



Project Report December 8, 2006

Strategic Plan Objectives: Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.

115 projects found

13210-A-001 - [Technical Assistance to Pacific Region NFHs \(HETs, CHMPs, HGMPs, site visits, etc.\).](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Technical assistance was provided to the Pacific Region NFHs as they continue to address recovery, mitigation, Tribal, and conservation programs using propagated fish.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Fisheries Program in the Pacific Region continues to use and refocus its NFHs as tools in the recovery of fish populations and to mitigate for the impacts from hydropower projects, loss of habitat, and harvest.</p> <p>The problem:</p> <p>Hatchery Evaluation Teams (HETs) ensure that NFH production programs: comply with the mandates governing that NFH; integrate the needs of local stakeholders; and continue to the Service's mission and goals.</p> <p>The objective:</p> <p>To conduct critical, evaluations of the Pacific Region's and CNO's 18 NFHs production programs. HETs are used to ensure scientifically sound production of appropriate stocks for use in tribal trust, mitigation, and recovery programs.</p> <p>The method:</p>	
Expended	\$115658		
Objective	Develop and share applied aquatic scientific and technologic tools with partners.		
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)		
Primary Benefited Population	Warm Springs hatchery spring chinook		
Plans	Spring Creek NFH Hatchery and Genetic Management Plan Warm Springs Hatchery and Genetic Management Plan (draft) Quinault NFH Cooperative Agreement		
Keyword	Fish Technology		
Need Number	N-002		
Partners			
<p>Accomplishments</p> <table border="1"> <tr> <td>Recovery Plan production tasks implemented</td> <td>3</td> </tr> </table>			Recovery Plan production tasks implemented
Recovery Plan production tasks implemented	3		

(PART)		<p>With representatives from Service, tribal groups, and other state and federal agencies, HETs meet to discuss NFH production activities. AFTC staff also participate in CHMP/HGMP development and visit NFHs to address individual concerns and develop specific research studies.</p>
Number of Fishery Management Plan production tasks implemented (PART)	5	

13210-A-002 - [Pacific Region Hatchery Management Workshop: Meeting the Scientific Needs of NFHs & Their Partners](#)

Facility	Abernathy Fish Technology Center
Expended	\$53998
Objective	Develop and share applied aquatic scientific and technologic tools with partners.
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)
Primary Benefited Population	Not specified
Plans	Pacific Region Fisheries Outreach Action Plan U.S. Fish and Wildlife Service National Aquatic Animal Health Policy
Keyword	Fish Technology
Need Number	N-002
Partners	

Accomplishments

Number of other Fishery Management Plan tasks implemented for populations of management concern.	2
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

Accomplishment Summary

Twenty-two technical presentations by Service and partner (universities, USGS/BRD, Bureau of Reclamation, CNO and Washington Office) employees provided to ~80 Pacific Region Fisheries Program field and Regional Office staff members.

Description

The importance to the Resource:

The Pacific Region's conservation, tribal, and mitigation NFH production programs are constantly searching for the latest technical, scientifically sound information for use in a successful production program. This is even more important as these programs work to ensure the continued existence of the resource while providing harvest opportunities.

The problem:

For NFH Managers and other Pacific Region Project Leaders it is often difficult to find a single source for current technical information of interest and immediate use in successful NFH conservation, tribal, and/or mitigation production programs. This is particularly true in these times of limited funding for technical meeting attendance.

The objective:

Provide a scientific forum to exchange technical information of interest to Pacific Region NFH Managers, other Project Leaders in the Pacific Region's Fisheries Program, and Regional Office staff.

The method:

	<p>This Workshop's, funded by Leavenworth NFH Complex, technical presentations are provided by speakers from within and outside the Service. Presentations cover new techniques and/or experimental findings (not production reviews). The annual Workshop is held in WA's Tri-cities region, allowing Pacific Region staff to drive, saving on airfare.</p> <p>Further description:</p> <p>Each year, in addition to the presentations on various topics, the ~80 Workshop participants also deal with one focal topic. These focal topics have included the use of genetics in NFH management (including a mutli-agency group panel discussion) and producing quality fish by manipulating nutrition, environment, and behavior.</p>
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13210-A-004 - [Annual Fish Technology Center Meeting: Sharing Scientific Information With Our Partners](#)

Facility	Abernathy Fish Technology Center
Expended	\$34217
Objective	Develop and share applied aquatic scientific and technologic tools with partners.
Primary Benefited Species	(0) Multiple Species
Primary Benefited Population	Not specified
Plans	Pacific Region Fisheries Outreach Action Plan
Keyword	Fish Technology
Need Number	N-002
Partners	Native Fish Society

Accomplishments

Number of other Fishery Management Plan tasks implemented for populations of management concern.	2
Number of applied aquatic scientific and technologic tools shared with partners.	1

Accomplishment Summary

Abernathy FTC hosted the 2006 Annual FTC Meeting with Washington Office, Pacific Regional Office, all Fish Technology Centers, the Olympia Fish Health Center, and Alaska Region Conservation Genetics Lab, and NGO (Native Fish Society) participants to discuss research and issues of concern across all Regions of the USFWS (March 2006).

Description

The *importance* to the Resource:

Natural resource conservation demands rigorous, timely, and relevant scientific information. The USFWS' Science Excellence Initiative works to ensure scientific excellence and strict adherence to science in making management decisions. This meeting assists in achieving this goal.

The *problem*:

To meet the natural resource challenges of tomorrow the USFWS must ensure the availability and use of sound science in making management decisions. One part of this is to ensure the sharing of resource information needs and scientifically robust information.

The *objective*:

The purpose of the meeting was to discuss issues important to the research needs of the Fisheries Program and to brief ARDs, WO, RO, and FTC staffs and their partners on items of national significance such as: Future Challenges Initiative; USFWS Scientific Policy; updates on current activities of FTCs; and shared national FONS projects.

	<p>The <i>method</i>:</p> <p>In March 2006 a meeting of the seven FTCs, the Alaska Region Conservation Genetics Lab, two Assistant Regional Directors for Fisheries, Pacific Regional Office staff, an NGO (the Native Fish Society), and Washington Office staff, was held in Vancouver, WA. Scientific information needs and current data were shared.</p>
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13210-A-005 - [Participation in Washington State Hatchery Reform Group: A Model for Cooperative Hatchery Reform](#)

Facility	Abernathy Fish Technology Center
Expended	\$43097
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Puget Sound ESU/Dosewallips River Independent Population
Plans	Puget Sound and Coastal Washington Hatchery Reform Project
Keyword	Fish Technology
Need Number	N-002
Partners	Long Live the Kings (\$1200) Washington Department of Fish and Wildlife (\$5000)

Accomplishments

Number of other Fishery Management Plan tasks implemented for populations of management concern.	3
Number of training session to support Tribal fish & wildlife conservation.	10
Number of applied aquatic scientific and technologic tools shared with partners.	2

Accomplishment Summary

Computer models have been developed and continue to be refined to implement long-range goals for hatcheries, habitat, and harvest. A manuscript describing the hatchery reform process was published in a peer-reviewed journal. Several technical workshops with co-managers were conducted. Progress report has been submitted to Congress.

Description

The importance to the Resource:

Hatcheries are one of several tools available for recovering wild salmon and supporting sustainable fisheries. They represent the most effective tool for achieving established goals for salmon populations. Hatchery reform means designing and operating hatchery programs in concert with the needs of wild salmon and steelhead populations.

The problem:

Hatchery operations began in the Pacific Northwest more than 100 years ago, with the primary purpose of producing fish for harvest. Recent findings have made it clear that hatchery operations contribute to the decline of wild salmon populations, requiring us to fundamentally change the way we think about hatcheries.

The objective:

To conduct a systematic, science-driven approach to rethinking how to use hatcheries to achieve two goals: help recover wild salmon and steelhead populations; and provide sustainable fisheries.

Number of techniques and culture technology tools developed.	2	<p>The <i>method</i>:</p> <p>The Hatchery Scientific Review Group (HSRG), between 2000 and 2006, reviewed all salmon and steelhead state, federal, and tribal hatchery programs in western Washington for their compliance with scientific principles, fishery and conservation goals.</p> <p>Further description:</p> <p>Hatchery Reform</p>
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13210-A-006 - [Integrated Hatchery Management: Scientific Review of NFHs in the Columbia River Basin.](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>In FY2006 the Hatchery Review Team completed its review of the Warm Springs NFH and Leavenworth NFH Complex (Leavenworth, Winthrop, and Entiat) production programs for Chinook salmon and steelhead. Recommendations have been produced for these production programs to assist in meeting short term and long term goals for Pacific salmon resources to meet future, conservation and harvest needs.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>USFWS proactively initiated a series of hatchery reviews in May 2005 to assure that programs at 12 NFHs are part of a holistic and integrated strategy-consistent with state, tribal, and federal strategies-for conserving wild stocks and managing fisheries in watersheds within the Columbia River Basin.</p> <p>The problem:</p> <p>In the past 150 years, habitat alterations, hydroelectric development, and consumptive fisheries have impacted salmon and steelhead populations in the Pacific NW. Mitigation hatcheries have been used to increase the fish available for harvest. Conservation needs of natural populations require review of NFH use in management/conservation strategies.</p> <p>The objective:</p> <p>The goal of these reviews is to ensure an integrated holistic approach to the long-term conservation and management of salmonid resources in the Columbia River Basin while supporting tribal and non-tribal harvest and</p>
Expended	\$64648	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Wind River spring Chinook	
Plans	<p>Federal Columbia River Power System 2002 Biological Opinion</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p>	
Keyword	Fish Technology	
Need Number	N-002	
Partners	<p>Confederated Tribes of The Warm Springs</p> <p>Confederated Tribes of the Colville Reservation</p> <p>Long Live the Kings</p> <p>Oregon Trout</p> <p>Washington Trout</p>	

Yakima Indian Nation

Accomplishments

Recovery Plan production tasks implemented (PART)	2
Number of other Recovery Plan tasks implemented for T&E populations	10
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

mitigation objectives.

The method:

The Pacific Region is conducting a scientific review of all Columbia River Basin NFHs. Chaired by a Regional Coordinator and Senior Scientist, the Hatchery Review Team uses current tools (HETs, CHMPs, HGMPs, spreadsheet models, multi-agency work groups, etc.) and develops others, to review all Service funded programs in the Columbia River Basin.

Further description:

Hatchery Reform

13210-A-009 - [Effects of Natural Prey on the Ability of NFH Fish to Successfully Forage After Release](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Preliminary feed trials with insects have been initiated to determine if use of more natural prey items in the feed for NFH salmon will increase prey recognition and foraging ability of NFH fish post release.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The rearing environment of NFH fish is significantly different from the conditions in the wild which could have an effect on post-release growth and survival. The feed is quite dissimilar from a wild fish diet with nutrient content, taste, mouth feel, and movement considerably different from what NFH fish will experience in the wild.</p> <p>The problem:</p> <p>Newly released NFH fish need to acclimate to the environment before they begin to eat. Pellet-fed NFH fish may not recognize natural prey or find natural prey unpalatable. For pellet-fed NFH fish to forage efficiently post-release they need to learn how to recognize and capture prey.</p> <p>The objective:</p> <p>Determine if introduction of a more natural prey item in addition to NFH salmon fish feeds will increase prey recognition, foraging ability of the fish, and ultimately improve survival.</p> <p>The method:</p> <p>Work has been started as part of a peer-reviewed study to introduce NFH fish to prey items prior to release to determine if the fish</p>					
Expended	\$15648						
Objective	Develop and share applied aquatic scientific and technologic tools with partners.						
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)						
Primary Benefited Population	Wild Warm Springs River Spring Chinook						
Plans	<p>Warm Springs Hatchery and Genetic Management Plan (draft)</p> <p>Eagle Creek NFH Winter Steelhead Hatchery and Genetic Management Plan</p> <p>Little White NFH Coho Salmon Hatchery and Genetic Management Plan</p>						
Keyword	Fish Technology						
Need Number	N-002						
Partners							
<p>Accomplishments</p> <table border="1"> <tr> <td>Recovery Plan production tasks implemented (PART)</td> <td>1</td> </tr> <tr> <td>Number of techniques and culture technology tools developed.</td> <td>1</td> </tr> <tr> <td>Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)</td> <td>1</td> </tr> </table>			Recovery Plan production tasks implemented (PART)	1	Number of techniques and culture technology tools developed.	1	Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)
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Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1						

	<p>can be conditioned to improve post-release foraging ability. Chinook, steelhead, and coho will be used in this study. First feeding trial showed fish, after a period of learning, did recognize and consume prey items.</p> <p>Further description:</p> <p>Nutrition</p>
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13210-A-014 - [Identify Critical Nutrient Requirements for Listed Broodstock](#)

Facility	Abernathy Fish Technology Center
Expended	\$68235
Objective	Develop and share applied aquatic scientific and technologic tools with partners.
Primary Benefited Species	Lahontan cutthroat trout (Oncorhynchus clarkii henshawi)
Primary Benefited Population	LNFH - Lahontan cutthroat trout Pilot Peak Broodstock
Plans	Lahontan Cutthroat Trout Recovery Plan
Keyword	Fish Technology
Need Number	N-002
Partners	

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	1
Number of applied aquatic scientific and technologic tools shared with partners.	1

Accomplishment Summary

Broodstock diets from Lahontan NFH, Mora FTC, Bears Bluff NFH were analyzed for key nutrients. One cutthroat trout broodstock feeding trial has been completed and a second trial has been started as parts of a study to to develop and formulate broodstock diets to improve condition and reproduction for species held in refugia. This accomplishment is associated with FONS project 13210-2003-004.

Description

The importance to the Resource:

More threaten and endangered fish are being held in refugia at NFHs as captive broodstock. Although there are broodstock diets available commercially, questions still remain on the nutritional adequacy of these feeds.

The problem:

Nutrition affects survival, fecundity, egg size, composition, egg hatchability and fry viability. Analysis of the fish and their reproductive products have identified nutrients needed by broodstock. This method is a start but needs to be fined tuned. Culture and fecundity problems are seen in some captive stocks which could be related to nutrition.

The objective:

But few well-structured feeding trials have been conducted to determine species specific nutritional requirements. Abernathy FTC, Mora NFH&TC, and Lahontan NFH staffs examined feeds currently in use to gain nutritional need information.

	<p>The <i>method</i>:</p> <p>Feeds of of the listed captive cutthroat trout broodstock in Pacific Region, Gila trout in the Southwest Region and sturgeon in the Southeast Region were examined. A feeding trial has been initiated with cutthroat trout broodstock. This accomplishment is associated with FONS project 13210-2003-004.</p> <p>Further description:</p> <p>Nutrition</p>
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13210-A-022 - [Field Identification and Genetic Validation of Steelhead, Cutthroat Trout, and Their Hybrids](#)

Facility	Abernathy Fish Technology Center
Expended	\$33148
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.
Primary Benefited Species	Cutthroat trout (Oncorhynchus clarkii)
Primary Benefited Population	Not specified
Plans	Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper) Lower Columbia Salmon Recovery and Subbasin Plan
Keyword	Fish Technology
Need Number	N-002
Partners	

Accomplishments

Recovery Plan production tasks implemented (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of applied aquatic scientific and technologic tools shared with partners.	1

Accomplishment Summary

Maximize field biologist's ability to classify juvenile steelhead, coastal cutthroat trout, and their hybrids. We determined morphometric measurements, genotyping completed for steelhead, cutthroat trout and hybrids. We are currently completing a manuscript for peer-reviewed publication.

Description

The importance to the Resource:

Conservation of native species depends on accurate estimates of population demographics, including population abundance, survival, recruitment, and migration. Often these estimates are based on the identification of individual organisms in the field using one or more phenotypic characters and the assumption of a simple breeding structure.

The problem:

In systems where native species are closely related or known to hybridize field-based identifications may be inaccurate. This inaccuracy can lead to erroneous conclusions on basic life history characters and population demographics, causing poor decisions on species listings, critical habitat designations, and conservation plans.

The objective:

We are attempting to maximize field biologist's abilities to classify juvenile steelhead, coastal cutthroat trout, and their hybrids.

The method:

We have collected juvenile steelhead, coastal cutthroat trout, and their hybrids during outmigration and classified individuals using phenotypic and genotypic methods.

Further description:

Ecological Physiology and Genetics

13210-A-024 - [Development of PIT Tag Interrogation Units for Imperiled Columbia River Basin Salmon and Trout](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Twelve remote PIT tag monitoring sites were upgraded, maintained, and monitored to examine the demographics, movements, and behavior of listed salmon and trout.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Various management plans and ESA-related Biological Opinions have stressed the need to evaluate the distribution, freshwater habitat use and migrations of imperiled populations of bull trout, cutthroat trout and other salmonids.</p> <p>The problem:</p> <p>Traditional monitoring methods (fixed traps, mark-recapture, and radio telemetry) are limited by high and low water flows, labor costs, and excessive handling effects.</p> <p>The objective:</p> <p>Construct, install, monitor, and upgrade PIT tag antenna arrays that enable the evaluation of imperiled trout and salmon distribution, freshwater habitat use, and migration patterns.</p> <p>The method:</p> <p>In cooperation with the Columbia River Fisheries Program Office and other partners this project has implemented PIT tag interrogation units at Columbia River basin monitoring sites established in Washington and Oregon.</p> <p>Further description:</p>
Expended	\$97281	
Objective	Develop and share applied aquatic scientific and technologic tools with partners.	
Primary Benefited Species	Bull trout (Salvelinus confluentus)	
Primary Benefited Population	Walla Walla River core area Bull Trout	
Plans	<p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Draft Columbia River Basin Research Plan</p>	
Keyword	Fish Technology	
Need Number	N-002	
Partners	<p>Bonneville Power Administration</p> <p>Columbia River Fisheries Program Office</p> <p>Oregon Department of Fish and Wildlife</p> <p>U. S. Army Corps of Engineers</p> <p>U. S. Forest Service</p> <p>U.S. Bureau of Reclamation</p>	

Utah State University
Washington
Department of Fish and
Wildlife

Ecological Physiology

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	1
Number of mitigation tasks implemented as prescribed in approved plans. (PART)	1
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1
Number of mitigation applied sci & tech tasks implemented as prescribed in approved plans.	1

13210-A-025 - [Bioenergetics of Genetically Distinct Populations of Bull Trout in Relation to Fish Passage](#)

Facility	Abernathy Fish Technology Center
Expended	\$55591
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Walla Walla River core area Bull Trout
Plans	Bull Trout Draft Recovery Plan, Chapter 23
Keyword	Fish Passage
Need Number	N-002
Partners	National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center Oregon Fish and Wildlife Office U.S. Geological Survey, Columbia River Research Lab

Accomplishment Summary

Respirometry equipment was built and successfully tested. Oxygen maximum consumption rate experiments on wild bull trout have been completed. Experiments to determine resting and active metabolic rates have been completed. Currently a final report is being compiled and should be available in late 2006.

Description

The importance to the Resource:

Bull trout has been listed by the USFWS. As such it is imperative to determine and describe basic metabolic needs of bull trout for use in making management decisions, specifically on such issues as culvert design.

The problem:

Basic metabolic needs of bull trout are unknown thus making management decisions, specifically on such issues as culvert design difficult.

The objective:

We intend to determine the resting and active metabolic rate for wild bull trout at several temperatures and sizes and respective maximum consumption rates. In addition we intend to develop a bioenergetics model for wild bull trout using data on life history, swim speed, activity, and water temperature.

The method:

We have determined the resting and active metabolic rate for wild bull trout at several temperatures and sizes and respective

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	1
Number of applied aquatic scientific and technologic tools shared with partners.	1

maximum consumption rates. We have developed a bioenergetics model for wild bull trout using data on life history, swim speed, and activity, and water temperature.

Further description:

Annual report is currently being prepared and will be available late 2006.

Ecological Physiology

13210-A-027 - [Evaluation of Water Diversion Screen Criteria for Pacific Lamprey](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Behavioral experiments to protect the declining Pacific Lamprey at water diversion structures were initiated and completed. Data was analyzed and a final report was prepared and submitted to the USFWS Oregon FWO for use in management decisions.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Effective screening criteria are essential to prevent impingement and entrainment of petitioned Pacific lamprey in water diversion structures at the Pacific Region's NFHs, agricultural drainage ditches, and hydropower facilities.</p> <p>The problem:</p> <p>Existing criteria were based on and developed for salmon species, such as Chinook, and questions have arisen as to whether existing criteria could protect the declining Pacific Lamprey from impingement and entrainment at fishery facilities in Pacific Northwest watersheds.</p> <p>The objective:</p> <p>To determine if existing fish screen criteria protect Pacific Lamprey from impingement and entrainment.</p> <p>The method:</p> <p>Using current generic salmon screening criteria as a baseline, Tte Center's Applied Research Program in Ecological Physiology conducted experiments to determine what risks, if any, the current water diversion screens pose to Pacific lamprey petitioned under the Endangered</p>	
Expended	\$17650		
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.		
Primary Benefited Species	Pacific lamprey (Lampetra tridentata)		
Primary Benefited Population	Columbia River Pacific Lamprey		
Plans	Salmon Subbasin Summary Lower Columbia Salmon Recovery and Subbasin Plan		
Keyword	Fish Passage		
Need Number	N-002		
Partners	Columbia River Fisheries Program Office Oregon Fish and Wildlife Office		
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Number of other Fishery Management Plan tasks implemented for populations of management concern.	2		

	<p>Species Act. The study and final report has been completed and submitted.</p> <p>Further description:</p> <p>Ecological Physiology</p>
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13210-A-028 - [The Utility of Volitional Release Strategies at Winthrop National Fish Hatchery, Winthrop, WA](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Data from both 2004 and 2005 study years were compiled and analyzed. Results indicate few if any differences between volitionally and force released fish. Additional samples were collected to determine whether a specific male hormone level is associated with precocious maturation. Project results were presented at the USFWS Region 1 Hatchery Management Workshop (Nov 2005) and the Annula Meeting of the American Fisheries Society, Oregon Chapter (Feb 2006). A manuscript is in preparation.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Given the apparent untenable status of many wild Pacific salmon populations, the role of hatchery stocks as a conservation tool has been increasingly debated. Numerous reviews of hatchery practices have recommended new practices concerning everything from release strategies to feeding methods that might improve the performance of NFH programs.</p> <p>The problem:</p> <p>One criticism of hatchery programs is that they release juvenile fish which are not fully ready to undergo downstream migration, this can lead to low post release survival and increased levels of precocious maturation in juvenile fish.</p> <p>The objective:</p> <p>The study objective is to determine if the use of volitional release for NFH juvenile fish results in the release of more physiologically and behaviorally competent smolts. The steelhead production program at Winthrop NFH was</p>					
Expended	\$17650						
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.						
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss .)						
Primary Benefited Population	Methow River (UCMET-s) population, part of the Upper-Columbia River steelhead ESU.						
Plans	Winthrop Hatchery Genetics Management Plan (Steelhead) Methow Subbasin Plan						
Keyword	Fish Technology						
Need Number	N-002						
Partners	Leavenworth National Fish Hatchery U.S. Bureau of Reclamation						
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	<p>chosen as a case study.</p> <p>The <i>method</i>:</p> <p>Volitionally released juvenile steelhead were compared to force released and non-migrating individuals. Factors compared include smolt physiology, reproductive physiology, and migratory behavior (using PIT tag monitoring technology). A manuscript is being prepared for submission to a peer reviewed journal.</p> <p>Further description:</p> <p>Ecological Physiology</p>
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13210-A-029 - [Emigration and Smolting of Net-Pen Reared Spring Chinook Salmon From Youngs Bay, OR](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Completed final study report examining emigration rate and its relationship to smolt development in spring Chinook salmon. The final report has been submitted to Oregon Fish and Wildlife Departments Recreation and Enhancement Board. In addition the results have been shared with regional partners concerned with monitoring and restoration of the Columbia River estuary.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Terminal fisheries extend the hatchery rearing period and are used to increase commercial and sport fishing opportunities. These programs can have negative impacts on wild fish by increasing competition for food and habitat. The results of this study will provide information to determine whether this program can be expanded or should be curtailed.</p> <p>The problem:</p> <p>The Columbia River estuary is known to be an important nursery and rearing area for a number of threatened and endangered wild salmon stocks. Whether there are negative interactions between the hatchery fish released for this terminal fishery program and wild fish is unknown.</p> <p>The objective:</p> <p>Project objectives are to determine: 1) the emigration rate of juvenile net-pen reared salmon; and 2) if there is a correlation between gill ATPase (a hormone used as a physiological measure of smolting) and emigration rate.</p>	
Expended	\$15500		
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.		
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)		
Primary Benefited Population	Lower Columbia River		
Plans	Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper) Lower Columbia Salmon Recovery and Subbasin Plan		
Keyword	Fish Technology		
Need Number	N-002		
Partners	Battelle Pacific Northwest National (\$1500) Clatsop Economic Development Council (\$1000) Oregon Department of Fish and Wildlife (\$1500) Salmon for All (\$500)		
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of other Fishery Management Plan</td> <td>1</td> </tr> </table>			Number of other Fishery Management Plan
Number of other Fishery Management Plan	1		

tasks implemented for populations of management concern.		<p>The <i>method</i>:</p> <p>Chinook physiology and emigration route and speed were measured using radio-telemetry techniques. This was a cooperative project, and including Salmon for All, Clatsop County, OR, Columbia River Estuary Study Team, and Oregon Department of Fish & Wildlife Recreation and Enhancement Board.</p> <p>Further description:</p> <p>Ecological Physiology</p>
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	

13210-A-032 - [Establishment of a Regional Repository for Fish Pathogens](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Collected more than 20 bacterial and viral fish pathogen samples from a number of fish health laboratories. Supplied pathogen samples to University of Idaho, Warm Springs FHC, Lamar FHC, and Auburn USDA Lab. Continued to characterize and catalogue samples already in the repository collection.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Ongoing research in fish health often requires viable pathogen isolates to pursue research questions. Often the required isolate is not available from any source or has been lost after initial isolation. Lack of appropriate isolates precludes important research critical to fish health diagnostic, treatment, management, and policy development.</p> <p>The problem:</p> <p>Maintainence of viable fish pathogens is usually done by culturing the isolates which can be labor intensive. Also cultured isolates are often no longer viable after prolonged storage.</p> <p>The objective:</p> <p>To create a repository for bacterial and viral fish pathogens using lyophilization technology to preserve viable pathogens. Lyophilization preserves bacteria and viruses and allows for long-term storage (years) of viable isolates.</p> <p>The method:</p> <p>Bacteria and virus isolates will be submitted by the Service's Fish Health Centers and partner laboratories. Isolates will be lyophilized,</p>					
Expended	\$25600						
Objective	Develop and share applied aquatic scientific and technologic tools with partners.						
Primary Benefited Species	(0) Multiple Species						
Primary Benefited Population	Not specified						
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy						
Keyword	Fish Health						
Need Number	N-002						
Partners							
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of applied aquatic scientific and technologic tools shared with partners.</td> <td>1</td> </tr> <tr> <td>Number of techniques and culture technology tools developed.</td> <td>1</td> </tr> <tr> <td>Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)</td> <td>1</td> </tr> </table>			Number of applied aquatic scientific and technologic tools shared with partners.	1	Number of techniques and culture technology tools developed.	1	Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)
Number of applied aquatic scientific and technologic tools shared with partners.	1						
Number of techniques and culture technology tools developed.	1						
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1						

catalogued, and be made available in response to researcher requests.

Further description:

Pathology

Viable fish pathogens for research and development purposes are not always readily available. Most research facilities retain a small selection of pathogens in active culture or frozen samples. However, samples stored this way require excessive labor to maintain and often lose viability and are lost. By using a freeze-drying technique, bacterial and viral samples can be retained without excessive labor and with preservation of viability over long periods of time (years). This would assure researchers of a reliable source for bacterial and viral fish pathogens for future research and development needs. This project collects and preserves viable bacterial and viral fish pathogens from a variety of sources such as USFWS and State Fish Health Labs, University Labs, and the commercial sector. Samples will be identified biochemically and serologically, and then stored for future dissemination. The availability of the different strains of various fish pathogens will allow critical research to be done independent of the strain's availability at the original source. This is particularly important in the rearing of species used in the restoration and recovery of declining, threatened and endangered species.

13210-A-034 - [Safety of Standard Therapeutic Compounds in Three Species of Salmonids](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>A manuscript has been prepared and submitted to the North American Journal of Aquaculture, a peer-reviewed publication.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Efficacious treatment is imperative in the prevention and elimination of disease in hatcheries. Treatments must be safe, effective, and cost effective. Improvements in treatment regimes are highly desirable both to reduce mortality and cost.</p> <p>The problem:</p> <p>Existing treatment recommendations for salmonids are based on safety and efficacy data generated using rainbow trout. Little is known about the actual safe limits for other species of salmonids.</p> <p>The objective:</p> <p>This study looked at five treatment compounds to improve understanding of the safety limits of those compounds on three species of salmonids.</p> <p>The method:</p> <p>Two sizes of coho and Chinook salmon and rainbow trout were exposed to different levels of 5 different chemotherapeutants. Compounds tested were copper sulfate, formalin, potassium permanganate, acetic acid, and hydrogen peroxide. Safe treatment levels for each compound were determined for each species and size of fish.</p>			
Expended	\$32257				
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.				
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)				
Primary Benefited Population	Not specified				
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy				
Keyword	INAD				
Need Number	N-002				
Partners					
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of applied aquatic scientific and technologic tools shared with partners.</td> <td>1</td> </tr> <tr> <td>Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)</td> <td>1</td> </tr> </table>			Number of applied aquatic scientific and technologic tools shared with partners.	1	Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)
Number of applied aquatic scientific and technologic tools shared with partners.	1				
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1				

Further description:

Pathology

Copper sulfate, potassium permanganate, formalin, acetic acid, and hydrogen peroxide have long been used as chemotherapeutants to treat fish pathogens. However, information on the actual toxicity levels of these compounds is not available in the published literature. Little is known about the toxicity to different species of fish. Differences in toxicity between different species of fish could present problems in treatment regimes, especially when dealing with endangered or threatened species. This study will look at the toxicity (expressed as LD50 concentrations) of these compounds in two different sizes (2 gm and 12 gm) rainbow trout, coho salmon, and Chinook salmon.

13210-A-039 - [Genetic and Geographic Origins of Threatened Bull Trout Trapped at Dams in the Clark Fork River, MT.](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Standardized genetic protocols were developed for identifying geographic origin of bull trout in the Lower Clark Fork River / Lake Pend Oreille. Fifty adults captured at the base of Cabinet Gorge Dam were genotyped in a rapid response mode as part of a selective passage program that involves three dams in the Clark Fork River Basin of ID and MT. This passage allows fish to reach their spawning grounds. 500 bull trout were genotyped to supplement the genetic baseline used to assigning fish.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Genetic information is used to assist with the selective passage of bull trout over three dams in the Clark Fork River Basin of Idaho and Montana. This passage allows fish to reach their spawning grounds. More fish spawning decreases the demographic risk of extinction for this bull trout core area.</p> <p>The problem:</p> <p>Bull trout are currently listed as threatened under the U.S. Endangered Species Act. In the Clark Fork River three large hydropower dams prevent upstream migration of adult fish back to their natal spawning areas. The reduction in the number of spawners reaching their natal streams has resulted in rapid population declines.</p> <p>The objective:</p> <p>To genetically identify the sub-basin of origin of trapped adults prior to their release downstream or passage upstream using a</p>
Expended	\$75285	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Bull trout (Salvelinus confluentus)	
Primary Benefited Population	Bull trout - Clark Fork (3) Cabinet Gorge Reservoir	
Plans	Chapter 3, Clark Fork River Recovery Unit, Montana, Idaho, and Washington. 285 p. U.S. Fish and Wildlife Service. Bull Trout (<i>Salvelinus confluentus</i>) Draft Recovery Plan. Portland, Oregon.	
Keyword	Genetics	
Need Number	N-002	
Partners	<p>Avista Corporation (\$10000)</p> <p>Confederated Salish Kootenai Tribes (\$5000)</p> <p>Idaho Fish and Game (\$5000)</p> <p>Montana Department of Fish, Wildlife & Parks (\$5000)</p> <p>Mountain Prairie Region Ecological Services Field Office (\$5000)</p>	

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	2
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1

"rapid response" methodology.

The *method*:

This project identified and developed a suite of DNA markers to genetically identify the sub-basin (or population) of origin of bull trout trapped at the base of main stem dams during their upstream spawning migrations.

13210-A-045 - [Genetic Monitoring of Threatened Hatchery and Natural Origin Steelhead in Battle Creek, CA](#)

Facility	Abernathy Fish Technology Center
Expended	\$44000
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)
Primary Benefited Population	California Central Valley Steelhead Distinct Population Segment (DPS)
Plans	Steelhead Restoration and Management Plan for California Endangered Species Act: Northern California ESU Steelhead
Keyword	Genetics
Need Number	N-002
Partners	Coleman National Fish Hatchery (\$5000) Red Bluff Fish and Wildlife Office (\$5000)

Accomplishments

Number of population assessments completed	1
Number of Fishery Management Plan production tasks implemented (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of	1

Accomplishment Summary

Hatchery and natural origin steelhead passed upstream at the Coleman NFH were genotyped at a set of DNA loci. A total of 1800 adult steelhead have been genotyped. Relative reproductive success of the two groups will be determined via parentage analysis.

Description

The importance to the Resource:

The Battle Creek, CA, population of steelhead is listed as threatened as part of the Central Valley distinct population segment. The USFWS is genetically monitoring the natural reproductive success of natural and hatchery-origin steelhead in Battle Creek upstream from the Coleman NFH.

The problem:

Are hatchery-origin fish produced by Coleman NFH directly contributing to, or impeding, the recovery of the Battle Creek ESA listed stock?

The objective:

The study's goal is to assess the natural reproductive success and genetic contribution of both hatchery and natural origin adult steelhead to returning natural origin adults in Battle Creek.

The method:

All adults passed upstream are genotyped with a suite of DNA markers. All natural origin adults returning one generation later are also being genotyped. DNA based parentage analysis will allow for the determination of the natural spawning success and progeny return

management concern.		rates of all adults passed upstream to spawn naturally.
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	

13210-A-049 - [Genetic Monitoring and Broodstock Management of Steelhead at the Eagle Creek NFH](#)

Facility	Abernathy Fish Technology Center
Expended	\$10000
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)
Primary Benefited Population	Clackamas River winter run steelhead
Plans	Eagle Creek NFH Winter Steelhead Hatchery and Genetic Management Plan 1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.
Keyword	Genetics
Need Number	N-002
Partners	Columbia River Fisheries Program Office (\$10000) Eagle Creek National Fish Hatchery (\$500) Lower Columbia Fish Health Center (\$500)

Accomplishments

Number of population assessments completed	2
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Accomplishment Summary

Genetic assignment tests were used to determine if Eagle Creek NFH steelhead trout are reproducing naturally in Eagle Creek. These findings will aid in the development of a genetic monitoring and broodstock management plan for steelhead at Eagle Creek NFH. This is the second year of a three year study. The first year of the study indicated the majority of the 200 natural-origin steelhead sampled were parented by the ESA listed native winter-run population.

Description

The importance to the Resource:

In the second year of a three year study, genetic assignment tests were used to determine the genetic impact of the Eagle Creek NFH fish on the ESA listed native winter-run steelhead. The information gathered from this project will aid managers with assessing genetic risks associated with maintaining the current broodstock at Eagle Creek NFH.

The problem:

The number of non-native Eagle Creek NFH steelhead spawning naturally in Eagle Creek is unknown. The NFH program is managed as a segregated program with the assumption that few, if any, hatchery steelhead spawn in the wild.

The objective:

Determine the reproductive success of Eagle Creek NFH steelhead in the wild.

The method:

Number of other Recovery Plan tasks implemented for T&E populations	2	Sixteen DNA markers and genetic assignment tests were used to determine if natural-origin juveniles were parented by hatchery or the ESA listed wild steelhead. A total of 200 juvenile and 50 adult steelhead were examined from five locations in the Eagle Creek basin.
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1	

13210-A-051 - [Genetic Analyses of Resident and Migratory Coastal Cutthroat Trout in the Lower Columbia River](#)

Facility	Abernathy Fish Technology Center
Expended	\$27350
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)
Primary Benefited Population	lower Columbia River Steelhead
Plans	Lower Columbia Salmon Recovery and Subbasin Plan Coastal Cutthroat Trout Framing Document (draft)
Keyword	Genetics
Need Number	N-002
Partners	

Accomplishments

Number of population assessments completed	2
Number of other Fishery Management Plan tasks implemented for populations of management concern.	2
Number of techniques and culture technology tools developed.	1

Accomplishment Summary

Genetic data was used to determine if the migratory and resident forms of coastal cutthroat trout represent distinct populations or if both life history types descended from a single random mating population in two Lower Columbia River streams. Two-hundred samples were genotyped at 21 microsatellite loci. Data analysis will be completed in FY07.

Description

The importance to the Resource:

Understanding the genetic relationship between resident and migratory groups within and among streams is critical to properly managing and conserving coastal cutthroat trout populations. For example, genetic data can help determine whether the resident form can potentially assist with recovery of the migratory form.

The problem:

Do the migratory and resident forms represent distinct coastal cutthroat trout populations or do both life history types descended from a single random mating population? This information is critically needed to assess the true status of the migratory form in the lower Columbia River.

The objective:

This study addresses the genetic relationship of sympatric migratory and resident coastal cutthroat trout in Aberrantly Creek and the Chinook River in Washington State.

The method:

DNA markers were used to compare genetic

	<p>profiles of resident and migratory forms in each of two tributaries in the lower Columbia River. Those results will determine whether the two life history forms represent two genetically-distinct populations or simply represent alternative life history strategies of a single population within each stream.</p>
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13210-A-052 - [Conservation Genetics of the Endangered Oregon Chub Over the Species Range](#)

Facility	Abernathy Fish Technology Center
Expended	\$9731
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Oregon chub (Oregonichthys crameri)
Primary Benefited Population	Not specified
Plans	Recovery Plan for the Oregon Chub (<i>Oregonichthys crameri</i>)
Keyword	Genetics
Need Number	N-002
Partners	Columbia River Fisheries Program Office (\$1000) Ecological Services (\$1000) Oregon Department of Fish and Wildlife (\$1000)

Accomplishments

Number of population assessments completed	21
Number of other Recovery Plan tasks implemented for T&E populations	3
Number of applied aquatic scientific and technologic tools shared with partners.	1

Accomplishment Summary

A range wide population genetics study was completed that included 21 populations of Oregon Chub. Fourteen DNA markers (microsatellite loci) were used to examine 1200 fish. This new genetic information will be used to estimate the level of inbreeding within populations, identify genetically distinct groups of Oregon chub, and identify historic migration patterns among the populations. Final report will be completed in FY07.

Description

The importance to the Resource:

Oregon chub are an endangered fish found only in the Willamette Valley of western Oregon. Currently, only 23 locations contain Oregon chub. Most of the remaining populations are isolated and contain low numbers of fish. This isolation and low abundance creates a high risk for demographic and genetic extinction.

The problem:

Currently new populations are being established and transfer of fish among populations is being considered. However, no genetic data are available on Oregon chub to help guide these important restoration efforts.

The objective:

This basic genetic information will allow us to estimate the level of inbreeding within populations, identify genetically distinct groups of Oregon chub, and identify historic migration patterns among the populations. These results will aid in the restoration of this highly endangered species.

The *method*:

Using 14 newly developed DNA markers, we determined the amount of within and among population genetic diversity present over the Oregon chub's range by examining at least 1200 fish from 21 populations.

13210-A-053 - [Evolutionary Genetic Relationships Between Threatened Foscett Springs and Warner Basin Speckled Dace](#)

Facility	Abernathy Fish Technology Center
Expended	\$8879
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Speckled dace (Rhinichthys osculus)
Primary Benefited Population	Speckled dace - Warner Basin and Alkali Subbasin
Plans	Recovery Plan for the Threatened and Rare Native Fishes of the Warner Basin and Alkali Subbasin: Warner sucker, Hutton tui chub, Foscett speckled dace.
Keyword	Genetics
Need Number	N-002
Partners	Ecological Services (\$1000)

Accomplishments

Number of population assessments completed	8
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

Accomplishment Summary

Evolutionary genetic relationships between threatened Foscett Springs speckled dace and speckled dace populations in the adjacent Warner and Goose Lake Basins were determined. 120 dace were examined.

Description

The importance to the Resource:

Foscett Spring speckled dace (*Rhinichthys osculus* ssp.) were listed as threatened in 1985 under the U.S. Endangered Species Act. It is an isolated population of speckled dace inhabiting Foscett Spring along the western margin of Coleman Lake, a hydrologically separated sub-basin approximately 10 km south of the Warner Basin in southeast Oregon.

The problem:

Coleman Lake became isolated hydrologically from the Warner Basin 12,000 years ago. Speckled dace is the only fish native to Foscett Springs. The close proximity of Coleman Lake and the Warner Basin raises questions regarding the amount of evolutionary genetic divergence between populations of speckled dace in those two basins.

The objective:

To determine if Foscett speckled dace be considered a distinct subspecies relative to the more abundant populations in the Warner Basin?

The method:

To test the null hypothesis that Foscett Spring

	<p>and Warner Basin populations of speckled dace have not diverged evolutionary from each other, we compared mtDNA sequences at the CytB and ND2 genes and resulting haplotype frequencies for 30 Foskett speckled dace to those of 100 speckled dace inhabiting the adjacent Warner and Goose Lake basins.</p>
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13210-A-061 - [Investigation of the Effects of Carcass Analog Use in Small Streams](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>A study plan was written and submitted for funding to analyze the effects of using carcass analogs (a fish carcass substitute) in small streams. Information from this study will provide insight into the contribution of carcass analogs to the nutrient load of the habitat.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>There is a large body of work available in the area of stream enrichment with various nutrients, i. e. raw or processed salmon carcasses and commercially produced organic or inorganic fertilizers. Researchers reiterate the need for marine-derived nutrients and energy to maintain salmon stocks.</p> <p>The problem:</p> <p>In considering every aspect of stream enrichment, the use of carcass analogs appears to be very promising. Pathogens would not be introduced to streams as may happen with fish carcasses. Water quality would not be degraded as may happen with the addition of fertilizers. Possible introduction of contaminants to the stream would be minimized.</p> <p>The objective:</p> <p>The objective of this project is to increase knowledge concerning supplementing streams with carcass analogs.</p> <p>The method:</p> <p>The analogs will be made and dispersed into streams as per the work done by Pearsons et</p>			
Expended	\$4130				
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.				
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)				
Primary Benefited Population	Mill Creek fall run Chinook				
Plans	2000 NMFS FCRPS Biological Opinion - December 21, 2000				
Keyword	Fish Technology				
Need Number	N-002				
Partners					
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>1</td> </tr> <tr> <td>Number of techniques and culture technology tools developed.</td> <td>1</td> </tr> </table>			Number of other Recovery Plan tasks implemented for T&E populations	1	Number of techniques and culture technology tools developed.
Number of other Recovery Plan tasks implemented for T&E populations	1				
Number of techniques and culture technology tools developed.	1				

al. 2003. To determine the impact of nutrient supplementation, fish will be sampled from the treatment and control stream. Differences in fatty acid profiles between the groups will be determined. Fish numbers will be monitored via a smolt trap.

Further description:

Nutrition

13210-A-062 - [Tryptophan Use In Diets to Reduce Aggression in Endangered Bull Trout](#)

Facility	Abernathy Fish Technology Center
Expended	\$4130
Objective	Develop and share applied aquatic scientific and technologic tools with partners.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Lower Deschutes River core area Bull Trout
Plans	Bull Trout Draft Recovery Plan, Chapter 23
Keyword	Fish Technology
Need Number	N-002
Partners	

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	1
Number of techniques and culture technology tools developed.	1

Accomplishment Summary

As part of a larger bull trout project, a literature search was conducted to determine if additional tryptophan in the diet was a viable solution to use to reduce aggressive behavior in bull trout. Analytical methods for tryptophan detection were also investigated.

Description

The importance to the Resource:

Bull trout were federally listed as threatened in 1998. Recovery efforts are underway, including rearing at NFHs and at Fish Technology Centers.

The problem:

Bull trout, by nature, are territorial and aggressive and rearing them in numbers may prove difficult. Even though several diverse production programs for bull trout have been developed over the last 35 years (Montana Bull Trout Scientific Group 1996), the success of these programs is unknown.

The objective:

The goal of this project is to evaluate new rearing techniques of bull trout as a part of a larger study to determine if artificial propagation from captively-reared, natural-origin, Deschutes or Lewis River juveniles is a viable method of restoring bull trout to the Clackamas River.

The method:

In an effort to reduce aggression, diets will be formulated with graded levels of tryptophan. As diets are developed they will be fed to the fish using standard nutrition study protocols in

	<p>controlled tank studies. Tryptophan levels in fish and feed will be determined and behavior during and after the trial will be monitored.</p> <p>Further description:</p> <p>Nutrition</p>
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13210-A-068 - [Genetic Identification of Species and Origin of Missouri and Yellowstone Rivers YOY Sturgeon.](#)

Facility	Abernathy Fish Technology Center
Expended	\$7133
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Pallid sturgeon (Scaphirhynchus albus)
Primary Benefited Population	RPA 1-3 Upper Missouri River per Recovery Plan (above Gavins Point) Pallid Sturgeon -
Plans	Pallid Sturgeon Recovery Plan
Keyword	Genetics
Need Number	N-002
Partners	Montana Department of Fish, Wildlife & Parks (\$20000) U.S. Geological Survey, Biological Resources Division (\$20000)

Accomplishments

Number of population assessments completed	2
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1
Number of applied science and technology tasks implemented as prescribed by	6

Accomplishment Summary

Tissue samples from young-of-year sturgeon sampled in the Upper Missouri and Yellowstone Rivers during 2004 (78 individuals) and 2005 (179 individuals) were genetically classified as pallid sturgeon, shovelnose sturgeon, or hybrids. Fish were also classified as hatchery or natural origin based on genetic tagging information.

Description

The importance to the Resource:

Intensive sampling for young-of-year sturgeon in the Missouri River and Yellowstone River is occurring to quantify reproductive success of shovelnose sturgeon and pallid sturgeon. This study provides a genetic method for distinguishing larvae and young-of-year sturgeon as pallid sturgeon, shovelnose sturgeon, or hybrids.

The problem:

Accurate field and laboratory identification of young-of-year sturgeon as pallid sturgeon, shovelnose sturgeon, hybrids, hatchery or natural origin is difficult due to the close similarity of *Scaphirhynchus* sp., the small size (16 – 140 mm) of individuals, and incomplete development of several key characteristics of individuals at small sizes.

The objective:

Provide a genetic method for distinguishing larvae and young-of-year sturgeon as pallid sturgeon, shovelnose sturgeon, or hybrids. In addition, the genetic information will also allow of the origin of the fish to be determined (hatchery or natural).

Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	6	<p>The method:</p> <p>The DNA profiles at 17 microsatellite loci for unmarked YOY fish will be compared to those of natural pallid, shovelnose, and hatchery-spawned adults in the genetic database. Parentage and assignment based methods will be used to classify fish.</p>
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13210-A-069 - [Developing a Genetic Baseline for Pend Oreille River Basin Bull Trout](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Kalispel Tribe of Indians and USFWS added 450 bull trout from the Pend Oreille River Basin to a genetic baseline to determine the geographic origins of bull trout trapped below Albeni Falls, Boundary or Cabinet Gorge Dams. Having these populations in the baseline allows for the transport of Lake Pend Oreille, Priest River, or Clark Fork River bull trout above Albeni Falls Dam, thereby allowing these fish the opportunity to reach their natal spawning grounds.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The results of this study assists the Kalispel Tribe of Indians in their extensive bull trout recovery efforts in the Pend Oreille River Basin by allowing for a better understanding of the movement / habitat requirements of these populations and knowing the geographic origins of fish collected at the base of Albeni Falls Dam.</p> <p>The problem:</p> <p>Fish can pass downstream at Albeni Falls Dam but no upstream passage is provided. The geographic origins of adult bull trout found below Albeni Falls Dam during the fall spawning migration are unknown.</p> <p>The objective:</p> <p>Bull trout populations were added from the Pend Oreille River Basin (i.e., the Salmo and Priest River drainages) to the larger Clark Fork and Lake Pend Oreille genetic baseline to determine the source of bull trout trapped below Albeni Falls, Boundary or Cabinet Gorge Dams.</p>					
Expended	\$17931						
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.						
Primary Benefited Species	Bull trout (Salvelinus confluentus)						
Primary Benefited Population	Pend Oreille Bull Trout						
Plans	Chapter 3, Clark Fork River Recovery Unit, Montana, Idaho, and Washington. 285 p. U.S. Fish and Wildlife Service. Bull Trout (<i>Salvelinus confluentus</i>) Draft Recovery Plan. Portland, Oregon.						
Keyword	Genetics						
Need Number	N-002						
Partners	Kalispel Tribe of Indians (\$25000) Washington Department of Fish and Wildlife (\$1000)						
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of population assessments completed</td> <td>6</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>2</td> </tr> <tr> <td>Number of technical assistance requests</td> <td>1</td> </tr> </table>			Number of population assessments completed	6	Number of other Recovery Plan tasks implemented for T&E populations	2	Number of technical assistance requests
Number of population assessments completed	6						
Number of other Recovery Plan tasks implemented for T&E populations	2						
Number of technical assistance requests	1						

fulfilled to support Tribal fish and wildlife conservation		The <i>method</i>:
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	
		<p>Abernathy FTC has developed microsatellite DNA markers for distinguishing Clark Fork River and Lake Pend Oreille bull trout populations. Fish from the Pend Oreille River Basin were added to this baseline. This allows biologists to transport captured fish into the appropriate region of the system so they can continue their spawning migrations.</p>
		Further description:

13210-A-070 - [Genetic Analysis of Kootenai River Basin Bull Trout in MT, ID and Canada](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>Levels of genetic diversity were quantified within and among 15 bull trout populations from the Kootenai River Basin in MT, ID and Canada. 458 fish from the basin were entered in to a range wide genetic database for bull trout. A set of genetic markers was identified to assign fish of unknown origin captured within the basin to their population of origin. This population assignment tool will be used to determine the geographic origins of fish captured at the base of Libby Dam.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Kootenai River Sub-basin is an international watershed that encompasses parts of British Columbia (B.C), Montana, and Idaho. The river flows south within the Rocky Mountain Trench into Kooconusa Reservoir created by Libby Dam in MT. It contains an important metapopulation of bull trout.</p> <p>The problem:</p> <p>Upstream fish passage structures do not exist at Libby Dam. However, Skaar et al. (1996) documented downstream bull trout passage through the turbines at Libby Dam. This raises the possibility of sub-adult fish passing through the dam and not being able to return to their natal populations to spawn.</p> <p>The objective:</p> <p>Examine genetic diversity within and among 15 populations in the Kootenai R. basin to determine if genetic tests can be used to assign the geographic origins of adult bull trout collected at the base of Libby Dam during the fall spawning migration period.</p>			
Expended	\$16425				
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.				
Primary Benefited Species	Bull trout (Salvelinus confluentus)				
Primary Benefited Population	Bull trout - Kootenai (4) Kootenai River				
Plans	Bull trout recovery Plan, Ch. 4, Kootenai River Chapter 4, Kootenai River Recovery Unit, Oregon. 89 p. In: U.S. Fish and Wildlife Service. Bull Trout (<i>Salvelinus confluentus</i>) Draft Recovery Plan.				
Keyword	Genetics				
Need Number	N-002				
Partners	Idaho Department of Fish and Game (\$1000) Montana Department of Fish, Wildlife & Parks (\$20000)				
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of population assessments completed</td> <td>15</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>1</td> </tr> </table>			Number of population assessments completed	15	Number of other Recovery Plan tasks implemented for T&E populations
Number of population assessments completed	15				
Number of other Recovery Plan tasks implemented for T&E populations	1				

Number of applied aquatic scientific and technologic tools shared with partners.	1	The <i>method</i>:
Number of techniques and culture technology tools developed.	1	
		<p>Montana FWP collected approximately 30 juvenile bull trout tissue samples from 15 tributaries located in British Columbia and Montana for analysis at 12 microsatellite loci to develop a noninvasive genetic technique to determine the geographic or genetic origin of bull trout located below Libby Dam and Kootenai Falls.</p>

13210-A-071 - [Genetic Stock Identification of Adult Spring/Summer Chinook Salmon at Lower Granite Dam](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>A joint project was initiated to determine the feasibility of using genetic mixture analysis to estimate natural and hatchery contribution to the Snake River aggregate escapement at Lower Granite Dam (LGD) in Idaho. 1000 fish were genotyped at 13 microsatellite loci. A power analysis will be conducted in FY07 to determine the resolution of the mixture analysis and to determine if 1000 fish is sufficient to represent the total composition of hatchery and natural populations.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Population level abundance is an essential component for monitoring the effects of harvest, habitat restoration programs, or recovery programs. We tested the ability to use genetic markers to estimate Chinook salmon population proportions precisely and accurately from mixed-stock samples collected at Lower Granite Dam on the Snake River, ID.</p> <p>The problem:</p> <p>Currently managers rely on coded wire tag program (CWT) and redd counts to estimate population abundance of endangered Chinook salmon populations in the Snake River. These methods have serious limitations for monitoring wild stocks and within river harvest rates.</p> <p>The objective:</p> <p>Develop genetic based methods to assign mixtures of fish back to their geographic origins in the Snake River.</p> <p>The method:</p>
Expended	\$40000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Snake River Spring/Summer Chinook ESU	
Plans	Lower Snake River Compensation Plan 2000 NMFS FCRPS Biological Opinion - December 21, 2000 1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.	
Keyword	Genetics	
Need Number	N-002	
Partners	Columbia River Inter Tribal Fish Commission (\$60000) Idaho Fish and Game (\$30000) Lower Snake River Compensation Plan (\$2000) National Oceanic and Atmospheric Administration, Northwest Fisheries Science	

	Center (\$60000)	<p>Genetic mixture analysis was used to estimate natural and hatchery contribution to the Snake River aggregate escapement at LGD. Scales taken from stratified-random sample of Chinook at LGD (n=1000) will were genotyped at 13 microsatellite loci. Fish were also aged to determine the population composition and age structure of the aggregate run.</p>
<p>Accomplishments</p>		
<p>Number of other Recovery Plan tasks implemented for T&E populations</p>	<p>1</p>	
<p>Number of mitigation tasks implemented as prescribed in approved plans. (PART)</p>	<p>1</p>	

13210-A-072 - [Genetic Analysis of Hybridization Between Bull and Brook Trout in the Swan River Basin, Montana.](#)

Facility	Abernathy Fish Technology Center
Expended	\$3825
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Bull trout - Clark Fork (3) Swan Lake
Plans	Chapter 3, Clark Fork River Recovery Unit, Montana, Idaho, and Washington. 285 p. U.S. Fish and Wildlife Service. Bull Trout (<i>Salvelinus confluentus</i>) Draft Recovery Plan. Portland, Oregon.
Keyword	Genetics
Need Number	N-002
Partners	Ecological Services, Region 6 (\$5000) Montana Department of Fish, Wildlife & Parks (\$5000) U. S. Forest Service (\$5000)

Accomplishments

Number of population assessments completed	3
Number of other Recovery Plan tasks	1

Accomplishment Summary

Genetic analysis of hybridization between bull and brook trout was initiated in three creeks located in the Swan River Basin, Montana. Fin clips were collected from 375 fish. Genetic identification of each fish as bull, brook or hybrid will be accomplished in FY07. Field and genetic identifications will be compared with the hope of developing a field protocol for the identification of hybrids.

Description

The importance to the Resource:

Bull trout are native to Swan Lake and the Swan River drainage in Montana and have historically represented one of the healthiest remaining populations of the species anywhere across the range. Hybridization between bull trout and non-native brook trout represents one of the potential factors responsible for decline of bull trout in the basin.

The problem:

More information is needed on the system wide implications of bull trout x brook trout hybridization within the Swan River drainage.

The objective:

Examine distribution and abundance of bull trout, brook trout, and hybrids. Genetic and field identifications will be compared with the hope of developing a field identification protocol for the identification of hybrids.

The method:

13 microsatellite loci will be used to distinguish bull trout, brook trout, and individuals of hybrid

implemented for T&E populations		ancestry. A photo box and digital photos were used to document the physical appearance of all fish sampled. Long-term population index sites were sampled to obtain population estimates. Fish from three creeks were examined (n=125/creek).
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	

13210-A-075 - [Simulated Natural Rearing \(NATURES\) Using Altered Feeding Strategies at Warm Springs NFH, OR.](#)

Facility	Abernathy Fish Technology Center
Expended	\$16265
Objective	Develop and share applied aquatic scientific and technologic tools with partners.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Warm Springs hatchery spring chinook
Plans	Warm Springs Hatchery and Genetic Management Plan (draft)
Keyword	Fish Technology
Need Number	N-002
Partners	

Accomplishments

Recovery Plan production tasks implemented (PART)	1
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

Accomplishment Summary

Warm Springs NFH fish were analyzed for proximate composition throughout rearing as part of a study to determine if altered feeding methods & modified feeds can be used to produce NFH fish resembling their wild counterparts in size and body composition. A planning meeting was convened to identify further tasks for the cooperators. This accomplishment is associated with FONS project 13210-2004-025.

Description

The importance to the Resource:

The conditions under which the fish are raised could have a great effect on their growth and morphology. A study plan outlining work to match fish growth rates in a NFH setting with growth rates of wild fish at the same location has been put into place and a literature search has been done.

The problem:

The rearing environment of NFH fish is significantly different from conditions in the wild. At some NFHs very little water temperature fluctuation occurs during the rearing period. Even if the NFH experiences fluctuating water temperature, the feeding regimes and the food used is quite different from a wild fish diet.

The objective:

The data collected will consist of fish from the stream and the hatchery for body composition and size comparison. Also, temperature profiles from the stream and hatchery will be monitored and compared. This data will give

	<p>the basis for changes in the NFH feeding regimes to produce fish more like their wild counterparts.</p> <p>The <i>method</i>:</p> <p>Spring Chinook salmon samples are being collected at the Warm Springs NFH with the assistance of the Lower Columbia FHC and the Columbia River FPO. Fish are monitored in the Warm Springs River, with NFH and in-river water temperatures being recorded. Fish were analyzed for proximate composition throughout the rearing period at Warm Springs NFH.</p> <p>Further description:</p> <p>Nutrition</p>
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13210-A-093 - [Genetic Structure of Chinook Salmon Populations in the Big White Salmon River Prior to Dam Removal](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>A study plan was developed and a proposal for funding was submitted to BPA to determine the genetic structure of Chinook salmon populations in the Big White Salmon River. This genetic baseline will be used for monitoring recolonization of the upper watershed after removal of Condit Dam. The potential restoration role of the Spring Creek NFH will be established.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The natural spawning habitat of Chinook salmon in the Columbia River Gorge has been severely reduced because of flooding by Bonneville Dam and upstream blockage by Condit Dam on the Big White Salmon River (BWSR), a major tributary to the Columbia River.</p> <p>The problem:</p> <p>Natural spawning of Chinook salmon currently occurs in a three-mile reach of the BWSR between Condit Dam and the Bonneville pool. In addition, Spring Creek NFH propagates a unique strain of Chinook salmon near the mouth of the BWSR. Condit Dam is scheduled to be removed in 2006, opening up miles of watershed to Chinook salmon.</p> <p>The objective:</p> <p>A genetic baseline will be developed for monitoring the recolonization of the BWSR by Chinook salmon after Condit Dam is removed. The genetic data will also be used to determine the potential role of Spring Creek NFH in the overall restoration effort.</p>
Expended	\$10000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	White Salmon River fall run (tule) Chinook	
Plans	Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)	
Keyword	Genetics	
Need Number	N-002	
Partners	<p>Columbia River Fisheries Program Office (\$5000)</p> <p>Columbia River Inter Tribal Fish Commission (\$20000)</p> <p>National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center (\$20000)</p> <p>Oregon Department of Fish and Wildlife (\$1000)</p> <p>Spring Creek National Fish Hatchery (\$1000)</p> <p>Washington</p>	

Department of Fish and
Wildlife (\$1000)

Accomplishments

Number of population assessments completed	5
Recovery Plan production tasks implemented (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	1
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1

The *method*:

DNA markers will be used to determine the genetic structure or breeding relationships of three strains of Chinook salmon currently spawning in the BWSR. Those genetic relationships will be compared to four NFH populations of Chinook salmon in the lower Columbia River.

13210-A-094 - [Population Structure and Genetic Characteristics of Summer Steelhead in the Deschutes River, Oregon](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>A four year genetic project was initiated with CRFPO to assess the population structure of summer steelhead trout in the Deschutes River and potential impact from out-of basin hatchery strays. 800 steelhead or redband trout were genotyped from 17 locations in the basin. Results of this work are critical to monitoring & evaluation projects of natural populations and questions associated with hatchery operations and impacts to the Deschutes basin native fish community.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>In identifying independent populations of ESA listed steelhead in the Deschutes River basin the Interior Columbia River Technical Recovery Team identified a number of important information gaps that needed to be addressed for effective steelhead trout management and recovery. This project will address those gaps.</p> <p>The problem:</p> <p>Limited information exists on the genetic differences between steelhead occupying the tributaries on the east and west sides of the lower Deschutes River below the Pelton Dam complex. Over half of the returning steelhead to the system have been out of basin strays and little is known about the reproductive success of these fish in the basin.</p> <p>The objective:</p> <p>Describe population structure and genetic variability among steelhead occupying tributaries and the main stem downstream of the Pelton Round Butte Dam, evaluate the</p>
Expended	\$44870	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Deschutes River East Side Tributaries Steelhead	
Plans	<p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Genetics	
Need Number	N-002	
Partners	<p>Columbia River Fisheries Program Office (\$23000)</p> <p>Columbia River Inter Tribal Fish Commission (\$10000)</p> <p>Confederated Tribes of The Warm Springs (\$20000)</p> <p>National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center (\$5000)</p>	

Oregon Department of
Fish and Wildlife (\$20000)

Accomplishments

Number of population assessments completed	17
Number of other Recovery Plan tasks implemented for T&E populations	4
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

effect of out-of-basin strays on natural populations, and help select a broodstock source for reintroducing steelhead to currently inaccessible portions of the middle and upper basin.

The method:

Steelhead and redband trout will be genotyped at 13 microsatellite loci from over 17 locations in the basin. Stray fish will be sampled at the Shears Falls trap. Genetic population structure will be determined and mixture analysis will be used to determine the genetic contribution of stray fish to the natural populations.

13210-A-097 - [Conservation Genetics of Bull Trout on the Flathead Indian Reservation, MT](#)

Facility	Abernathy Fish Technology Center	<p>Accomplishment Summary</p> <p>One hundred and twelve bull trout samples from the Jocko River and Mission Creek basins on the Flathead Indian Reservation in MT. Samples are currently being analyzed to determine population structure and identification of source of unknown individual fish.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Confederated Salish Kootenai Tribal biologists have restored bull trout areas on the Flathead Reservation lands by removing non-native brook trout and improving the physical habitat. The goal of this effort is to reintroduce bull trout into many of these restored areas.</p> <p>The problem:</p> <p>Genetic data are needed to aid in the identification of appropriate source populations for these reintroductions.</p> <p>The objective:</p> <p>Determine genetic relationships among bull trout populations on tribal lands to guide the selection of populations for transport into the restored habitats.</p> <p>The method:</p> <p>We used DNA markers to identify the genetic relationships among bull trout populations within the Reservation. DNA markers were also used to eliminate the transfer of bull / brook hybrid trout.</p>					
Expended	\$7970						
Objective	Provide technical assistance to Tribes.						
Primary Benefited Species	Bull trout (Salvelinus confluentus)						
Primary Benefited Population	Bull trout - Clark Fork River 3 (Flathead River to Thompson Falls Dam)						
Plans	Chapter 3, Clark Fork River Recovery Unit, Montana, Idaho, and Washington. 285 p. U.S. Fish and Wildlife Service. Bull Trout (<i>Salvelinus confluentus</i>) Draft Recovery Plan. Portland, Oregon.						
Keyword	Genetics						
Need Number	N-002						
Partners	Avista Corporation (\$70000) Confederated Salish Kootenai Tribes (\$30000) Montana Department of Fish, Wildlife & Parks (\$5000)						
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of population assessments completed</td> <td>4</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>2</td> </tr> <tr> <td>Number of technical assistance requests</td> <td>1</td> </tr> </table>		Number of population assessments completed	4	Number of other Recovery Plan tasks implemented for T&E populations	2	Number of technical assistance requests	1
Number of population assessments completed	4						
Number of other Recovery Plan tasks implemented for T&E populations	2						
Number of technical assistance requests	1						

fulfilled to support Tribal fish and wildlife conservation		
Number of applied aquatic scientific and technologic tools shared with partners.	1	

13310-A-109 - [Service Funded Stock Assessment Marking and Evaluation at Service Facilities](#)

Facility	Columbia River Fisheries Program Office	Accomplishment Summary Marked and tagged a total of 5,858,783 fish at Winthrop, Entiat, Leavenworth, Dworshak, and Kooskia NFHs.
Expended	\$365500	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Kooskia National Fish Hatchery HGMP Leavenworth Hatchery Genetics Management Plan Entiat Hatchery Genetics Management Plan Dworshak NFH Spring Chinook Salmon HGMP Dworshak NFH Steelhead HGMP 2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon 2000 NMFS FCRPS Biological Opinion - December 21, 2000 1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin. Columbia River Basin Fish and Wildlife Program (NPPC 2000) Conservation of</p>	Description
		The importance to the Resource:
		Marking and tagging of hatchery stocks is critical to west coast fisheries management and wild stock protection and recovery.
		The problem:
		West coast salmon fisheries catch a variety of ESA listed and other stocks of concern as they target abundant hatchery and other productive wild stocks. A coast wide tagging and stock assessment program to monitor and evaluate status of stocks and impacts of fisheries on various stocks of concern is critical to wild stock protection and recovery.
		The objective:
		Each year Columbia River Fisheries Program Office (CRFPO) staff conducts fish marking activities at Service facilities that do not have evaluation and fish marking programs funded by other reimbursable accounts.
		The method:
		For FY 2006, CRFPO staff marked and/or coded-wire-tagged 3,355,737 spring Chinook at Dworshak, Kooskia, Entiat, Leavenworth and Winthrop NFHs and 2,503,046 steelhead at Dworshak and Winthrop NFHs.
		Further description:
		This marking is done for the purposes of

	Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)	hatchery evaluation, estimating survival and contribution rates, stock assessment, brood stock management, fishery management, and compliance with NOAA Fisheries hatchery biological opinions under the Endangered Species Act. This marking supports the coast wide management data base of Columbia Basin stocks to assist in providing the maximum level of harvest opportunity for harvestable stocks while providing the necessary level of protection for depressed and listed stocks to assist in the rebuilding process.
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners		
Accomplishments		
Number of marking and tagging targets met, as prescribed by Recovery plans	2	
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1	
Number of other Recovery Plan tasks implemented for T&E populations	2	
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	2	
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	12	
Number of other Fishery Management Plan tasks implemented for populations of management concern.	2	

13310-A-118 - [StreamNet Activities](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Provided Service hatchery facility, fish return and age composition information to the StreamNet database, and participated in StreamNet Steering and Technical Committee meetings. The data is used by managers to monitor populations.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>StreamNet was established to meet the data needs of the Northwest Power Planning Council's Fish and Wildlife Program and related activities that complement the Program.</p> <p>The problem:</p> <p>A multitude of agencies collect data on Columbia River basin fish and wildlife. Lack of coordination and a common database is ineffective and inefficient.</p> <p>The objective:</p> <p>StreamNet provides decision makers and fish and wildlife managers with essential baseline data to aid in their efforts to protect and restore the region's fish and wildlife resources.</p> <p>The method:</p> <p>Columbia River Fisheries Program Office provided Service hatchery facility, fish return and age composition information to the StreamNet database, and participated in StreamNet Steering and Technical Committee meetings.</p> <p>Further description:</p> <p>StreamNet is a cooperative venture of the</p>
Expended	\$13092	
Objective	Develop and share applied aquatic scientific and technologic tools with partners.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)	
Keyword	Interjurisdictional	
Need Number	N-002	
Partners	<p>Bonneville Power Administration</p> <p>Columbia River Inter Tribal Fish Commission</p> <p>Idaho Department of Fish and Game</p> <p>Oregon Department of Fish and Wildlife</p> <p>Pacific States Marine Fisheries Commission</p> <p>Washington Department of Fish and Wildlife</p>	
Accomplishments		

Number of other Recovery Plan tasks implemented for T&E populations	1	<p>region's fish and wildlife agencies and tribes. The StreamNet project receives funding from the Bonneville Power Administration and is authorized under the Fish and Wildlife Program of the Northwest Power and Conservation Council. StreamNet 's mission is: To create, maintain, and enhance high quality, regionally consistent data on fish and related aquatic resources that are directly applicable to regional policy, planning, management, and research; and to provide data and information services in an efficient and timely manner and in a format that meets the needs of users.</p>
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	

13310-A-120 - [Evaluate Spawning and Rearing Habitat for Fall Chinook and Chum Salmon in the Columbia River.](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Described habitat use/requirements for Chinook and chum salmon in Lower Columbia River near Bonneville Dam; initiated new research on habitat use near The Dalles, John Day, and McNary dams and in the lower Columbia near Vancouver. Results used to configure hydro operations for benefit of species</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Populations of ESA-listed chum and fall Chinook salmon affected by operation of The Federal Columbia River Power System (FCRPS) must be protected and enhanced.</p> <p>The problem:</p> <p>Quantify the location and level of spawning and rearing activity by chum and fall Chinook salmon in the Columbia River near Bonneville, The Dalles, John Day, and McNary dams. The extent of spawning, and conditions needed to provide successful spawning and rearing below the mainstem dams, and the measures needed to protect those fish, are required.</p> <p>The objective:</p> <p>Describe physical habitat use and requirements for fall Chinook salmon in the Columbia River downstream from The Dalles, John Day, and McNary dams and for chum salmon downstream from Bonneville Dam. These data will be used to help configure the hydrosystem, operation of the FCRPS, for the long term benefit of these species.</p> <p>The method:</p>
Expended	\$0	
Objective	Develop and share applied aquatic scientific and technologic tools with partners.	
Primary Benefited Species	Chum salmon (Oncorhynchus keta)	
Primary Benefited Population	Lower Gorge Chum Salmon	
Plans	<p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>Lower Columbia Salmon Recovery And Fish & Wildlife Subbasin Plan: Volume II, Chapter A – Lower Columbia Mainstem and Estuary for Washington State - 2004</p> <p>Columbia Gorge Subbasin Plan</p> <p>Lower Mid-Columbia Mainstem Subbasin Plan - 2004</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Monitoring and Assessment	
Need	N-002	

Number		<p>Conducted boat deployed field surveys with survey grade instrumentation to precisely map the bathymetric surfaces of previously unmapped spawning sites. Conducted deep water redd surveys using a 2-man boat mounted underwater videography system equipped with on the fly GIS/GPS mapping capabilities. Collate data with in-season flows.</p> <p>Further description:</p> <p>The purpose of this project is to quantify the location and level of spawning activity by chum and fall Chinook salmon in the Columbia River near Bonneville, The Dalles, John Day, and McNary dams. These data will be used to help configure they hydrosystem for the long term benefit of these species. Research continued to determine day/night spawning and movement patterns by ESA-listed chum salmon. We also collected geographic and hydrologic data at chum spawning sites in the lower Columbia in preparation for a habitat assessment at these new locations. Work continued to quantify fall Chinook spawning activity downstream from The Dalles, John Day, and McNary dams. Mapping of spawning areas continued for all three locations, and collection of habitat use data continued. Hydrodynamic modeling was used to determine the effect of hydrosystem operations on the availability of spawning habitat for fall Chinook. Hydrophones were used to detect day/night spawning below The Dalles, John Day and McNary dams.</p>
Partners	<p>Bonneville Power Administration (\$59842) Oregon Department of Fish and Wildlife U.S. Geological Survey Washington Department of Fish and Wildlife</p>	
Accomplishments		
Number of population assessments completed	2	
Number of other Recovery Plan tasks implemented for T&E populations	3	
Number of other Fishery Management Plan tasks implemented for populations of management concern.	16	
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2	

13310-A-123 - [Comparative Survival Study Tagging and Evaluation Project](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Tagged and released 14,982 spring Chinook at Carson NFH and 51,955 spring Chinook at Dworshak NFH with Passive Integrated Transponder (PIT) tags and participated in systemwide survival studies.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The PIT tag study is a long term, basin wide program measuring smolt-to-adult survival for spring chinook salmon and steelhead from the Columbia River Basin. This program is also evaluating mitigation measures such as flow augmentation, spill, and fish transportation for the recovery of listed salmon stocks.</p> <p>The problem:</p> <p>There is significant uncertainty regarding the efficacy of juvenile fish transportation as a recovery implementation strategy. Therefore, the co-managers are engaged in a long term transportation study to better define the benefits and risks of this management strategy.</p> <p>The objective:</p> <p>The study addresses whether transportation of fish to below Bonneville Dam can compensate for the effect of the hydrosystem on juvenile survival rates and will allow comparison of survival rates of fish handled at the dams versus those that migrate without or with less handling.</p> <p>The method:</p> <p>CRFPO staff PIT tagged spring Chinook at Carson and Dworshak NFHs, worked with co-managers to develop simulation programs,</p>
Expended	\$21500	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	Columbia River Basin Fish and Wildlife Program (NPPC 2000) 2000 NMFS FCRPS Biological Opinion - December 21, 2000 Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	Bonneville Power Administration (\$47322) Columbia River Inter Tribal Fish Commission Idaho Department of Fish and Game Oregon Department of Fish and Wildlife Washington Department of Fish and	

Wildlife

Accomplishments

Number of population assessments completed	64
Number of other Recovery Plan tasks implemented for T&E populations	3
Number of other Fishery Management Plan tasks implemented for populations of management concern.	4
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	3

performed statistical analyses, helped prepare the 2005 CSS Annual Report, responded to comments on the draft Annual Report, and developed a proposal to evaluate the effectiveness of fall Chinook transportation.

Further description:

The objectives of the Comparative Survival Study are consistent with the Plan for Analyzing and Testing Hypotheses process and the Collaborative Systemwide Monitoring and Evaluation Project (CSMEP).

13310-A-134 - [Lower Snake River Compensation Plan Technical Assistance Activities](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Provided technical assistance to the Lower Snake River Compensation Plan (LSRCP) office in the areas of flow management, harvest management, production management, recovery planning, and hatchery reform evaluation. Also provided oversight for Passive Integrated Transponder (PIT) tagging studies through the PIT Tag Steering Committee.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Lower Snake River Compensation Plan (LSRCP) is a major hatchery program in the Snake River Basin that was designed to mitigate the effects of the four mainstem dams on the lower Sanke River. It is important to maximize production benefits while minimizing negative impacts through hatchery, harvest and hydrosystem action evaluations.</p> <p>The problem:</p> <p>Hatchery actions ,if not managed under best management practices ,can have deleterious effects on native species. On the other hand, federal agencies have treaty trust and other legal responsibilities to the Columbia River tribes, as will as hatchery mitigation obligations to the general public for Columbia Basin hydrosystem development projects.</p> <p>The objective:</p> <p>The CRFPO works closely with the LSRCP office in the areas of flow management, harvest management, production management, recovery planning, and hatchery reform evaluation.</p>
Expended	\$0	
Objective	Meet the Service's responsibilities for mitigating fisheries.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Lower Snake River Compensation Plan</p>	
Keyword	Mitigation	
Need Number	N-002	
Partners	<p>Bonneville Power Administration (\$75200)</p> <p>Columbia River Inter Tribal Fish Commission</p> <p>Idaho Department of Fish and Game</p> <p>National Marine Fisheries Service</p> <p>Nez Perce Tribe</p> <p>Oregon Department of Fish and Wildlife</p> <p>Umatilla Tribe</p> <p>Washington Department of Fish and Wildlife</p>	

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	6
Number of mitigation tasks implemented as prescribed in approved plans. (PART)	2
Number of mitigation post-stocking survival tasks implemented as prescribed in approved plans.	1

The *method*:

CRFPO staff provided flow management technical assessment, support, and coordination as well as harvest management, production management and recovery planning technical assessment assistance, support, and coordination in regional and west coast harvest management, production management, and recovery planning fora that affect LSRCP production.

Further description:

In addition, staff provided coordination and technical expertise in the application of PIT tag technology throughout the basin through participation on the PIT Tag Steering Committee. Providing technical assessment assistance, support, and coordination in these regional fora is critical to our efforts to maximize the mitigation and conservation benefits of the Lower Snake River Compensation Plan program while minimizing any potential negative affects to wild stocks from this hatchery program.

13310-A-142 - [Smolt Monitoring Program Tagging](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Tagged and released 14,987 spring Chinook salmon, 5,996 summer Chinook salmon, and 2,989 fall Chinook salmon with Passive Integrated Transponder tags (PIT) at Leavenworth NFH and Wells and Priest Rapids State Hatcheries in the mid-Columbia River.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Smolt Monitoring Program is a long term, basin wide assessment program of smolt passage survival of salmonids migrating out of the Columbia and Snake River Basins. Smolt migration data are collected each year to aid the fisheries agencies and tribes in making water management decisions to enhance juvenile fish passage through the hydrosystem.</p> <p>The problem:</p> <p>Annual tagging is needed to track the timing and survival of juvenile fish through the hydrosystem so that decisions on the best use of limited flow manipulations to enhance juvenile fish passage can be made.</p> <p>The objective:</p> <p>The objective is to maintain an annual cooperative program of fish tagging of index stocks throughout the upper basin and monitoring at mainstem Columbia and Snake River dams for the purpose of making in-season water management decisions that benefit juvenile fish passage.</p> <p>The method:</p> <p>Fish are PIT tagged and data are collected at the mainstem dams for the purpose of in-</p>
Expended	\$0	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	Columbia River Basin Fish and Wildlife Program (NPPC 2000) 2000 NMFS FCRPS Biological Opinion - December 21, 2000	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	Bonneville Power Administration (\$39154) Columbia River Inter Tribal Fish Commission Fish Passage Center Idaho Department of Fish and Game National Marine Fisheries Service Oregon Department of Fish and Wildlife Washington Department of Fish and Wildlife	

Accomplishments

Number of other Fishery Management Plan tasks implemented for populations of management concern.	4
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	3

season management of flows and spills and the post-season evaluation of the effect of that year's management actions on migrating salmonids.

Further description:

This cooperative tagging program provides information critical to the overall flow management assessment and is a reimbursable project funded by the Bonneville Power Administration.

13310-A-147 - [Fish Passage, Water Quality, and TMDL's in the Columbia River Basin](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Represented the Service on technical fish passage and water quality issues in the mainstem Columbia River Basin by participating in regional forums that address the recovery of listed fish species. Helped assure adequate water quality and passage conditions while maintaining power production.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Columbia River Fisheries Program Office is the lead for fish passage and water management issues that address specific operations or programs of the Federal Columbia River Power System (FCRPS).</p> <p>The problem:</p> <p>Identify critical uncertainties of specific causes of ESA-listed and non-listed fish passage and survival problems related to the existence and the operation of the FCRPS, and associated infra-structure. Develop actions for specific data and remedial actions to protect the fish under treaty trust responsibilities and mandates of applicable laws.</p> <p>The objective:</p> <p>An interagency Regional Forum is responsible for implementation of actions required by the biological opinions of the National Marine Fisheries Service and the Fish and Wildlife Service for operation of the FCRPS.</p> <p>The method:</p> <p>Significant modeling activity has been conducted to develop alternative management strategies for streamflow and spill to improve</p>
Expended	\$105078	
Objective	Facilitate management of aquatic habitats on national and regional scales.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>2006 Fish Passage Implementation Plan (In accordance with the Court Order)</p> <p>2006 Water Management Plan</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>	
Keyword	Fish Passage	
Need Number	N-002	
Partners	<p>Bonneville Power Administration</p> <p>Columbia River Inter Tribal Fish Commission</p> <p>Environmental Protection Agency</p>	

National Marine
 Fisheries Service
 Oregon Department of
 Fish and Wildlife
 U.S. Army Corps of
 Engineers
 Washington
 Department of Fish and
 Wildlife

passage conditions and survival for
 anadromous fish.

Further description:

ESA listed bull trout, Kootenai River sturgeon,
 Snake River snails, and twelve stocks of
 salmon and steelhead continue to contribute to
 the complexity of fish passage issues in the
 Columbia River basin. The listings and
 associated biological opinions, and basin
 management plans require a constant and
 ongoing effort to balance the competing needs
 of the listed species, trust responsibilities,
 hydropower production, flood control,
 navigation, and irrigation.

Accomplishments

Number of population assessments completed	72
Number of other Recovery Plan tasks implemented for T&E populations	12
Number of other Fishery Management Plan tasks implemented for populations of management concern.	5
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2

13310-A-148 - [Bonneville Power Administration Funded Marking Program for Annual Stock Assessment](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Tagged a total of 175,281 spring Chinook and coho for monitoring and evaluation purposes.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Marking and tagging of hatchery stocks is critical to west coast fisheries management and wild stock protection and recovery.</p> <p>The problem:</p> <p>West coast salmon fisheries catch a variety of ESA listed and other stocks of concern as they target abundant hatchery and other productive wild stocks. A coast wide tagging and stock assessment program to monitor and evaluate status of stocks and impacts of fisheries on various stocks of concern is critical to wild stock protection and recovery.</p> <p>The objective:</p> <p>The Bonneville Power Administration (BPA) and the Northwest Power and Conservation Council recognized the need to have annual evaluations of production facilities throughout the Columbia River Basin and BPA has supplied funding to meet this annual need for programs that are not marked under other funding sources.</p> <p>The method:</p> <p>CRFPO staff tagged 175,281 spring Chinook and coho at Service facilities that had no ongoing evaluation program. Fish are marked to evaluate hatchery performance, survival, and contribution to fisheries. Results are reported in an annual stock assessment report</p>
Expended	\$0	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Carson NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p> <p>Little White NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p> <p>Eagle Creek NFH Coho Salmon Hatchery and Genetic Management Plan</p> <p>2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia</p>	

	River Basin. Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)	<p>and are used to recommend improvements in hatchery practices and fisheries management.</p> <p>Further description:</p> <p>In addition, the Service provides the monitoring and evaluation assessments of these annual tagging programs.</p>									
Keyword	Monitoring and Assessment										
Need Number	N-002										
Partners	Bonneville Power Administration (\$84099)										
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of marking and tagging targets met, as prescribed by Recovery plans</td> <td>3</td> </tr> <tr> <td>Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)</td> <td>1</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>1</td> </tr> <tr> <td>number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)</td> <td>2</td> </tr> <tr> <td>Number of other Fishery Management Plan tasks implemented for populations of management concern.</td> <td>1</td> </tr> </table>			Number of marking and tagging targets met, as prescribed by Recovery plans	3	Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1	Number of other Recovery Plan tasks implemented for T&E populations	1	number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	2	Number of other Fishery Management Plan tasks implemented for populations of management concern.
Number of marking and tagging targets met, as prescribed by Recovery plans	3										
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1										
Number of other Recovery Plan tasks implemented for T&E populations	1										
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	2										
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1										

13310-A-152 - [Walla Walla River Bull Trout Recovery Efforts](#)

Facility	Columbia River Fisheries Program Office
Expended	\$73923
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Walla Walla River core area Bull Trout
Plans	Bull Trout Draft Recovery Plan, Chapter 10 Bull Trout Recovery Plan (Draft)
Keyword	Recovery
Need Number	N-002
Partners	Oregon Department of Fish and Wildlife (\$2000) Umatilla Tribe (\$2000) Upper Columbia Fish and Wildlife Office Walla Walla Basin Watershed Council Washington Department of Fish and Wildlife (\$2000)

Accomplishments

Number of miles of in-stream habitat assessed	18.0
Number of other Recovery Plan tasks	5

Accomplishment Summary

Continued work to develop habitat suitability criteria for spawning and rearing bull trout in the Walla Walla River, and to refine suitable water temperature criteria. Habitat and temperature criteria will allow development of more realistic instream flows to help recover bull trout. Habitat suitability model validation began during 2006.

Description

The importance to the Resource:

Bull trout are currently listed as threatened. Development of habitat suitability models will assist in the recovery of bull trout.

The problem:

Inadequate instream flows occur throughout the Walla Walla basin, primarily as a result of irrigation withdrawals.

The objective:

This project is designed to provide the technical data to improve conditions for ESA-listed bull trout in the Walla Walla basin to make progress towards recovery and delisting.

The method:

A probabilistic regression model is being developed to identify suitable habitat for spawning and rearing bull trout. Once suitable habitat is identified, alterations to flow can be modeled and the resulting affects on useable habitat can be estimated following the instream flow methodology.

Further description:

implemented for T&E populations		The habitat criteria currently being developed are required to define the physical conditions bull trout need to maintain stable populations, and to develop instream flow recommendations that will assist recovery. Data indicate that current water temperature criteria may not capture the conditions bull trout will use. This could result in elimination of suitable areas from restoration and instream flow development. Results of this work could actually expand the possible distribution of bull trout as a function of temperature conditions and allow us to determine instream flows to provide the necessary physical habitat.
Number of applied aquatic scientific and technologic tools shared with partners.	2	

13310-A-154 - [Salmon Technical Recovery Team Participation](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Accomplishment: Participated in the National Marine Fisheries Service Interior Columbia Basin and Lower Columbia/Willamette Technical Recovery Team (TRT) and assisted in developing viability criteria, status assessments, gap analysis, and limiting factors analysis. Developed reports for viability criteria and gap analysis. Reviewed regional recovery plans for consistency with TRT guidance.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Columbia, was once the most productive river for Pacific salmon in North America; currently, however, there are 13 ESUs of salmon listed under the Endangered Species Act (ESA). In addition to their listing and economic value, salmon are an ecologically-important. The region needs technical criteria to guide for recovery of these populations.</p> <p>The problem:</p> <p>The region has implemented one of the largest, most administratively complex, and costly (~150 million dollars per year) fisheries restoration programs in the world. Given the listed status for 13 ESUs, and the complex and confounding nature of impacts to these populations, providing consistent guidance for recovery measures is a difficult task</p> <p>The objective:</p> <p>This project provided information and analysis required by the NOAA Fisheries to develop recovery plans for listed salmon in the interior and lower Columbia River. The criteria and evaluation process that were developed through this project will ensure that recovery</p>
Expended	\$90864	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Federal Columbia River Power System 2002 Biological Opinion</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>	
Keyword	Recovery	
Need Number	N-002	
Partners	<p>Columbia River Inter Tribal Fish Commission</p> <p>Idaho Department of Fish and Game</p> <p>National Marine Fisheries Service</p> <p>Oregon Department of Fish and Wildlife</p> <p>U. S. Forest Service</p> <p>University of Montana</p> <p>Washington</p>	

Department of Fish and
Wildlife

Accomplishments

Number of population assessments completed	134
Number of other Recovery Plan tasks implemented for T&E populations	6
Number of other Fishery Management Plan tasks implemented for populations of management concern.	3
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

measures can be evaluated against a consistent set of benchmarks for recovery.

The method:

Our staff provided technical expertise to the Technical Recovery Teams in the following areas: 1) population identification; 2) delisting criteria; 3) habitat/fish productivity relationships; 4) salmon limiting factor analysis; 5) hatchery evaluations; 6) monitoring and evaluation design, and 7) estimating survival gaps.

Further description:

We provided information and analysis required by the NMFS to develop recovery plans for listed salmon in the interior and lower Columbia River. . Our staff provided technical expertise to the Interior and Lower Columbia/Willamette (LCW) Technical Recovery Teams in the following areas: 1) population identification; 2) delisting criteria; 3) habitat/fish productivity relationships; 4) salmon limiting factor analysis; 5) hatchery evaluations; and 6) monitoring and evaluation design. The goal is to develop a sound recovery plan for Columbia River listed salmon. The CRFPO was fully engaged in both TRTs and worked on population identification for Chinook and steelhead in the Interior, a Viability Report for populations in the Interior, application of viability criteria to assess population status in LCW, and reviewed subbasin plans relative to viability criteria. In addition we reviewed a number of regional recovery plans with respect to viability criteria. The Interior team has begun developing models to assess limiting factors relative to viability criteria. Also, the team is developing methodologies to integrate the population analyses for an ESU. We developed a modeling system to estimate survival gaps

13310-A-156 - [US-Canada, Pacific Salmon Treaty, Technical Assistance](#)

Facility	Columbia River Fisheries Program Office
Expended	\$44855
Objective	Support, facilitate, and/or lead collaborative approaches to manage interjurisdictional fisheries.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Not specified
Plans	<p>Pacific Salmon Treaty of 1999</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	

Accomplishments

Number of population assessments completed	30
Number of other Recovery Plan tasks	3

Accomplishment Summary

Assisted in the technical analysis of fishery exploitation rates on indicator stocks and estimation of current year salmon stock abundance for the Pacific Salmon Commission.

Description

The importance to the Resource:

The Pacific Salmon Commission is responsible for salmon harvest sharing between the US and Canada in the development of fishery regimes that provide opportunity for important coastal fisheries while providing an appropriate level of protection for ESA listed and other stocks of concern..

The problem:

The Commission relies on a collaborative effort of the relevant state, federal and tribal fishery management entities to provide technical assistance, management expertise and policy direction within the Commission process.

The objective:

The Chinook Technical Committee (CTC) conducts the annual fishery exploitation rate analysis on indicator stocks to track harvest impacts on stocks of concern relative to US-Canada harvest sharing agreements and calculates the Treaty allowed "Aggregate Abundance Based Management" catch given information on the current abundance of key stocks.

The method:

CRFPO Staff conducted the 2005 exploitation rate analysis based on code wire tag

implemented for T&E populations		recoveries for Lyon's Ferry/Snake River, Spring Creek Hatchery, Hanford Wild, Upriver Brights, Bonneville Hatchery, Cowlitz Falls, Stayton Pond, Lewis River Wild, and Wells Summer Stock groups. CRFPO staff also calibrated the Chinook model for the same stocks.
Number of other Fishery Management Plan tasks implemented for populations of management concern.	7	
		<p>Further description:</p> <p>The CTC fishery impact analysis is critical to protection and recovery of depressed and listed west coast stocks.</p>

13310-A-157 - [Magnuson-Stevens Sustainable Fisheries Management Act, Technical Assistance](#)

Facility	Columbia River Fisheries Program Office
Expended	\$20000
Objective	Support, facilitate, and/or lead collaborative approaches to manage interjurisdictional fisheries.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Not specified
Plans	<p>Pacific Salmon Plan (1999), and various amendments</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	

Accomplishments

Number of population assessments completed	16
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Accomplishment Summary

Assisted in the technical analysis of proposed salmon fishery regulatory options being considered by the Pacific Fishery Management Council and the development and compilation of west coast salmon stock abundance information that is used to make annual ocean fisheries management decisions.

Description

The importance to the Resource:

The Pacific Fishery Management Council (PFMC) is responsible for developing and recommending salmon fishing regulations for federal waters off the coasts of Washington, Oregon, and California to the Secretary of Commerce for promulgation.

The problem:

The PFMC relies on a collaborative effort of a number of scientific, technical, and fishery advisory committees with representation from the relevant state, federal, tribal, and fishery users (depending on the charge of the committee) to provide technical assistance, impact analysis and management advice within the PFMC process.

The objective:

The Columbia River Fisheries Program Office provided staff representation at the technical level for the Salmon Technical Team and the Model Evaluation Workgroup of the Pacific Fishery Management Council.

The method:

The Salmon Technical Team reviewed the past year's ocean fisheries and analyzed the current

Number of other Recovery Plan tasks implemented for T&E populations	5	<p>year's proposed regulatory options using computer models. The analysis takes into account the escapement needs of critical species, the treaty rights of native Americans consistency with applicable law, especially ESA, and the needs of the fishery users.</p> <p>Further description:</p> <p>Protection and recovery of the fisheries resource continues to be the first priority of the Service in its participation in the PFMC forum at the technical level.</p>
Number of other Fishery Management Plan tasks implemented for populations of management concern.	6	

13310-A-158 - [General Biometrics Activities](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Provided biometric support to a variety of fisheries projects and recovery efforts.</p> <p>Description</p> <p>Further description:</p> <p>Performed quantitative analyses and provided statistical advice for a wide range of problems. Among these was helping to develop strategies for assessing and monitoring the status of listed bull trout population segments. Much of this work was done in cooperation with state and tribal partners. Provided statistical advice for experimental designs for studies that estimate survival rates and fish abundance, and for studies relating habitat attributes to abundance of aquatic animals. These include serving on the oversight committee for the regional Comparative Survival Study of salmon throughout the Columbia River basin, and participating in the Collaborative Systemwide Monitoring and Evaluation Project (CSMEP). Participated in the FCRPS Biological Opinion Remand Collaboration Passage Model Workgroup by developing hypotheses for models, attending meetings. Ongoing tasks include technical assistance and review of NOAA Fisheries and FWS policy documents and peer review of manuscripts for journal publication.</p>
Expended	\$68500	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Bull Trout Recovery Plan (Draft)</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	<p>ESSA Technologies, Ltd.</p> <p>Environmental Protection Agency</p> <p>Idaho Department of Fish and Game</p> <p>Montana Fish, Parks and Wildlife</p> <p>National Oceanic and Atmospheric Administration, Fisheries</p> <p>Oregon Department of</p>	

Fish and Wildlife
U. S. Forest Service
U.S. Geological Survey
Utah State University
Washington
Department of Fish and
Wildlife

Accomplishments

Number of population assessments completed	25
Number of other Recovery Plan tasks implemented for T&E populations	8

13310-A-159 - [Science Team Activities](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Supported RO activities in bull trout conservation issues. Chaired Recovery Monitoring and Evaluation Group for bull trout recovery which continued to develop guidance for assessing recovery criteria. Identified and developed methods to delintae fundamental sampling units (populations) and sample for distribution. Initiated the development of methods to assess connectivity. Continued deliberations on how to assess abundance and trends in abundance.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Science Team (ST) is the Service's attempt to formally organize its collective efforts across the various Service offices that are involved with broad scale, scientific issues that would be best addressed utilizing a diversity of expertise.</p> <p>The problem:</p> <p>Through a comprehensive assessment, analysis and review of the best available science, the team served to provide a sound approach and defensible response to various scientific questions facing the Service.</p> <p>The objective:</p> <p>The initial focus of the ST was to assist in issues surrounding bull trout recovery. As part of that effort, the bull trout Recovery Monitoring and Evaluation Group (RMEG) was formed. In FY2006, the RMEG held two meetings, had multiple conference calls, and continued to develop a comprehensive monitoring strategy. This work is ongoing.</p>
Expended	\$82723	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Bull trout (Salvelinus confluentus)	
Primary Benefited Population	Not specified	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Bull Trout Recovery Plan (Draft)</p> <p>Bull Trout Recovery Plan, Ch 1 Introduction</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	<p>ESSA Technologies, Ltd.</p> <p>Environmental Protection Agency</p> <p>Montana Fish, Parks and Wildlife</p> <p>U. S. Forest Service</p> <p>U.S. Geological Survey</p> <p>University of Georgia</p> <p>University of Montana</p> <p>Utah State University</p> <p>Washington Department of Fish and</p>	

Wildlife

Accomplishments

Number of population assessments completed	36
Number of other Recovery Plan tasks implemented for T&E populations	3
Number of applied aquatic scientific and technologic tools shared with partners.	3

The *method*:

CRFPO staff chair the RMEG and represent RMEG and the FWS in the Columbia System Monitoring and Evaluation Plan (CSMEP) forum. The RMEG worked on developing guidance on appropriate ways to monitor and evaluate bull trout connectivity, distribution, abundance and trends in abundance. This work is ongoing.

Further description:

13310-A-165 - [Evaluation of the Effect of Columbia River Water Management on the Hanford Reach National Monument](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Conducted additional habitat modeling and developed Reach-wide spawning habitat model. Completed spawning habitat modeling of Hanford Reach. Recommended operations to reduce juvenile mortality and improve productivity of spawning habitat for fall Chinook while maintaining flexibility for hydropower production. Coordinated with Tribes, States, and assisted with FERC relicensing.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Hanford Reach NM was established in part to protect the last free-flowing section of the mainstem Columbia River in the US, and the internationally significant stock of fall Chinook salmon that spawn and rear there. Evaluation of the effect of water management for power production on stock productivity is required to maintain fishery benefits.</p> <p>The problem:</p> <p>Spawning habitat and production are degraded and millions of juvenile salmon are killed each spring as a result of hydropower operations. Realistic escapement goals cannot be determined because of compromised freshwater productivity. Habitat-based escapement goals have not yet been determined and productivity and fishery benefits are being lost.</p> <p>The objective:</p> <p>The objective of the project is to assess the effect of water management, including hydropower operations, on the productivity of the habitat and on juvenile salmon mortality.</p>
Expended	\$41945	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Col. R. below Priest Rapids Dam - Hanford Reach Fall Chinook	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Pacific Salmon Treaty of 1999</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>	
Keyword	Native Species	
Need Number	N-002	
Partners	<p>Alaska Department of Fish and Game (\$1000)</p> <p>American Rivers (\$1000)</p> <p>Columbia River Inter Tribal Fish Commission (\$2000)</p> <p>Hanford Reach National Monument/Saddle Mountain National Wildlife</p>	

Refuge (\$1000)
 Umatilla Tribe
 Upper Columbia Fish
 and Wildlife Office
 Yakama Indian Nation

Accomplishments

Number of habitat assessments completed	2.0
Number of miles of in-stream habitat assessed	51.0
Number of population assessments completed	1
Number of other Recovery Plan tasks implemented for T&E populations	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	7
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

Conditions evaluated range from stable, natural streamflows to current load following hydrographs that have resulted in lost productivity.

The method:

Physical, hydrodynamic, habitat, and biological models were developed in a GIS to conduct the assessment of water management effects. These models were used to quantify spawning and rearing habitat for a range of streamflows. They were also used to quantify juvenile salmon mortality under existing conditions, and to predict how to reduce mortality.

Further description:

Hanford Reach National Monument was established in part to protect the last free-flowing section of the mainstem Columbia River in the US, and the internationally significant stock of fall Chinook salmon that spawn and rear there. Hydropower operations cause hourly fluctuations in streamflow that compromise spawning habitat and production, and result in the death of millions of juvenile salmon each spring during the rearing period. This project developed recommendations for hydro operations during the spring to minimize juvenile salmon mortality, while maintaining flexibility for power production. A spawning habitat model was also completed and used to simulate the effect of streamflows and hydropower operations on spawning habitat. A process was developed to evaluate a range of operational options to be implemented each season. Options were designed to accommodate both hydropower production and fish production. Technical assistance was provided to the FERC process for the relicensing of the upstream hydro project (Priest Rapids) to protect the Chinook salmon that use the Hanford Reach, to protect the other significant resources of the Hanford

	Reach National Monument, and maintain flexibility for power production.
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13310-A-167 - [Evaluate Habitat Use and Population Dynamics of Lampreys in Cedar Creek](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Estimated abundance, migration timing, and biological characteristics of adult and juvenile lampreys; conducted spawning ground surveys; and conducted evaluation of electrofishing efficiency for juvenile lamprey.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Three lower Columbia subbasin plans as well as the Columbia River Basin Lamprey Technical Workgroup outlines lamprey status, distribution, habitat use, and migration biology as some of the major critical uncertainties facing both anadromous and resident lamprey species. This project has addressed these specific uncertainties during FY 2006.</p> <p>The problem:</p> <p>The USFWS was petitioned in 2003 to list four species of lamprey. Three of these species are native to the Columbia River Basin. The petition was declined based on the paucity of information about lamprey status, distribution, and population structure. Too little research is being conducted in the CRB to understand these critical uncertainties.</p> <p>The objective:</p> <p>Estimate abundance, migration timing, biological characteristics of adult and juvenile Pacific and Western brook lampreys; Describe spawning habitat and assess approaches to monitor spawning activity; Determine susceptibility of larval lampreys to electrofishing and assess electrofishing as a tool for determining presence and estimating abundance.</p>
Expended	\$0	
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.	
Primary Benefited Species	Pacific lamprey (Lampetra tridentata)	
Primary Benefited Population	Not specified	
Plans	<p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>Lower Columbia and Columbia Estuary Bi-State Subbasin Plan - 2004</p> <p>Critical Uncertainties for Lamprey in the Columbia River Basin: Results from a strategic planning retreat of the Columbia River Lamprey Technical Workgroup 2005</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	<p>Bonneville Power Administration (\$204465)</p> <p>Fish First Washington Washington</p> <p>Department of Ecology Washington</p> <p>Department of Fish and Wildlife</p>	

Accomplishments

Number of habitat assessments completed	1.0
Number of miles of in-stream habitat assessed	10.0
Number of population assessments completed	6
Number of other Fishery Management Plan tasks implemented for populations of management concern.	10
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	2
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

The *method*:

Adult PCL captured in pot traps and fish ladder. Mark recapture used for abundance estimates. Rotary screw trap used for migration timing and abundance estimates of juvenile PCL and WBL. Foot surveys completed for assessment of spawning activity. Controlled trials were conducted to assess efficiency of electroshocker and susceptibility of larvae.

Further description:

The goal of the project is to gain information on the distribution, abundance, and biological characteristics of lampreys in a watershed that is not directly influenced by reservoirs and passage impediments associated with dams in the Columbia River. It is funded by Bonneville Power Administration. This ongoing, multi-year study examined lamprey in Cedar Creek, Washington, a third-order tributary to the Lewis River. Adult (n = 151), macrophthalmia (n = 10), and ammocoete (n = 176) stages of Pacific and Western brook lamprey were examined in 2006. Thirty-one spawning ground surveys were conducted during which 246 Pacific lamprey nests were identified. Ammocoete movement was positively correlated with high flows and appeared to be passive while macrophthalmia movement was not associated with discharge. The ability to detect presence of larval lamprey with an electroshocker was assessed relative to larval size and larval density. Higher densities increased the probability of detection. Capture efficiency was higher for smaller fish.

13310-A-168 - [Movement of Coastal Cutthroat Trout in the Lower Columbia River: Tributary, Mainstem, and Estuary](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>The project goal is to provide guidance for monitoring and evaluation of populations and habitat use by various life history stages of cutthroat trout relative to potential disturbances to mainstem and estuarine habitats. This year continued investigations of investigations of movements from tributaries to the lower Columbia River; monitoring movement of fish within three tributaries using PIT tag technology; and assessing population status in lower Columbia River tributaries.</p> <p>Description</p> <p>The <i>importance</i> to the Resource:</p> <p>Effective management of coastal cutthroat trout relies upon an understanding of population status, migration patterns and habitat used by this sensitive species.</p> <p>The <i>problem</i>:</p> <p>This study continues a time series data set describing movement of trout within and between tributaries, mainstem and estuary habitat. Information collected through implementation of this project is critical to assess population status for prevention of listing.</p> <p>The <i>objective</i>:</p> <p>Quantify populations and identify those most in peril. Quantify trout movement between tributary and main stem habitat in time series sufficient to provide predictive power to habitat modifications and to describe trout utilization of important estuary habitat.</p> <p>The <i>method</i>:</p>
Expended	\$65218	
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.	
Primary Benefited Species	Cutthroat trout (Oncorhynchus clarkii)	
Primary Benefited Population	Not specified	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Coastal Cutthroat Trout Framing Document (draft)</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>Columbia Estuary Province Sub-basin Plans</p> <p>Lower Columbia Salmon Recovery And Fish & Wildlife Subbasin Plan: Volume II, Chapter A – Lower Columbia Mainstem and Estuary for Washington State - 2004</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	Columbia River Estuary Study Taskforce	

Lower Columbia Fly Fishers
 Lower Columbia River Estuary Partnership
 Lower Columbia River Watershed Council
 North Coast Watershed Association
 Oregon Department of Fish and Wildlife
 Scappoose Bay Watershed Council
 Sea Resources
 U.S. Army Corps of Engineers (\$62564)
 Washington Department of Fish and Wildlife

A combination of PIT tag and acoustic tag technologies will be used to accomplish project objectives. PIT tag technology within tributaries will help quantify population status and describe movement between tributary and mainstem habitat. Monitoring acoustic tagged fish will describe estuary habitat utilization.

Further description:

Accomplishments

Number of population assessments completed	6
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13310-A-169 - [Malheur National Wildlife Refuge Stream Improvement Biological Verification and Monitoring](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Conducted habitat restoration post-construction survey to describe fish and aquatic macroinvertebrate communities at reference and treatment sample sites. This was the second post-construction survey conducted. Fish community appears more diverse throughout study area and higher densities of redband trout associated with restoration sites.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The goal of the project is to evaluate biological responses to stream habitat improvements on the Blitzen River. The primary fish species intended to benefit from the work is redband trout, a sensitive aquatic species. Improved habitat conditions for this species will contribute toward the prevention of listing.</p> <p>The problem:</p> <p>Habitat in the Blitzen River has been degraded by such activities as overgrazing, channelization, and water management. Improvements to aquatic and riparian habitats were planned for a 4-km reach to benefit the aquatic community.</p> <p>The objective:</p> <p>Establish baseline dataset by describing habitats and fish and aquatic macroinvertebrate communities before planned habitat improvements are performed and compare fish and aquatic macroinvertebrate communities between control and treatment sites (i.e., reaches without and with habitat improvements).</p>
Expended	\$28055	
Objective	Maintain diverse, self-sustaining fish and other aquatic resource populations.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Not specified	
Plans	Columbia River Basin Fish and Wildlife Program (NPPC 2000)	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	Malheur National Wildlife Refuge Oregon Department of Fish and Wildlife	
Accomplishments		
Number of habitat assessments completed	1.0	
Number of miles of in-stream habitat assessed	2.0	
Number of population assessments completed	1	

	<p>The <i>method</i>:</p> <p>Pre-construction monitoring occurred in 2002. Post-construction monitoring occurred in 2003 and 2005. Monitoring was conducted at treatment (habitat improvement) and control (status quo) sites and included documenting changes in biological and physical parameters.</p>
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13310-A-171 - [Assessment of Spring Creek and Little White Salmon National Fish Hatchery Operation & Maintenance](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Hatchery assessment, planning, coordination, biological sampling and reporting to improve hatchery operations that lead to hatchery reform.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Biological and operational monitoring helps improve hatchery operations and production of fall Chinook salmon. Monitoring of age and sex composition, including behavior of returning adults, helps track the performance of the hatchery and provides opportunity to make improvements as necessary. Year-class strength can also be determined.</p> <p>The problem:</p> <p>Without monitoring of age, size and sex composition of returns, errors in predicting future returns would occur and affect future hatchery and harvest planning for co-managers. Hatchery operations also must be evaluated to determine impacts to native or ESA-listed species.</p> <p>The objective:</p> <p>Measure the length, sex and age composition of returning adult fall Chinook salmon to Spring Creek and Little White Salmon National Fish Hatchery. Provide information to managers to improve knowledge and predictive ability in future returns. Additionally, assess hatchery operations or changes to operations and impacts to native or listed species.</p> <p>The method:</p>
Expended	\$0	
Objective	Meet the Service's responsibilities for mitigating fisheries.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Spring Creek NFH Hatchery and Genetic Management Plan</p> <p>Comprehensive Hatchery Management Plan - Spring Creek NFH White Salmon Subbasin Plan</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	<p>Little White Salmon National Fish Hatchery</p> <p>National Oceanic and Atmospheric Administration, Fisheries</p> <p>Spring Creek National Fish Hatchery</p>	

U.S. Army Corps of
Engineers (\$16000)
Washington
Department of Fish and
Wildlife

Fish are examined for sex determination and measured for fork length. Scales are collected from the dorsal area of the fish to be examined by trained staff under magnified power for age determination. Study designs are determined and implemented. A report of the information is composed and distributed to managers and funding sources.

Accomplishments

Number of marking and tagging targets met, as prescribed by Recovery plans	1
Number of other Recovery Plan tasks implemented for T&E populations	2
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	1
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

Further description:

In fiscal year 2005, several studies were completed and reports written on the behavior of fall Chinook salmon during changes in adult return ladder operation at Spring Creek and Little White Salmon NFH. Additionally, information on the age, size, and sex composition of returning fall Chinook salmon was determined and applied to determining year-class strength and prediction of the 2006 adult return to both of these National Fish Hatcheries.

13310-A-174 - [Bull Trout Population assessment of viability and demographic parameters for guiding recovery.](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Continued population assessment of bull trout focusing on quantifying key demographics, including fish density and distribution, growth, survival, movement, and population size. Also, assessment efforts expanded into the North Fork John Day basin, and bull trout genetic assessments continued.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Bull Trout are listed throughout the coterminous United States with populations demonstrating a wide range in population abundance, structure, demography, and vital rates. There is a need to 1) finalize a recovery plan for this wide ranging species with measurable recovery criteria, and 2) develop an associated monitoring and evaluation plan.</p> <p>The problem:</p> <p>Although bull trout are listed, quantitative measures of population viability criteria (e.g., distribution, abundance, and trend) are lacking, and little information exists for key demographic parameters (structure, movement, survival and growth) to identify limiting factors, set recovery benchmarks, and evaluate responses to proposed measures.</p> <p>The objective:</p> <p>Evaluate population viability through measurement of population distribution, abundance, and trend. Provide information for identifying recovery benchmarks and limiting factors through measurement of key vital rates and parameters including movement, growth, and survival. Evaluate strategies for M&E</p>
Expended	\$230785	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Bull trout (Salvelinus confluentus)	
Primary Benefited Population	Walla Walla River core area Bull Trout	
Plans	<p>Bull Trout Recovery Plan (Draft)</p> <p>Bull Trout Draft Recovery Plan, Chapter 9</p> <p>Bull Trout Draft Recovery Plan, Chapter 10</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	<p>Environmental Protection Agency (\$5000)</p> <p>Oregon Department of Fish and Wildlife (\$8000)</p> <p>U.S. Geological Survey (\$28753)</p> <p>Umatilla Tribe</p> <p>Utah State University (\$24500)</p> <p>Walla Walla Basin Watershed Council</p>	

Accomplishments

Number of habitat assessments completed	1.0
Number of miles of in-stream habitat assessed	21.0
Number of miles of riparian habitat assessed	21.0
Number of population assessments completed	3
Number of other Recovery Plan tasks implemented for T&E populations	13
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

based on cost, effort and information gained.

The *method*:

Population assessment, including mark-recapture, was used for estimation of population and demographic parameters (e.g., size, trend and growth, survival). Study includes assessment of genetic structure using microsatellites as well as evaluation of habitat suitability, cues for migration, and the role of marine-derived nitrogen using isotopes.

Further description:

USGS Utah Coop. Unit and CRFPO conducted research in the South Fork Walla Walla, the North Fork Umatilla River, and the North Fork John Day River. Assessments included mark-recapture studies with innovative PIT tag techniques. We made robust estimates for population distribution, size, and trend and estimates of growth, survival, movement, and habitat suitability. Techniques provided guidance to the RMEG on sample design. Patch model assessment for monitoring and evaluation was evaluated. The potential for genetic differentiation among putative groups was assessed. There appears to be gene flow among fish categorized a priori as likely resident versus migratory, as well as among all spatial groupings, and data demonstrate one panmictic population. Isotopic tissue analysis combined with bioenergetics models provided an evaluation of formerly-abundant salmon in determining the diet and growth of bull trout. This indicated that growth rates are low and summer diets contain only a small portion of fish; bioenergetics simulations suggest a diet rich in salmon (as present historically) would increase bull trout growth potential considerably. The study contributed to the goal of providing a template for recovery planning region-wide.

13310-A-176 - [Determination of Bull Trout Instream Flow and Passage Needs in the Walla Walla River](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Monitoring of the Walla Walla bull trout spawning population continued to determine recovery. Better definition of bull trout distribution and habitat criteria helped to determine relevant areas for development of instream flow and passage needs. Additional PIT arrays were installed in the basin and some PIT arrays were improved to gather directional information and increase efficiency which should further refine distribution and movement information.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>This project is designed to provide the technical data to improve conditions for ESA-listed bull trout in the Walla Walla basin to make progress towards recovery and delisting.</p> <p>The problem:</p> <p>Inadequate instream flows occur throughout the basin, primarily as a result of irrigation withdrawals which may limit bull trout movement and distribution.</p> <p>The objective:</p> <p>Our objective continues to be an assessment of habitat and passage conditions in the basin to determine seasonal distribution and movement of bull trout throughout both un-impacted and impacted areas of the South Fork and mainstem river. This will allow development of instream flow targets for relevant areas in the basin.</p> <p>The method:</p>			
Expended	\$94069				
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.				
Primary Benefited Species	Bull trout (Salvelinus confluentus)				
Primary Benefited Population	Walla Walla River core area Bull Trout				
Plans	Bull Trout Draft Recovery Plan, Chapter 10				
Keyword	Monitoring and Assessment				
Need Number	N-002				
Partners	Oregon Department of Fish and Wildlife Umatilla Tribe Upper Columbia Fish and Wildlife Office Walla Walla Basin Watershed Council Washington Department of Fish and Wildlife				
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of population assessments completed</td> <td>2</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>7</td> </tr> </table>			Number of population assessments completed	2	Number of other Recovery Plan tasks implemented for T&E populations
Number of population assessments completed	2				
Number of other Recovery Plan tasks implemented for T&E populations	7				

<p>Number of applied aquatic scientific and technologic tools shared with partners.</p>	<p>1</p>	<p>Our work will determine the current distribution of bull trout and movement patterns to identify current passage and rearing areas. The Instream Flow Methodology can be applied to rearing and passage areas as habitat suitability curves are developed.</p> <p>Further description:</p> <p>PIT tag detection arrays were installed to determine passage timing and numbers for bull trout, steelhead, and spring Chinook. Fluvial bull trout passage was observed through late June, and sub-adult bull trout presence was documented at Nursery Bridge Dam during the summer. Snorkel surveys documented rearing bull trout in the mainstem downstream as far as the Washington/Oregon state line.</p>
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13310-A-178 - [Determination of Bull Trout Instream Flow and Passage Needs in the Umatilla River Basin.](#)

Facility	Columbia River Fisheries Program Office
Expended	\$88389
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Umatilla River core area Bull Trout
Plans	Bull Trout Draft Recovery Plan, Chapter 10 Bull Trout Recovery Plan (Draft)
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	Oregon Department of Fish and Wildlife Umatilla Tribe

Accomplishments

Number of population assessments completed	2
Number of other Recovery Plan tasks implemented for T&E populations	6

Accomplishment Summary

Work continued to assimilate physical and biological data. Spawning ground surveys were conducted, and surveys to determine juvenile and subadult distribution. Downstream movement of bull trout was detected during spring. Distribution of these fish will identify the area for instream flow targets.

Description

The importance to the Resource:

Bull trout are federally-listed as threatened. In the lower Umatilla River, there are a multitude of irrigation withdrawals that cause the river to be de-watered seasonally. Bull trout have been shown to utilize the lower river, and the lack of flow their potentially limits their production.

The problem:

Sections of the lower Umatilla River are de-watered seasonally making fish passage impossible and potentially limiting the production of bull trout, which have been shown to utilize the lower river. The de-watered sections result from extensive withdrawal of river water for irrigation.

The objective:

The objective is to determine when, seasonally, bull trout are impacted by the irrigation withdrawals, and to develop instream flow targets for the affected stream sections and time periods.

The method:

Snorkeling, radio tagging, and PIT-tagging in combination with remote PIT tag arrays will be

used to monitor the seasonal distribution and movement of migratory bull trout. This information will be used in modeling instream flow and setting flow targets for the impacted stream reaches.

Further description:

This project is designed to provide the technical data to improve conditions for ESA-listed bull trout in the Umatilla basin to make progress towards recovery and delisting. Inadequate instream flows occur throughout the basin, primarily as a result of irrigation withdrawals. Spawning ground surveys continued in the N. Fork Umatilla to maintain an index of bull trout population abundance and to quantify numbers of resident and fluvial spawners. Sampling during spring revealed a small downstream movement of subadult bull trout. These fish were either PIT-tagged to determine movement past remote detection arrays or radio tagged so they could be mobility tracked. The tagged fish remained in the upper Umatilla River, upstream from areas impacted by water diversions. Larger, older subadult bull trout rearing below the spring trapping site are currently being captured by snorkeling and dip-netting at night. They will also be radio-tagged and tracked throughout the year. Continued snorkeling, PIT tagging, and radio tagging will be used to track movements through fall, winter, and spring to determine usage and movement through the impacted lower section of the river.

13310-A-181 - [Technical Assistance For Selective Harvest Development](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Provided technical assistance in the effort to upgrade the fishery assessment models used in the PSC and PFMC forums to evaluate the impact of selective fisheries on ESA listed wild stocks.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Developing methods and the fishery management and evaluation tools to selectively harvest abundant hatchery fish while providing appropriate protection for ESA listed and other stocks of concern is a common goal of many west coast fishery managers .</p> <p>The problem:</p> <p>Current management and impact analysis of west coast salmon fisheries rely on a coastwide CWT tagging and sampling program that was not designed to accommodate mark selective fisheries. As a result, the management database is being degraded by the expanding implementation of selective fisheries.</p> <p>The objective:</p> <p>CRFPO staff participate in various conservation planning arenas that review selective harvest methods and work on developing new management and fishery impact analysis models. These new tools are designed to work in concert with current management tools to minimize database degradation and maximize information for stock specific management needs.</p> <p>The method:</p>
Expended	\$57025	
Objective	Support, facilitate, and/or lead collaborative approaches to manage interjurisdictional fisheries.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Pacific Salmon Plan (1999), and various amendments</p> <p>2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p>	
Keyword	Monitoring and Assessment	
Need	N-002	

Number		
Partners		
Accomplishments		
Number of population assessments completed	17	<p>CRFPO staff have been participating in WDFW's study evaluating the use of tangle (small mesh) nets in the lower Columbia River and the computer code (FRAM) used to model selective fisheries in Puget Sound. PSC area efforts included enhancing a pilot coho selective fisheries computer model for Chinook salmon in ocean fisheries.</p> <p>Further description:</p>
Number of other Recovery Plan tasks implemented for T&E populations	8	
Number of other Fishery Management Plan tasks implemented for populations of management concern.	8	

13310-A-182 - [Determination of Bull Trout Instream Flow and Passage Needs in the John Day River Basin.](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Spawning ground surveys were conducted, and surveys to determine juvenile and subadult distribution which can be used when setting instream flow targets. Based on limited data, North Fork John Day bull trout historically moved large distances. Fluvial sized bull trout in the North Fork that were radio tagged and monitored during 2006 remained in the North Fork John Day. Their migration pattern may be limited due to insufficient water, warmer water temperatures and push-up dams.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>This project is designed to provide the technical data to improve conditions for ESA-listed bull trout in the John Day basin to make progress towards recovery and delisting.</p> <p>The problem:</p> <p>Inadequate instream flows occur throughout the basin, primarily as a result of irrigation withdrawals. Push up dams for irrigation diversions may limit passage.</p> <p>The objective:</p> <p>The objective is to determine when, seasonally, bull trout are impacted by the irrigation withdrawals, and to develop instream flow targets for the affected stream sections and time periods.</p> <p>The method:</p> <p>Snorkeling, radio tagging, and PIT-tagging will be used to monitor the seasonal distribution and movement of migratory bull trout. This</p>					
Expended	\$88389						
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.						
Primary Benefited Species	Bull trout (Salvelinus confluentus)						
Primary Benefited Population	John Day River core area Bull Trout						
Plans	Bull Trout Draft Recovery Plan, Chapter 9 Bull Trout Recovery Plan (Draft)						
Keyword	Monitoring and Assessment						
Need Number	N-002						
Partners	Oregon Department of Fish and Wildlife						
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of miles of in-stream habitat assessed</td> <td>12.0</td> </tr> <tr> <td>Number of population assessments completed</td> <td>1</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>4</td> </tr> </table>			Number of miles of in-stream habitat assessed	12.0	Number of population assessments completed	1	Number of other Recovery Plan tasks implemented for T&E populations
Number of miles of in-stream habitat assessed	12.0						
Number of population assessments completed	1						
Number of other Recovery Plan tasks implemented for T&E populations	4						

information will be used in modeling instream flow and setting flow targets for the impacted stream reaches.

Further description:

This project is designed to provide the technical data to improve conditions for ESA-listed bull trout in the John Day basin to make progress towards recovery and delisting. Inadequate instream flows occur throughout the basin, primarily as a result of irrigation withdrawals. Push up dams are prevalent for irrigation diversions in the mainstem John Day. Spawning ground surveys continued in the John Day to maintain an index of bull trout population abundance and to quantify numbers of resident and fluvial spawners. Continued snorkeling, PIT tagging, and radio tagging will be used to track movements through fall, winter, and spring to determine usage and movement through the impacted lower section of the river.

13310-A-188 - [U.S. v. Oregon Technical Assistance](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Assisted in the technical analysis of proposed fishery regulatory options, stock status assessments, and necessary escapements being considered under the 2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The U.S. v Oregon forum is responsible for developing harvest sharing and production management agreements between the states and the tribes under federal oversight to address ESA listed stock issues.</p> <p>The problem:</p> <p>State, tribal, and federal fishery management agencies often have differing perspectives on management approaches and even the appropriate level of restriction to protect stocks of concern. These interjurisdictional management issues must be worked out in technical and policy level forums that provide opportunity for all concerns to be addressed.</p> <p>The objective:</p> <p>CRFPO staff, in cooperation and coordination with the other state, tribal, and federal fishery management agencies, participated in U.S. v. Oregon technical fishery and production management forums, primarily the Technical Advisory Committee, to address interjurisdictional fisheries issues.</p> <p>The method:</p> <p>CRFPO staff provided technical level</p>
Expended	\$23000	
Objective	Support, facilitate, and/or lead collaborative approaches to manage interjurisdictional fisheries.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	<p>Columbia River Inter Tribal Fish Commission</p> <p>Confederated Tribes of The Warm Springs</p> <p>Idaho Department of</p>	

Fish and Game
National Marine
Fisheries Service
Nez Perce Tribe
Oregon Department of
Fish and Wildlife
Umatilla Tribe
Washington
Department of Fish and
Wildlife
Yakama Indian Nation

representation and assistance for Columbia River management forums that develop harvest management options that meet the needs of critical salmon and steelhead species, the treaty rights of native Americans, and provide the greatest benefit to other users, consistent with applicable law.

Further description:

CRFPO staff provide technical assistance to U.S. v Oregon process by participating in the Technical Advisory Committee (TAC). Some of the tasks of the TAC include preparation of pre-season forecast of salmon and steelhead run sizes to the Columbia River, in-season updates on run projects, review of in-river harvest models and projects, preparation of the "Fact Sheet" for the Columbia River Compact, run reconstruction for listed stocks, and preparation of Biological Assessments for listed stocks. Most of the ad-hoc tasks are data analysis requested by the U.S. v Oregon Policy Committee as they negotiate harvest sharing and hatchery production agreements between the states and the tribes. Some of the ad-hoc assignments during the last fiscal year include analysis of PIT tags of spring and summer Chinook, development of a new pre-season forecast method for listed Snake River stocks, development of new methods to use PIT tag recoveries for in-season run size update, run reconstruction of fall Chinook at Lower Granite Dam and confidence intervals for those estimates.

Accomplishments

Number of population assessments completed	17
Number of other Recovery Plan tasks implemented for T&E populations	5
Number of other Fishery Management Plan tasks implemented for populations of management concern.	7

13310-A-193 - [Coho Marking for Yakama Indian Nation Yakima River Tribal Restoration Program](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Tagged hatchery coho for the Yakama Indian Nation Tribal Coho Restoration Program in the Yakima River.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Marking, tagging and evaluation of hatchery stocks is critical to west coast fisheries management and wild stock protection and recovery</p> <p>The problem:</p> <p>The Yakama Indian Nation currently does not have the staff, marking equipment, and expertise to conduct all of their necessary fish marking programs. The FWS works in partnership with the Tribe to complete selected marking projects for the Tribe's fishery restoration projects.</p> <p>The objective:</p> <p>In FY 2006, Columbia River Fisheries Program Office staff again assisted the Yakama Indian Nation by conducting coho marking programs for tribal restoration efforts in the Yakima River.</p> <p>The method:</p> <p>At the request of the Yakama Indian Nation, the Service coded-wire tagged 119,581 coho at Prosser Hatchery and adipose clipped 464,411 coho at Eagle Creek NFH for release into the Yakima River in spring of 2007 as part of the tribal coho restoration effort in the Yakima River.</p> <p>Further description:</p>
Expended	\$0	
Objective	Provide technical assistance to Tribes.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Not specified	
Plans	<p>2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Tribal	
Need Number	N-002	
Partners	Bonneville Power Administration (\$66733)	

Accomplishments

Number of marking and tagging targets met, as prescribed by Recovery plans	1
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	2
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	2
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	2

As part of a Bonneville Power Administration funded research program to study the effects of coho re-introductions into the Yakima River Basin, the Yakama Indian Nation is conducting the evaluations of its coho release programs. The Service is assisting with these evaluation efforts by conducting the marking programs for the Tribe.

13310-A-199 - [Deschutes River Genetics Monitoring](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Study design and work plans have been developed with Abernathy FTC (\$23,000 allocated to run genetic samples), NOAA Fisheries, Warm Springs Tribe, and Oregon Department of Fish and Wildlife. Sampling fish to describe their genetics has begun.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The project entails characterizing the life history characteristics and genetic make-up of hatchery and wild ESA listed steelhead trout populations in the Deschutes River, Oregon to assist with recovery planning.</p> <p>The problem:</p> <p>Lack of genetic information on steelhead could hinder recovery.</p> <p>The objective:</p> <p>The objective of the study is to determine the population structure and genetic characteristics of hatchery and wild fish, and also determine the origin of stray hatchery steelhead based on their genetics.</p> <p>The method:</p> <p>Juvenile and adult fish were sampled at multiple locations throughout the Deschutes River, Oregon. Small tissue samples (partial fin clips) were collected and analyzed for genetic DNA markers.</p> <p>Further description:</p> <p>Study design, planning, equipment and supplies purchase occurred in FY 04. Sample</p>
Expended	\$56407	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Not specified	
Plans	<p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Warm Springs Hatchery and Genetic Management Plan (draft)</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p>	
Keyword	Genetics	
Need Number	N-002	
Partners	<p>Abernathy Fish Technology Center</p> <p>Confederated Tribes of The Warm Springs National Marine Fisheries Service</p> <p>Oregon Department of Fish and Wildlife (\$3000)</p> <p>Portland General Electric (\$3000)</p>	

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	2
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

collection began in FY 05. Abernathy Fish Technology Center began processing genetic samples in FY06. This project will lead to hatchery reform and habitat protection to better maintain the wild fish population traits in the Deschutes River. This project will assist the Technical Recovery Teams.

13310-A-204 - [Conduct Mass Marking to Implement Congressionally Mandated Directive for Federal Hatcheries](#)

Facility	Columbia River Fisheries Program Office	Accomplishment Summary Conducted mass marking of fall Chinook at Spring Creek and Little White Salmon NFHs and Priest Rapids SH to implement Congressional directive to mass mark all hatchery production at federally funded and/or operated facilities that is produced for harvest.
Expended	\$1273060	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>Spring Creek NFH Hatchery and Genetic Management Plan</p> <p>Little White NFH Upriver Bright Fall Chinook Salmon Hatchery and Genetics Management Plan</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>FY 2003 Omnibus Bill and H.R. 2361--Department of the Interior, Environment, and Related Agencies</p>	
		Description
		The importance to the Resource:
		<p>Marking and tagging of hatchery stocks is critical to west coast fisheries management and wild stock protection and recovery. Congress provided funding in FY 06 that was earmarked to implement its directive to mass mark all federally funded hatchery fish that are raised and released for harvest purposes.</p>
		The problem:
		<p>Many wild stocks are depressed and listed under ESA while other hatchery stocks are abundant and available for harvest. Management strategies that promote the selective harvest of hatchery fish rely on an easily identifiable external mark. Mass marking of hatchery fish intended for harvest with an adipose clip helps enable selective fisheries.</p>
		The objective:
		<p>Mass marking provides the mechanism to enable opportunity for selective fisheries while providing protection for listed and depressed stocks. Mass marking of hatchery fish also greatly assists in the ability for biologists to identify and separate hatchery from wild fish throughout their life history and better track the status of wild stocks.</p>

	Appropriations Act, 2006 (Reported in House)
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	
Accomplishments	
Number of marking and tagging targets met, as prescribed by Recovery plans	3
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	2
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
<p>The method:</p> <p>In FY '06, the Columbia River Fisheries Program Office adipose clipped 14,472,202 and coded wire tagged 451,795 tule fall Chinook at Spring Creek NFH, adipose clipped 1,353,999 and coded wire tagged 219,698 bright fall Chinook at Little White Salmon NFH and adipose clipped 1,700,353 bright fall Chinook at Priest Rapids SH under this program.</p> <p>Further description:</p> <p>Production targeted for restoration and recovery purposes is exempt from the mass marking requirement.</p>	

13310-A-205 - [Marking Program for Umatilla Tribal Walla Walla River Spring Chinook Restoration Program](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Marked and tagged 50,102 spring Chinook for the Umatilla Tribe's spring Chinook restoration program in the Walla Walla River.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Marking, tagging and evaluation of hatchery stocks is critical to west coast fisheries management and wild stock protection and recovery.</p> <p>The problem:</p> <p>The Umatilla Tribe currently does not have the staff, marking equipment, and expertise to conduct all of their necessary fish marking programs. The FWS works in partnership with the Tribe to complete selected marking projects for the Tribe's fishery restoration projects.</p> <p>The objective:</p> <p>In FY 2006, Columbia River Fisheries Program Office staff again assisted the Umatilla Tribe by conducting spring Chinook marking programs for tribal restoration efforts in the Walla Walla River.</p> <p>The method:</p> <p>A total of 50,102 spring Chinook from Little White Salmon/Willard NFH Complex were marked and tagged under this cooperative marking program in FY 2005.</p> <p>Further description:</p> <p>Spring Chinook were extirpated from the Walla</p>
Expended	\$0	
Objective	Provide technical assistance to Tribes.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	<p>2005-2007 Interim Management Agreement for Upriver Chinook, Sockeye, Steelhead, Coho, and White Sturgeon</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	Umatilla Tribe (\$8003)	

Accomplishments

Number of marking and tagging targets met, as prescribed by Recovery plans	1
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	2
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1

Walla River early in the 1900s due to high irrigation demand and poor water management practices. Spring Chinook were reintroduced into the system late in the 1900s by the Umatilla Tribe after some success in changing water management polices that leaves more water for in-stream use. Starting in FY 2005, at the request of the Umatilla Tribe, the U.S. Fish and Wildlife Service entered into an agreement with the Tribe to ad-clip and coded wire tag approximately 50,000 spring Chinook for the Walla Walla River tribal restoration program. Fish from either Carson NFH or Little White Salmon NFH were to be marked on an annual basis to assist the Umatilla Tribe with their monitoring and evaluation program of this tribal restoration project. A total of approximately 200,000 spring Chinook that accompany the ADCWT 50,000 fish for the program are also adipose clipped by the Service under an alternate funding source (i.e., Mitchell Act). Carson stock spring Chinook, a non-native stock, are being used for the initial restoration efforts and NOAA Fisheries has required 100% marking of the Walla Walla River destined hatchery fish to evaluate and guard against straying into the Snake River Basin.

13310-A-208 - [Monitoring the Use of the Mainstem Columbia River by Bull Trout from the Walla Walla River Subbasin](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>A remote PIT tag detection array was operated in the lower Walla Walla River to monitor the passage of bull trout between the Walla Walla and Columbia Rivers. An incidental advantage of the installation is the detection of Chinook and steelhead to benefit state and tribal fisheries programs.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Bull trout historically used the mainstem Columbia and Snake rivers as part of their life cycle and they are currently listed as a threatened species.</p> <p>The problem:</p> <p>Passage in the lower Walla Walla and the presence of hydropower dams in the Columbia may be restricting bull trout movement and limiting progress towards recovery.</p> <p>The objective:</p> <p>This project is designed to help determine use of mainstem Columbia River habitat by bull trout, consistent with the USFWS 2000 FCRPS Biological Opinion.</p> <p>The method:</p> <p>A multi-agency effort by the USFWS, Forest Service, and Utah State University has tagged more than 2,000 bull trout with PIT tags in the basin. The installation of the PIT array at Oasis Road Bridge will monitor movement of PIT tagged bull trout between the Walla Walla and Columbia Rivers.</p>
Expended	\$0	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Bull trout (Salvelinus confluentus)	
Primary Benefited Population	Walla Walla River core area Bull Trout	
Plans	2000 FWS Biological Opinion - Effects to Listed Species from Operations of the Federal Columbia River Power System Bull Trout Draft Recovery Plan, Chapter 10	
Keyword	Monitoring and Assessment	
Need Number	N-002	
Partners	U.S. Army Corps of Engineers (\$86031) Umatilla Tribe Walla Walla Basin Watershed Council Washington Department of Fish and Wildlife	
Accomplishments		

Number of other Recovery Plan tasks implemented for T&E populations

4

Further description:

This detection site will also continue to provide data on Chinook and steelhead that are important to state and tribal fisheries management programs.

13310-A-209 - [Develop Geographic Information System Program for staff & provide analytical support and training.](#)

Facility	Columbia River Fisheries Program Office
Expended	\$110000
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Not specified
Plans	Columbia River Basin Fish and Wildlife Program (NPPC 2000) Bull Trout Draft Recovery Plan, Chapter 10 Bull Trout Recovery Plan (Draft)
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	

Accomplishments

Number of habitat assessments completed	2.0
Number of miles of in-stream habitat assessed	59.0
Number of other Recovery Plan tasks implemented for T&E populations	5
Number of other Fishery Management	2

Accomplishment Summary

Acquired GIS analyst who planned, developed, and is implementing our GIS program and capabilities to assess aquatic habitat for resident and anadromous fish in the Columbia River basin. Training was provided to staff on using software for analysis and display. GIS layers were developed for hydrologic modeling and a fall Chinook spawning habitat assessment in the Hanford Reach of the Columbia R. GIS layers were developed for a bull trout spawning habitat assessment and multi-basin patch analysis.

Description

The importance to the Resource:

GIS analysis has become critical for resource assessments due to the ability to perform complex spatial and statistical analyses. Spatial problem solving produces more realistic, understandable solutions since most problems are spatially oriented. Adequate GIS capabilities are critical for recovery planning and developing conservation strategies.

The problem:

Complex spatial and statistical analyses and queries are not possible without a fully functioning GIS program. Analytical products are difficult to understand in numeric and text formats. Easy to understand maps that depict results of analyses are not available. Recovery planning is more difficult and less intuitive without GIS capabilities.

The objective:

The objective of the project is to obtain a GIS analyst (FTE) and the necessary hardware,

Plan tasks implemented for populations of management concern.		<p>software, and field equipment to work towards implementation of an enterprise GIS program along with the ability to conduct spatially oriented field work that will be compatible with, and benefit from analytical and display capabilities of the program.</p> <p>The method:</p> <p>A GIS analyst with the necessary skills will develop and implement the program and provide analytical assistance and training. Hardware (e.g. servers, plotters) and software (e.g. ARCGis) will be acquired that will enable GIS assessments and analyses. Field equipment (e.g. GPS) will be acquired that will enable spatially oriented data collection.</p> <p>Further description:</p> <p>Advanced GIS analysis has become a requirement for many CRFPO resource assessment activities due to the ability to perform complex spatial and statistical analyses that were not previously feasible. Spatial problem solving produces more realistic on-the-ground solutions since most problems are spatially distributed. Our GIS capabilities will be better able to adequately provide technical support for recovery plans and multi-state conservation strategies such as those for bull trout, cutthroat trout, and Pacific lamprey. Hardware, software, and field equipment need to be acquired to complete development of our comprehensive, integrated GIS program. Because of the diverse nature of the CRFPO and the strong spatial orientation of its work, a functional GIS with appropriate equipment will provide essential information for many products currently required by the agency. Developed GIS layers for building a hydrologic model in the Hanford Reach of the Columbia River. Developed GIS layers for assessing spawning habitat suitability of fall chinook salmon in the Hanford Reach. Developed GIS</p>
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1	

	layers for assessing spawning habitat suitability of bull trout in the South Fork of the Walla Walla River, Oregon
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13310-A-210 - [NE Oregon Bull Trout Population Structure and Dynamics](#)

Facility	Columbia River Fisheries Program Office
Expended	\$67739
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Not specified
Plans	Bull Trout Recovery Plan (Draft) Bull Trout Draft Recovery Plan, Chapter 12
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	Oregon Department of Fish and Wildlife U. S. Forest Service

Accomplishments

Number of population assessments completed	6
Number of other Recovery Plan tasks implemented for T&E populations	10

Accomplishment Summary

The ultimate goal of this project is to provide empirical information toward defining minimum viable populations of bull trout. A PIT tag antenna was installed to help confirm isolation of study populations. PIT tags were implanted in bull trout throughout the study area. A bull trout abundance estimate of the isolated portion of Big Sheep Creek was conducted to provide demographic information that will be compared to the genetic effective population size determined from sampled genetic tissues.

Description

The importance to the Resource:

Recovery of bull trout will depend, in part, on understanding the numbers of bull trout that a population must contain to be viable. The ultimate goal of this study is to provide empirical information toward defining minimum viable populations of bull trout.

The problem:

The Imnaha River subbasin provides a unique opportunity to provide information toward bull trout recovery. The drainage includes an irrigation canal which effectively isolated small populations of bull trout that continue to persist. Empirical information on the effective population size of these populations will contribute toward recovery.

The objective:

The objectives of this study are to describe connectivity among populations, determine within and among population genetic structure, estimate bull trout abundance, and determine effective population size through demographic and genetic methods.

	<p>The <i>method</i>:</p> <p>The objectives will be accomplished through a combination of technology (PIT tags), genetic analysis, and sampling methodology.</p>
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13310-A-212 - [Mid-Columbia River Summer Chinook Escapement Goal Study](#)

Facility	Columbia River Fisheries Program Office
Expended	\$0
Objective	Support, facilitate, and/or lead collaborative approaches to manage interjurisdictional fisheries.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Not specified
Plans	Pacific Salmon Treaty of 1999 Columbia River Basin Fish and Wildlife Program (NPPC 2000)
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	National Marine Fisheries Service (\$7643)

Accomplishments

Number of population assessments completed	3
Number of other Fishery Management Plan tasks implemented for populations of management concern.	4

Accomplishment Summary

Work continued on reviewing available information and developing an appropriate naturally spawning escapement goal for summer Chinook in the mid-Columbia River region.

Description

The importance to the Resource:

The 1999 amended Pacific Salmon Treaty established an abundance-based approach for management of Chinook in certain ocean fisheries. An important tool used by the Chinook Technical Committee (CTC) to monitor the impact of Pacific Salmon Treaty fisheries on natural stocks of concern is stock specific escapement goals.

The problem:

The Pacific Salmon Commission originally deferred to the relevant management agencies to identify appropriate escapement levels for natural stocks of concern to the Commission with the expectation that these goals would be reviewed and updated as necessary.

The objective:

The 1999 Pacific Salmon Treaty directs the CTC to evaluate and review escapement objectives that fishery management agencies have set for Chinook stocks of interest to the Pacific Salmon Commission for consistency with maximum sustained yield or other agreed to biologically-based objectives.

The method:

In FY '05, the National Marine Fisheries Service (NMFS) contracted with the Service to

	<p>review available information and work with the relevant Columbia River managers to develop an appropriate mid-Columbia River summer Chinook natural spawning escapement goal using adult to smolt recruitment rates. Work continued on this project in FY '06.</p> <p>Further description:</p> <p>Funding for this project is from the Pacific Salmon Commission through the NMFS.</p>
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13310-A-213 - [Lamprey Population Structure](#)

Facility	Columbia River Fisheries Program Office	<p>Accomplishment Summary</p> <p>Collected western brook lamprey and contracted with GIS to isolate 20 microsatellite DNA markers</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The USFWS was recently petitioned to list four species of lamprey. One of the biggest uncertainties regarding lamprey, and a significant reason the petition was denied, revolved around a poor understanding of lamprey population structure.</p> <p>The problem:</p> <p>Pacific lamprey (PCL) and western brook lamprey (WBL) are the two focal species of lamprey in the Pacific Northwest. These species exhibit very different life histories, PCL are anadromous whereas WBL are freshwater residents. Almost no research has been conducted on WBL and their population structure but it is essential to prevent listing.</p> <p>The objective:</p> <p>Given that WBL are resident species and presumed to migrate very little, the hypothesis is that WBL populations are finely structured and will show very little mixing. If this is the case, management scenarios may need to be very different for these two species. This project is designed to increase our knowledge of lamprey population structure.</p> <p>The method:</p> <p>Fin clips were collected from WBL adults and sent to Genetic Identification Services for the development of microsatellite markers and</p>
Expended	\$10500	
Objective	Develop and share applied aquatic scientific and technologic tools with partners.	
Primary Benefited Species	Western brook lamprey (Lampetra richardsoni)	
Primary Benefited Population	Not specified	
Plans	<p>Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan: Volume II, Chapter G – Lewis Subbasin - 2004</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p> <p>Critical Uncertainties for Lamprey in the Columbia River Basin: Results from a strategic planning retreat of the Columbia River Lamprey Technical Workgroup 2005</p>	
Keyword	Genetics	
Need Number	N-002	
Partners	<p>Great Lakes Institute for Environmental Research</p> <p>Margaret Docker</p> <p>University of Manitoba</p>	
Accomplishments		

Number of population assessments completed	10	<p>custom primers. These tools are still being fine tuned and will be used for analyzing population structure of WBL.</p> <p>Further description:</p> <p>Although little research has been done on any native lamprey in the Northwest, what has been done has focused on PCL. This research includes work on the population structure of PCL, as inferred from genetic and behavioral analyses, and suggests that PCL populations are coarsely (if at all) structured and exhibit a large amount of mixing. Population structure for both species, Pacific and Western brook, are outlined as critical uncertainties by the Columbia River Basin Lamprey Technical Workgroup.</p>
Number of other Fishery Management Plan tasks implemented for populations of management concern.	3	
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	

13310-A-215 - [Simulated Natural Rearing \(NATURES\) Environments compared to standard hatchery ponds.](#)

Facility	Columbia River Fisheries Program Office
Expended	\$10913
Objective	Develop and share applied aquatic scientific and technologic tools with partners.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Warm Springs hatchery spring chinook
Plans	Warm Springs Hatchery and Genetic Management Plan (draft) 1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.
Keyword	Fish Technology
Need Number	N-002
Partners	Abernathy Fish Technology Center Confederated Tribes of The Warm Springs Lower Columbia River Fish Health Center Warm Springs National Fish Hatchery

Accomplishments

Recovery Plan production tasks implemented (PART)	1
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Accomplishment Summary

Hatchery reform to increase health and survival rates of hatchery fish by mimicking conditions in the natural environment.

Description

The importance to the Resource:

Warm Springs National Fish Hatchery, Oregon will serve as the pilot facility for this evaluation. This hatchery produces and releases fish native to its watershed and strives to maintain characteristics of the native stocks in both the hatchery and stream environment.

The problem:

Survival of hatchery fish is lower than wild fish, once the hatchery fish are released into the stream, from the smolt to adult phase.

The objective:

NATURES rearing seeks to improve survival of hatchery stocks and minimize impacts on imperiled wild stocks.

The method:

This project will investigate the performance of fish reared in simulated natural rearing (NATURES) environments compared to standard hatchery ponds. This project will develop features at the hatchery to simulate natural habitat found in streams, including shade, cover, instream structure, color, flow, and rearing density.

Further description:

The Columbia River Fisheries Program Office

Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1	will monitor juvenile fish in each treatment/control group and in streams to assess and compare performance; and develop techniques to measure performance including growth, survival, cryptic coloration, predator avoidance, foraging behavior, habitat utilization, and fish health.
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14330-A-001 - [Steelhead evaluation studies](#)

Facility	Idaho Fisheries Resource Office	<p>Accomplishment Summary</p> <p>We continued propagation of fall returning broodstock, thereby improving the fall steelhead fishery in the Clearwater River. We also completed an evaluation of brood stock selection for B-run steelhead.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Fall returning steelhead are an important part of the diverse life history of the Clearwater B steelhead run as well as comprising a valuable part of the Idaho sport and tribal harvest. As the sole repository for the Clearwater 'B' run steelhead it is important that Dworshak NFH preserves that life history characteristic through proper management.</p> <p>The problem:</p> <p>If the collection of broodstock does not occur throughout the entire spectrum of the run loss of particular genetic traits such as return timing or spawning timing may impact the overall fitness of the stock. Loss of these fish may jeopardize the long-term existence of the run.</p> <p>The objective:</p> <p>The objective is to include the entire spectrum of the run thereby protecting the genetic integrity of the Clearwater 'B' steelhead and providing a fall steelhead fishery for sport and tribal anglers.</p> <p>The method:</p> <p>We open the ladder at Dworshak NFH in October to ensure collection of any fall returning fish. We spawn these fish separately and then monitor and evaluate their return to</p>			
Expended	\$84000				
Objective	Maintain diverse, self-sustaining fish and other aquatic resource populations.				
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)				
Primary Benefited Population	North Fork Clearwater River				
Plans	<p>A Review of Dworshak National Fish Hatchery Mitigation Record (Miller, 1987)</p> <p>Dworshak NFH Steelhead HGMP</p> <p>Columbia River Basin Fish and Wildlife Program (NPPC 2000)</p>				
Keyword	Mitigation				
Need Number	N-002				
Partners	Idaho Department of Fish and Game Nez Perce Tribe				
<p>Accomplishments</p> <table border="1"> <tr> <td>number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)</td> <td>1</td> </tr> <tr> <td>Number of other Fishery Management Plan tasks implemented for populations of management concern.</td> <td>7</td> </tr> </table>			number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	1	Number of other Fishery Management Plan tasks implemented for populations of management concern.
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	1				
Number of other Fishery Management Plan tasks implemented for populations of management concern.	7				

Number of mitigation tasks implemented as prescribed in approved plans. (PART)	1	the hatchery and the sport and tribal fisheries.
Number of mitigation production tasks implemented as prescribed in approved plans. (PART)	1	
Number of consultations conducted to support Tribal fish & wildlife conservation.	1	

14330-A-003 - [Increasing the Survival of Juvenile Fall Chinook Salmon in the Snake River.](#)

Facility	Idaho Fisheries Resource Office	<p>Accomplishment Summary</p> <p>We provided in-season data to help time releases of reservoir water and then verified that these releases increased survival of fall Chinook salmon passing downstream in the FCRPS.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>This project will help to recover of Snake River fall Chinook salmon listed as threatened under the ESA. It was identified as research activity 190 in the 2000 Federal Columbia River Power System (FCRPS) Biological Opinion.</p> <p>The problem:</p> <p>The migrational corridor of juvenile Snake River fall Chinook salmon was impounded by eight hydroelectric dams comprising the FCRPS. To increase passage survival, cool water is released from reservoirs located upstream to increase velocity and decrease temperature during the summer. Analyses were needed to evaluate passage survival.</p> <p>The objective:</p> <p>The objective of this project is to determine if releasing cool water from reservoirs located upstream of the FCRPS increases survival of Snake River fall Chinook salmon juveniles passing downstream in the FCRPS.</p> <p>The method:</p> <p>We are using passive integrated transponder tags (PIT tags) to monitor downstream passage survival of wild fall Chinook salmon juveniles in the FCRPS.</p>					
Expended	\$166000						
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.						
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)						
Primary Benefited Population	Snake River Fall Chinook Salmon						
Plans	2000 NMFS FCRPS Biological Opinion - December 21, 2000						
Keyword	Recovery						
Need Number	N-002						
Partners	Bonneville Power Administration U.S. Geological Survey Washington Department of Fish and Wildlife						
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of population assessments completed</td> <td>1</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>1</td> </tr> <tr> <td>Number of consultations conducted to support Tribal fish & wildlife conservation.</td> <td>1</td> </tr> </table>			Number of population assessments completed	1	Number of other Recovery Plan tasks implemented for T&E populations	1	Number of consultations conducted to support Tribal fish & wildlife conservation.
Number of population assessments completed	1						
Number of other Recovery Plan tasks implemented for T&E populations	1						
Number of consultations conducted to support Tribal fish & wildlife conservation.	1						

14330-A-006 - [Comparative survival study of hatchery PIT tagged Chinook](#)

Facility	Idaho Fisheries Resource Office	<p>Accomplishment Summary</p> <p>We released 52,895 PIT-tagged spring Chinook salmon on March 27 and 29, 2006 into the North Fork Clearwater River. The average juvenile detection at Lower Granite Dam was 16.1%. The average migration time was 32.3 days. We collected 30 PIT-tagged adult spring Chinook salmon in the Dworshak NFH ladder. The ocean age class composition of the returning adults was 1 I-salt, 24 II-ocean and 5 III-ocean.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Large numbers of wild and hatchery fish are transported from Snake and Columbia river dams annually. The impacts of the transportation program are not fully known or evaluated. There is both direct and delayed mortality associated with transportation and a full evaluation of these impacts are critical to salmon recovery throughout the basin.</p> <p>The problem:</p> <p>The problem is obtaining definitive data that completely evaluates fish transportation from Snake and Columbia river dams. A large scale study that encompasses many hatcheries in the basin is difficult to fund and conduct in order to develop the long-term data set needed to truly answer the question.</p> <p>The objective:</p> <p>The objectives are to develop a long-term index of transport and in-river survival rates for Snake River wild and hatchery spring Chinook salmon, to develop a long-term index of survival rates from release to return, and to compare overall survival rates for upriver and</p>			
Expended	\$5758				
Objective	Support, facilitate, and/or lead collaborative approaches to manage interjurisdictional fisheries.				
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)				
Primary Benefited Population	Clearwater River Lower Mainstem Tributaries				
Plans	2000 NMFS FCRPS Biological Opinion - December 21, 2000 Columbia River Basin Fish and Wildlife Program (NPPC 2000)				
Keyword	Fish Passage				
Need Number	N-002				
Partners	Bonneville Power Administration Fish Passage Center Idaho Department of Fish and Game				
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>1</td> </tr> <tr> <td>Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)</td> <td>2</td> </tr> </table>			Number of other Recovery Plan tasks implemented for T&E populations	1	Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)
Number of other Recovery Plan tasks implemented for T&E populations	1				
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2				

downriver spring/summer Chinook hatchery and wild populations.

The *method*:

Thee CSS program PIT tags large numbers of spring and summer Chinook at most major hatcheries in the basin and estimates survival rates over different life stages and transported versus non-transported fish in this multi-year study.

14330-A-012 - [Technical Review of Fishery Documents](#)

Facility	Idaho Fisheries Resource Office	<p>Accomplishment Summary</p> <p>IFRO staff improved the technical accuracy and ensured sound science was applied in technical papers pertaining to fisheries management by completing peer reviews on approximately 30 fishery documents in FY2006.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>This project provides current, accurate, and correct data, information, and analysis to support decisions made by Fishery managers in the Snake and Columbia river basins.</p> <p>The problem:</p> <p>Reports and plans that are not reviewed for accuracy, complete analysis, and supported conclusions may lead to incorrect decisions and potential mis-management of fishery resources.</p> <p>The objective:</p> <p>The objective is to provide unbiased reviews and ensure that documents are technically accurate and based on sound scientific principles.</p> <p>The method:</p> <p>We will provide technical reviews and comments on documents produced by this office or from outside requests on documents such as; Biological Assessments, Biological Opinions, Technical Reports, Management Plans, Conservation Plans, Research Proposals, manuscripts submitted for publication to scientific journals, etc...</p>	
Expended	\$30000		
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.		
Primary Benefited Species	(0) Can Not Assign		
Primary Benefited Population	Not specified		
Plans	Columbia River Basin Fish and Wildlife Program (NPPC 2000)		
Keyword	Fish Technology		
Need Number	N-002		
Partners			
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of other Fishery Management Plan tasks implemented for populations of management concern.</td> <td>2</td> </tr> </table>			Number of other Fishery Management Plan tasks implemented for populations of management concern.
Number of other Fishery Management Plan tasks implemented for populations of management concern.	2		

14330-A-014 - [Spring Chinook Salmon Coded-wire Tag Program for Dworshak NFH Complex](#)

Facility	Idaho Fisheries Resource Office
Expended	\$35000
Objective	Meet the Service's responsibilities for mitigating fisheries.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Clearwater River Lower Mainstem Tributaries
Plans	Lower Snake River Compensation Plan Columbia River Basin Fish and Wildlife Program (NPPC 2000)
Keyword	Interjurisdictional
Need Number	N-002
Partners	

Accomplishments

Number of other Fishery Management Plan tasks implemented for populations of management concern.	10
Number of mitigation tasks implemented as prescribed in approved plans. (PART)	2
Number of mitigation post-stocking survival tasks implemented as prescribed in approved plans.	1

Accomplishment Summary

The spring Chinook juvenile marking program included over 240,000 CWTs. In excess of 1,000 returning adults were examined for CWTs and other marks.

Description

The importance to the Resource:

A comprehensive marking and tagging program is critical to the proper evaluation of a hatchery program and to determine if there are any negative impacts to wild populations. Critical to the tagging program is the maintenance of a database to allow thorough and complete analysis.

The problem:

Without a long-term data set a thorough evaluation of the Dworshak NFH spring Chinook salmon mitigation program is not possible. Annual variations complicate analysis and long-term trend data enables separation of annual fluctuations versus true change.

The objective:

The objective is to build and maintain extensive coded-wire tag databases for spring Chinook salmon at Dworshak NFH for evaluation purposes.

The method:

We schedule the tagging and coordinate with the contractors. We check for coded-wire tag retention before smolts are released. We extract the coded-wire tags from adults that return from the ocean. Data on coded-wire tag releases and returns are submitted to the Pacific States Marine Fisheries Commission for

	inclusion into regional databases.
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14330-A-016 - [Brood Year Reports for Spring Chinook Salmon at Dworshak NFH](#)

Facility	Idaho Fisheries Resource Office	<p>Accomplishment Summary</p> <p>We significantly expanded our databases used for long-term analysis of hatchery production and success by incorporating a completed brood year report for BY00 and data for BYs 01 through 06.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Brood year reports compile all the pertinent biological and environmental data describing the success of for a particular brood year of spring Chinook salmon at Dworshak NFH. The data contribute to a larger database of production trend information that allows evaluation of production success over a longer period of time.</p> <p>The problem:</p> <p>The difficulty is in keeping an accurate centrally located file for all the data that is generated by Dworshak NFH, the Idaho Fish Health Office, and the Idaho FRO during the 5-year life cycle of the broodyear.</p> <p>The objective:</p> <p>This project is intended to assimilate all the information for each specific brood year of spring Chinook salmon into a central file at the Idaho Fishery Resource Office.</p> <p>The method:</p> <p>The life cycle of one brood year is completed as the adults return to the hatchery each year. The data for that brood year is compiled into a report that summarizes each phase of the life cycle. Data from successive brood years are used for trend analysis to evaluate the overall</p>	
Expended	\$35000		
Objective	Meet the Service's responsibilities for mitigating fisheries.		
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)		
Primary Benefited Population	Clearwater River Lower Mainstem Tributaries		
Plans	Vision Action Plan and the Hatchery Evaluation Action Plan Columbia River Basin Fish and Wildlife Program (NPPC 2000)		
Keyword	Interjurisdictional		
Need Number	N-002		
Partners	Dworshak National Fish Hatchery Hagerman National Fish Hatchery Idaho Fish Health Office Kooskia National Fish Hatchery		
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of other Fishery Management Plan tasks implemented for populations of management concern.</td> <td>8</td> </tr> </table>			Number of other Fishery Management Plan tasks implemented for populations of management concern.
Number of other Fishery Management Plan tasks implemented for populations of management concern.	8		

	production program.
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14330-A-036 - [Updated Review on Bull Trout Assessments and Radio-telemetry Studies](#)

Facility	Idaho Fisheries Resource Office
Expended	\$50000
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Bull trout (Salvelinus confluentus)
Primary Benefited Population	Not specified
Plans	Bull Trout Recovery Plan, Ch 18 Southwest Idaho RU Bull Trout Recovery Plan, Ch 16 Clearwater RU
Keyword	Recovery
Need Number	N-002
Partners	Boise State University (\$15000) U.S. Bureau of Reclamation (\$32000)

Accomplishments

Number of habitat assessments completed	1.0
Number of other Recovery Plan tasks implemented for T&E populations	1
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1

Accomplishment Summary

Data from three different studies was synthesized and analyzed. The November 2006 final report will include a discussion of the case studies, data collection and analysis, as well as the types of questions we have asked in the past, how these data have been used, and what types of questions we can ask given the data we have collected. The report will culminate in some guidelines for conducting future studies grounded in the question of interest. All monies have been expended.

Description

The problem:

Much data on bull trout has been collected since previous reviews were done. In particular, many studies involving radio telemetry that help characterize life history, movements and habitat preferences have been conducted. Analysis and review beyond individual studies or watersheds has not been done.

The objective:

Assimilate and synthesize the existing data regarding bull trout habitat use and movement into a database and several peer-reviewed articles, which will fill a void in the literature associated with broad-scale questions of bull trout biology and ecology.

The method:

Survey biologists conducting bull trout radio telemetry studies over the range of the species, update what is known about bull trout and make it readily available for managers and recovery planning.

14235-A-008 - [Improve Passage of Listed Species at the Kooskia National Fish Hatchery Weir](#)

Facility	Kooskia National Fish Hatchery
Expended	\$23312
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)
Primary Benefited Population	Not specified
Plans	Kooskia National Fish Hatchery HGMP
Keyword	Fish Passage
Need Number	N-002
Partners	

Accomplishments

Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1
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Accomplishment Summary

Completed annual monitoring and evaluation to measure the effect the Kooskia NFH weir has on targeted species, resident fish, and ESA listed steelhead and bull trout.

Description

The importance to the Resource:

This project will develop an operations plan to allow passage of ESA listed fish at the permanent fish weir at Kooskia NFH, minimizing take of these species. Wild summer steelhead and bull trout in Clear Creek are listed as threatened under the ESA.

The problem:

The Service's BiOp regarding the construction and operation of the weir stated that the weir, may adversely affect but is not likely to jeopardize the continued existence of the Columbia Basin DPS of bull trout and that adult and sub-adult migrating bull trout could be taken as a result of this proposed action.

The objective:

Data collected by this project will: 1) Determine the timing and frequency of ESA listed fish encounters, 2) provide for an operations plan that will minimize the incidental take of ESA listed species, and 3) optimize broodstock collection for the hatchery.

Further description:

14235-A-009 - [Develop Highly Reliable Alternative Sources of Water Supply for Kooskia NFH](#)

Facility	Kooskia National Fish Hatchery
Expended	\$57049
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Not specified
Plans	Kooskia National Fish Hatchery HGMP
Keyword	Fish Technology
Need Number	N-002
Partners	

Accomplishments

Number of Fishery Management Plan production tasks implemented (PART)	1
number of marking and tagging targets met, as prescribed by Fishery management plans. (PART)	1

Accomplishment Summary

New water sources are being identified, including rehabing old or developing new wells. New water quality monitoring equipment was purchased and water quality is being monitored and logged weekly. Work was performed to improve water flow into the creek water intake.

Description

The importance to the Resource:

Currently, Kooskia NFH depends on well water from two ground wells and from Clear Creek.

The problem:

Clear Creek is not available during summer months due to decreased water quantity and quality. This forces Kooskia to depend entirely on well water and recirculation system for these months. In order to accommodate the loss of Clear Creek water, well water has to be pumped in conjunction with water chillers to benefit the salmon.

The objective:

Developing additional sources of high quality water decreases Kooskia's dependence on technology and would decrease energy costs. Water quality monitoring assures high quality fish rearing conditions and early detection of water sytem problems.

Further description:

14235-A-012 - [Improving Kooskia NFH evaluation and long term monitoring of listed species](#)

Facility	Kooskia National Fish Hatchery
Expended	\$14164
Objective	Restore declining fish and other aquatic resource populations before they require listing under the Endangered Species Act.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Clearwater River Lower Mainstem Tributaries
Plans	Kooskia National Fish Hatchery HGMP
Keyword	Fish Passage
Need Number	N-002
Partners	

Accomplishments

Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1
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Accomplishment Summary

Completed collecting information on numbers and sizes of juvenile steelhead and bull trout in the adult fish trap at the Kooskia NFH weir.

Description

The importance to the Resource:

Under Incidental Take, the NMFS lists two specific RPMs for agencies operating artificial production programs: monitoring and evaluating their programs, and reducing potential negative impacts to listed Chinook and steelhead.

The problem:

In the NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin, operation of weirs for the collection of broodstock is listed as one potential effect on listed species.

The objective:

Implement a monitoring and evaluation plan to measure the effectiveness of the Kooskia NFH SCS program, allowing for adaptive management and optimizing production while minimizing the impacts to ESA listed stocks. Data on the numbers, sizes, and migration timing of bull trout and wild summer steelhead will be compiled in the weir and adult pond

The method:

These data will be used for comparison with data collected by the Idaho Fishery Resource Office on the numbers, sizes, and status of bull trout and wild summer steelhead populations residing in the upper reaches of Clear Creek. These comparisons will be used to assess and

	evaluate the effects of the weir operation on these listed populations.
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13231-A-006 - [Fish Health Inspections and Certifications](#)

Facility	Lower Columbia River Fish Health Center	Accomplishment Summary Twenty-eight stocks of salmon and other fish used to fulfill mitigation and restoration plans in the Columbia River Basin were monitored for health, inspected for disease, and certified as fit and healthy for release.
Expended	\$338629	
Objective	Meet the Service's responsibilities for mitigating fisheries.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	White Salmon River fall run (tule) Chinook	
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Carson NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p> <p>Spring Creek NFH Hatchery and Genetic Management Plan</p> <p>Little White NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p> <p>Little White NFH Upriver Bright Fall Chinook Salmon Hatchery and Genetics Management Plan</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Warm Springs Hatchery and Genetic Management Plan (draft)</p> <p>Eagle Creek NFH Coho Salmon Hatchery and Genetic Management Plan</p>	Description
		The importance to the Resource:
		The fish at 6 National Fish Hatcheries and Abernathy Fish Technical Ctr. are regularly examined throughout their life cycle to ensure that healthy fish, meeting the requirements of National, State, and Tribal Fish Health Policies, are produced and released in the lower Columbia River Basin.
		The problem:
		Disease outbreaks reduce viability and survival of hatchery fish. The fish from these hatcheries are critical to help overcome the impaired habitat and obstruction from dams, and to allow harvest in the Columbia River Basin and ocean fisheries; unhealthy fish do not survive.
		The objective:
		Regular exams at each hatchery provides information necessary to manipulate the environmental/cultural conditions to maintain healthy fish and to avoid losses due to disease. We also provide technical and certification/diagnostic services to tribal, federal, state, and private biologists to improve health and conserve fish resources in the NW.
		The method:
		The Lower Columbia River Fish Health Ctr. uses veterinary technology to monitor health

	Eagle Creek NFH Winter Steelhead Hatchery and Genetic Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	National Oceanic and Atmospheric Administration, Fisheries	
Accomplishments		
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	6	
Number of other Recovery Plan tasks implemented for T&E populations	9	
Number of Fishery Management Plan production tasks implemented (PART)	1	
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1	
Number of applied aquatic scientific and technologic tools shared with partners.	1	
Number of techniques and culture technology tools developed.	1	
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2	
		and prevent disease in 5 salmon species, lamprey, steelhead and sturgeon. In FY2006, we conducted 220 exams on over 7000 fish at the hatcheries to monitor, inspect and certify the health of 16,500 adult fish and over 35 million juveniles.
		Further description:
		The fish at 6 National Fish Hatcheries and Abernathy Fish Technical Ctr. are regularly examined throughout their life cycle to ensure that healthy fish, meeting the requirements of National, State, and Tribal Fish Health Policies, are produced and released. The fish from these hatcheries are critical to help overcome the impaired habitat and obstruction from dams, and to allow harvest in the Columbia River Basin and ocean fisheries; unhealthy fish do not survive. The Lower Columbia River Fish Health Ctr. uses veterinary technology to monitor health and prevent disease in 5 salmon species, lamprey, steelhead and sturgeon. Regular exams at each hatchery provides information necessary to manipulate the environmental/cultural conditions to maintain healthy fish and to avoid losses due to disease. In FY2006, we conducted 220 exams on over 7000 fish at the hatcheries to monitor, inspect and certify the health of 16,500 adult fish and over 35 million juveniles. We also provided technical assistance for tribal, federal, and state biologists and certification/diagnostic services to private aquaculture facilities, all to conserve aquatic resources through improved fish health. Mitchell Act funding from NOAA helps support this work.

13231-A-007 - [National Wild Fish Health Survey](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>Surveyed over 1500 wild fish from 21 watersheds in WA, OR, ID and the Columbia River to evaluate disease and to prevent spread of aquatic pathogens for improved aquatic ecosystem management.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Initiated by Congress in 1997 because wild fish populations were being decimated by disease, the National Wild Fish Survey gathers health information for wild fish to ascertain the extent of disease problems and ways to manage disease in the wild.</p> <p>The problem:</p> <p>Disease disables and kills wild fish. A limited knowledge of disease sources and their environmental inducers inhibits better management of habitat problems for wild fish.</p> <p>The objective:</p> <p>The 9 National Fish Health Ctrs undertook this project to survey the health of wild fish and to make this information available to federal, state, and tribal fishery managers. Information is used to improve fisheries management and monitor specific populations. The national database (http://wildfishsurvey@fws.gov) is available for public use.</p> <p>The method:</p> <p>In FY06, the Lower Columbia River FHC examined over 1500 wild fish from 21 watersheds in WA, OR, ID and the Columbia River. We tested for 13 pathogens (virus, bacteria, parasites) using state-of-the-art</p>
Expended	\$64977	
Objective	Facilitate management of aquatic habitats on national and regional scales.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Wind River summer run steelhead	
Plans	<p>National Wild Fish Health Survey</p> <p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Yakima Subbasin Plan</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	<p>Confederated Tribes of The Warm Springs</p> <p>Oregon Department of Fish and Wildlife</p> <p>U.S. Geological Survey</p>	

(\$5000)
 Washington
 Department of Fish and
 Wildlife
 Yakama Indian Nation
 (\$900)

technology to confirm presence/absence of disease in freshwater and seagoing fish.

Further description:

The National Wild Fish Health Survey was initiated by Congress in 1997 because wild fish populations were being decimated by disease and there was little information available on the extent of the problem and ways to manage disease in the wild. The 9 National Fish Health Ctrs undertook this project to survey the health of wild fish and to make this information available to federal, state, and tribal fishery managers. This year, the Lower Columbia River Fish Health Ctr, in cooperation with the Yakama Nation, extensively sampled over 10 fish species in Drano Lake, a popular fishing lake that also serves as nursery habitat for Chinook salmon, a resting area for salmonid adults migrating up the Columbia River and the inlet/outlet for the Little White Salmon Hatchery fish. In anticipation of Condit Dam removal, fish in the White Salmon River were sampled for future health comparisons. Information from the wild fish health surveys are used by state/federal agencies for Ecosystem Diagnosis models for improving aquatic resource management and by the various cooperators for monitoring specific populations of fish. The national database, a repository of all survey information, is available for managerial and public use.

Accomplishments

Number of population assessments completed	21
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	1
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	3
Number of applied aquatic scientific and technologic tools shared with partners.	1
Number of techniques and culture technology tools developed.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2

13231-A-008 - [Fish Health Certification for Mitigation of Salmon for John Day Dam](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>The tule fall Chinook salmon, numbering over 15 million, were monitored for Enteric Redmouth disease using DNA technology to track disease progression during the stressful necessity of mass-marking. All fish were certified healthy for release to the Columbia River.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Spring Creek Hatchery provides over 15 million salmon for ocean and river fisheries to mitigate for the John Day Dam which interferes with upriver salmon migration. Besides providing commercial, tribal and recreational fisheries, this tule fall Chinook stock is genetically pure, reared for 100 yrs by the hatchery near their site of origin.</p> <p>The problem:</p> <p>John Day Dam interferes with upriver salmon migration so optimizing the health of fish released from the Spring Creek National Fish Hatchery helps ensure that fish can deal with the dam(n) obstacles.</p> <p>The objective:</p> <p>The Lower Columbia River Fish Health Ctr. ensures that the fish released for mitigation are healthy so that their survival to adulthood is optimized.</p> <p>The method:</p> <p>Modern clinical lab procedures were used to check the fish prior to release, following the Fish Health Policies established by the U.S. Fish & Wildlife Service, the states and tribes.</p>
Expended	\$15538	
Objective	Meet the Service's responsibilities for mitigating fisheries.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	White Salmon River fall run (tule) Chinook	
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Spring Creek NFH Hatchery and Genetic Management Plan</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Comprehensive Hatchery Management Plan - Spring Creek NFH</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Army Corps of	

Engineers

Accomplishments

Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	5
Number of Fishery Management Plan production tasks implemented (PART)	1
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	1
Number of techniques and culture technology tools developed.	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	3

State-of-the-art DNA technology was used to track fish health during the stresses of the legally mandated mass marking.

Further description:

The Spring Creek National Fish Hatchery annually provides over 15 million salmon for ocean and river fisheries to mitigate for the John Day Dam which interferes with upriver salmon migration. Besides providing commercial, tribal, and recreational fisheries, the tule fall Chinook is novel in that it is a genetically pure salmon stock produced by a hatchery at the site from which the fish originated. In FY06, the Lower Columbia River Fish Health Ctr. ensured that the 15,000,000 fish released for mitigation were healthy so that their survival to adulthood would be optimized. For the second year, 100% of the fish were mass-marked, necessitating intensive handling, a problem because water is 90% reused and ERM disease is present. The FHC sampled 360 juvenile fish before, during and after mass marking to ascertain its effects on disease progression. This project is funded by reimbursable money from the Corps of Engineers.

13231-A-010 - [Yakama Indian Nation Fish Health Program](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>The Lower Columbia River Fish Health Ctr. inspected and certified the health of over 1 million salmon for the Yakama Indian Nation's supplementation programs at the Klickitat and Prosser Hatcheries.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Yakama/Klickitat Fisheries Project of the Yakama Nation seeks to rebuild and maintain populations of naturally spawning salmon to replace runs of fish made extinct by habitat changes, harvest, and hydropower.</p> <p>The problem:</p> <p>Habitat changes, harvest and hydropower have reduced runs of salmon to the Klickitat and Yakima Basins, reducing traditional fisheries and cultural activities of the Yakama Nation.</p> <p>The objective:</p> <p>As part of a large program that intends to improve salmon survival, the Lower Columbia Fish Health Ctr. (FHC) plays an integral role by helping minimize the transmission of pathogens to produce healthy coho, fall and spring Chinook salmon, and steelhead for release into the Yakima and Klickitat Basins.</p> <p>The method:</p> <p>The FHC uses up-to-date technology to examine the health of fish coming into and being released from the Yakiman and Klickitat Basins. Along with the Prosser Hatchery and its acclimation sites, the FHC recently took on the fish health care of the Klickitat Hatchery, a new acquisition for the Yakama Nation.</p>			
Expended	\$71142				
Objective	Provide technical assistance to Tribes.				
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)				
Primary Benefited Population	Yakima River Summer/Fall-Run Chinook Salmon				
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Yakima Subbasin Plan</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>				
Keyword	Fish Health				
Need Number	N-002				
Partners	Yakama Indian Nation				
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)</td> <td>1</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>2</td> </tr> </table>			Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1	Number of other Recovery Plan tasks implemented for T&E populations
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1				
Number of other Recovery Plan tasks implemented for T&E populations	2				

Number of Fishery Management Plan production tasks implemented (PART)	2	<p>Further description:</p> <p>The FHC visits the Prosser Hatchery at least 20 times per year to monitor fish health and to ensure that proper nutrition and disease management are maintained. Beginning in July, the same protocols are being followed at the Yakama's latest acquisition, the Klickitat Hatchery. For the Lower Yakama supplementation efforts in FY06, we examined the health of 9 stocks of salmon at the Prosser and Klickitat Hatcheries and 2 stocks of salmon at 3 acclimation sites. The wild steelhead kelts are also examined for whirling disease when needed. The Lower Columbia FHC and the Olympia FHC (for Yakama's CleElum Program) sign an annual MOU with the Yakama Nation who funds these programs.</p>
Number of other Fishery Management Plan tasks implemented for populations of management concern.	3	
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	5	
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1	

13231-A-012 - [Ecological Interactions of Wild and Hatchery Fish in the Warm Springs and Deschutes River System](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>Measured health of wild Chinook salmon and other native fish from the Warm Springs River and Shitike Creek. Fish health testing shows that wild and hatchery salmon carry the same pathogens, an indication of their identical genetic origins, similar ocean destinations and food sources. Additional field sampling and testing of other native species is ongoing. DNA technology is used for disease detection and to prevent the spread of microbial aquatic nuisance species that cause disease.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Warm Springs National Hatchery annually releases 750,000 fish into the Deschutes River system which contains wild Chinook salmon, steelhead and endangered bull trout. It is important to ensure that both the wild and hatchery fish cohabit without adverse consequences, a goal of the Confederated Tribes of the Warm Springs.</p> <p>The problem:</p> <p>Interactions of wild and hatchery fish can result in disease transmission.</p> <p>The objective:</p> <p>To increase fish survival and to prevent disease transmission between hatchery and wild fish. While the common myth states that hatchery fish transmit disease to wild fish, the converse can be true and pathogens of native fish may be transmitted through the river water to the captive hatchery fish. This study examines both hatchery and wild fish</p>
Expended	\$9731	
Objective	Facilitate management of aquatic habitats on national and regional scales.	
Primary Benefited Species	Bull trout (Salvelinus confluentus)	
Primary Benefited Population	Lower Deschutes River core area Bull Trout	
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>National Wild Fish Health Survey</p> <p>Warm Springs Hatchery and Genetic Management Plan (draft)</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	Confederated Tribes of The Warm Springs	

U.S. Geological
Survey, Columbia River
Research Lab

Accomplishments

Number of population assessments completed	2
Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	3
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	2
Number of consultations conducted to support Tribal fish & wildlife conservation.	1
Number of techniques and culture technology tools developed.	1
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	3

The method:

Since the inception of the hatchery, its fish have been subjected to intensive health exams and management by the Lower Columbia River Fish Health Ctr. To address issues of disease transmission between hatchery and wild fish in FY06, wild fish were examined for disease pathogens using DNA technology and standard methodology.

Further description:

Interactions of wild and hatchery fish can result in disease transmission. The Warm Springs National Hatchery annually releases 750,000 fish into the Deschutes River system which contains wild Chinook salmon, steelhead and endangered bull trout. Since the inception of the hatchery, its fish have been subjected to intensive health exams and management by the Lower Columbia River Fish Health Ctr. This is to increase fish survival and to prevent disease transmission to the wild fish. Conversely, the pathogens of native fish can be transmitted through the river water to the captive hatchery fish. To address issues of disease transmission between hatchery and wild fish in FY06, wild fish were examined for disease pathogens. Clinical testing shows that wild and hatchery salmon carry the same pathogens, an indication of their identical genetic origins, similar ocean destinations and food sources. Additional field sampling and testing of other native species is ongoing. DNA technology is used for disease detection and to prevent the spread of microbial aquatic nuisance species that cause disease. This technology is also being tested to determine whether non-lethal sampling methods can be used to detect infections. FONS# 2000-003.

13231-A-014 - [Investigational New Animal Drug \(INAD\) program and its use at Columbia River Natl. Fish Hatcheries](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>Chemotherapeutants prevented or controlled disease outbreaks in five lots of salmonids at three hatcheries, allowing successful release of healthy salmon for tribal supplementation and mitigation programs.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Bacterial kidney disease, coldwater disease and bacterial gill disease can cause serious mortalities in fish. Studies investigating the judicious use of antibiotics for disease control are used to provide validation for safe use, as required by the Food and Drug Administration.</p> <p>The problem:</p> <p>There is a lack of studies verifying the safe and proper use of chemotherapeutants for treating disease in aquaculture facilities.</p> <p>The objective:</p> <p>When disease outbreaks occur at a hatchery, the Lower Columbia River Fish Health Ctr. may recommend treatment with antibiotic under controlled conditions. This is to enhance drug application and determine its efficacy and safety in controlling disease.</p> <p>The method:</p> <p>Diagnosis of furunculosis in the coho at one hatchery necessitated a timely intervention with oxytetracycline medicated feed. At two hatcheries, erythromycin is used to control bacterial kidney disease. Personnel monitor the drug studies and forward the information to the National INAD Office to help garner drug</p>
Expended	\$10000	
Objective	Minimize range expansion and population growth of established aquatic nuisance species.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Wild Warm Springs River Spring Chinook	
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Warm Springs National Fish Hatchery Assessments and Recommendations Final Report</p> <p>Little White NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p> <p>Yakima Subbasin Plan</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	<p>Confederated Tribes of the Umatilla Indian Reservation</p> <p>Yakama Indian Nation</p>	
Accomplishments		

Number of other Recovery Plan tasks implemented for T&E populations	1	<p>approval by FDA.</p> <p>Further description:</p> <p>While antibiotics can help reduce disease, their use can create drug resistance. Towards that issue, the Lower Columbia River FHC is doing a long-term study that looks at reducing the use while maintaining the current survival benefits provided to fish. Personnel monitor the drug studies and forward the information to the National INAD Office for the Federal-State Aquaculture Drug Approval Partnership Project to help garner drug approval by FDA. We also provide fish health /therapeutic services for tribal, federal, and state biologists.</p>
Number of Fishery Management Plan production tasks implemented (PART)	1	
Number of other Fishery Management Plan tasks implemented for populations of management concern.	2	
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	2	
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2	

13231-A-015 - [Wild Fish Health Information Management](#)

Facility	Lower Columbia River Fish Health Center
Expended	\$38089
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)
Primary Benefited Population	Wind River summer run steelhead
Plans	National Wild Fish Health Survey 1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin. Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)
Keyword	Management
Need Number	N-002
Partners	

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	3
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species	1

Accomplishment Summary

Information on over 20 wild fish species in WA ,OR and ID has been inputted into the National Wild Fish Health Survey Database for use in fish management by states, federal, tribal and private entities. The Fish Health Ctr. helped assess the spread of Whirling Disease in the Clackamas watershed and in cooperation with researchers at Oregon State University, published a paper detailing the dissemination of the parasite. Other information is being used for management of fisheries in OR and WA.

Description

The importance to the Resource:

Data from wild fish health exams is used to provide information to help guide management decisions by the states, federal and tribal entities.

The problem:

The Lower Columbia River Fish Health Ctr. has collected over 13,500 wild/native fish for health assessment as mandated by the National Wild Fish Health Survey Initiative.

The objective:

To expedite completion of lab assays of microbial aquatic nuisance species, like the parasite causing Whirling Disease.

The method:

Using state-of-the-art technology for detection of DNA and standard lab assays, a backlog of fish samples were processed and the information entered into the National Wild Fish Health Survey database. This information is being used by state agencies and universities

(PART)		
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1	
Number of applied aquatic scientific and technologic tools shared with partners.	1	
		<p>for management planning.</p> <p>Further description:</p> <p>The Lower Columbia River Fish Health Ctr. has collected over 13,500 wild/native fish for health assessment as mandated by the National Wild Fish Health Survey Initiative. Data from wild fish health exams is used to provide information to help guide management decisions by the states, federal and tribal entities. The Fish Health Ctr. was able to expedite completion of lab assays of microbial aquatic nuisance species, like the parasite causing Whirling Disease. The Fish Health Ctr. helped assess the spread of Whirling Disease in the Clackamas watershed and in cooperation with researchers at Oregon State University, published a paper detailing the dissemination of the parasite. Other information has and will be used in ecosystem diagnosis modeling to determine how to best manage fisheries in the Wind River, White Salmon and Klickitat Watersheds. This is FONS project 13231-2000-005, funded by the Columbia Basin Salmon Initiative.</p>

13231-A-016 - [DNA Technology to Improve Hatchery Practices and Reduce Disease](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>New instrumentation allows rapid disease detection through analysis of DNA. This helps determine how to improve hatchery practices to reduce disease and save 1000's of fish.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>A new DNA technology called quantitative polymerase chain reaction (QPCR) can detect very low levels of disease in eggs, water and young fish. The QPCR instrumentation is used by the Lower Columbia River Fish Health Ctr. to help detect routes of disease, allowing hatcheries to improve or modify practices.</p> <p>The problem:</p> <p>Bacterial kidney disease kills thousands of salmon every year, resulting in expensive efforts to reduce this disease. The drug erythromycin is used to prevent this disease and improve survival but this has its risks and deducing where disease starts might reduce of this antibiotic.</p> <p>The objective:</p> <p>Track points of disease dissemination at the hatchery to ascertain how to best control disease so that antibiotic use can be reduced or eliminated.</p> <p>The method:</p> <p>The QPCR allows studies to determine routes of disease transmission. For instance, the Warms Springs NFH maintains the genetics and environmental integrity of the native wild salmon by identifying their fish with a tiny snout tag which may inadvertently cause localized</p>
Expended	\$30471	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Wild Warm Springs River Spring Chinook	
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Warm Springs Hatchery and Genetic Management Plan (draft)</p> <p>National Wild Fish Health Survey</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Fish Technology	
Need Number	N-002	
Partners	Confederated Tribes of The Warm Springs	
Accomplishments		
Number of other Recovery Plan tasks	4	

implemented for T&E populations		infections.
Number of techniques and culture technology tools developed.	1	Further description:
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1	Bacterial kidney disease kills thousands of salmon every year, resulting in expensive efforts to reduce this disease. A new DNA technology called quantitative polymerase chain reaction (QPCR) can detect very low levels of disease in eggs, water and young fish, something not possible by the standard methodologies. The QPCR instrumentation is used by the Lower Columbia River Fish Health Ctr. to help detect routes of disease, allowing hatcheries to improve or modify practices. For instance, the Warms Springs NFH maintains the genetics and environmental integrity of the native wild salmon by identifying their fish with a tiny snout tag which may inadvertently cause localized infections. The QPCR will allow studies to determine whether this is a route of disease transmission. This is important as it could mean a reduction in use of erythromycin, a drug currently being used to prevent BKD which is a concern to the Confederated Tribes of the Warm Springs Reservation who help manage the hatchery. This is FONS project 13231-2002-008 funded by the Columbia Basin Salmon Initiative.
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	3	

13231-A-021 - [Eagle Creek Ecological Interactions Study \(2002-005\)](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>Wild fish in the Clackamas/Eagle Creek Basin were sampled for health status by measuring their exposure to 13 pathogens.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>As identified in the Endangered Species Act and Biological Opinions, the fate of fish released from our National Fish Hatcheries and their potential effect on the aquatic community needs to be assessed.</p> <p>Further description:</p> <p>As identified in the Endangered Species Act and Biological Opinions, the fate of fish released from our National Fish Hatcheries and their potential effect on the aquatic community needs to be assessed. In the first year of this study, the Lower Columbia River Fish Health Center has sampled wild fish in the Clackamas/Eagle Creek Basin to determine their exposure to 13 pathogens, including the one causing whirling disease. Along with other techniques, DNA technology is being used for disease detection and to prevent the spread of microbial aquatic nuisance species that cause disease. The health status of wild fish had been non-existent and already, the results from this project has been shared with the Oregon Department of Fish & Wildlife and used for management of hatcheries. (FONS project #13231-2002-005)</p>
Expended	\$9633	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Clackamas River winter run steelhead	
Plans	<p>Eagle Creek NFH Winter Steelhead Hatchery and Genetic Management Plan</p> <p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>National Wild Fish Health Survey</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p>	
Keyword	Fish Health	
Need Number	N-002	

Partners

Oregon Department of
Fish and Wildlife
U. S. Forest Service

Accomplishments

Number of population assessments completed	1
Number of other Recovery Plan tasks implemented for T&E populations	3
Number of Fishery Management Plan production tasks implemented (PART)	1
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of activities conducted to support the management and control of aquatic invasive species	1
Number of technical assistance/coordination activities conducted	1
Number of surveys conducted for aquatic invasive species baseline/trend information	4
Number of applied science and technology tasks implemented as prescribed by Recovery Plans. (PART)	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	3

13231-A-022 - [Ecological Interactions between Hatchery and Wild Fish in the Wind River, WA](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>The interaction, habitat use, and disease status of hatchery salmon and wild steelhead in the Wind River has been done. No fish health problems have been found thus far. According to PIT tag data, the young hatchery salmon that reared naturally in the river in 2005-6 survived and migrated to Bonneville Dam. This year's crop of salmon have a poor survival rate, likely due to the big spring rains and river flush-outs. This information is available for management decisions.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Valuable tribal, sport and commercial fishing is provided by Chinook salmon from Carson National Fish Hatchery on the Wind River in the Columbia River Basin. However, these fish are not native to the river and may interfere with the native-borne steelhead which are a threatened population. Results from this work apply to other NW basins.</p> <p>The problem:</p> <p>Concerns have been raised whether current salmon management practices (leaving some hatchery salmon in the river to spawn outside the hatchery) are limiting the recovery of steelhead. This may have disease and competition implications that could be easily avoided.</p> <p>The objective:</p> <p>Determine if the Carson salmon fry that rear naturally in the Wind River are a source of competition and/or disease for the native steelhead, the original inhabitants of the Wind River in WA.</p>
Expended	\$24083	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Wind River summer run steelhead	
Plans	<p>Carson NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p> <p>National Wild Fish Health Survey</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>Comprehensive Hatchery Management Plan - Carson NFH</p>	
Keyword	Recovery	
Need Number	N-002	
Partners	U. S. Forest Service U.S. Geological Survey,	

Columbia River Research Lab
 (\$12000)
 Underwood
 Conservation District
 Washington
 Department of Fish and
 Wildlife
 Yakama Indian Nation

The method:

The spawning habitat below and above the hatchery has been surveyed to ascertain the interactions, densities, habitat use and disease levels of salmon and steelhead. Salmon fry that have reared naturally in the river have been individually identified by PIT tags so that their survival can be tracked. Young salmon are checked for disease.

Further description:

Valuable tribal, sport and commercial fishing is provided by Chinook salmon from Carson National Fish Hatchery on the Wind River in the Columbia River Basin. However, these fish are not native to the river and may interfere with the native-borne steelhead which are a threatened population. Concerns have been raised whether current salmon management practices (leaving some hatchery salmon in the river to spawn outside the hatchery) are limiting the recovery of steelhead. Good progress has been made in FY06, the third year of this study. The spawning habitat below and above the hatchery has been surveyed by biologists to ascertain the interactions, densities, habitat use and disease levels of salmon and steelhead. Salmon fry that have reared naturally in the river have been individually identified by PIT tags so that their survival can be tracked. This contributes needed information to meet the Biological Opinions and the hatchery's Genetic and Management Plan. Tribal, state and USFWS entities can manage the Wind River to save and protect the native steelhead by minimizing negative interactions while providing highly valued salmon to tribal fisheries, Columbia River and Wind River recreational fisheries. FONS 2002-002

Accomplishments

Number of miles of in-stream habitat assessed	9.0
Number of population assessments completed	1
Number of other Recovery Plan tasks implemented for T&E populations	4
Number of post stocking survival tasks met as prescribed by Fishery Management Plans, for hatchery propagated depleted species (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	2

13231-A-023 - [Supplementation of Chinook Salmon to the Walla Walla Basin](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>The Lower Columbia River Fish Health Center performed disease inspection and certification of 500,000 Chinook salmon to ensure that healthy fish were delivered to the Confederated Tribes of the Umatilla for restoration efforts in the Walla Walla Basin.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Confederated Tribes of the Umatilla Indian Reservation plan to restore Chinook salmon that were originally depleted by environment changes into the Walla Walla Basin.</p> <p>The problem:</p> <p>Because this program involves inter-basin transfers of fish, health officials of Washington and the US Fish & Wildlife Service require that all fish be certified in order to establish healthy, viable stocks able to survive and return to the Walla Walla Basin.</p> <p>The objective:</p> <p>The Little White Salmon National Fish Hatchery is cooperating with the Ringold Hatchery in providing salmon to establish a source of healthy spring Chinook for natural spawning augmentation by the Umatilla Tribe.</p> <p>The method:</p> <p>Using veterinary technology, the Lower Columbia River FHC conducted disease inspections of the adult salmon and health certifications of their progeny to ensure that the fish met the health goals of this restoration project.</p>
Expended	\$2000	
Objective	Provide fish for Tribal resource management.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Umatilla River Spring Chinook	
Plans	<p>Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper)</p> <p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.</p> <p>2000 NMFS FCRPS Biological Opinion - December 21, 2000</p> <p>Little White NFH Spring Chinook Salmon Hatchery and Genetic Management Plan</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	Confederated Tribes of the Umatilla Indian Reservation	

Accomplishments

Recovery Plan production tasks implemented (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	4
Number of Fishery Management Plan production tasks implemented (PART)	1
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

Further description:

In last two years, this program was funded under 1937-xxxx with funds from BPA. In FY06, no funding from BPA

13231-A-028 - [White River Spring Chinook Salmon: Fish Health Care for Endangered Species Recovery Project](#)

Facility	Lower Columbia River Fish Health Center	<p>Accomplishment Summary</p> <p>The 2005 progeny of the endangered White River spring Chinook salmon are successfully rearing in their first year at the Little White Salmon NFH. Fish health, as measured by bi-weekly exams and special tests, show that this stock of salmon is doing well, with only minor incidence of bacterial kidney disease. A MOU with the Grant Co. Public Utility District for the care of these fish was achieved.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The White River spring Chinook salmon are listed as endangered. A scant 14 pairs of spawning adults were noted in past years in this upper Columbia Basin river.</p> <p>The problem:</p> <p>Deteriorating habitat, warm water conditions and dams have contributed to the near demise of this population.</p> <p>The objective:</p> <p>Recover the salmon through the use of a captive broodstock program and rear fish for restoration back into the White River in the upper Wenatchee Basin.</p> <p>The method:</p> <p>Bacterial kidney disease severely limits the viability of this stock in captivity. The Lower Columbia River Fish Health Ctr. is monitoring the stock at the Little White Salmon National Fish Hatchery and providing fish health care in attempts to produce viable smolts that can survive in the White River after their release</p>
Expended	\$7619	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Wenatchee River (UCWEN) spring chinook salmon	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy 2000 NMFS FCRPS Biological Opinion - December 21, 2000 Conservation of Columbia Basin Fish, Final Basinwide Salmon Recovery Strategy, 12/2000 (All H Paper) Wenatchee Subbasin Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	Grant County Public Utility District Washington Department of Fish and Wildlife	

Accomplishments

Number of post-stocking survival tasks met, as prescribed by Recovery plans for hatchery propagated listed species. (PART)	1
Number of other Recovery Plan tasks implemented for T&E populations	1
Number of Fishery Management Plan production tasks implemented (PART)	1
Number of other Fishery Management Plan tasks implemented for populations of management concern.	1
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

from the hatchery.

13330-A-101 - [Fisheries Involvement in Five Dams on the Columbia River](#)

Facility	Mid-columbia River Fisheries Resource Office	<p>Accomplishment Summary</p> <p>Increased survival of ESA-listed salmon at five Columbia River dams by participating in process to implement Habitat Conservation Plan measures including hatchery mitigation and fish passage studies at mainstem dams.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Ensures USFWS Fisheries involvement in the development and implementation of comprehensive fish passage and mitigation programs impacting listed species, tribal trust , and inter jurisdictional fisheries. These programs greatly facilitate recovery efforts targeting ESA-listed native salmonid stocks as well as hatchery produced stocks.</p> <p>The problem:</p> <p>The Columbia River hydrosystem has a demonstrated deleterious effect on survival of fish migrating through the system. These effects are numerous and include delayed migration, mortality at tubines and through concentration of predators below dams.</p> <p>The objective:</p> <p>This project ensures that FWS fisheries expertise is engaged in the development and implementation of fish passage survival improvements & hatchery and habitat mitigation programs associated with the Anadromous Fish Agreements and Habitat Conservation Plans for the Wells, Rocky Reach and Rock Island Hydroelectric Projects.</p> <p>The method:</p> <p>The Project Leader is the FWS's designated</p>
Expended	\$23406	
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.	
Primary Benefited Species	Rainbow trout (Oncorhynchus mykiss)	
Primary Benefited Population	Wenatchee River (UCWEN) population, part of the Upper-Columbia River steelhead ESU.	
Plans	<p>Federal Columbia River Power System 2002 Biological Opinion</p> <p>Priest Rapids Project Salmon and Steelhead Settlement Agreement</p> <p>Wells Dam Anadromous Fish Agreement and Habitat Conservation Plan</p> <p>Rock Island Anadromous Fish Agreement and Habitat Conservation Plan</p> <p>Rocky Reach Anadromous Fish Agreement and Habitat Conservation Plan</p>	
Keyword	Fish Passage	
Need Number	N-002	
Partners	<p>Chelan County Public Utility</p> <p>Douglas County Public</p>	

Utility District
National Marine
Fisheries Service
Washington
Department of Fish and
Wildlife
Yakama Indian Nation

representative on the HCP Coordinating and Hatchery Committees providing oversight on implementation of HCP agreements. The FRO also participates on the PRCC Hatchery and Coordinating Committee's. This work enhances efforts in developing mitigation and fish passage improvements at the Priest Rapids Project

Accomplishments

Number of other Recovery Plan tasks implemented for T&E populations	2
Number of Fishery Management Plan production tasks implemented (PART)	4
Number of other Fishery Management Plan tasks implemented for populations of management concern.	8
Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1

Further description:

This project ensures that FWS fisheries expertise is engaged in the development of fish passage survival improvements & hatchery and habitat mitigation programs associated with the Anadromous Fish Agreements and Habitat Conservation Plans for the Wells, Rocky Reach, Priest Rapids and Rock Island Hydroelectric Projects operated by Douglas, Grant and Chelan County Public Utility Districts. The effort at each of these projects is needed to protect Columbia River salmon, two of which (Upper Columbia River spring Chinook salmon and steelhead) are currently listed under the ESA. Bull trout (a FWS Threatened species) are also present throughout this area. Benefit : Ensures USFWS Fisheries involvement in the development and implementation of comprehensive fish passage and mitigation programs impacting listed species, tribal trust , and inter jurisdictional fisheries.

13330-A-109 - [Recovery of ESA-listed Entiat River Salmonids Through Improved Management Action](#)

Facility	Mid-columbia River Fisheries Resource Office
Expended	\$29695
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Entiat River (UCENT) spring chinook salmon.
Plans	Entiat Hatchery Genetics Management Plan Entiat Subbasin Plan
Keyword	Monitoring and Assessment
Need Number	N-002
Partners	National Oceanic and Atmospheric Administration, Fisheries

Accomplishments

Number of population assessments completed	1
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Accomplishment Summary

Operated a juvenile salmonid trap throughout the year. Population and survival estimates were determined for spring and summer Chinook salmon. Data are now available real-time. This monitoring operation uses methods approved under BPA's Monitoring Strategy for the Upper Columbia Basin.

Description

The importance to the Resource:

The effort will assist the recovery of ESA-listed spring Chinook salmon, steelhead and bull trout inhabiting the Entiat River Basin by gathering previously unknown information about the juvenile life history characteristics and populations of these species in this basin.

The problem:

The status of fish populations are largely unknown due to a lack of consistent monitoring. Funding for such monitoring programs is difficult to secure without partners.

The objective:

The MCRFRO will continue to monitor populations of fish, including ESA-listed species, produced in the Entiat River Basin. The effort assist recovery of ESA-listed spring Chinook salmon, steelhead and bull trout inhabiting the Entiat River Basin by gathering information about the juvenile life history characteristics and populations in this basin.

The method:

A rotray screw trap was operated throughout the year to capture migrating juvenile salmon

and steelhead and other fish following methods approved under BPA's Monitoring Strategy for the Upper Columbia Basin. A portion of captured fish were pit-tagged, generating travel time and survival estimates through the Columbia River corridor.

Further description:

MCRFRO continued the fourth year of an intensive and long term juvenile salmonid monitoring program. The effort will assist the recovery of ESA-listed spring Chinook salmon, steelhead and bull trout inhabiting the Entiat River Basin by gathering previously unknown information about the juvenile life history characteristics and populations of these species in this basin. This information will improve resource management decisions. A rotary screw trap operated nearly continuously, following methods approved under BPA's Monitoring Strategy for the Upper Columbia Basin, throughout the year and was highly successful in capturing a significant number and variety of species. All data is available in real-time and is disseminated widely. A portion of emigrating Chinook , steelhead and bull trout were pit-tagged, generating travel time and survival estimates through the Columbia River corridor. Tissue has been collected from Chinook and steelhead juveniles for genetic analysis. Some captured salmonids have been utilized to construct pathological profiles as part of the National Wild Fish Health Survey. Data collected this past year will be furthered compared to asses any potential impacts between hatchery versus the wild populations.

13330-A-110 - [Entiat River Basin Bull Trout Radio Telemetry Project](#)

Facility	Mid-columbia River Fisheries Resource Office	<p>Accomplishment Summary</p> <p>In FY 2006 we continued to monitor locations and movements of radio tagged adult bull trout in the Entiat River watershed. We also documented bull trout spawning, post-spawning, and over-wintering areas and identified barriers to migrations in the Mad and Entiat Rivers.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Resource managers are hampered by a lack of specific information necessary to make informed decisions reducing impacts to species and habitats. Similarly, specific locations utilized by bull trout in the Entiat Basin had not previously been precisely identified diminishing sufficiency of management plans there.</p> <p>The problem:</p> <p>Information associated with bull trout seasonal distribution and spawning locations are lacking which hampers management decisions leading to the eventual recovery of the bull trout.</p> <p>The objective:</p> <p>The object of this project is to describe the seasonal distribution and spawning locations of bull trout in the Entiat River watershed. Information from this project will improve resource and aquatic species management plans leading to recovery and eventual de-listing of the species.</p> <p>The method:</p> <p>Bull trout in the Entiat River were surgically implanted with radio tags, released, and were tracked to describe seasonal distribution and</p>			
Expended	\$43886				
Objective	Recover fish and other aquatic resource populations protected under the Endangered Species Act.				
Primary Benefited Species	Bull trout (Salvelinus confluentus)				
Primary Benefited Population	Entiat River Bull Trout.				
Plans	Bull Trout Draft Recovery Plan, Chapter 22 Entiat Subbasin Plan				
Keyword	Monitoring and Assessment				
Need Number	N-002				
Partners	Chelan County Public Utility (\$40000) Douglas County Public Utility District (\$40000) U. S. Forest Service (\$2000) Washington Department of Fish and Wildlife				
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of population assessments completed</td> <td>1</td> </tr> <tr> <td>Number of other Recovery Plan tasks implemented for T&E populations</td> <td>3</td> </tr> </table>			Number of population assessments completed	1	Number of other Recovery Plan tasks implemented for T&E populations
Number of population assessments completed	1				
Number of other Recovery Plan tasks implemented for T&E populations	3				

<p>Number of other Fishery Management Plan tasks implemented for populations of management concern.</p>	<p>1</p>	<p>spawning locations. Telemetry data were collected from fixed sites, mobile ground and air surveys. Data are shared with USFS, Mid-Columbia PUD's, WDFW, and USFWS Ecological Services.</p> <p>Further description:</p> <p>Bull trout are listed as threatened under the ESA. Current species and habitat plans are hampered by a lack of specific data regarding the identification of critical habitat, migrations and life history diversity of bull trout. This project initiated in FY 2003, is providing information on migrational corridors and barriers, rearing, spawning and over-wintering locations and genetic makeup of bull trout populations. This information will support designations of critical habitat areas for bull trout and provide information necessary to make better land use management decisions leading to recovery of the species within the Upper Columbia River Bull Trout Recovery Unit. In FY 2006 we continued to monitor movements and locations of bull trout throughout the Entiat Basin. We also conducted bull trout spawning ground surveys in the basin. We also identified migrations and movements into the mainstem Columbia River. Genetic information from tagged bull trout was collected and analyzed by Abernathy Fish Technology Center. This data, in combination with movement data, will provide information necessary to define populations and will be incorporated into the Upper Columbia River Basin bull trout genetic baseline database.</p>
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13295-A-001 - [Fish Health Inspections for adult salmon and steelhead returning to Makah NFH](#)

Facility	Olympia Fish Health Center
Expended	\$32800
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Not specified
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy
Keyword	Fish Health
Need Number	N-002
Partners	

Accomplishments

Number of population assessments completed	3
Number of Fishery Management Plan production tasks implemented (PART)	1

Accomplishment Summary

To prevent the spread of fish diseases at Makah NFH, 650 adult returning salmon and steelhead were tested for fish diseases.

Description

The importance to the Resource:

Fish Health Inspections are necessary to monitor and control viruses, bacteria and parasites that may enter hatcheries through returns of salmon and steelhead adults.

The problem:

Pathogens cause disease and losses of fish if not detected and held in check. Pathogens occur naturally in the wild and anadromous fish populations are constantly exposed.

The objective:

Prevent and reduce the loss of salmon and steelhead essential to meeting Service fishereis goals.

The method:

Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. Inspections of adults are also required if egg transfers are made to other locations.

Further description:

Pathogen inspections of adults are also required by policy and regulation if egg transfers are made to other locations.

13295-A-002 - [Inspect, monitor and treat juvenile salmon and steelhead at Makah NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Prevent excess loss and increase survival of approximately 3,000,000 chinook, coho, and steelhead juvenile fish. All groups were inspected, monitored, and treated to prevent the spread of disease.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Pathogens can cause disease and losses of fish critical to Makah NFH goals if not detected and held in check. Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations.</p> <p>The problem:</p> <p>Pathogens and disease can cause significant losses in hatcheries.</p> <p>The objective:</p> <p>Prevent and reduce pathogens and disease losses at Makah NFH.</p> <p>The method:</p> <p>Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. Treatments and fish cultural modifications will be recommended to minimize losses.</p> <p>Further description:</p> <p>Inspections are also required to transfer fish to other locations. 605 juveniles were tested to determine presence and monitor pathogens in fish populations at Makah NFH. Treatments</p>	
Expended	\$30800		
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.		
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)		
Primary Benefited Population	Not specified		
Plans	Makah NFH Cooperative Agreement U.S. Fish and Wildlife Service National Aquatic Animal Health Policy		
Keyword	Fish Health		
Need Number	N-002		
Partners			
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of Fishery Management Plan production tasks implemented (PART)</td> <td>3</td> </tr> </table>			Number of Fishery Management Plan production tasks implemented (PART)
Number of Fishery Management Plan production tasks implemented (PART)	3		

	and recommended environmental modifications have reduced losses that would have occurred from these pathogens and diseases.
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13295-A-003 - [Disease testing of adult salmon and steelhead at Quinault NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>To prevent the introduction and spread of diseases at Quinault NFH, 959 adult salmon and steelhead were sampled and tested for pathogens.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations. Pathogens cause disease and losses of fish if not detected and held in check.</p> <p>The problem:</p> <p>Pathogens and disease levels in adults can have an impact on resultant eggs and progeny. Anadromous adults are exposed to pathogens while they are in the wild.</p> <p>The objective:</p> <p>Detect critical pathogens in spawning adults and provide risk management information to managers to minimize impacts to hatchery programs.</p> <p>The method:</p> <p>831 adult fish were scientifically tested to determine the presence and magnitude of pathogens to determine the threat of disease. Risk assessments then determine facility and production measures needed to prevent catastrophic losses.</p> <p>Further description:</p> <p>Adult inspections are also required if eggs are to be transferred to other locations.</p>
Expended	\$31500	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Not specified	
Plans	Quinault NFH Cooperative Agreement U.S. Fish and Wildlife Service National Aquatic Animal Health Policy	
Keyword	Fish Health	
Need Number	N-002	
Partners		

13295-A-004 - [Disease testing, monitoring, and treatment of juvenile salmon and steelhead at Quinault NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Prevent loss and increase survival of approximately 2,500,000 Chinook, coho, chum and steelhead juvenile fish by inspecting, monitoring, and treating to prevent the spread of disease.</p> <p>Description</p> <p>The <i>importance</i> to the Resource:</p> <p>Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations. Quinault NFH rears fish to meet those goals.</p> <p>The <i>problem</i>:</p> <p>Pathogens and disease can cause catastrophic losses to hatchery populations if not prevented or held in check. Pathogen exposure can come from adults or free roaming fish in the hatchery water supply.</p> <p>The <i>objective</i>:</p> <p>Prevent and reduce the prevalence and magnitude of pathogens and disease in juveniles at Quinault NFH.</p> <p>The <i>method</i>:</p> <p>Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. Treatments and recommended environmental modifications have reduced losses that would have occurred from these pathogens and diseases.</p> <p>Further description:</p>
Expended	\$32000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy Quinault NFH Cooperative Agreement	
Keyword	Fish Health	
Need Number	N-002	
Partners		

	<p>742 juveniles were tested to determine presence and levels of pathogens in fish populations at Quinault NFH. Inspections are also required for any transfers from this station to other locations.</p>
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13295-A-005 - [Fish Health Inspections of returning adult salmon at Quilcene NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Adult salmon are tested to determine diseases that may be present that will threaten the success of fish production at Quilcene NFH.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations. Quilcene NFH produces fish to meet Service goals. Inspections are critical to determine disease risk to the resource.</p> <p>The problem:</p> <p>Pathogens cause disease and losses of fish if not detected and held in check. Anadromous adults are exposed to pathogens in the wild.</p> <p>The objective:</p> <p>Prevent and reduce pathogen and disease risk to Quilcene NFH</p> <p>The method:</p> <p>Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. 245 adult salmon were tested to determine the presence and numbers of pathogens and threat of disease.</p> <p>Further description:</p> <p>Fish Health Inspections are necessary to monitor and control viruses, bacteria and parasites that may enter hatcheries through returns of salmon adults. Inspections of adults are necessary before transfers of eggs can be made to other locations.</p>
Expended	\$25000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Not specified	
Plans	Hood Canal Salmon Management Plan (Quilcene NFH) U.S. Fish and Wildlife Service National Aquatic Animal Health Policy	
Keyword	Fish Health	
Need Number	N-002	
Partners		

13295-A-006 - [Disease testing, monitoring, and treatment of juvenile salmon at Quilcene NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Juvenile salmon are monitored, tested and treated to prevent losses of over 400,000 production fish in support of management and restoration plans for Hood Canal interjurisdictional fisheries.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations. Fish production at Quilcene NFH supports interjurisdictional fisheries in Canadian fisheries, Puget Sound and Hood Canal. Disease monitoring and control are essential to prevent significant losses to the resource.</p> <p>The problem:</p> <p>Diseases can reduce survival and cause losses to production of salmon. Exposure to pathogens can come from surface water or other vectors.</p> <p>The objective:</p> <p>Prevent and reduce the prevalence and magnitude of pathogens and disease at Quilcene NFH.</p> <p>The method:</p> <p>Scientifically based monitoring and testing can detect diseases and fish can be treated to prevent death and increase survival of populations. 173 juveniles were tested to determine levels of pathogens in fish populations at Quilcene NFH. Treatments and cultural modifications were recommended to reduce losses from disease.</p>
Expended	\$28300	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Not specified	
Plans	Hood Canal Salmon Management Plan (Quilcene NFH) U.S. Fish and Wildlife Service National Aquatic Animal Health Policy	
Keyword	Fish Health	
Need Number	N-002	
Partners		

	<p>Further description:</p> <p>Juvenile inspections are also necessary before transfers or releases may be done.</p>
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13295-A-008 - [Wild Fish Health Survey](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>1598 Wild fish scientifically tested to determine the presence, range and importance of fish diseases in the wild.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Wild fish and the habitats they inhabit are important to the Service and the public. Diseases that may be transmitted by wild fish can cause reductions of populations and may be limiting factors in wild and hatchery populations.</p> <p>The problem:</p> <p>Determining the presence of pathogens in wild populations. Information gaps exist because of the magnitude in numbers of populations and geographic areas to be surveyed.</p> <p>The objective:</p> <p>Sample and test wild populations as opportunities arise with partnerships.</p> <p>The method:</p> <p>Scientifically sound testing provides information for sound management decisions. 1598 juvenile fish from 5 cooperating partners were sampled and tested for diseases at 20 locations representing 9 watersheds</p> <p>Further description:</p> <p>The information gathered was transmitted to the National Wild Fish Health database for access by the public through the Internet.</p>
Expended	\$95950	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	(0) Can Not Assign	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy	
Keyword	Fish Health	
Need Number	N-002	
Partners	Hood Canal Salmon Enhancement Group Northwest Indian Fisheries Commission Olympic National Park Washington Department of Fish and Wildlife Yakama Indian Nation	

13295-A-009 - [Disease testing of adult spring Chinook salmon at Winthrop NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Adult salmon were tested for pathogens to prevent disease and losses to production at Winthrop NFH</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Restoration and supplementation of Pacific salmon is essential to meet Service goals and obligations. Pathogens cause disease and losses of fish if not detected and controlled.</p> <p>The problem:</p> <p>Disease can cause significant losses to Winthrop NFH production and certain diseases can be transmitted from adults to progeny.</p> <p>The objective:</p> <p>Prevent and control pathogens and disease impacts to fish at Winthrop NFH</p> <p>The method:</p> <p>Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. 260 adult salmon were tested to determine the numbers of pathogens and threat of disease.</p> <p>Further description:</p> <p>Adult inspections are also necessary for any transfers of eggs.</p>
Expended	\$30000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Methow River (UCMET) spring chinook salmon.	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy Winthrop National Fish Hatchery Genetics Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Bureau of Reclamation	

13295-A-010 - [Disease testing, monitoring and treatment of juvenile salmon and steelhead at Winthrop NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Juvenile salmon and steelhead are monitored, tested and treated to prevent losses of production of fish in support of management and restoration plans for the Columbia River Basin.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Fish production at Winthrop NFH supports recovery of listed Chinook and steelhead plus coho for mitigation and restoration of interjurisdictional fisheries in the Columbia River, Washington and Oregon.</p> <p>The problem:</p> <p>Diseases can reduce survival and cause losses to production of salmon.</p> <p>The objective:</p> <p>Prevent and reduce pathogen and disease in juveniles at Winthrop NFH.</p> <p>The method:</p> <p>Scientifically based monitoring and testing can detect diseases and fish can be treated to prevent death and increase survival of populations. 330 juveniles were tested for pathogens to determine disease status and proper treatments when necessary.</p> <p>Further description:</p> <p>Juvenile inspections are also necessary before release or transfer of fish.</p>
Expended	\$51000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Methow River (UCMET) spring chinook salmon.	
Plans	<p>U.S. Fish and Wildlife Service National Aquatic Animal Health Policy</p> <p>Winthrop Hatchery Genetics Management Plan (Steelhead)</p> <p>Winthrop National Fish Hatchery Genetics Management Plan</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Bureau of Reclamation	

13295-A-011 - [Disease testing of adult spring Chinook salmon at Entiat NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Adult salmon were tested to prevent disease and losses to production at Entiat NFH</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations. Adult salmon inspections are necessary to monitor and control viruses, bacteria and parasites that may enter hatcheries through returns of salmon adults.</p> <p>The problem:</p> <p>Pathogens cause disease and losses of fish if not detected and held in check.</p> <p>The objective:</p> <p>Prevent and control pathogens and disease at Entiat NFH.</p> <p>The method:</p> <p>Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. 209 adult Spring Chinook salmon were tested to determine the numbers of pathogens and threat of disease.</p> <p>Further description:</p> <p>Adult pathogen inspections are required if eggs are moved from the facility.</p>
Expended	\$25000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy Entiat Hatchery Genetics Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Bureau of Reclamation	

13295-A-012 - [Disease monitoring, testing and treatment of juvenile salmon at Entiat NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Juvenile salmon are monitored, tested and treated to prevent losses of production of fish in support of management and restoration plans for the Columbia River Basin.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Fish production at Entiat NFH supports mitigation and restoration of interjurisdictional fisheries in the Columbia River, Washington and Oregon.</p> <p>The problem:</p> <p>Diseases can reduce survival and cause losses to production of salmon.</p> <p>The objective:</p> <p>Prevent and control pathogens and disease losses in juveniles at Entiat NFH</p> <p>The method:</p> <p>Scientifically based monitoring and testing can detect diseases and fish can be treated to prevent death and increase survival of populations. 247 juveniles were tested for pathogens to determine disease status and proper treatments when necessary.</p> <p>Further description:</p> <p>Juvenile pathogen inspection are necessary if fish are moved or released from the facility.</p>
Expended	\$30000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy Entiat Hatchery Genetics Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Bureau of Reclamation	

13295-A-013 - [Disease testing of adult Chinook salmon at Leavenworth NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Adult salmon were tested to prevent disease and losses to production at Leavenworth NFH.</p> <p>Description</p> <p>The <i>importance</i> to the Resource:</p> <p>Disease can cause serious reduction in survival of fish intended for mitigation projects to restore lost salmon fishery opportunities to the public and Native Americans</p> <p>The <i>problem</i>:</p> <p>Hatcheries built to mitigate for habitat and fishing loss due to construction of Grand Coulee Dam can potentially amplify disease if proper monitoring and elimination of pathogens and disease does not occur.</p> <p>The <i>objective</i>:</p> <p>Monitor and reduce the prevalence of pathogens and disease in hatchery populations</p> <p>The <i>method</i>:</p> <p>Test fish for pathogens, segregate or eliminate high risk eggs from production lots.</p> <p>Further description:</p> <p>Adult salmon inspections are necessary to monitor and control viruses, bacteria and parasites that may enter hatcheries through returns of salmon adults. Restoration and supplementation of Pacific salmon are essential to meet Service goals and obligations. Pathogens cause disease and losses of fish if not detected and held in check. Scientifically based testing is performed to find any diseases that would be a threat to the</p>
Expended	\$48000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy Leavenworth Hatchery Genetics Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Bureau of Reclamation	

	<p>population or would cause losses in production. 600 adult salmon were tested to determine the numbers of pathogens and threat of disease.</p>
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13295-A-014 - [Disease monitoring, testing and treatment of juvenile salmon at Leavenworth NFH](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Juvenile salmon are monitored, tested and treated to prevent losses of production of fish in support of management and restoration plans for the Columbia River Basin.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Disease can cause serious reduction in survival of juvenile fish at mitigation hatcheries intended to restore lost salmon fishery opportunities to the public and Native Americans</p> <p>The problem:</p> <p>Pathogens and disease can cause significant loss of fish being reared at federal hatcheries.</p> <p>The objective:</p> <p>Reduce and prevent the prevalence of pathogens and the loss of fish due to disease.</p> <p>The method:</p> <p>Monitor juveniles for pathogens and disease during the rearing period. Recommend treatments to prevent and control diseases if they appear and present undue risk to the resource.</p> <p>Further description:</p> <p>Fish production at Leavenworth NFH supports recovery of listed Chinook for mitigation and restoration of interjurisdictional fisheries in the Columbia River, Washington and Oregon. Diseases can reduce survival and cause losses to production of salmon. Scientifically</p>
Expended	\$44519	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy Leavenworth Hatchery Genetics Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	U.S. Bureau of Reclamation	

	<p>based monitoring and testing can detect diseases and fish can be treated to prevent death and increase survival of populations. Over 200 representative juveniles were tested for pathogens to determine disease status and proper treatments when necessary.</p>
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13295-A-015 - [Disease testing and monitoring of adult spring Chinook for the Yakama Indian Nation](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Adult salmon were tested to prevent disease and losses to fish at the Yakama Nation Research and Enhancement facility.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Yakama Indian Nation manages the Cle Elum Supplementation and Research Facility (CESRF) for fishery and restoration purposes in the Yakima river system. CESRF also provides research studies comparing hatchery techniques and studies hatchery and wild fish to scientifically determine the benefits and risk of hatchery supplementation.</p> <p>The problem:</p> <p>Water use patterns, passage barriers, and habitat degradation have contributed to declines in spring chinook in the Yakima River. The CESRF facility can potentially have the same problems as many other hatcheries in controlling the prevalence and impact of pathogens and disease on fish reared at the facility</p> <p>The objective:</p> <p>Monitor adults for prevalence and magnitude of critical fish pathogens. Identify high risk adults and eliminate those eggs which are the result of adults with a high pathogen profile and resulting high risk of contracting disease.</p> <p>The method:</p> <p>Test all females and representative males for critical fish pathogens that will affect juvenile survival. Identify high risk egg groups for</p>
Expended	\$30000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Upper Yakima River spring chinook salmon	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy	
Keyword	Fish Health	
Need Number	N-002	
Partners	Yakama Indian Nation	

segregation and/or elimination from the production population.

Further description:

The Yakama Nation is actively trapping and enhancing wild spring Chinook salmon within the Yakima River. Adult testing is necessary to monitor and control viruses, bacteria and parasites that may enter facilities through returns of salmon adults. Pathogens cause disease and losses of fish if not detected and held in check. Restoration and supplementation of Pacific salmon in the Yakima and Columbia River are essential to meet Service goals and obligations. The Yakama Tribe requested assistance and the Service responded to meet Tribal Trust and resource responsibilities. Scientifically based testing is performed to find any diseases that would be a threat to the population or would cause losses in production. 310 adults were tested to determine numbers of pathogens and threat of disease.

13295-A-016 - [Disease testing, monitoring and treatments of juvenile spring Chinook salmon for the Yakama Nation](#)

Facility	Olympia Fish Health Center
Expended	\$42702
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	Upper Yakima River spring chinook salmon
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy
Keyword	Fish Health
Need Number	N-002
Partners	Yakama Indian Nation

Accomplishments

Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	2
Number of training session to support Tribal fish & wildlife conservation.	2

Accomplishment Summary

Juvenile salmon were tested, monitored, and treated to prevent loss of production at the Yakama Nation Cle Elum Facility and 3 additional satellite release facilities.

Description

The importance to the Resource:

Disease can have an devastating impact on juvenile populatons before and after release from hatcheries. Losses in the hatchery and potential spread of disease in the wild can cause significant losses to fish resources.

The problem:

Hatchery rearing may amplify pathogens and disease. Disease may be caused by exposure to surface waters and the mere fact that fish are more crowded in hatcheries.

The objective:

Reduce the prevalence, magnitude and impact of pathogens and disease in fish reared at CESRF.

The method:

Monitor hatchery populations for prevalence and magnitude of critical pathogens. If necessary, recommend treatments to prevent and reduce pathogens and disease at the facility.

Further description:

Fish production at the Cle Elum Research Hatchery supports recovery of wild spring Chinook salmon for interjurisdictional fisheries

in the Columbia River, Washington and Oregon. Diseases can reduce survival and cause losses to production of salmon. Scientifically based monitoring and testing can detect diseases and fish can be treated to prevent death and increase survival of populations. Over 700 representative juveniles were tested to determine pathogens and severity of disease. This information is used for determining the need for treatments and to contribute to efforts by the Tribe to determine the effect of disease status on out migration and adult returns.

13295-A-017 - [Disease monitoring of adult coho for the Yakama Nation](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Adult coho salmon were scientifically tested to monitor and prevent the spread of diseases and losses to the Yakama coho enhancement project</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Yakama Indian Nation is trying to re-introduce extinct coho to the mid-Columbia River.</p> <p>The problem:</p> <p>Returning adult coho may have critical pathogens that will impact the survival of progeny. Eggs from the adults spawned are destined to other facilities and areas for further hatching and rearing. Eggs can't be moved to these facilities without proper testing and clearance to avoid undue pathogen transfers.</p> <p>The objective:</p> <p>Reduce the risk of transfer of critical pathogens to eggs and subsequent progeny at other facilities.</p> <p>The method:</p> <p>Test representative adults to determine the prevalence and magnitude of critical fish pathogens.</p> <p>Further description:</p> <p>797 adult coho salmon were sampled and tested for pathogens to assist the Yakama Nation and prevent the spread of diseases in the Columbia River Basin. Test information was used to determine the risk of transfer of</p>
Expended	\$54001	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Not specified	
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy	
Keyword	Fish Health	
Need Number	N-002	
Partners	Bonneville Power Administration Yakama Indian Nation	

	<p>eggs from these adults to various rearing sites within the basin. Information was essential to obtain Co-manager and State permits and cooperation for restoration and enhancement projects by the Tribe.</p>
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13295-A-018 - [Monitoring and Control of Diseases for Yakama Nation Juvenile Coho Salmon](#)

Facility	Olympia Fish Health Center
Expended	\$36858
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)
Primary Benefited Population	Not specified
Plans	U.S. Fish and Wildlife Service National Aquatic Animal Health Policy
Keyword	Fish Health
Need Number	N-002
Partners	Bonneville Power Administration Yakama Indian Nation

Accomplishments

Number of technical assistance requests fulfilled to support Tribal fish and wildlife conservation	1
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Accomplishment Summary

Juvenile coho were monitored and tested to prevent disease and losses during rearing for the Yakama Nation

Description

The importance to the Resource:

Restoration of mid-Columbia coho will add to fishery opportunities to Native Americans and the general public.

The problem:

Coho juveniles are reared at various hatcheries (Leavenworth NFH and Winthrop NFH) and are subject to transfers from other hatcheries outside of the Leavenworth Complex. Preventing the spread and amplification of pathogens and disease is critical to the survival and ultimate success of the project.

The objective:

Prevent and reduce the impact of pathogens and disease on fish reared at the various hatcheries within the Leavenworth National Fish Hatchery Complex.

The method:

Monitor and test representative juveniles for the presence and magnitude of critical pathogens and disease. Recommend treatments and prevent the transfer of high risk fish within the basin.

Further description:

Juvenile coho salmon are reared at the Leavenworth NFH complex for the Yakama Nation's project to restore coho to the upper

	<p>Columbia River basin. Fish health monitoring and testing of 244 fish sampled during the rearing period provided pathogen and disease information used for necessary risk assessment or treatments prior to transfers or releases of this population.</p>
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13295-A-021 - [The effect of hatchery production on health of wild fish in the Icicle Creek and Wenatchee River](#)

Facility	Olympia Fish Health Center	<p>Accomplishment Summary</p> <p>Wild salmon and steelhead/rainbow trout were collected and tested in areas that would be influenced by Leavenworth NFH. 60 fish have been collected and tested from areas above the hatchery.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Pathogen and disease interaction between wild and hatchery fish is not well understood, but is suspected to have impacts on each population dependent on situational specific parameters.</p> <p>The problem:</p> <p>Lack of scientific knowledge of prevalence and magnitude of wild fish above and below Leavenworth NFH.</p> <p>The objective:</p> <p>Compare timing of occurrence, prevalence and magnitude of representative pathogens within the Leavenworth NFH with timing of occurrence, prevalence and magnitude of the same pathogens in Icicle Creek.</p> <p>The method:</p> <p>Monitor pathogen prevalence and magnitude in wild populations in Icicle Creek and in hatchery populations.</p> <p>Further description:</p> <p>Fishery management does not know the impact of fish hatcheries on wild populations or vice versa and can't make valid management decisions on wild fish and habitat restoration</p>
Expended	\$23000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)	
Primary Benefited Population	Wenatchee River (UCWEN) spring chinook salmon	
Plans	Leavenworth Hatchery Genetics Management Plan	
Keyword	Fish Health	
Need Number	N-002	
Partners	Leavenworth National Fish Hatchery Mid-Columbia Fisheries Resource Office	

efforts within the Icicle Creek drainage. Wild and hatchery fish survival is dependent on levels of disease within each population and there is likely an interaction and exposure of pathogens between each population. In cooperation with the National Wild Fish Health Survey, Leavenworth NFH and the Mid-Columbia Fisheries Resource Office, standardized tests will be performed on wild salmon captured above and below the hatchery. These test results will be compared to fish disease profiles of salmon in the hatchery to determine if significant interaction does occur.

13295-A-023 - [Introduction to Fish Health - Course coordination and instruction](#)

Facility	Olympia Fish Health Center
Expended	\$3500
Objective	Provide employees with opportunities to maintain competencies in the expanding knowledge and technologies needed to improve opportunities for professional achievement, advancement and recognition.
Primary Benefited Species	(0) Can Not Assign
Primary Benefited Population	Not specified
Plans	
Keyword	Outreach
Need Number	N-002
Partners	Abernathy Fish Technology Center Northwest Indian Fisheries Commission USFWS National Conservation Training Center Washington Department of Fish and Wildlife

Accomplishments

Number of applied aquatic scientific and technologic tools shared with partners.	1
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Accomplishment Summary

Training and outreach for 18 fisheries professionals from various agencies was completed which gave them basic knowledge of fish diseases, diagnosis, and control.

Description

The importance to the Resource:

Training in basic fish health practices helps hatcheries and fisheries professionals identify and control diseases that are critical to conservation and survival of fishery resources.

The problem:

Basic fish health information needs to get to workers in fisheries stations.

The objective:

Deliver basic fish health information to practitioners and workers in the field of fisheries.

The method:

Deliver a one week course in "Introduction to Fish Health"

Further description:

"Introduction to Fish Health" is a one week course completed in cooperation with the National Conservation Training Center (NCTC) as course FIS 1150. OFHC utilizes local fish health experts from our staff, the Northwest Indian Fisheries Commission, and Abernathy Technology Center to inform and train other fisheries and hatchery staff on the prevention, diagnosis and control of fish diseases found in the Western Region of the USFWS.

13245-A-011 - [Genetic Analyses of coho salmon populations in Hood Canal](#)

Facility	Quilcene National Fish Hatchery	<p>Accomplishment Summary</p> <p>Quilcene NFH funded the Genetic Analyses of Coho Salmon Populations in Hood Canal with the Abernathy Fish Technology Center Genetics Lab. Genetic analyses of 11 hatchery stocks and 17 natural populations are being evaluated. The genetic relationship of the Quilcene NFH stock relative to natural populations within Hood Canal will be determined. This effort provides information to help cooperators decide on objectives and broodstock sources for any new or modified coho programs in Hood Canal.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The Hatchery Scientific Review Group (HSRG) has recommended that the current coho stock at the Quilcene NFH be replaced with a new broodstock derived from an existing natural population in Hood Canal, Big Beef Creek. These fish were chosen in part to reduce the genetic risks of straying of returning hatchery-origin adults from Port Gamble Bay.</p> <p>The problem:</p> <p>Hood Canal comanagers felt that the HSRG lacked enough scientific information to make the recommendations for coho stocks used for on station release and tribal net pens. The Service is attempting to secure data to scientifically evaluate those recommendations and then act on them.</p> <p>The objective:</p> <p>Determine the genetic relationship of the Quilcene NFH stock relative to natural populations within Hood Canal. The co-managers can use this genetic information to</p>
Expended	\$34600	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Puget Sound/Strait of Georgia ESU	
Plans	<p>Puget Sound and Coastal Washington Hatchery Reform Project</p> <p>Pacific Region Fisheries Outreach Action Plan</p>	
Keyword	Genetics	
Need Number	N-002	
Partners	<p>Jamestown S'Klallam tribe</p> <p>Lower Elwha S'Klallam tribe</p> <p>NOAA Fisheries (\$30000)</p> <p>Port Gamble S'Klallam tribe</p> <p>Skokomish Tribe</p> <p>Suquamish tribe</p> <p>Washington Department of Fish and Wildlife</p>	

Accomplishments

Number of other Fishery Management Plan tasks implemented for populations of management concern.	4
Number of applied science and technology tasks implemented as prescribed by Fishery Management Plans. (PART)	1

make a sound scientific decision on the HSRG recommendations for Quilcene NFH

The method:

The Genetics Lab at Abernathy Fish Technology Center will use DNA markers to genetically compare 11 hatchery and 17 natural populations of coho salmon in Hood Canal. Out-of-basin populations will serve as genetic "outgroups" for quantifying the genetic similarity of hatchery and natural populations within Hood Canal.

Further description:

The comanagers felt that the HSRG lacked enough scientific information to make the recommendations they did. Quilcene NFH and their partners will use genetic sampling and analyses to make a sound scientific decision on the HSRG recommendations.

The USFWS will work closely with NOAA-Fisheries Northwest Fisheries Science Center to combine the data generated in this study with an extensive coho salmon baseline.

Note that the HSRG recommendations are not a recognized management plan.

13245-A-012 - [Fish Feed Quality Control](#)

Facility	Quilcene National Fish Hatchery	<p>Accomplishment Summary</p> <p>Quilcene National Fish Hatchery funded the Fish Feed Quality Control Program for fiscal year 2006 out of station operation funds. This enabled the Abernathy Fish Technology Center to perform monitoring of the fish feed quality that was being used at Quilcene NFH</p> <p>Description</p> <p>The importance to the Resource:</p> <p>The U.S. Fish & Wildlife Service facility Abernathy Fish Technology Center performs Fish Feed Quality Control to monitor the quality of commercial fish feeds used at Region one National Fish Hatcheries. The information is critical to maintaining the quality and survivability of fish produced by Region One national fish hatcheries.</p> <p>The problem:</p> <p>Commercial fish feed quality needs to be monitored for contract specified concentrations of protein, fat, lipids, ash, moisture and vitamins. This is important to maintain fish health and growth of fish raised at Quilcene National Fish Hatchery.</p> <p>The objective:</p> <p>The objective is to determine if the commercial fish feeds used at Quilcene NFH are within approved specification for protein, fat, ash, moisture and vitamins for USFWS feed contracts.</p> <p>The method:</p> <p>Fish feed samples were taken by employees at Quilcene NFH and sent to Abernathy FTC for analyses.</p>
Expended	\$8000	
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.	
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)	
Primary Benefited Population	Puget Sound/Strait of Georgia ESU	
Plans	<p>Hood Canal Salmon Management Plan (Quilcene NFH)</p> <p>Pacific Region Fisheries Outreach Action Plan</p> <p>Puget Sound Salmon Management Plan</p>	
Keyword	Fish Health	
Need Number	N-002	
Partners	<p>Jamestown S'Klallam tribe</p> <p>Lower Elwha S'Klallam tribe</p> <p>Port Gamble S'Klallam tribe</p> <p>Skokomish Tribe</p> <p>Suquamish tribe</p>	
Accomplishments		

Number of Fishery Management Plan production tasks implemented (PART)	6	Further description:
Number of other Fishery Management Plan tasks implemented for populations of management concern.	9	
Number of applied aquatic scientific and technologic tools shared with partners.	1	
		<p>If there was a problem with raising fish at one of the Region One National Fish Hatcheries that could be linked to the fish feed, additional investigation of the problem would be conducted by a Nutritionist at Abernathy FTC. This person also conducts spot checks at fish feed companies for comparison of results from field station hatcheries.</p>

13250-A-022 - [Fish Feed Quality Control \(FFQC\) Program](#)

Facility	Quinault National Fish Hatchery	<p>Accomplishment Summary</p> <p>Abernathy FTC's Applied Research Program in Nutrition operated a Fish Feed Quality Control (FFQC) Program to monitor the quality of commercial fish feeds used at the Quinault NFH. The information provided by the Center was critical to both contracting negotiations and to the quality and survivability of fish produced by the Quinault NFH. The Nutrition Program also provided technical assistance for fish feed issues.</p> <p>Description</p> <p>The importance to the Resource:</p> <p>Abernathy FTC's Applied Research Program in Nutrition operates a Fish Feed Quality Control (FFQC) Program to monitor the quality of commercial fish feeds used at Region 1 NFHs. The information provided by the Center is critical to both contracting negotiations and to the quality and survivability of fish produced by the Pacific Region's NFHs.</p> <p>The problem:</p> <p>Commercial fish feeds do not always contain the specified concentrations of protein, fat, ash, moisture, and vitamins. Such diets can result in poor growth and health when fed to NFH - reared fish.</p> <p>The objective:</p> <p>The objective of the FFQC Program is to determine whether commercial feeds fall within approved specifications. An additional objective is to determine the chemical composition and quality (via proximate, rancidity, vitamin and mineral analyses) of commercial feeds. Staff provided feed-related technical assistance to NFHs as well as feed</p>			
Expended	\$4000				
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.				
Primary Benefited Species	Coho salmon or silver salmon (Oncorhynchus kisutch)				
Primary Benefited Population	Not specified				
Plans	Quinault NFH Cooperative Agreement				
Keyword	Fish Technology				
Need Number	N-002				
Partners	Quinault Indian Nation				
<p>Accomplishments</p> <table border="1"> <tr> <td>Number of Fishery Management Plan production tasks implemented (PART)</td> <td>6</td> </tr> <tr> <td>Number of applied aquatic scientific and technologic tools shared with partners.</td> <td>1</td> </tr> </table>			Number of Fishery Management Plan production tasks implemented (PART)	6	Number of applied aquatic scientific and technologic tools shared with partners.
Number of Fishery Management Plan production tasks implemented (PART)	6				
Number of applied aquatic scientific and technologic tools shared with partners.	1				

mills.

The method:

In FY06, 2 diets were sent to Abernathy FTC for proximate analyses (feed analyzed for protein, lipid, moisture and ash) that were covered under the FFQC monies from Quinault. A total of 5 diets were analyzed in FY06 at Abernathy FTC for Quinault. Staff provided feed-related technical assistance to NFHs as well as feed mills.

Further description:

In early Spring, increased mortalities were observed in fish fed Skretting Starter feeds at Makah and Quilcene NFHs. Additional testing was done (rancidity, aflatoxins, vitamins) to determine whether the mortalities resulted from a problem with the diets. It was later determined that the problem was related to poor quality soy protein concentrate used in the diets. Skretting has since indicated it will no longer use soy protein in its starter feeds. BioOregon announced that its popular moist fish feed called BioDiet Starter as well as their other moist products would no longer be manufactured as the company was undergoing a merger with Skretting. No other companies are capable of producing a similar high moisture fish feed. BioDiet Starter was particularly popular at Chinook salmon hatcheries as many salmon culturists have observed that this species would accept only a moist feed when the fry begin to feed for the first time. Therefore, AFTC initiated a conference call with representatives of four feed companies to discuss alternative feeds for first-feeding Chinook. Personnel from numerous Region 1 hatcheries participated in the call and had a chance to talk to feed company representatives about alternative feeds.

13255-A-003 - [Study to evaluate release of unfed fry utilizing otolith marking technique.](#)

Facility	Spring Creek National Fish Hatchery
Expended	\$300
Objective	Utilize appropriate scientific and technologic tools in formulating and executing fishery management plans and policies.
Primary Benefited Species	Chinook salmon or king salmon (Oncorhynchus tshawytscha)
Primary Benefited Population	White Salmon River fall run (tule) Chinook
Plans	Spring Creek NFH Hatchery and Genetic Management Plan Comprehensive Hatchery Management Plan - Spring Creek NFH 1999 NMFS Biological Opinion on Artificial Propagation in the Columbia River Basin.
Keyword	Fish Technology
Need Number	N-002
Partners	U.S. Army Corps of Engineers

Accomplishments

Recovery Plan production tasks implemented (PART)	1
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Accomplishment Summary

Collected 2000 otoliths from 3 year and 4 year old returning adult fall Chinook during the 2005 spawning season.. Received results from 2000 otoliths collected from FY2004 return year.

Description

The importance to the Resource:

Unfed fry releases may contribute to achieving escapement goals for the hatchery. During years of low ocean productivity the hatchery may not always achieve it's escapement goal of 7,000 adults. Releasing large numbers of unfed fry in addition to smolts may contribute to returning adults numbers.

The problem:

Historically, Spring Creek National Fish Hatchery would release large numbers of unfed fry or presmolt juveniles. This practice was discontinued during years of low adult return numbers when surplus eggs were not available. The return rate of unfed fry was never fully evaluated to determine the contribution of that action.

The objective:

Three different yearclasses of unfed fry will be marked and recaptured as returning adults to determine survival rate and contribution to escapement goals.

The method:

One million unfed fry will be marked, beginning in 1999 using the technique of otolithography, (thermal marking of otoliths) As returning adults, otliths will be taken and read to determine return and survival rates.

Further description:

The release of unfed fry had been a component of the production program at Spring Creek NFH since 1901, but was discontinued in 1970. Adult return rates began to diminish after termination of the unfed fry program. A study was initiated in 1999 to evaluate the contribution of unfed fry to adult returns to the facility. Unfed fry releases occurred in 1999, 2001 and 2002 as 3 million fry each year were otolith-marked by water temperature manipulation and released unfed. In 2005, otoliths were collected from 1000 3-year old adults and 1000 4-year old adults. Results from broodyear returns from unfed fry to date is 0.021% compared to 0.631% for normal smolt returns for the same year classes. Information from this study will be used for future management decisions when adjusting or modifying production targets and to development techniques for tagging unfed fry . The COE had provided funding for this study up through 2005. Additional funding is needed to evaluate samples collected in 2005 and complete the study.