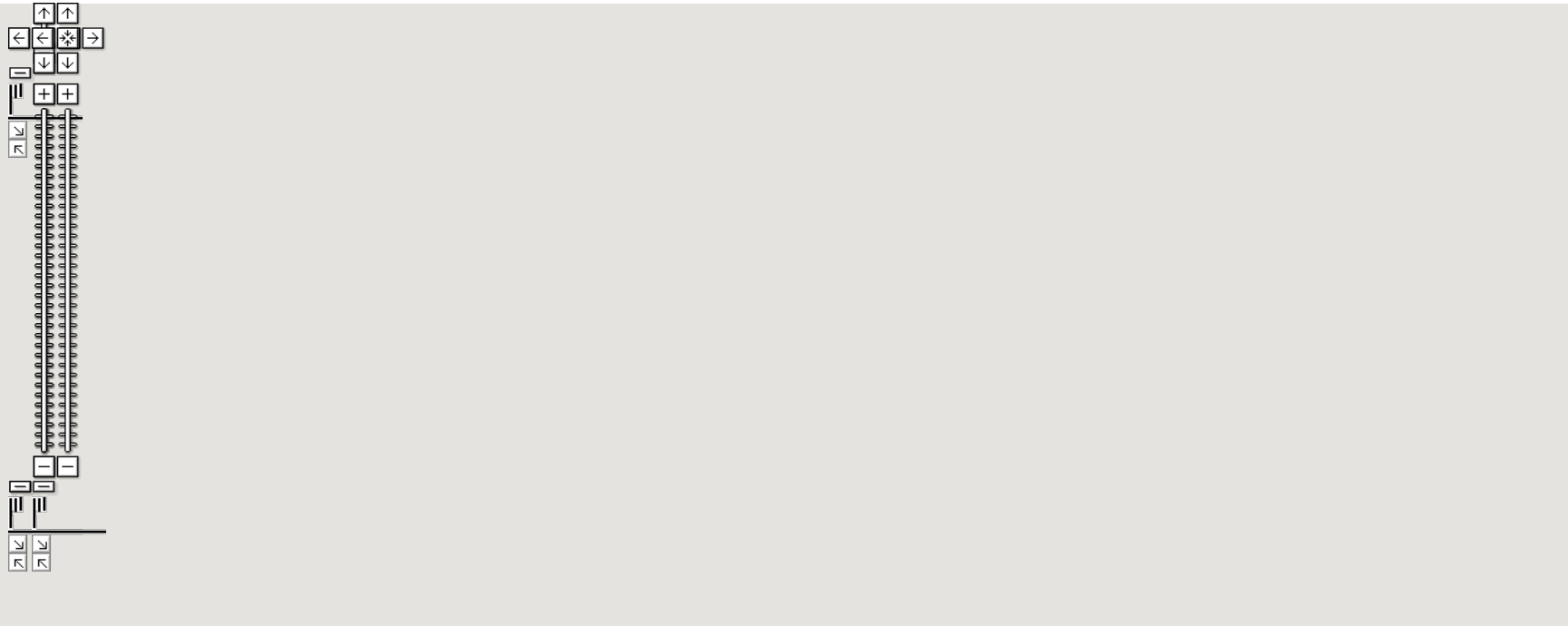
Outlined HUC Scale: All Watersheds (HUC5)

Hybrid Satellite Terrain



Region	HUC Level	HUC#	HUC Name
Tributaries / Watersheds	HUC4	17060305	SOUTH FORK CLEARWATER
Tributaries / Watersheds	HUC5	1706030615	CLEARWATER-15
Tributaries / Watersheds	HUC5	1706030622	CLEARWATER-22
Tributaries / Watersheds	HUC4	17060304	MIDDLE FORK CLEARWATER
Tributaries / Watersheds	HUC5	1706030616	CLEARWATER-16

Project Significance & Problem Statement

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Project Significance to Regional Programs:

A basin-wide strategic assessment of needed information/data to guide management of Columbia Basin anadromous salmonids was recently developed in the Regional RM&E Collaboration strategies (Coordinated Anadromous Workshop 2010 a, b and c). These documents concisely call for Snake River basin spring/summer Chinook and steelhead high precision estimates of adult abundance (coefficient of variation of 15% or less) in at least one population per life history type per MPG. Leading up to the development of the Coordinated Anadromous Workshop basin-wide strategy, are voluminous assessments of resource condition and recommendations for desired information. Given the problem statements and limiting factors listed in the Clearwater Subbasin Management Plan (Ecovista 2004), a list of objectives, strategies, and research, monitoring and evaluation (RM&E) activities were developed and linked to these approaches. The objectives and strategies identified the need to conduct various RM&E activities. The Viable Salmonid Populations (VSP) criteria recommended by McElhaney et al. (2000) were suggested to provide a means of analyzing population response to implementing objectives and strategies (Ecovista 2004). Population level performance standards were to be evaluated in terms of abundance, population growth rate, life history diversity, spatial distribution, and genetic diversity. The need to collect population specific adult abundance and productivity key performance data were identified as data gaps necessary to collect as a direct measure of delisting metrics (Ecovista 2004). This information along with other key performance measures were identified to be necessary for effective management, understanding mechanisms that affect freshwater survival, relating fish population data to current habitat conditions and proposed rehabilitation measures, and providing unbiased and precise estimators of interim abundance and productivity viability targets. The need to assess biological performance of natural origin salmon and steelhead populations in tributary streams and for measurement of recovery status of listed species has been recognized by multiple Biological Opinion related documents (NMFS 2000, NOAA Fisheries 2004, U.S. Army Corps of Engineers et al. 2004, 2005, NOAA Fisheries 2008, ICTRT 2007). The Northwest Power and Conservation Council's Fish and Wildlife program (NPCC 2000, 2005) lists biological objectives which contains abundance as one of the biological performance measures. A number of authors have identified the need for population monitoring, viability assessment, and species conservation (Allendorf and Ryman 1987, Botkin et al. 2000, Foose et al. 1995, Franklin 1980, Goodman 1987, ICTRT 2005, Kapuscinski and Miller 1995, Kincaid 1997, Kucera and Blenden 1999, Mace and Lande 1991, McElhaney et al. 2000, Mundy 1999, Reed and Blaustein 1997, Shaffer 1987, Soule 1980, Soule 1987, Starfield et al. 1995). It is important that objectives from regional plans be quantifiable in biological terms as standardized performance measures (CSMEP 2005, Ecovista 2004). When the common tender across regional plans, policies,

and goals is performance measures, this provides the necessary linkage for research, monitoring, and evaluation studies. This project provides the standardized performance measures of accurate and precise adult escapement to tributary, progeny-per-parent productivity, and adult run timing information. The B-Run steelhead project proposes to provide high accuracy and precision adult escapement to tributary, abundance data, hatchery fraction, age structure, age-at-return, size-at-return, age-at-emigration, percent females, and adult run timing to Lolo Creek and a subset of that information for the South Fork Clearwater. This information provides a direct measure and feedback to regional objectives and supports derived life stage specific and population growth rate performance measures. Relationship to 2008 FCRPS Biological Opinion and Action Agency Implementation Plan The 2008 FCRPS Biological Opinion (NOAA Fisheries 2008) lists Reasonable and Prudent Alternatives (RPA's) for research, monitoring and evaluation (RM&E) actions. The overall RM&E objective was to provide information needed to support planning and adaptive management and demonstrate accountability related to the implementation of FCRPS ESA hydropower and offsite actions for all Evolutionary Significant Units (ESU's). The Action Agencies were directed to undertake RM&E through project implementation and compliance monitoring, status monitoring, action effectiveness research, and critical uncertainties research in nine RM&E strategy areas. This project is also related to RPA 51.1 to support data management of fish population metrics (Chinook and steelhead), RPA 62.5 to investigate genetic stock identification monitoring techniques (steelhead). Relationship to Regional RM&E Collaboration Strategies Quantifying abundance, survival, distribution, and diversity (VSP) of all populations is desired by fisheries managers, however is not scientifically needed or financially possible to robustly quantify all VSP performance measures in all populations. Pre-establishment of a subset of populations for intensive status monitoring and other areas for trend/index monitoring is prudent for efficient assessment and allocation of limited resources. Despite multiple recommendations for increased and improved monitoring (ISAB/ISRP 2009-1, ISRP 2008-4, ISRP/ISAB 2005-15, NPCC 2009, Botkin et al. 2000), a commonly accepted description of what type, location, and replication of RM&E that is needed in the Columbia River basin has been lacking until just recently. Columbia Basin natural resource managers, funding agencies, and regulatory entities worked together in 2009 to produce a coordinated anadromous monitoring strategy that establishes the scope, spatial coverage and desired precision for monitoring and evaluating population status and trends, hatchery, habitat, hydro, diversity, and data management and access of anadromous salmonids in the Columbia Basin (Coordinated Anadromous Workshop 2010 a , b, and c). The research, monitoring, and evaluation strategy developed by the Coordinated Anadromous Workshop can be reviewed in full at http://www.cbfwa.org/ams/FinalDocs.cfm. Relationship to 2009 Northwest Power and Conservation Council Fish and Wildlife Program The Northwest Power and Conservation Council Fish and Wildlife Program (NPPC 2009) states that biological objectives have two components, biological performance and environmental characteristics. Biological performance which describes population responses to habitat conditions in terms of capacity, abundance, productivity, and life history diversity. The biological objective component, abundance, is intended to be empirically measurable based on explicit scientific rationale to meet Power Council objectives and vision of the Fish and Wildlife program. Objectives should be expressed in quantitative and measurable terms at the province and subbasin level. Strategies identified in the adult passage subsection (NPPC 2009) include evaluation of escapement numbers to spawning grounds. Strategies identified under the Research, Monitoring and Evaluation subsection identifies the primary RM&E strategies as: 1) identify priority fish and wildlife and ecosystem elements of the Program that can be monitored in a cost-effective manner, evaluate the monitoring data and manage the Program based on results, 2) research and report on key uncertainties, 3) make information from this program accessible to the public, and 4) to the extent practicable ensure consistency with other processes. The purpose of the monitoring and evaluation strategies is to assure that the effects of actions taken under this program are measured, that these measurements are analyzed so that we have better knowledge of the effects of the action, and that this improved knowledge is used to choose future actions. Monitoring and evaluation of tributary specific adult salmon abundance and productivity in the Secesh River as a key biological performance measure is closely linked to biological objectives. Salmon abundance information from this project is quantified, has high accuracy and precision, is available to the public, is compared to supplementation program performance, and directly measures the effect of FCRPS (2008) conservation measures in the aggregate. Finally, the NPPC (2009) has adopted the subbasin plans. The Clearwater Subbasin Management Plan biological objectives and strategies are discussed below, and contain direct linkages to the population level steelhead adult abundance and productivity information that this project collects. Steelhead information would relate in the same manner for the described NPPC Fish and Wildlife Program objectives and strategies. This project is consistent with the NPPC (2009) Fish and Wildlife Program direction. Relationship to 2006 NPPC Columbia River Basin Research Plan The NPPC (2006) Columbia River Basin Research Plan identified the need for monitoring and evaluation, including status and trend monitoring of fish, wildlife, habitats, and ecosystems, and action effectiveness research, to provide information to evaluate project outcomes, project objectives, and programmatic standards within an adaptive management framework. This plan acknowledged that monitoring contributes needed information to address whether biological and programmatic performance objectives in the Fish and Wildlife Program, subbasin plans, FCRPS Biological Opinion and ESA recovery plans were being met. Use of monitoring data to recommend management changes, identify factors that limit achieving performance standards, and identifying which mitigation actions are most effective at addressing limiting factors was emphasized. Collection of natural origin salmon and steelhead escapement and productivity data on this project, for status and trend monitoring, supplementation program comparison, Biological Opinion and recovery plan metrics seem to agree with intent of the NPPC (2006) research plan. Relationship to ISRP Reports The Independent Scientific Review Panel (ISRP 2005) provided retrospective recommendations on monitoring in subbasin plans. The ISRP identified the need to develop a coordinated system-wide monitoring and evaluation program. Recommendation 1 was to develop a sound census monitoring procedure to examine fish population and habitat trends over time. Census monitoring of fish populations might include data from all stream reaches in a watershed..... and adult counts at weirs. This project provides census monitoring of natural and hatchery origin adult steelhead abundance and productivity in Lolo Creek at the population level. The ISRP also recommends that as data are obtained on status and trends of fish populations that regression models be developed to predict abundance or presence/absence of focal species. In addition, the ISRP has consistently recommended the need for storage of primary data and metadata collected in research studies in the Columbia River basin. The Department takes seriously the need to make primary data and metadata available within the region (ISRP 2005). The volume and complexity of information gathered through monitoring and evaluation activities will need to be compiled and organized in a systematic manner (see Objective7 in proposal that specifically addresses this topic). Relationship tp the

Tribal Recovery Plan The Wy-Kan-Ush-Me-Wa-Kush-Wit, Spirit of the salmon, (1995) provides guidance to establish and monitor escapement checkpoints at mainstem dams and in index subbasins. Methods to be used include video counting at hydropower dams and at key locations in tributaries using the least intrusive method to collect the necessary information. It further recommends establishing additional monitoring programs for each of the subbasin tributary systems to monitor adult escapement and resulting smolt production, and to evaluate (by measuring the number of adults returning) the ability of managers to meet goals set by the Columbia River Fish Management Plan (CRFMP).

Problem Statement:

Objectives & Project Deliverables

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OBJ-1. Coordinate efforts among co-managers to efficiently and effectively collect and analyze effectiveness data

Description: Tasks- a) facilitate brood stock integration and management of supplementation releases, b) ensure appropriate levels of juvenile marking and tagging for conventional, supplementation releases as well as natural fish juveniles and adults, c) prevent duplication of efforts and maximize data collection for effort expended

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Deliverable: DELV-6: All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.

Description: To obtain performance measures that include juvenile survival, SARs, proportion broodstock and natural spawners by origin requires that all hatchery fish need to be marked with CWT, and an adequate sample with PIT tags. This project will work within the US v. OR aggreement, but ensure that 100% of the fish produced and released into Lolo Creek and South Fork Clearwater are marked with CWT to enable successful implementation of this project.

Start: 2011 End: 2011 Budget: $1,066,973

Assoc. Work Elements: 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

OBJ-2. Evaluate the juvenile and adult population abundances in Lolo Creek

Description: Tasks- a) emigrant abundance estimation (screw trap) utilizing a marking and recapture program, b) adult abundance estimation with the operation of the Lolo Creek weir and evaulation of remote PIT Tag arrays.

Deliverable: DELV-2: Determine and compare life stage-specific survival rates for Lolo Cr. (natural and supplementation) and SFCR (natural, supp, and conventional) fish.

Description: Two primary performance measures describing life stage-specific survival rates are examined: juvenile emigrant survival to Lower Granite Dam and smolt-to-adult return rate (SAR) for natural-origin fish and hatchery produced fish in Lolo Creek (supplementation) and South Fork Clearwater River (supplementation and conventional). Associated performance measures include juvenile emigrant abundance and smolt equivalents. Juvenile steelhead emigrate from natal streams as parr, presmolts, and smolts (both yearling and precocial yearlings). The relative abundance of emigration at each lifestage is influenced by environmental conditions. Fish will be marked with PIT tags for subsequent survival estimation. Characterization of juvenile survival of natural fish is limited to fish emigrating from tributaries as smolts for this objective to be comparable to hatchery fish released as smolts. Mark-recapture methodology utilizing Passive Integrated Transponder (PIT) tags and subsequent detections at remote PIT tag arrays and mainstem dams generate survival estimates. Hatchery-origin fish (supplementation and conventional) are PIT tagged prior to release. Natural-origin fish will be PIT tagged at time of emigration. Juveniles will be tagged representatively across the emigration period and scale samples will be taken at the time of tagging to determine age at emigration. Juvenile survival comparisons will be determined with only emigrating natural smolts while SAR's quantification requires tags to be applied across all life stages. Smolt-to-adult return rates will be generated for four performance areas: tributary to tributary, tributary to Lower Granite Dam (LGD), LGD to LGD, and LGD to tributary. Coded Wire Tags (CWT) and PIT tag methods will be used to generate hatchery SARs.

On-the-ground work will consist of the operation of two rotary screw traps (typically nine months): one in Lolo Creek and one in South Fork Clearwater River. Work will also occur at the Clearwater and Dworshack Fish Hatcheries during marking and tagging of hatchery-origin supplementation and conventional fish.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Size of Fish at a Life Stage	Length: Juveniles (none)
Survival Rate: Inter-Life Stage	CJS survival estimation (Smith, S..G., J.R. Skalski, W. Schlechte, A. Hoffmann, and V. Cassen., 1994) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Survival Rate: Inter-Life Stage	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Use of Instream PIT tag Arrays to Monitor Migration (none)
Survival Rate: Inter-Life Stage	Egg Survival (none) hatchery fish growth and survival (none)

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and

then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start:	2011	End:	2020	Budget:	$1,600,460
Assoc. Work Elements:	159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data				
Env. Metrics/Methods:					

Deliverable: DELV-5: Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the broodstock

Description: Abundance is estimated for adults returning to natal streams (as total escapement) and to spawning areas above weirs (as spawner abundance) and PIT Arrays by origin. Above the weir and arrays, the method is a mark-recapture calculation, where recaptures are downstream moving kelts (marked at the weir and detected in the arrays).

Spawner abundance is calculated by utilizing the mark-recapture estimate to the fish. Origin percent composition (i.e., hatchery fraction) and gender percent composition, calculated from collected fish at the Lolo Creek Weir and adults PIT tagged at Lower Granite Dam and detected (recaptured) at the PIT arrays on Lolo Creek and South Fork Clearwater.

Start:	2011	End:	2020	Budget:	$711,316
Assoc. Work Elements:	70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data				

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-6: All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.

Description: To obtain performance measures that include juvenile survival, SARs, proportion broodstock and natural spawners by origin requires that all hatchery fish need to be marked with CWT, and an adequate sample with PIT tags. This project will work within the US v. OR aggreement, but ensure that 100% of the fish produced and released into Lolo Creek and South Fork Clearwater are marked with CWT to enable successful implementation of this project.

Start:	2011	End:	2011	Budget:	$1,066,973
Assoc. Work Elements:	158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data				

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

OBJ-3. Evaluate the survival, behavior, and performance of natural and supplementation steelhead in Lolo Creek

Description: Tasks- a) Emigrant capture and marking program to determine mainstem survival and arrival timing, b) evaluation of PIT tag array data to determine SAR rates, adult run-timing and conversion rate of adults between Lower Granite Dam and the Lolo Creek, c) scale sampling of juveniles and adults to assess the age composition of natural and supplementation fish at emigration and adult return, d) collection of biological data at the hatcheries, screw trap, and weir to compare life history and phenotypic characteristics (in-hatchery survival, size and condition at release), e) relative reproductive success evaluation (see objective 4).

Deliverable: DELV-2: Determine and compare life stage-specific survival rates for Lolo Cr. (natural and supplementation) and SFCR (natural, supp, and conventional) fish.

Description: Two primary performance measures describing life stage-specific survival rates are examined: juvenile emigrant survival to Lower Granite Dam and smolt-to-adult return rate (SAR) for natural-origin fish and hatchery produced fish in Lolo Creek (supplementation) and South Fork Clearwater River (supplementation and conventional). Associated performance measures include juvenile emigrant abundance and smolt equivalents. Juvenile steelhead emigrate from natal streams as parr, presmolts, and smolts (both yearling and precocial yearlings). The relative abundance of emigration at each lifestage is influenced by environmental conditions. Fish will be marked with PIT tags for subsequent survival estimation. Characterization of juvenile survival of natural fish is limited to fish emigrating from tributaries as smolts for this objective to be comparable to hatchery fish released as smolts. Mark-recapture methodology utilizing Passive Integrated Transponder (PIT) tags and subsequent detections at remote PIT tag arrays and mainstem dams generate survival estimates. Hatchery-origin fish (supplementation and conventional) are PIT tagged prior to release. Natural-origin fish will be PIT tagged at time of emigration. Juveniles will be tagged representatively across the emigration period and scale samples will be taken at the time of tagging to determine age at emigration. Juvenile survival comparisons will be determined with only emigrating natural smolts while SAR's quantification requires tags to be applied across all life stages. Smolt-to-adult return rates will be generated for four performance areas: tributary to tributary, tributary to Lower Granite Dam (LGD), LGD to LGD, and LGD to tributary. Coded Wire Tags (CWT) and PIT tag methods will be used to generate hatchery SARs.

On-the-ground work will consist of the operation of two rotary screw traps (typically nine months): one in Lolo Creek and one in South Fork Clearwater River. Work will also occur at the Clearwater and Dworshack Fish Hatcheries during marking and tagging of hatchery-origin supplementation and conventional fish.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Size of Fish at a Life Stage	Length: Juveniles (none)
Survival Rate: Inter-Life Stage	CJS survival estimation (Smith, S..G., J.R. Skalski, W. Schlechte, A. Hoffmann, and V. Cassen., 1994) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Survival Rate: Inter-Life Stage	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Use of Instream PIT tag Arrays to Monitor Migration (none)
Survival Rate: Inter-Life Stage	Egg Survival (none) hatchery fish growth and survival (none)

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and

then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Deliverable: DELV-5: Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the broodstock

Description: Abundance is estimated for adults returning to natal streams (as total escapement) and to spawning areas above weirs (as spawner abundance) and PIT Arrays by origin. Above the weir and arrays, the method is a mark-recapture calculation, where recaptures are downstream moving kelts (marked at the weir and detected in the arrays).

Spawner abundance is calculated by utilizing the mark-recapture estimate to the fish. Origin percent composition (i.e., hatchery fraction) and gender percent composition, calculated from collected fish at the Lolo Creek Weir and adults PIT tagged at Lower Granite Dam and detected (recaptured) at the PIT arrays on Lolo Creek and South Fork Clearwater.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-6: All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.

Description: To obtain performance measures that include juvenile survival, SARs, proportion broodstock and natural spawners by origin requires that all hatchery fish need to be marked with CWT, and an adequate sample with PIT tags. This project will work within the US v. OR aggreement, but ensure that 100% of the fish produced and released into Lolo Creek and South Fork Clearwater are marked with CWT to enable successful implementation of this project.

Start: 2011 End: 2011 Budget: $1,066,973

Assoc. Work Elements: 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

Deliverable: DELV-3: Determine the adult and juvenile life history characteristics of natural and supplementation B-run steelhead.

Description: Life history characteristics include the age at migration, size at migration, and migration timing. Age at migration will be determined for juveniles by collecting and aging scale samples from those fish caught at the Lolo Creek and SFCR screw traps. Scale sampling will also be used for adult returns at the Lolo Creek weir. For adults, this information will be coupled with additional data recovered from tagging and marking efforts (i.e., Pit tags and CWTs).

Size at migration will also be collected at the sampling occasions described above (screw traps and Lolo Creek weir) as well as at Lower Granite Dam (adults removed for marking).

Migration timing will be assessed for juveniles and adults using PIT tag monitoring at Lower Granite Dam and, in the case of adult migrations, at PIT tag arrays located on Lolo Creek and SFCR.

Start: 2011 End: 2020 Budget: $355,658

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Distribution: Temporal	Dsitribution: Temporal (Juvenile) (none)
Fecundity	Fecundity by Age (none)
Length of Fish Species	Length: Juveniles (none)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Sex Ratio	Percent females (Beasley, C.A. and 10 co-authors, 2008)
Size of Fish at a Life Stage	Length: Juveniles (none)
Weight	Weight (none)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Distribution: Temporal	Distribution: Temporal (Adult) (none)
Length of Fish Species	Length: Adult (none)
Size of Fish at a Life Stage	Length: Adult (none)

Deliverable: DELV-4: Determine the influence, proportion, and rates of naturally spawning fish that are stray (conventional hatchery origin) fish in the stream.

Description: Adult fish captured at weirs or with PIT tag array observations will be identified by origin. Fish observed at the weir can be classified by the use of tags and marks. natural fish will have none, supplementation fish will have a CWT and conventional hatchery fish will have both a CWT and an ad-clip. PIT tagged fish are identified by origin at the time of tagging. Population dynamic analyses and modeling will be used to estimate the influence of these additional spawners on abundance, productivity, and natural population growth rate.

To determine if Lolo Creek and South Fork Clearwater River origin supplemented fish migrate to other locals we rely on the reporting of CWT data recorded in the RMIS database. The RMIS database does not include fish that may have migrated to areas without detection and analysis capabilities, such as natural streams without carcass surveys.

Start: 2011 End: 2020 Budget: $533,487

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-7: Determine and compare the in-stream and in-hatchery productivity of natural, supplemental, and conventional hatchery fish.

Description: The key performance measure is progeny-per-parent ratio (P:P), which is quantified within Lolo Creek and South Fork Clearwater River for natural-origin fish and hatchery-origin fish independently. This is a derived value. Calculation of P:P relies on annual run reconstructions and requires quantification of adult abundance to Lolo and SFCR (escapement), spawner abundance (spawner), hatchery fraction, age class structure, age-at-return, adult spawner sex ratio, prespawning mortality, and in-tributary harvest. Progeny are quantified through run-reconstruction. Natural fish P:P use two variants of parents: estimated escapement and spawners. P:P ratio will be calculated for total adult contribution (adult-to-adult) and by female contribution (female-to-female).

On-the-ground work associated with completion of this deliverable includes the operation of a permanent weir to enumerate and mark returning adults in Lolo Creek, and adult estimation with PIT tag array in SFCR.

Start: 2011 End: 2020 Budget: $355,658

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Fecundity	Fecundity by Age (none)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Sex Ratio	Percent females (Beasley, C.A. and 10 co-authors, 2008)
Size of Fish at a Life Stage	Length: Juveniles (none)
Weight	Weight (none)
Survival Rate: Inter-Life Stage	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Use of Instream PIT tag Arrays to Monitor Migration (none)
Survival Rate: Inter-Life Stage	Egg Survival (none) hatchery fish growth and survival (none)

OBJ-4. Quantify the Relative Reproductive Success of natural and supplementation steelhead in Lolo Creek to evaluate whether supplemented fish mimic natural

Description: The reproductive success of supplementation fish is a key uncertainty in supplementation efforts. The number of offspring produced per spawner broadly defines reproductive success. This is influenced by factors such as pre-spawning mortality, spawning effectiveness (spawning site selection, mate acquisition, redd digging capability, spawning timing, and egg retention), fecundity and survival of progeny. The desired outcome for this objective is quantifying the genetic fitness of the population following integration of natural and hatchery-origin adults into a hatchery environment by looking at: Are there significant temporal (year-to-year) genetic variation in the population? 2) are there significant genetic differences between hatchery and natural steelhead? Tasks- a) genetic sampling at the Lolo Creek screw trap of young of the year and emigrating smolts, b) genetic sampling of returning adults at the Lolo Creek weir, c) coordination of genetic analysis.

Deliverable: DELV-1: Determine and compare relative reproductive success of supplementation and natural steelhead in Lolo Creek using genetic parentage analysis.

Description: We propose to use microsatellite-based parentage assignment and exclusion analyses to determine the relative reproductive success (parentage analysis) of natural and supplementation origin steelhead in Lolo Creek. Doing so will inform management decisions regarding supplementation by quantitatively evaluating the long and short-term effects of supplementation on production and productivity.

The parentage analysis work will be contracted out to the Hagerman Genetics Laboratory, operated by the Columbia River Inter-Tribal Fish Commission. On-the-ground work will involve the operation of a permanent weir to enumerate and mark returning adults and collect genetic tissue from steelhead passed above the weir and from fish retained for broodstock. Collection of juvenile genetic samples will also be taken at the screw trap. Therefore, parentage can be assessed at three difference life stages: young of the year, emigrating smolts, and returning adults. Though returning adults are the definitive measure of population productivity, measuring relative parental contribution in the juvenile life stages will provide an interim measure before adult returns can be sampled and fully analyzed.

A variety of performance measures will be used to document genetic effects of supplementation on the Lolo Creek natural population. This will be accomplished by characterizing the genetic structure and variability within the population using microsatellite analyses (measures include heterozygosity and allelic richness). Indices of genetic differentiation will be calculated and patterns of genetic change will be examined through time in the population.

Estimate effective population size (Ne) and the ratio Ne/N will also be analyzied for the Lolo Creek population. Fixation indices and gametic disequilibrium will be used to estimate and evaluate the relationship between effective population size and census size (N) estimated from weir counts and mark recapture analysis.

An overall assessment will be made of the power of genetic markers to provide monitoring and evaluation information that is useful for an adaptive management approach to supplementation. We already know that this approach can be very useful in some instances and less useful in others, but we continue to make this evaluation as the data accumulate. Monitoring of effective population size should be conducted over the duration of the program, and could be done at regular intervals rather than continually.

Start: 2011 End: 2020 Budget: $177,829

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Relative Reproductive Success (RRS)	Genetic Diversity (Beasley, C.A. and 10 co-authors, 2008) Relative reproductive success (Meagher, T.R. and E.A. Thompson, 1986) trap tissue collection for DNA analysis (none)
Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

OBJ-5. Evaluate the juvenile and adult population abundances in South Fork Clearwater River

Description: Tasks- a) emigrant abundance estimation (screw trap) utilizing a marking and recapture program, b) adult abundance estimation with the evaulation of remote PIT Tag arrays.

Deliverable: DELV-2: Determine and compare life stage-specific survival rates for Lolo Cr. (natural and supplementation) and SFCR (natural, supp, and conventional) fish.

Description: Two primary performance measures describing life stage-specific survival rates are examined: juvenile emigrant survival to Lower Granite Dam and smolt-to-adult return rate (SAR) for natural-origin fish and hatchery produced fish in Lolo Creek (supplementation) and South Fork Clearwater River (supplementation and conventional). Associated performance measures include juvenile emigrant abundance and smolt equivalents. Juvenile steelhead emigrate from natal streams as parr, presmolts, and smolts (both yearling and precocial yearlings). The relative abundance of emigration at each lifestage is influenced by environmental conditions. Fish will be marked with PIT tags for subsequent survival estimation. Characterization of juvenile survival of natural fish is limited to fish emigrating from tributaries as smolts for this objective to be comparable to hatchery fish released as smolts. Mark-recapture methodology utilizing Passive Integrated Transponder (PIT) tags and subsequent detections at remote PIT tag arrays and mainstem dams generate survival estimates. Hatchery-origin fish (supplementation and conventional) are PIT tagged prior to release. Natural-origin fish will be PIT tagged at time of emigration. Juveniles will be tagged representatively across the emigration period and scale samples will be taken at the time of tagging to determine age at emigration. Juvenile survival comparisons will be determined with only emigrating natural smolts while SAR's quantification requires tags to be applied across all life stages. Smolt-to-adult return rates will be generated for four performance areas: tributary to tributary, tributary to Lower Granite Dam (LGD), LGD to LGD, and LGD to tributary. Coded Wire Tags (CWT) and PIT tag methods will be used to generate hatchery SARs.

On-the-ground work will consist of the operation of two rotary screw traps (typically nine months): one in Lolo Creek and one in South Fork Clearwater River. Work will also occur at the Clearwater and Dworshack Fish Hatcheries during marking and tagging of hatchery-origin supplementation and conventional fish.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)

Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Size of Fish at a Life Stage	Length: Juveniles (none)
Survival Rate: Inter-Life Stage	CJS survival estimation (Smith, S..G., J.R. Skalski, W. Schlechte, A. Hoffmann, and V. Cassen., 1994) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Survival Rate: Inter-Life Stage	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Use of Instream PIT tag Arrays to Monitor Migration (none)
Survival Rate: Inter-Life Stage	Egg Survival (none) hatchery fish growth and survival (none)

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Deliverable: DELV-5: Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the broodstock

Description: Abundance is estimated for adults returning to natal streams (as total escapement) and to spawning areas above weirs (as spawner abundance) and PIT Arrays by origin. Above the weir and arrays, the method is a mark-recapture calculation, where recaptures are downstream moving kelts (marked at the weir and detected in the arrays).

Spawner abundance is calculated by utilizing the mark-recapture estimate to the fish. Origin percent composition (i.e., hatchery fraction) and gender percent composition, calculated from collected fish at the Lolo Creek Weir and adults PIT tagged at Lower Granite Dam and detected (recaptured) at the PIT arrays on Lolo Creek and South Fork Clearwater.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:	Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
	Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
	Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
	Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
	Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
	Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-6: All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.

Description: To obtain performance measures that include juvenile survival, SARs, proportion broodstock and natural spawners by origin requires that all hatchery fish need to be marked with CWT, and an adequate sample with PIT tags. This project will work within the US v. OR aggreement, but ensure that 100% of the fish produced and released into Lolo Creek and South Fork Clearwater are marked with CWT to enable successful implementation of this project.

Start: 2011 End: 2011 Budget: $1,066,973

Assoc. Work Elements: 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data

Env. Metrics/Methods:	Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
	Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
	Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

OBJ-6. Evaluate the survival, behavior, and performance of supplementation and conventional steelhead in the South Fork Clearwater

Description: Tasks- a) Emigrant capture and marking program to determine mainstem survival and arrival timing, b) evaluation of PIT tag array data to determine SAR rates, adult run-timing and conversion rate of adults between Lower Granite Dam and the SFCR, c) scale sampling of juveniles and adults to assess the age composition of natural and supplementation fish at emigration and adult return, d) collection of biological data at the hatcheries, screw trap, and weir to compare life history and phenotypic characteristics (in-hatchery survival, size and condition at release), e) spatial distribution of adult spawners with radio tagging adults from SFCR (see objective 7).

Deliverable: DELV-2: Determine and compare life stage-specific survival rates for Lolo Cr. (natural and supplementation) and SFCR (natural, supp, and conventional) fish.

Description: Two primary performance measures describing life stage-specific survival rates are examined: juvenile emigrant survival to Lower Granite Dam and smolt-to-adult return rate (SAR) for natural-origin fish and hatchery produced fish in Lolo Creek (supplementation) and South Fork Clearwater River (supplementation and conventional). Associated performance measures include juvenile emigrant abundance and smolt equivalents. Juvenile steelhead emigrate from natal streams as parr, presmolts, and smolts (both yearling and precocial yearlings). The relative abundance of emigration at each lifestage is influenced by environmental conditions. Fish will be marked with PIT tags for subsequent survival estimation. Characterization of juvenile survival of natural fish is limited to fish emigrating from tributaries as smolts for this objective to be comparable to hatchery fish released as smolts. Mark-recapture methodology utilizing Passive Integrated Transponder (PIT) tags and subsequent detections at remote PIT tag arrays and mainstem dams generate survival estimates. Hatchery-origin fish (supplementation and conventional) are PIT tagged prior to release. Natural-origin fish will be PIT tagged at time of emigration. Juveniles will be tagged representatively across the emigration period and scale samples will be taken at the time of tagging to determine age at emigration. Juvenile survival comparisons will be determined with only emigrating natural smolts while SAR's quantification requires tags to be applied across all life stages. Smolt-to-adult return rates will be generated for four performance areas: tributary to tributary, tributary to Lower Granite Dam (LGD), LGD to LGD, and LGD to tributary. Coded Wire Tags (CWT) and PIT tag methods will be used to generate hatchery SARs.

On-the-ground work will consist of the operation of two rotary screw traps (typically nine months): one in Lolo Creek and one in South Fork Clearwater River. Work will also occur at the Clearwater and Dworshack Fish Hatcheries during marking and tagging of hatchery-origin supplementation and conventional fish.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:		
	Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
	Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
	Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
	Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
	Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
	Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
	Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
	Size of Fish at a Life Stage	Length: Juveniles (none)
	Survival Rate: Inter-Life Stage	CJS survival estimation (Smith, S..G., J.R. Skalski, W. Schlechte, A. Hoffmann, and V. Cassen., 1994) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
	Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
	Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
	Survival Rate: Inter-Life Stage	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Use of Instream PIT tag Arrays to Monitor Migration (none)
	Survival Rate: Inter-Life Stage	Egg Survival (none) hatchery fish growth and survival (none)

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Deliverable: DELV-5: Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the broodstock

Description: Abundance is estimated for adults returning to natal streams (as total escapement) and to spawning areas above weirs (as spawner abundance) and PIT Arrays by origin. Above the weir and arrays, the method is a mark-recapture calculation, where recaptures are downstream moving kelts (marked at the weir and detected in the arrays).

Spawner abundance is calculated by utilizing the mark-recapture estimate to the fish. Origin percent composition (i.e., hatchery fraction) and gender percent composition, calculated from collected fish at the Lolo Creek Weir and adults PIT tagged at Lower Granite Dam and detected (recaptured) at the PIT arrays on Lolo Creek and South Fork Clearwater.

Start: 2011 End: 2020 Budget: $711,316

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-6: All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.

Description: To obtain performance measures that include juvenile survival, SARs, proportion broodstock and natural spawners by origin requires that all hatchery fish need to be marked with CWT, and an adequate sample with PIT tags. This project will work within the US v. OR aggreement, but ensure that 100% of the fish produced and released into Lolo Creek and South Fork Clearwater are marked with CWT to enable successful implementation of this project.

Start: 2011 End: 2011 Budget: $1,066,973

Assoc. Work Elements: 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

Deliverable: DELV-3: Determine the adult and juvenile life history characteristics of natural and supplementation B-run steelhead.

Description: Life history characteristics include the age at migration, size at migration, and migration timing. Age at migration will be determined for juveniles by collecting and aging scale samples from those fish caught at the Lolo Creek and SFCR screw traps. Scale sampling will also be used for adult returns at the Lolo Creek weir. For adults, this information will be coupled with additional data recovered from tagging and marking efforts (i.e., Pit tags and CWTs).

Size at migration will also be collected at the sampling occasions described above (screw traps and Lolo Creek weir) as well as at Lower Granite Dam (adults removed for marking).

Migration timing will be assessed for juveniles and adults using PIT tag monitoring at Lower Granite Dam and, in the case of adult migrations, at PIT tag arrays located on Lolo Creek and SFCR.

Start: 2011 End: 2020 Budget: $355,658

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Distribution: Temporal	Dsitribution: Temporal (Juvenile) (none)
Fecundity	Fecundity by Age (none)
Length of Fish Species	Length: Juveniles (none)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Sex Ratio	Percent females (Beasley, C.A. and 10 co-authors, 2008)
Size of Fish at a Life Stage	Length: Juveniles (none)
Weight	Weight (none)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Age	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Distribution: Temporal	Distribution: Temporal (Adult) (none)
Length of Fish Species	Length: Adult (none)

Size of Fish at a Life Stage	Length: Adult (none)

Deliverable: DELV-4: Determine the influence, proportion, and rates of naturally spawning fish that are stray (conventional hatchery origin) fish in the stream.

Description: Adult fish captured at weirs or with PIT tag array observations will be identified by origin. Fish observed at the weir can be classified by the use of tags and marks. natural fish will have none, supplementation fish will have a CWT and conventional hatchery fish will have both a CWT and an ad-clip. PIT tagged fish are identified by origin at the time of tagging. Population dynamic analyses and modeling will be used to estimate the influence of these additional spawners on abundance, productivity, and natural population growth rate.

To determine if Lolo Creek and South Fork Clearwater River origin supplemented fish migrate to other locals we rely on the reporting of CWT data recorded in the RMIS database. The RMIS database does not include fish that may have migrated to areas without detection and analysis capabilities, such as natural streams without carcass surveys.

Start: 2011 End: 2020 Budget: $533,487

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-7: Determine and compare the in-stream and in-hatchery productivity of natural, supplemental, and conventional hatchery fish.

Description: The key performance measure is progeny-per-parent ratio (P:P), which is quantified within Lolo Creek and South Fork Clearwater River for natural-origin fish and hatchery-origin fish independently. This is a derived value. Calculation of P:P relies on annual run reconstructions and requires quantification of adult abundance to Lolo and SFCR (escapement), spawner abundance (spawner), hatchery fraction, age class structure, age-at-return, adult spawner sex ratio, prespawning mortality, and in-tributary harvest. Progeny are quantified through run-reconstruction. Natural fish P:P use two variants of parents: estimated escapement and spawners. P:P ratio will be calculated for total adult contribution (adult-to-adult) and by female contribution (female-to-female).

On-the-ground work associated with completion of this deliverable includes the operation of a permanent weir to enumerate and mark returning adults in Lolo Creek, and adult estimation with PIT tag array in SFCR.

Start: 2011 End: 2020 Budget: $355,658

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Fecundity	Fecundity by Age (none)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
Scales	Scale collection (Nielson, L.A., and D.L. Johnson, 1983)
Sex Ratio	Percent females (Beasley, C.A. and 10 co-authors, 2008)
Size of Fish at a Life Stage	Length: Juveniles (none)
Weight	Weight (none)
Survival Rate: Inter-Life Stage	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Use of Instream PIT tag Arrays to Monitor Migration (none)
Survival Rate: Inter-Life Stage	Egg Survival (none) hatchery fish growth and survival (none)

OBJ-7. Evaluate the spatial distribution of natural, conventional, and supplementation fish in the South Fork Clearwater

Description: Tasks - a) radio tag representative portion of SFCR adults (natural, conventional, and supplementation) at Lower Granite Dam utilizing separation by code known SFCR adults (PIT tagged as juveniles), b) radio tag representative portion of adult natural (unmarked) spawners in SFCR through angling, c) monitor tagged fish to evaluate the distribution of spawners in SFCR, paying particulty attention to the presumed velocity barrer near Golden.

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Deliverable: DELV-8: Determine and compare adult distribution of hatchery (conventional and supplementation) and natural origin steelhead in South Fork Clearwater

Description: Performance measures include: adult spawner spatial distribution, prespawn mortality, adult run timing, and spawn timing. A radio tagging study will be completed to accomplish this objective. Adults will be radio tagged in two locations, Lower Granite Dam (LGD) and from angling in the South Fork Clearwater River (SFCR). Utilizing the Separation by Code (SbyC) known destination fish can be diverted to the LGD sample room and radio tagged. This will allow for an evaluation of these three separate groups of steelhead: 1. Natural umarked fish from SFCR; 2. Hatchery unmarked supplementation fish; 3. Conventional adclipped hathcery fish. Marking of these group with PIT tags will be accomplished at teh hathcery for supplementation and conventional fish prior to release (in sufficient numbers to return as adults) and from the rotary screw trap for juvenile natural fish (numbers may not be sufficient to ensure enough PIT tagged adults return to LGD) . This will allow for an evaluation of these three separate groups, to be tagged and tracked from LGD to the SFCR, and then evaluated within the SFCR to quantify the performance measures listed above. If sample size of returning natural fish PIT tags is limited, then an angling effort within the lower portion of the SFCR will increase the sample size of natural unmarked fish.

Start: 2011 End: 2020 Budget: $177,829

Assoc. Work Elements: 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results

Env. Metrics/Methods:

Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
Sex Ratio	Percent females (Beasley, C.A. and 10 co-authors, 2008)
Distribution: Temporal	Distribution: Temporal (Adult) (none)

OBJ-8. Steelhead Run Reconstruction (spatial distribution and final disposition) at Lower Granite Dam (formerly separate proposal 50K/yr)

Description: Tasks- a) Coordinate and implement team of comanagers partition (reconstruct) the count of steelhead annually over Lower Granite Dam, b)coordinate and facilitate data sharing and analysis.

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description: The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Deliverable: DELV-6: All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.

Description: To obtain performance measures that include juvenile survival, SARs, proportion broodstock and natural spawners by origin requires that all hatchery fish need to be marked with CWT, and an adequate sample with PIT tags. This project will work within the US v. OR aggreement, but ensure that 100% of the fish produced and released into Lolo Creek and South Fork Clearwater are marked with CWT to enable successful implementation of this project.

Start: 2011 End: 2011 Budget: $1,066,973

Assoc. Work Elements: 158: Mark/Tag Animals; 159: Transfer/Consolidate Regionally Standardized Data

Env. Metrics/Methods:

Abundance of Fish	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler, 2007)
Age	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed., 1996)
Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)

Deliverable: DELV-4: Determine the influence, proportion, and rates of naturally spawning fish that are stray (conventional hatchery origin) fish in the stream.

Description: Adult fish captured at weirs or with PIT tag array observations will be identified by origin. Fish observed at the weir can be classified by the use of tags and marks. natural fish will have none, supplementation fish will have a CWT and conventional hatchery fish will have both a CWT and an ad-clip. PIT tagged fish are identified by origin at the time of tagging. Population dynamic analyses and modeling will be used to estimate the influence of these additional spawners on abundance, productivity, and natural population growth rate.

To determine if Lolo Creek and South Fork Clearwater River origin supplemented fish migrate to other locals we rely on the reporting of CWT data recorded in the RMIS database. The RMIS database does not include fish that may have migrated to areas without detection and analysis capabilities, such as natural streams without carcass surveys.

Start: 2011 End: 2020 Budget: $533,487

Assoc. Work Elements: 70: Install Fish Monitoring Equipment; 157: Collect/Generate/Validate Field and Lab Data; 158: Mark/Tag Animals; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:	Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
	Productivity: Inter-Life Stage	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008) Smolt to adult return rate (Beasley, C.A. and 10 co-authors, 2008)
	Progeny-per-Parent Ratio (P:P) (Productivity)	Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe, 2005) Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors, 2008)
	Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
	Distribution: Temporal	Distribution: Temporal (Adult) (none)

Deliverable: DELV-9: Run reconstruction of steelhead over Lower Granite Dam (annually)- comanagement task

Description: In this proposal a steelhead run reconstruction will be led by the Nez Perce Tribe and provide some monetary support for the participating agencies. The Nez Perce Tribe will: 1) lead the RR collaboration (facilitation), 2) subcontract for statistical consultation (if necessary), and 3) disperse funds for staff participation by key entities.
The steps to produce RR estimates require data generated by and involvement of staff from multiple projects and entities; RR steps include:
1) Data collection (numbers, marks, scales, length, gender) on fish sampled at Lower Granite Dam trap, funded under the WDFW LSRCP M&E contract, NPTH M&E (198335003) project, and NOAA Lower Granite Dam Trap Operation contract.
2) Data collection at all weirs and traps upstream of Lower Granite Dam (numbers, marks, scales, length, gender), operated by ODFW (i.e, Little Sheep, Wallowa, Big Canyon, and Lookingglass), CTUIR (i.e., Catherine Creek, and Upper Grande Ronde), NPT (i.e., Kooskia, Horse, Cow, Lightning, Camp, Freezeout, Crazyman, Lolo, and Joseph), USFWS (i.e, Dworshak), IDFG (i.e, Red, Crooked, Powell, Hells Canyon, East Fork Salmon, Pahsimeroi, Sawtooth, and Squaw), WDFW (i.e., Asotin,
3) Data collection from redd counts from IDFG, WDFW, and ODFW.
4) Data collection from PIT tag arrays operated by ISEMP, located in Grande Ronde (2), Imnaha (5), Clearwater (4), South Fork Salmon (6), upper Salmon (3), and other arrays operated by IDFG, BOR, etc.
5) Data entry and validation. Done by individual contracts.
6) Data summary and organization. Done by individual contracts but following a standard set of data types established by RR workgroup.
7) Identification of data nuances and assumptions, and decisions on how to address. Workshop one - RR workgroup under facilitation by project NPT (this proposal).
8) Collation of multiple data sets, synthesis, and assembly of data into disposition categories. This proposal.
9) Statistical analysis and preliminary estimation. This proposal – RR facilitator and consulting statistician.
10) Validation of preliminary estimates and roll up to population scale. RR workgroup under facilitation by this project (workshop two).
11) Reporting of methods and results. This deliverable with review by RR workgroup.
12) Posting/dissemination of data. With this information we help evaluate the performance of the Snake River Steelhead above Lower Granite Dam in contributing to natural spawning, progress towards meeting ESA delisting criteria and management goals.

To accomplish these multiple tasks, a sample of the steelhead population at LGR Dam is sampled annually, and released at the LGD trap. In addition at all of the spawning facilities, the spawning process, steelhead are identified by marks and tags, scale patterns and genetic markers. Reconstruction data includes estimating population age structure from tags and scale pattern analysis, estimating abundance and trend data for the natural population, and estimating returns and SARs for both hatchery and wild fish. Currently the run reconstruction is the only method available to determine abundance, origin and biological attributes of the spawning population of steelhead above LGD and these data will provide substantial information to the agencies, which is used to make informed management decisions for the population.

Basics will be to provide financial assistance to all comanagers interested in run reconstruction. NPT, IDFG, ODFW, USFSW (LSRCP), CTUIR, WDFW, SBT.

Start: 2011 End: 2020 Budget: $560,169

Assoc. Work Elements: 157: Collect/Generate/Validate Field and Lab Data; 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:	Mark	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Hatchery Fish Marking and Tagging (none) PIT tagging (CBFWA PIT Tag Steering Committee, 1999)
	Mortality	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek, 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek, 2010)
	Abundance of Fish	Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors, 2008) Use of Instream PIT tag Arrays to Monitor Migration (none) Weirs (Christian E. Zimmerman and Laura M. Zabkar, 2007)
	Distribution: Temporal	Distribution: Temporal (Adult) (none)

OBJ-9. Provide timely exchange of science-based information

Description: Tasks – a) Project information storage and backup, b) analysis and summary, and e) dissemination

Deliverable: DELV-10: Provide annual reports, metadata, and performance measure data to DFRM database.

Description:

The DFRM now has the equipment infrastructure necessary to ensure efficient and timely exchange of science-based information on regionally accepted performance measures (Beasley et al. 2008). With additional funding for a data steward, DFRM annual reports, metadata, and performance measure data will be available on the new DFRM website http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. This proposal seeks to enable DFRM participation in regional data management and sharing forums and processes (e.g. PNAMP) as required by RPAs 71 and 72.

The Nez Perce Tribe (NPT) Department of Fisheries Resources Management (DFRM) takes seriously the need to make primary data, summary data, and metadata publically available. The NPT DFRM has recently invested in information technology infrastructure for networking, as well as upgraded the equipment for data storage, backup, analysis, summary, and dissemination. The NPT will utilize a centralized, region-wide database, developed to unify data collection activities spanning across multiple agencies. The NPT DFRM is participating in a regional effort initiated by the Lower Snake River Compensation Plan (LSRCP) Snake Basin Data Group to place raw data into a central place with equal access to the participants. This neutral database (to be housed at Pacific States Marine Fisheries Commission) ensures that each participating agency has access to the exact raw information. This allows co managers to work on the same data, thus making resource management decisions more transparent.

To date this data management tool allows participating agencies to utilize the tools developed by Snake Basin Data Group to enter and input information for adult trapping and spawning of Chinook and steelhead. This database will be expanding to incorporate juvenile trapping, spawning ground/carcass, snorkeling, temperature, etc. information as well. This information is inputted into the program and then uploaded to a central database. Once in the central database, all participating agencies can access the same raw data for use in summarization, analysis, reporting, and co-management decisions. In addition to equal access to all data by participating agencies, all other agencies and general public will have access to data summaries and downloads as identified by the Lower Snake policy group. These other agencies or groups do not participate in data input, but are allowed to view and extract agreed upon information summaries.

Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures. In the past, DFRM projects used annual report submissions to the BPA web site (http://www.efw.bpa.gov/searchpublications/) thus making project information publicly available. Those submissions will still occur, however DFRM annual reports and summarized regionally accepted performance measures will be available on the new DFRM website http://www.nptfisheries.org allowing easier access to the Tribe's valuable information. Thus enabling the public, managers, policy makers, and researches with usable reports and data for their use.

Start: 2011 End: 2020 Budget: $1,600,460

Assoc. Work Elements: 159: Transfer/Consolidate Regionally Standardized Data; 160: Create/Manage/Maintain Database; 161: Disseminate Raw/Summary Data and Results; 162: Analyze/Interpret Data

Env. Metrics/Methods:

Project History

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Financials

Budgets

Expense	SOY	Working Budget	Contracted Amount	Expenditures
FY2004				
FY2005				
FY2006				
FY2007				
FY2008				
FY2009				
FY2010				

No Capital budgets

No Project Cost Share

Explanation of Recent Financial Performance:
<none>

Explanation of Financial History:
<none>

Reporting & Contracted Deliverables Performance

<none>

Major Accomplishments

Major Accomplishments:

Assessments

Independent Scientific Review Panel Assessment:

<none>

Council Recommendation:

<none>

Response to past ISRP and Council comments and recommendations:
<none>

Adaptive Management

Management Changes:
This is a new project and does not have management changes to report.

Project Documents & Reports

Public Attachments in Pisces

None listed.

Other Project Documents on the Web

<none>

Project Relationships

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Project Relationships: <none>

Additional Relationships Explanation:

Project 198335000 - Nez Perce Tribal Hatchery O& M. This is supplementation program that is being monitored and evaluated by the Nez Perce Tribal Hatchery – Monitoring and Evaluation project (198335003). Lolo Creek and Newsome Creek (tributary to the SFCR) are treatment streams. The weir to be constructed on Lolo Creek (see below), that will be used to collect spring Chinook broodstock and monitor steelhead returns, will be operated by NPTH M&E staff.

Project 201003800 - Lolo Creek Permanent Weir Construction. This fast track BiOp project is for the design, permitting, and construction of a permanent adult weir on Lolo Creek. This weir will be operated by the NPTH M&E project. Operation of this weir will provide adult return information that is used to calculate standardized performance measures.

Project 198909800 - Evaluate Salmon Supplementation Studies in Idaho Rivers (ISS). This project evaluates specific spring Chinook supplementation strategies to increase natural production in the Clearwater and Salmon subbasins from conventional hatcheries. Lolo and Newsome creeks, Crooked and Red rivers are part of study design for the ISS project.

Project 1989201301 - Coded Wire Tag – PSMFC. CWT data collected from adults trapped at the weir are provided to this regional database. The regional database is accessed to obtain data on CWT recoveries throughout the basin.

Project 199607702 - Lolo Creek Watershed Restoration. This project involves road obliteration, channel realignment, channel re-vegetation, riparian fencing, and off sight watering development. This habitat/watershed project should benefit steelhead populations. Monitoring responses to habitat improvements will be a cooperative effort between the projects.

Project 200206000 - Nez Perce Harvest Monitoring, monitors anadromous fisheries conducted by the Nez Perce Tribe. Primary focal species are Snake River spring/summer/ fall Chinook salmon ESU, and steelhead ESU and on the ground harvest monitoring is implemented in the Clearwater Subbasin, Salmon Subbasin, Imnaha Subbasin, Grande Ronde Subbasin, Tucannon Subbasin, and Columbia River Zone 6. Quantification of harvest is essential for tributary run reconstruction and evaluation of the effectiveness of supplementation. Lower Snake River Compensation Plan and US Army Corps of Engineers provide monies for the collection of harvest management information.

Project 200301700 - Integrated Status and Effectiveness Monitoring Program (ISEMP). The primary purpose of this project is to determine whether innovative methods can be employed to increase the accuracy and precision of adult abundance estimates for summer Chinook salmon and steelhead at the subpopulation, population, and major population group scale. The ISEMP study has installed PIT tag arrays in the lower South Fork of the Salmon Basin (six total), Lemhi Basin (2) and in 2010/11 will be installing 14 more arrays in the Grande Ronde (2 in main Grande Ronde and 2 in Joseph Creek), Imnaha Basin (5 total), Clearwater Basin (2 in Lolo Creek and 2 in South Fork Clearwater), and one in the upper Salmoln to quantify both natural origin adult salmon and steelhead escapement and it will validate the PIT tag array generated adult steelhead escapement with another technology (weir). Results from ISEMP investigations have both regional and subbasin level application.

Project 200716400 - Potlatch River Steelhead Monitoring and Evaluation. This project is related to this proposal in that they also collect population status monitoring on adult steelhead in the Clearwater River system. This project is funded by the Pacific Coast Salmon Recovery Funds. Steelhead monitoring in the Potlatch River collects escapement, hatchery composition, migration timing, and age structure data.

Project 199005500 - Idaho Steelhead Monitoring and Evaluation Studies. ISMES collects adult steelhead escapement data in Fish Creek in the upper Clearwater River. This project also collects migration timing, hatchery composition, and age structure information on a natural origin steelhead population. Information on steelhead escapement at hatchery weirs at Rapid River Hatchery, Pahsimeroi Hatchery, and Sawtooth Hatchery are also compiled.

Project 201003200 - Imnaha River Steelhead Status Monitoring. This project has been funded through the Fast Track process to evaluate steelhead population status monitoring in a hatchery supplemented system. This project will collect steelhead escapement, hatchery composition, migration timing and age structure information in the Imnaha Basin.

Focal Species

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Primary Focal Species

Steelhead (O. mykiss) - Snake River DPS (threatened)

Secondary Focal Species

Chinook (O. tshawytscha) - Snake River Fall ESU (threatened)
Chinook (O. tshawytscha) - Snake River Spring/Summer (not listed)
Coho (Oncorhynchus kisutch) - Lower Columbia River ESU (threatened)
Lamprey, Pacific (Lampetra tridentata)

Emerging Limiting Factors
This project, primarily concerned with the evaluation of hatchery action effectiveness, is not designed to account for other extrinsic limiting factors.

Types of Work

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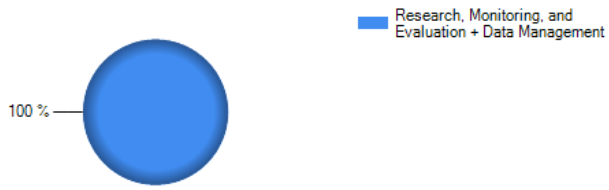
Work Classes



Work Elements
70. Install Fish Monitoring Equipment
157. Collect/Generate/Validate Field and Lab Data
158. Mark/Tag Animals
159. Transfer/Consolidate Regionally Standardized Data
160. Create/Manage/Maintain Database
161. Disseminate Raw/Summary Data and Results
162. Analyze/Interpret Data

RM&E

What type(s) of RM&E will you be doing?

Status and Trend Monitoring
Action Effectiveness Research
Uncertainties Research

Where will you post or publish the data your project generates?

Name	URL
RMIS - Regional Mark Information System	http://www.rmis.org
Fish Passage Center	http://www.fpc.org
PTAGIS	http://www.ptagis.org/ptagis/index.jsp
StreamNet	http://www.streamnet.org/datastore_search.cfm
Nez Perce Tribe - Department of Fisheries Resources Management	http://www.nptfisheries.org

Tagging

Please explain why the tagging technology used in this project was selected. Include a discussion of how the cost and applicability of the selected tagging technology influenced your selection. Enter "NA" if not applicable to your project.

Fish marking is a tool used to support complex fish management processes (harvest, escapement, and RM&E) and is subject to several existing legal forums; importantly, U.S. v Oregon and the Pacific Salmon Treaty. The Tribe has tried to require that the use of tags be evaluated and justified. We believe that tagging proposals should: 1) minimize the overall amount of marking/handling of fish as tribal philosophy is averse to handling and marking fish in any way; 2) maximize and integrate the use of tagged fish across studies (i.e. minimize the amount of tagging by using the same tagged fish wherever possible), and 3)the impact of tagging/marking fish should be assessed in terms of reduced adult returns. CWTs are the primary identifier of unique hatchery production groups, supporting: program performance evaluations, broodstock management, and spawner escapement management. CWTs are relatively low cost with limited deformation of the fish. CWTs are compatible with regional electronic sampling providing ocean and down river harvest distr. and stray information. PIT tags quantify reach specific survival and migration timing at multiple life stages for hatchery and natural-origin fish. The tag's small size supports representative tagging and manageable cost enables sufficient sample sizes to estimate adult return rates. PIT tags enable in-season return monitoring of adult returns, used for harvest and weir management. Sample size requirements are estimated using the SURPH SAMPLE-SIZE program (Lady et al. 2001). Min. release groups of 500-1,000 are needed to determine migration timing, median arrival dates and survival to Lower Granite;release groups of 10,000-15,000 are needed for SAR estimates. Adult fish interrogated at weirs are given a disc tag, or hole punch in the OP, or PIT tag. These marks are used for mark/recapture popn. estimates after the marked fish are recovered as carcasses or kelts. The OP and PIT tag provide distribution information.

Describe any of the innovative approaches that your projects proposes that are in direct support of the ISAB/ISRP's recommendations to improve techniques for surgical insertion of internal tags, or external attachment of acoustic, radio, or data storage tags that reduce handling time, fish injury and stress. Enter "NA" if not applicable to your project.

N/A

For specific tagging technologies, please address the tagging report's recommendations for genetic markers, otolith thermal marking, PIT tags, acoustic tags and radio tags for improving technologies in any way applicable. Enter "NA" if not applicable to your project.

This project is linked the ISEMP project whose purpose is to increase the accuracy and precision of adult abundance estimates for Chinook salmon and steelhead. The ISEMP study has installed PIT tag arrays in the South Fork of the Salmon Basin (6), Lemhi Basin (2) and 2010/11 will be installing 14 more arrays in the Grande Ronde (2 in Grande Ronde, 2 in Joseph Creek), Imnaha Basin (5), Clearwater Basin (2 in Lolo Creek, 2 in South Fork Clearwater), and one in the upper Salmon to quantify both natural origin adult salmon and steelhead escapement. Furthermore, validation of the PIT tag array-generated adult steelhead escapement will be made using an alternative method (weir sampling). Utilizing passover array systems for generating adult abundance estimates will only be successful if natural and hatchery steelhead are representatively marked as juveniles or as adults; and enough marks are applied to get sufficient recaptures for calculation of abundance estimates with an acceptable level of variance. In 2008 the cooperators of the LSRCP (states and tribes) program started representatively PIT tagging a subsample of the releases of hatchery steelhead in the Snake Basin at numbers sufficient to generate adult abundance estimates for recaptures to LGD. This project will be able to utilize those representatively marked hatchery fish to calculate abundance with acceptable variance from the ISEMP PIT tag arrays. The current ISEMP marks natural adult steelhead (3,800 in 2009) at LGD in order to

estimate abundance of natural steelhead into the Snake River basin. A sample size analysis was completed to evaluate different tagging rates at LGD and varying efficiencies of the PIT tag arrays at detecting the marked fish. Utilizing the ISEMP analysis the steelhead marking in this proposal should be sufficient to estimate populations of steelhead in the Snake River Basin.

If your project involves ocean port sampling and lower river sampling for coded wire tag (CWT) recovery, address the tagging and tag recovery issues (statistical validity of tagging rates, tag recovery rates, and fishery sampling rates) presented in the Pacific Salmon Commission's Action Plan to Address the CWT Expert Panel (PSC Tech. Rep. No. 25, March 2008).

NA

Explain how your tagging and tag recovery rates ensure a statistically valid result for your project. Enter "NA" if not applicable to your project.

Project Deliverables & Budget

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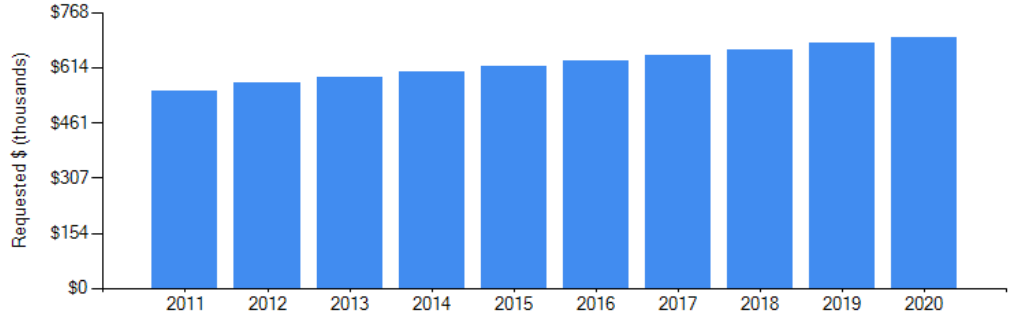
Project Deliverable	Objectives	Work Elements	Start	End	Budget
DELV-1 Determine and compare relative reproductive success of supplementation and natural steelhead in Lolo Creek using genetic parentage analysis.	OBJ-4	70, 157, 158, 160, 161, 162	2011	2020	$177,829
DELV-10 Provide annual reports, metadata, and performance measure data to DFRM database.	OBJ-1, OBJ-2, OBJ-3, OBJ-4, OBJ-5, OBJ-6, OBJ-7, OBJ-8, OBJ-9	159, 160, 161, 162	2011	2020	$1,600,460
DELV-2 Determine and compare life stage-specific survival rates for Lolo Cr. (natural and supplementation) and SFCR (natural, supp, and conventional) fish.	OBJ-2, OBJ-3, OBJ-5, OBJ-6	70, 157, 158, 159, 160, 161, 162	2011	2020	$711,316
DELV-3 Determine the adult and juvenile life history characteristics of natural and supplementation B-run steelhead.	OBJ-3, OBJ-6	70, 157, 158, 160, 161, 162	2011	2020	$355,658
DELV-4 Determine the influence, proportion, and rates of naturally spawning fish that are stray (conventional hatchery origin) fish in the stream.	OBJ-3, OBJ-6, OBJ-8	70, 157, 158, 160, 161, 162	2011	2020	$533,487
DELV-5 Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the broodstock	OBJ-2, OBJ-3, OBJ-5, OBJ-6	70, 157, 158, 159, 160, 161, 162	2011	2020	$711,316
DELV-6 All hatchery production marked with CWT, a portion with ad clips (conventional) and a representative sample with PIT tags.	OBJ-1, OBJ-2, OBJ-3, OBJ-5, OBJ-6, OBJ-8	158, 159	2011	2011	$1,066,973
DELV-7 Determine and compare the in-stream and in-hatchery productivity of natural, supplemental, and conventional hatchery fish.	OBJ-3, OBJ-6	70, 157, 158, 159, 160, 161, 162	2011	2020	$355,658
DELV-8 Determine and compare adult distribution of hatchery (conventional and supplementation) and natural origin steelhead in South Fork Clearwater	OBJ-7	157, 158, 160, 161	2011	2020	$177,829
DELV-9 Run reconstruction of steelhead over Lower Granite Dam (annually)- comanagement task	OBJ-8	157, 159, 160, 161, 162	2011	2020	$560,169
				Total	**$6,250,695**

Requested Budget by Fiscal Year



Fiscal Year	Actual Request	Explanation
2011	$550,000	
2012	$572,674	
2013	$586,992	
2014	$601,665	
2015	$616,708	
2016	$632,126	
2017	$647,928	
2018	$664,125	

2019	$680,729
2020	$697,748
Total	**$6,250,695**

Item	Notes	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Personnel		$200,146	$233,423	$239,258	$245,240	$251,371	$257,655	$264,096	$270,699	$277,466	$284,403
Travel		$8,431	$8,431	$8,642	$8,858	$9,079	$9,306	$9,539	$9,777	$10,022	$10,272
Prof. Meetings & Training		$1,750	$1,750	$1,794	$1,839	$1,885	$1,932	$1,980	$2,029	$2,080	$2,132
Vehicles		$6,757	$6,757	$6,926	$7,099	$7,277	$7,458	$7,645	$7,836	$8,032	$8,233
Facilities/Equipment	(See textbox below)	$99,470	$81,470	$83,507	$85,594	$87,734	$89,928	$92,176	$94,480	$96,842	$99,263
Rent/Utilities		$2,436	$2,436	$2,497	$2,559	$2,623	$2,689	$2,756	$2,825	$2,896	$2,968
Capital Equipment		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Overhead/Indirect		$66,910	$74,307	$76,165	$78,069	$80,021	$82,022	$84,072	$86,174	$88,328	$90,537
Other		$109,500	$109,500	$112,238	$115,043	$117,920	$120,868	$123,889	$126,986	$130,161	$133,415
PIT Tags		$54,600	$54,600	$55,965	$57,364	$58,798	$60,268	$61,775	$63,319	$64,902	$66,525
Total		**$550,000**	**$572,674**	**$586,992**	**$601,665**	**$616,708**	**$632,126**	**$647,928**	**$664,125**	**$680,729**	**$697,748**

Major Facilities and Equipment explanation:

This project will be operated out of the Nez Perce Tribe's Orofino Field Office. This office currently provides resources for multiple projects and personnel. Existing office personnel, equipment and support services (office manager, copier, fax, phone systems, etc.) are shared among all projects. Office and storage space will be made available to this project and its associated staff and equipment. Project office furniture, computers, and operating supplies will need to be purchased. Major equipment items will also need to be secured prior to implementation. In addition, fish marking is included under this line item and that accounts for coded wire tagging >400,000 unclipped steelhead destined for release into Lolo Creek and South Fork Clearwater River. Also includes monies for radio tags ($225 each) for an intensive look at the spawning distribution of fish in the South Fork Clearwater River.

RM&E Metrics, Indicators and Methods

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RM&E Metric or Indicator	Deliverable	Method Name and Citation
Fish - Abundance of Fish: Fish Life Stage Strategy (Juvenile - Smolt), Fish Origin (Both)	DELV-2, DELV-6, DELV-7	Rotary Screw Trap (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Efficiency Testing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007) Trap Processing (Gregory C. Volkhardt, Steven L. Johnson, Bruce A. Miller, Thomas E. Nickelson, and David E. Seiler 2007)
Fish - Age: Fish Life Stage Strategy (Juvenile Fish), Fish Origin (Natural)	DELV-2, DELV-6, DELV-7	Age Determination of Juvenile B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed. 1996)
Fish - Distribution: Temporal: Fish Life Stage Strategy (Juvenile - Smolt)	DELV-3	Dsitribution: Temporal (Juvenile)
Fish - Fecundity:	DELV-3, DELV-7	Fecundity by Age
Fish - Length of Fish Species: Fish Life Stage Strategy (Juvenile Fish)	DELV-3	Length: Juveniles
Fish - Mark:	DELV-1, DELV-2, DELV-4, DELV-5, DELV-6, DELV-7, DELV-8, DELV-9	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek 2010) PIT tagging (CBFWA PIT Tag Steering Committee 1999) Hatchery Fish Marking and Tagging
Fish - Mortality: Fish Life Stage Strategy (Adult Fish)	DELV-2, DELV-5, DELV-8, DELV-9	Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek 2010) Radio Telemetry Spawning Location (Kinsey et al. in Contor C. and K. Reznicek 2010)
Fish - Productivity: Inter-Life Stage: Fish Life Stage Range (Adult to Juvenile), Fish Origin (Both)	DELV-2, DELV-4, DELV-5, DELV-7	Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors 2008) Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe 2005) Smolt to adult return rate (Beasley, C.A. and 10 co-authors 2008)
Fish - Progeny-per-Parent Ratio (P:P) (Productivity): Fish Life Stage Range (Adult to Adult)	DELV-2, DELV-4, DELV-5, DELV-7	Progeny Per Parent Ratio 2 (Beasley, C.A. and 10 co-authors 2008) Progeny per parent ratio (Vogel, J.L., J.A. Hesse, J.R. Harbeck, D.D. Nelson, and C.D. Rabe 2005)
Fish - Relative Reproductive Success (RRS): Fish Origin (Both)	DELV-1	Genetic Diversity (Beasley, C.A. and 10 co-authors 2008) trap tissue collection for DNA analysis Relative reproductive success (Meagher, T.R. and E.A. Thompson 1986)
Fish - Scales:	DELV-2, DELV-3, DELV-7	Scale collection (Nielson, L.A., and D.L. Johnson 1983)
Fish - Sex Ratio: Fish Life Stage Range (Adult to Adult), Fish Origin (Both)	DELV-3, DELV-7, DELV-8	Percent females (Beasley, C.A. and 10 co-authors 2008)
Fish - Size of Fish at a Life Stage: Fish Life Stage Strategy (Juvenile Fish)	DELV-2, DELV-3, DELV-7	Length: Juveniles
Fish - Survival Rate: Inter-Life Stage: Fish Life Stage Range (Juvenile to Juvenile), Fish Origin (Both)	DELV-2	CJS survival estimation (Smith, S..G., J.R. Skalski, W. Schlechte, A. Hoffmann, and V. Cassen. 1994) PIT tagging (CBFWA PIT Tag Steering Committee 1999)
Fish - Weight:	DELV-3, DELV-7	Weight
Fish - Abundance of Fish: Fish Life Stage Strategy (Adult Fish), Fish Origin (Both)	DELV-2, DELV-3, DELV-4, DELV-5, DELV-9	Weirs (Christian E. Zimmerman and Laura M. Zabkar 2007) Use of Instream PIT tag Arrays to Monitor Migration Adult Escapement to Tributary (Beasley, C.A. and 10 co-authors 2008)
Fish - Age: Fish Life Stage Strategy (Adult Fish), Fish Origin (Both)	DELV-1, DELV-2, DELV-3	Age Determination of Adult B-Run Steelhead Using Scale Samples (B.R. Murphy and D.W. Willis, Ed. 1996)
Fish - Distribution: Temporal: Fish Life Stage Strategy (Adult Fish)	DELV-3, DELV-4, DELV-5, DELV-8, DELV-9	Distribution: Temporal (Adult)
Fish - Length of Fish Species: Fish Life Stage Strategy (Adult Fish)	DELV-3	Length: Adult
Fish - Size of Fish at a Life Stage: Fish Life Stage Strategy (Adult Fish)	DELV-3	Length: Adult
Fish - Survival Rate: Inter-Life Stage: Fish Life Stage Range (Adult to Adult), Fish Origin (Both)	DELV-2, DELV-7	Use of Instream PIT tag Arrays to Monitor Migration Radio Telemetry Adult Migration and Passage (Kinzey et al. in Contor C. and K. Reznicek 2010)

Fish - Survival Rate: Inter-Life Stage: Fish Life Stage Range (Egg to Juvenile), Fish Origin (Hatchery)	DELV-2, DELV-7	hatchery fish growth and survival Egg Survival

Study Designs

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The effect of hatchery supplementation to the natural B-run steelhead population in Lolo Creek

Temporal Design: Complete Revisit Design
Spatial Design: Representative Sampling
Response Design: Analysis of Variance (ANOVA) Design
Number of Sites: 1
Description:

The differential performance of natural, supplementation and conventional B-run steelhead in the South Fork Clearwater River

Temporal Design: Complete Revisit Design
Spatial Design: Representative Sampling
Response Design: Analysis of Variance (ANOVA) Design
Number of Sites: 1
Description:

Cost Share

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Source / Organization	Fiscal Year	Proposed Amount	Type	Description
Nez Perce Tribe	2011	$300,000	In-Kind	Lolo Creek juvenile emigrant trapping and adult trapping as a result of the ongoing NPTH M&E project (198335003). Ongoing project is funded for the forseeable future.
Quantitative Consultants Inc	2012	$100,000	In-Kind	PIT tag array operation, maintenance, data analysis, and reporting. PIT tag arrays in Lolo and SF Clearwater will provide an independent adult escapment estimate as will provide juvenile detections.
Idaho Department of Fish and Game (IDFG)	2011	$500,000	In-Kind	Idaho Department of Fish and Game operates the Clearwater Hatchery, and satellite facilites within the South Fork Clearwater and coordinate the ISS study. These studies provide marking and M&E.
US Fish and Wildlife Service (USFWS)	2011	$500,000	In-Kind	USFWS and Nez Perce Tribe operate the Dworshak Hatchery and the Idaho Fishery Resource Office. They provide fish culture, marking and M&E in the Clearwater Basin.

Project References or Citations

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