Endangered Species Act
Federal Columbia River Power System

2010-2013 Implementation Plan

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BONNEVILLE POWER ADMINISTRATION

US Army Corps of Engineers

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BUREAU OF RECLAMATION

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2010-2013 Implementation Plan Overview

In May 2008, NOAA Fisheries issued a Biological Opinion (BiOp) on the operation of the dams that make up the Federal Columbia River Power System (FCRPS). Based on the BiOp, the Action Agencies committed to implementing actions to improve the survival of salmon and steelhead listed under the Endangered Species Act (ESA), including:

- Hydro: the use of spill, surface passage, and other dam improvements, as well as management of water releases from storage reservoirs, to provide better fish survival
- Predator Management: expanded control of birds, fish, and marine mammals that prey on salmon
- Habitat: an extensive, biologically targeted program to restore tributary and estuary habitat
- Hatcheries: implementation of "safety net" hatcheries and reforms to existing hatchery mitigation programs
- Accountability for Results: a system that includes performance standards, research and monitoring, progress reporting, adaptive management, contingencies, and regional collaboration

Throughout the Columbia River basin, tribal, state, local, and federal parties are working in partnership to protect and restore stocks of salmon and steelhead. Thirteen stocks of these fish are listed as threatened or endangered under the Endangered Species Act (ESA). Many parties in the region are working together to protect and enhance important habitats, improve hatchery and harvest practices, and enhance river conditions for migrating fish. Recovering species that have such complex life cycles—that spawn and rear in freshwater rivers but spend most of their lives in the ocean— requires a comprehensive approach.

The federal agencies that manage the system of dams in the basin include the U.S. Army Corps of Engineers, Bureau of Reclamation, and Bonneville Power Administration, collectively known as the Action Agencies. They consult with NOAA Fisheries on dam operation, including activities that improve conditions for fish. Operating the dams for flood control, power production, irrigation, navigation, and other uses affects the flow of the river and water conditions. In addition, the mainstem dams are in the path of salmon and steelhead as they migrate many miles to the ocean to mature and return upriver to spawn in inland streams and tributaries.

In September 2009, the FCRPS BiOp was enhanced through an Adaptive Management Implementation Plan (AMIP, available at http://www.salmonrecovery.gov/Files/BiologicalOpinions/AMIP_09 10 09.pdf), which includes accelerated actions, additional research related to fish status and climate change, and precautionary use of biological triggers and contingency plans in case there is an unexpected, significant fish decline. Recently the AMIP and six new implementation actions were incorporated into NOAA Fisheries' 2010 Supplemental Biological Opinion (available at http://www.salmonrecovery.gov/Files/FCRPS-Suppl-BO.pdf), issued May 20, 2010.

Both the 2008 BiOp and the 2010 Supplemental BiOp are being actively implemented and are collectively referred to as the "BiOp."

To make implementation of the BiOp "reasonably certain to occur," the Action Agencies have done a number of things:

- Administrative Commitments: The Action Agencies have adopted the BiOp's key provisions through formal records of decision. In addition, BPA is including BiOp and Fish Accord commitments in its electric rate case proceedings.
- Staffing and Resources: Each agency has provided dedicated staff and resources for BiOp implementation and regional collaboration.
- Ten-Year Funding Commitments and Partnerships: The Action Agencies have entered into the Columbia Basin Fish Accords with two states and five tribes to promote regional partnerships and "on-the-ground" implementation, as well as an Estuary Memorandum of Agreement with a third state. These historic, ten-year agreements secure funding for the duration of the BiOp and reinforce commitments to attain biological benefits. Partnerships such as these help accomplish "on-the-ground" implementation of actions that are beneficial to listed fish.
- Updated Implementation Plans: Approximately every three years, the agencies update their implementation plans under the BiOp's adaptive management framework, taking into account any new scientific information on fish status, action effectiveness, climate change, etc.

The 2010-2013 Implementation Plan summarizes the significant actions that will be implemented by the Action Agencies from 2010 through 2013 to protect ESA-listed salmon and steelhead affected by the operation of the FCRPS. Work to be performed is summarized in this Implementation Plan and supported by a detailed list of projects. The purposes of the Implementation Plan are to:

- Assign agency responsibility and accountability for implementing specific actions.
- Determine and document strategies, priorities, actions, and timetables.
- Facilitate and measure agency progress toward performance standard and targets.
- Provide a basis for agency management and progress reporting.
- Provide a dynamic framework for adapting actions and achieving results over the period of the Implementation Plan.
- Provide an opportunity for the Regional Implementation Oversight Group (RIOG) and other regional parties to review the Action Agencies' plans and actions.

Consistent with the BiOp, the actions described in this plan are focused on (1) achieving biological performance standards, (2) achieving programmatic performance targets, and (3) addressing factors that limit certain life stages for specific evolutionarily significant units (ESUs) or distinct population segments (DPSs) of salmon and steelhead. The plan is structured around the Reasonable and Prudent Alternative (RPA) table used in the BiOp and

for annual BiOp progress reporting. Although the plan covers a four-year time frame (2010-2013), the Action Agencies will hold regional discussions as results and progress are evaluated through the annual progress reports. If needed, mid-course modifications may be made to implementation actions; these modifications will be detailed in the annual progress reports. Adaptive management will continue to be used to make adjustments to actions based on new scientific information and in response to changing circumstances, to meet biological performance objectives effectively and efficiently.

Near the end of this implementation period, the Action Agencies will complete a comprehensive report evaluating their progress, currently scheduled for June 2013. The results of this evaluation will inform the next implementation period, which will be from 2014 through 2016. (The next Implementation Plan is due December 2013.) The comprehensive report will include an update of the status for each of the interior basin species (including consideration of available information on recruit-per-spawner, lambda, and abundance trends for populations rolled up to the ESU level) to determine whether we are on track or if additional actions and types of actions may be needed to get the ESUs on track by the end of the BiOp period.

Updated Information and Adaptive Management

As noted above, the FCRPS BiOp is premised on adaptive management and accountability for results. The Action Agencies use the best available scientific information to achieve performance standards and make needed adjustments so that actions meet the BiOp goals. This Implementation Plan incorporates the provisions of the AMIP that resulted from review of the 2010 Supplemental BiOp. In addition, the Implementation Plan reflects information arising from 2008 and 2009 research and implementation, summarized below; this confirmed most aspects of BiOp implementation but did result in a few adaptive management changes.

Hydropower actions benefit all listed species. Hydrosystem strategies to provide juvenile and adult survival improvements include water management, dam passage improvements, spill operations, and fish transportation. Specific performance standards (such as 96 percent and 93 percent dam survival for spring and summer migrating juvenile fish, respectively) and metrics guide the priorities for action. For hydropower mitigation, the Action Agencies observed the following in 2008 and 2009:

- Dam modifications and spill/surface passage improvements appear to be on track to achieve the hydrosystem performance standards of 96 and 93 percent average dam survival for spring and summer migrating fish, respectively. New installation and operation in 2008 of surface passage at Lower Monumental and John Day dams are already on track for achievement of hydro performance standards. In 2009 a new surface passage installation was completed at Little Goose Dam, which also is on track for achievement of hydro performance standards.

- Each dam presents unique circumstances and passage routes that must be considered to provide optimum passage and meet performance standards. Increased dam survival is not always associated with increased spill volumes. The relationship between dam survival, spill passage efficiency, and passage delay at individual dams will continue to be a focus in future years.
  - Surface passage structures often pass a greater number of fish with a lesser volume of water than do other passage routes. Surface passage allows migrants to pass at depths where juveniles naturally migrate and oftentimes reduces forebay delay. Snake River surface passage improvements are nearly complete, after which the focus on additional survival improvements in future years will shift toward the lower river dams, particularly McNary, John Day, and The Dalles.
  - Optimizing project operations to provide good passage for juveniles while not impacting adult upstream passage is critical. In previous years, adult passage studies have shown increased fallback and lower escapement rates under higher spill levels at some projects.
- Adult return data continue to confirm that May transportation provides higher adult returns than in-river migration for steelhead, and somewhat higher returns for Chinook. The Action Agencies are continuing to monitor the adult return data to see whether this relationship changes as conditions are improved for in-river migrants.
- Pursuant to court-ordered operations, spill was continued through August 31, 2008, and 2009, regardless of the 300-fish trigger in the BiOp. That trigger would have resulted in spill through August 30 in 2008 if the triggers had been implemented. In 2009, the trigger would have resulted in spill ending on August 2, 11, 15, and 17 at Lower Granite, Little Goose, Lower Monumental, and Ice Harbor, respectively. (The range of dates observed in recent years for this trigger has been August 1 to August 30.) The AMIP and the 2010 Supplemental BiOp confirm the juvenile fish trigger along with a commitment to spill through August 31 in years following very low adult abundance.

The 2010-2013 Implementation Plan takes this information into account.

Highlights: 2010-2013 Hydropower Actions

Some action highlights include:

- Operate projects to provide flows and water quality to improve juvenile and adult fish survival. Specific highlights for 2010-2013 include:
  - A pilot study to develop mid-month forecasts at Hungry Horse and Dworshak dams and examination of Libby Dam water supply forecast procedures with a goal of reducing forecast error.
  - Beginning discussions with BC Hydro regarding a new long-term non-treaty storage agreement.

  - Initiating a dry year study to evaluate potential alternative operations of FCRPS in the 20 percent driest water years.
  - Annual development of Fish Passage Plans and Water Management Plans.
- Modify Columbia and Snake River dams to improve survival and meet performance standards. Specific highlights include:
  - At Bonneville Dam, modifications of the Powerhouse 1 sluiceway to increase the volume of water for this passage system.
  - Construction of a new spill wall at The Dalles Dam to improve fish guidance and survival.
  - New extended flow deflector and avian deterrent arrays to aid juvenile fish survival at John Day Dam.
  - Relocating the juvenile bypass outfall at McNary and Little Goose dams to improve juvenile egress and survival.
  - Lower Monumental Dam juvenile bypass system outfall relocation included in planning options to attain performance standards.
  - Continued testing at selected dams to confirm achievement of hydro performance standards.
- Implement spill and juvenile transportation improvements at Columbia and Snake River dams:
  - Develop and coordinate annual spill and transport operations to improve juvenile and adult survival.
  - Continue operation and maintenance of fish facilities at mainstem projects to maintain biological performance.
- Develop and implement a kelt management plan. Specific actions to implement kelt reconditioning programs and enhance steelhead productivity include:
  - Initiating design and planning for a new juvenile fish facility at Lower Granite Dam, including evaluating alternatives to facilitate collection and transport of kelt.
  - Constructing temporary kelt holding facilities at Lower Granite Dam for collection and transport of kelt pending completion of a new juvenile facility.
- Work with the University of Washington Climate Impact Group to develop climate change streamflow scenarios, water supply forecasts, and flood control elevations that will be used to model climate change impacts to the hydrosystem.

Habitat actions benefit all listed species. Habitat actions under the BiOp are targeted at biological needs, addressing priority populations and limiting factors. The habitat strategies involve protecting and improving tributary and estuary habitat, respectively, to increase fish survival. For habitat mitigation, the Action Agencies observed the following in 2008 and 2009:

- The habitat program structure, which consists of biologically targeted projects, assessment of habitat quality improvements, use of expert panels, and independent scientific review, is under way and functioning well overall.

  - Projects were implemented that improved habitat quality in 2008 and 2009, and many new projects are ramping up for future implementation.
  - Several estuary projects were successfully completed. Estuary actions are behind schedule, but a catch-up plan has been formulated, with many new estuary projects under development for completion in 2010-2013.
  - Timely environmental review for habitat projects has emerged as a concern. The Action Agencies are working on streamlined processes for compliance with state and federal agencies.

- Emerging information related to climate change continues to confirm the Independent Scientific Review Board's (ISAB) recommendations that habitat protection and restoration are important responses to potential impacts. The BiOp's extensive program of habitat actions remains consistent with the recommendations.
- Tangible tributary habitat benefits are being achieved by specific projects. For example:
  - Year-round flow was returned to previously dry sections of a Pahsimeroi River tributary. In September 2008, Idaho Department of Fish and Game biologists counted two Chinook "redds," or nests, whereas 69 redds were counted in 2009. Adding water to a dry section of stream added prime spawning ground and provided almost immediate benefits to fish.
  - Fixes to passage barriers in the Methow River resulted in recolonization of upstream habitat by spawners of listed fish; however, significant straying of hatchery adult steelhead into the recolonized tributary study areas also occurred.
  - Intensively monitored watershed (IMW) efforts are under way to confirm survival improvement benefits. This represents a cutting-edge approach to research and monitoring and also has potential in monitoring climate change conditions.
- Tangible estuary habitat benefits are being achieved by specific projects. For example:
  - Critical estuary habitats, such as the Willow Grove and Elochoman properties, have been acquired, and restoration/management plans are being developed and/or implemented.
  - Riparian areas are being restored and reconnected to the river in the tidally influenced areas of the lower river and estuary, including restoration projects in the Sandy River Delta area.
  - Action effectiveness monitoring is under way to confirm habitat improvements for multiple on-the-ground habitat actions. This information will be used to make needed adjustments and adaptively manage so that actions meet the BiOp goals.

The 2010-2013 Implementation Plan takes this information into account.

Highlights: 2010-2013 Tributary Habitat Actions

Some action highlights include:

- Continued implementation of tributary water transactions through the Columbia Basin Water Transaction Program. Plans for 2010-2013 include building on water transaction successes in priority areas, such as:
  - Eight coordinated water transactions were recently completed in the Lemhi watershed to permanently increase flows and provide upstream and downstream passage for Snake River steelhead and Snake River Chinook populations. Additional flow transactions in the Lemhi will build on this effort in 2010-2013 to further enhance flows for steelhead and Chinook in a coordinated approach with Idaho and water users.
- Tributary and reach assessments in the Upper Columbia, Grande Ronde, and Salmon subbasins are being used to help identify, prioritize, and implement other actions that provide greater biological benefits for listed fish (within the context of the 2008 RPA). In the Upper Columbia, the Action Agencies will be implementing larger, more complex channel habitat improvements to address the factors most limiting to fish, working with the Upper Columbia Salmon Recovery Board, the Yakama Indian Nation, and others. For example, a river channel will be restored in the Entiat, and side channels will be reconnected in the Methow to provide greater quantity of diverse habitats.
- In the Grande Ronde, implementation includes improving access to more than 45 miles of instream habitat in Catherine Creek and reconnecting 0.5 mile of stream channel in the Upper Grande Ronde.
- In the Lower Salmon basin, actions being implemented include replacing culverts to improve access to more than 22 miles of stream for the Big Creek population and decommissioning more than 15 miles of road to reduce excess fine sediments in spawning and rearing areas.
- In the Upper Salmon basin, actions are being implemented in the East Fork Salmon River, Lemhi River and its tributaries, lower and upper mainstem Salmon River and its tributaries, the Pahsimeroi River, and Valley Creek. Fish screens will be installed, stream flows will be increased, and fish passage barriers will be removed.
- In addition to the already expanded level of effort to address limiting factors for the Lochsa, Lolo, and South Fork Clearwater populations of steelhead, actions in 2010-2013 will be implemented to address limiting factors in the Selway, Crooked, and American river watersheds for Snake River B-Run steelhead.
  - This work is being done in cooperation with the Nez Perce Tribe and Clearwater National Forest. For example, in the Lochsa, culverts will be replaced to improve access to about 15 miles of instream habitat, and 80 miles of road will be improved/decommissioned to reduce excess sediments in spawning and rearing areas.
- In the Tucannon, projects will be implemented to protect riparian areas, reconnect floodplains, and add large woody debris to increase instream habitat diversity.

In 2009, the Action Agencies recognized that in order to reach the BiOp survival benefit targets by 2018, the rate at which estuary habitat restoration projects were being completed would have to increase. In response, the Action Agencies reviewed their accomplishments to date, identified the limiting factors, and developed strategies and specific actions that will be implemented to ensure that the survival benefit targets will be met. The actions include:

- Development of joint project selection criteria
- Active pursuit of partnerships on both the Oregon and Washington shores
- Identification of large tracts of land where major restoration projects could be accomplished
- Identification of sites where dredged material could be used to restore or create shallow-water habitat

The Action Agencies have begun implementing these actions and expect a substantial increase in the rate of project implementation.

Highlights: 2010-2013 Estuary Habitat Actions

Some action highlights include:

- Development and application of an Estuary Ecosystem Habitat Classification System. This system will provide information on priority areas, project types and locations, and other critical data that will improve identification and prioritization of estuary habitat projects based on relative survival benefits.
- Implementation of a pile structure condition survey and hydraulic analyses that will identify Corps-owned pile structures that can be removed or modified without adversely affecting the Corps' navigation mission, private property, or desirable habitat.
- Development and implementation of habitat projects on the mainstem or the lower areas of tributaries where multiple species would benefit. For example:
  - The Fort Columbia restoration project on the mainstem of the lower reaches of the estuary will restore critical saltwater wetlands. This action will initially open up more than 12 acres to historical tidal influence. Over time, up to 96 acres of saltwater wetlands could be restored.
  - The Mudd Lake acquisition will restore 340 acres and more than 1 mile of shoreline, riparian area, wetlands, and forests in the lower reaches of the Lewis River, near its confluence with the Columbia.

Predator management actions are designed to improve the survival of juvenile and adult fish as they pass through the hydrosystem. Implementation strategies focus on three areas: piscivorous predation control measures to increase survival of juvenile fish; avian predation control measures to increase survival of juvenile fish; and marine mammal control

measures to increase survival of adult salmonids at Bonneville Dam. For predator management, the Action Agencies have observed the following in 2008 and 2009:

- Predation has emerged as a serious issue for the survival of both juvenile and adult salmon and steelhead. Future management actions must focus on controlling predation by native and non-native species.
- Predation by Caspian terns on juvenile fish continues to suggest that successfully relocating much of the tern nesting colony away from East Sand Island, where fish are most vulnerable to predation, will reduce mortality of juvenile salmonids. Diet studies have shown that steelhead smolts appear to be particularly vulnerable to predation, especially by Caspian terns.
- Total avian predation on young fish has increased as a result of a nearly threefold expansion of a colony of double-crested cormorants on East Sand Island and predation by terns and cormorants from other colonies (Crescent Island, Rock Island, Foundation Island, etc.). Successful management of avian predation must be based on a broader framework, both in terms of the geographical area covered and the community of all potential avian predators present within that area.
- Predation by northern pikeminnow is being successfully controlled, with significant survival benefits.
- Examination of predation by non-native fish species, such as shad, walleye, and bass, is under way. Management of non-native species predation may conflict with state management of exotic warm-water game species (walleye, largemouth and smallmouth bass, Northern pike, catfish, etc.) for sport fisheries. The AMIP confirmed and recognized ongoing efforts by the Action Agencies and others; these efforts include a recent workshop the Action Agencies hosted to develop priority recommendations to control non-indigenous fish species.
- The amount of fish eaten by sea lions has been increasing. However, removal of sea lions is helping to reduce marine mammal predation on returning adult fish.

The 2010-2013 Implementation Plan takes this information into account.

Highlights: 2010-2013 Predator Management Actions

Some action highlights include:

- Continuation of the Northern Pikeminnow Management Program into the future, based on monitoring results.
- New research and actions to address non-indigenous fish predation—specifically, the priority projects identified in the 2009 workshop, which focus on three species and issues:
  - Documenting the influence of juvenile shad on the growth and condition of non-native piscivorous predators in the fall as they prepare for overwintering.
  - Documenting whether removals of smallmouth bass in areas of intense predation could reduce the mortality of outmigrating juvenile salmonids.

- Documenting the relative abundance, distribution, and predation rates of channel catfish.
- Continuing implementation of new and modified components for the habitat and dam inland avian management plans.
- Intensive monitoring at the Potholes colony, including diet composition, abundance estimation, and productivity.
- Developing and implementing a management plan for double-crested cormorants in the estuary, resulting from completion of the status assessment of Pacific coast cormorants in 2010.
- Continuing the assessment of the effectiveness of ongoing efforts of the harassment and removal program on sea lions in the Bonneville tailrace.

Hatchery actions involve funding FCRPS mitigation hatchery programs in a way that contributes to reversing the decline of downward-trending species. There are two strategies to meet this overall objective: (1) ensuring that hatchery programs funded by the Action Agencies as mitigation for the FCRPS are not impeding recovery, and (2) preserving and rebuilding genetic resources through safety-net and conservation actions to reduce short-term extinction risk and promote recovery. For hatchery actions, the Action Agencies have observed the following in 2008 and 2009:

- The Snake River sockeye captive broodstock and conservation/supplementation program returned high numbers of adult fish in 2008 and 2009. We have potentially moved from handfuls of adult fish on the brink of extinction to a more stable base for this program, which will be expanded in future years under the BiOp.
- The Hatchery Scientific Review Group process in 2006-2009 developed useful guidelines for hatchery reforms, although potential reforms for each hatchery program will have to be considered case by case, in conjunction with development of updated Hatchery and Genetic Management Plans (HGMPs) and ESA consultations.
- The schedule for completion of ESA reviews for basin hatchery programs has been delayed for a number of reasons.

The 2010-2013 Implementation Plan takes this information into account.

Highlights: 2010-2013 Hatchery Actions

Some action highlights include:

- Continued implementation of safety net and conservation hatchery programs, with expanded implementation of the successful sockeye captive broodstock program to produce from 500,000 to 1 million smolts annually.
- Completion of updated HGMPs and initiation of RPA Action 39 ESA consultations for programs funded by the Action Agencies.
- A revised schedule for completion of ESA reviews for Action Agency-funded hatchery programs.

- Improvements at Winthrop National Fish Hatchery that will produce fish that are more fit and have higher survivability to adulthood.

Harvest actions are not a primary responsibility of the Action Agencies, but the agencies are encouraging research into improved harvest techniques that can increase the survival of naturally spawning fish. For harvest management, the Action Agencies observed the following in 2008 and 2009:

- In the Colville selective fisheries study, the immediate release survival of summer/fall Chinook and steelhead was assessed for three gear types. Mortality was lowest for fish captured in purse and beach seines (100 and 99 percent immediate release survival, respectively), compared to traditional hoop, dip, and tangle nets, which had only an 80 percent immediate release survival.
- These preliminary results show promise for improved harvest methods that can allow harvest of hatchery fish to continue with fewer impacts on naturally spawning fish.

The 2010-2013 Implementation Plan takes this information into account.

Highlights: 2010 Harvest Actions

Some action highlights include:

- The Colville selective fishery experiments will continue:
  - The project will purchase a purse seine boat for continued implementation of selective fishing below Chief Joseph Dam.
  - The project will pursue planning for a weir to be placed in the mainstem Okanogan River for the purpose of selective fishing.

Research, monitoring, and evaluation (RM&E) provides information to support planning and adaptive management and demonstrate accountability related to the implementation of hydropower and offsite actions for all species. RM&E encompasses project implementation, compliance monitoring, fish status monitoring, action effectiveness research, and critical uncertainties research. The Action Agencies implemented a robust plan of actions in 2008 and 2009:

- The Action Agencies and NOAA Fisheries sponsored a series of regional RM&E work groups and collaboration processes to assess RM&E priorities, coverage, and gaps, as well as to standardize methods and metrics. Workshop reports documented who is doing what, including what the Action Agencies are committing to implement under the BiOp.
- The AMIP addressed other aspects of RME, including enhanced status and habitat monitoring by the Action Agencies and NOAA Fisheries.

The 2010-2013 Implementation Plan takes this information into account. New BiOp priorities and AMIP commitments have been included.

Regarding broader considerations of fish status, ocean conditions, and climate change, the Action Agencies observed the following in 2008 and 2009:

- Survival improvements associated with implementation of the 2008 BiOp will not be reflected in adult returns until 2011 for steelhead and sockeye, and 2012 for Chinook.
- Adult fish returns in 2008 and 2009 were good. Counts of adult and jack summer Chinook, fall Chinook, and sockeye passing Bonneville Dam all exceeded the 10-year average, and spring Chinook, steelhead, and coho counts were below the 10-year average. This likely is a result of both the survival improvements made in recent years and excellent ocean conditions. It is not likely that current levels will be sustained, and future variability is expected consistent with BiOp assumptions. The Action Agencies will be looking for overall trends that are stable and increasing at the species level.
- The Northwest Fisheries Science Center annually forecasts future salmon abundance based on a variety of ocean ecosystem indicators. The January 2010 forecast predicts that, based on superior ocean conditions during spring-summer 2008, spring Chinook runs in 2010 may rival the high returns of this species seen in 2001 and 2002. This forecast based on ocean indicators is also supported by high returns of spring Chinook jacks in spring 2009.
- Several issues are evolving around the tagging and marking effort needed for future assessments of fish status. One is the effect of the type and extent of fish marking on the accuracy and sensitivity of wild and hatchery escapement estimates. Another issue related to fish status assessments is simply the number of fish handled for an RME program of this magnitude, because survival of handled fish generally is reduced. Implementation of the RME actions depends on ESA take authorizations. Evaluating this level of take will require a significant level of analysis to be conducted by NOAA Fisheries.
- The 2008 BiOp summarized a number of studies, including the Independent Scientific Advisory Board's review of the literature relevant to climate change impacts on Columbia River basin salmon and steelhead (*Climate Change Impacts on Columbia River Basin Fish and Wildlife*, Independent Scientific Advisory Board, 2007). There was no significant new information on climate change in 2008 or 2009.

The 2010-2013 Implementation Plan takes this information into account.

Highlights: 2010-2013 Research, Monitoring, and Evaluation

Some action highlights include:

- Testing hydro performance at specific dams.

- Intensively monitoring watersheds to examine habitat action effectiveness and climate change.
- Evaluating estuary habitat action effectiveness to better prioritize project selection and help ensure more effective implementation.
- Monitoring fish and habitat status, including Supplemental BiOp provisions.
- Implementing Supplemental BiOp provisions related to severe decline triggers and contingencies.

Collaboration with the Region

Regional efforts to protect and recover threatened and endangered fish in the Columbia River basin are comprehensive and reflect the complex life cycles of the fish themselves. Progress has been made each year by building step by step on each preceding year's successful effort. It will take many years to rebuild sustainable populations of some species.

As in 2008-2009, the Action Agencies will work with regional interests during 2010-2013 to implement actions to strengthen Columbia River basin salmon and steelhead stocks. The Action Agencies work closely with the region through the federal-state-tribal Regional Implementation Oversight Group (RIOG), the Columbia Basin Fish Accords, and the Northwest Power and Conservation Council's Fish and Wildlife Program.

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Reasonable and Prudent Alternative (RPA): Implementation Plan Summary

Action No.	Action Description	2010-2013 Actions	Adaptive Management
The Action Agencies will continue collaborating with states and tribes in the implementation of RPA actions, progress reporting, and adaptive management using regional forums such as the Regional Implementation Oversight Group, as described in their Biological Assessment, Section 2.1.			
1	**Implementation Plans** The Corps, BPA, and Reclamation will collectively submit to NOAA Fisheries Action Implementation Plans by the end of December 2009, December 2013, and December 2016 that detail commitments to implement actions during subsequent years. Specifically, that Action Implementation Plans will describe the tributary and estuary habitat actions that will be funded during the 2010-2013, 2014-2016, and 2017-2018 periods. The Implementation Plans will take into account pertinent new information on climate change and effects of that information on limiting factors and project prioritization. The Action Implementation Plans will also detail any changes in hydro, predation management, hatchery, or RM&E RPA actions	<u>2010</u> • Complete 2010-2013 Implementation Plan in early 2010. Tributary habitat actions identified by expert panels in 2009 and funded for implementation from 2010-2012 will be included in the 2010-2013 Implementation Plan. Tributary habitat actions to be funded for implementation in 2013 will be identified at the next cycle of expert panel workshops planned for 2012. <u>2012</u> • Produce a supplement to the 2010-2013 Implementation Plan that identifies tributary habitat actions funded for implementation in 2013-2015.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
	from the actions described in this RPA for each time period. This information will assist NOAA Fisheries in determining if the RPA is being implemented as identified in this Biological Opinion or if re-initiation triggers defined in 50 CFR 402.16 have been exceeded.		
2	**Annual Progress Reports** The Corps, BPA, and Reclamation will submit to NOAA Fisheries Annual Progress Reports in September of all years except 2013 and 2016. The reports will cover operations for the previous calendar year. These Annual Progress Reports will describe the status of implement-ing all actions as of the end of the previous calendar year. For example, the 2009 RPA Progress report will describe the status of actions through December 2008. In addition to RPA action implementation status, the Annual Progress Reports will describe the status of physical or biological metrics monitoring (as described in the RM&E). Annual progress reports will include a summary of the annual forecast review and also summarize any new, pertinent climate change information or research. This information will assist NOAA Fisheries in determining if the RPA is being implemented as anticipated in this Biological Opinion or, conversely, if re-initiation triggers defined in 50 CFR 402.16 have been exceeded.	2010-2012 • Release Annual Progress Reports in September 2010, 2011, and 2012.	Beginning in 2010, NOAA Fisheries will annually provide the Action Agencies with a scientific literature review regarding habitat and ocean conditions, habitat project priorities, and forecasting and modeling results to ensure that the latest scientific information on climate change is considered throughout implementation of the RPA. [Adaptive Management Implementation Plan (AMIP) p. 12]
3	**Comprehensive RPA Evaluations** The Corps, BPA, and Reclamation will submit	2012 • Initiate development of the Comprehensive RPA Evaluation of	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
	to NOAA Fisheries Comprehensive RPA Evaluation of multi-year implementation activities by the end of June 2013 and June 2016. The Comprehensive Evaluations shall review all implementation activities through the end of the previous calendar year (as would be covered in the Annual Progress Report) and compares them to scheduled completion dates as identified in this RPA or modified in the Implementation Plans in 2009, 2013 and 2016. The Comprehensive Evaluations will also describe the status of the physical and biological factors identified in this RPA, and compare these with the expectations in the survival improvements identified in the Comprehensive Analysis or Supplemental Comprehensive Analysis. Physical and biological factors will include new information on climate change and its effects on listed salmon and steelhead. The Comprehensive Evaluation will include a discussion of the Action Agencies' plan to address any shortcomings of current estimated survival improvements as compared to the original survival estimates identified in the Comprehensive Analysis referenced in this Biological Opinion. This information will assist NOAA Fisheries in determining if the RPA is being implemented as anticipated in this Biological Opinion or, conversely, if re-initiation triggers defined in 50 CFR 402.16 have been exceeded.	implementation activities from January 2007 to December 2012. <u>2013</u> • Produce the Comprehensive RPA Evaluation and submit to NOAA Fisheries by June 2013.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
4	**Storage Project Operations** The Action Agencies will operate the FCRPS storage projects (Libby, Hungry Horse, Albeni Falls, Grand Coulee and Dworshak projects) for flow management (see FCRPS Biological Assessment, Appendix B.2-1, for pertinent discussion and Table B.2.1-2 for a summary of seasonal flow objectives and planning dates for the mainstem Columbia and Snake rivers) to aid anadromous fish. Specific operations for each storage project are identified in Table 1 below. These storage project operations will be included in the Water Management Plan. These projects are operated for multiple purposes including fish and wildlife, flood control, irrigation, navigation, power, and recreation. Table 1 primarily identifies operations that are designed to benefit flow management specifically for listed species. For more detail on the operation of storage projects for other purposes see Appendix B.1.	2010-2013 plans for the operation of storage projects are described in the Annual Water Management Plans (WMPs) and will be posted to the Technical Management Team (TMT) website at http://www.nwd-wc.usace.army.mil/tmt.	

Hydro Actions

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
5	**Lower Columbia and Snake River Operations** The Action Agencies will operate the FCRPS run-of-river mainstem lower Columbia River and Snake River projects (Bonneville, The Dalles, John Day, McNary, Ice Harbor, Lower Monumental, Little Goose and Lower Granite projects) to minimize water travel time through the lower Columbia and Snake rivers to aid in juvenile fish passage as defined below. These projects are operated for multiple purposes including fish and wildlife, irrigation, navigation, power, recreation, and limited flood control. The following description primarily identifies operations that are designed to benefit listed anadromous species.	2010-2013 Plans for operations of run-of-river mainstem projects will be described in the Annual Water Management Plans, which will be posted to the TMT website at http://www.nwd-wc.usace.army.mil/tmt.	
	• Lower Snake River projects (Ice Harbor, Lower Monumental, Little Goose and Lower Granite projects) will be operated at minimum operating pool (MOP) with a 1-foot operating range from April 3 until small numbers of juvenile migrants are present (approximately September 1) unless adjusted to meet authorized project purposes, primarily	2010-2013 Lower Snake River Projects will be operated within 1 foot of operating range from April 3 to approximately September 1 as described in the annual WMP. Operations outside this range during this period will be coordinated with the appropriate agencies (the Corps' Reservoir Control Center [RCC] and the TMT) using procedures described within each annual WMP available at http://www.nwd-wc.usace.army.mil/tmt.	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
	navigation. Lower Granite reservoir may be raised as needed after September 1, in order to operate the adult fish holding facilities to support brood stock collection.		
	• Except for the John Day Project, the Lower Columbia River projects (Bonneville, The Dalles, and McNary) will be operated at normal operating range for each project. John Day Reservoir will be operated at the lowest elevation (elevation 262.5 to 264.0) (with a 1.5-foot operating range) that continues to allow irrigation withdrawals from April 10 through September 30. Slight deviations from these levels, based on navigation needs, load following, and operational sensitivity, may be required on occasion.	2010-2013 Bonneville, The Dalles and McNary dams will be operated within normal operating ranges, and John Day Dam will be operated within the lowest 1.5-foot operating range as described as described in the annual WMP. Operation outside of these prescribed ranges will be coordinated with the appropriate agencies (the Corps' RCC and the TMT) as described in the annual WMP available at http://www.nwd-wc.usace.army.mil/tmt.	
	• These run-of-river operations will be included in the annual WMP.	Included in the WMP as described above.	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
6	**In-Season Water Management** Prioritization of the use of flow augmentation water is done through in-season management by the Regional Forum (see FCRPS BA Appendix B.2.1). Each fall, the Action Agencies will prepare an annual Water Management Plan (WMP) and seasonal updates that describe planned hydrosystem fish operations for the upcoming fall and winter, and for the spring, and summer passage seasons. The annual WMP strives to achieve the best possible mainstem passage conditions, recognizing the priorities established in the FCRPS BA and the need to balance the limited water and storage resources available in the region. Fall/winter and spring/summer updates are prepared as more data is available on the water conditions for that year.	2010- 2013 The Annual Water Management Plan and fall/winter and spring/summer seasonal updates will be developed and submitted by the action agencies consistent with the schedule identified in the RPA and will be posted to the TMT website at http://www.nwd-wc.usace.army.mil/tmt.	
	A draft update of the WMP will be prepared by October 1 each year, with a final plan completed by January 1.		
	The fall/winter update to the WMP will be drafted by November 1 and finalized by January 1		
7	**Forecasting and Climate Change/Variability**	2010-2013 The Action Agencies, working through the Columbia River	The Action Agencies will investigate the impacts of

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	The Action Agencies will hold annual forecast performance reviews looking at in-place tools for seasonal volume forecasts and to report on the effectiveness of experimental or developing/emerging technologies and procedures. As new procedures and techniques become available and are identified to have significant potential to reduce forecast error and improve the reliability of a forecast, the Action Agencies will discuss the implementation possibilities with regional interests. The purpose is to improve upon achieving upper rule curve elevations by reducing forecasts errors and thereby providing for improved spring flows.	Forecast Group (CRFG), will support the advancement of forecasting skill, products, and techniques in the Columbia River basin for the purpose of improving reservoir operations. This includes both water supply forecasting and streamflow forecasting. • Under both RPA 7 and the associated action on page 25 of the AMIP, the Action Agencies formed the Columbia River Forecast Group (CRFG). The CRFG purpose is to promote and support the advancement of forecasting skill, products, and techniques in the Columbia River Basin. The CRFG spent most of 2009 developing a charter and organizational structure as well as organizing expectations and a strategy for the group. As the start-up process was proceeding, two workshops were held to review the performance of the previous year's forecasts and to hear speakers on various topics related to water supply forecasting. The first workshop was in March 2009 (to review water year 2008) and a second was held in December 2009 (to review water year 2009). • The CRFG has developed a work plan for 2010 to address specific issues surrounding water supply forecasting and implementation. They will produce an annual summary of the group's activities, achievements, and recommendations approximately 4 months after the end of the water year. The report will be the basis for annual reporting required for the Biological Opinion and Fish Accord records. • The Corps will prepare a draft revised Libby Dam water supply forecast procedure by spring 2010 with the goal of reducing the forecast error. The procedure will then go	possible climate change scenarios on listed salmon and steelhead. The Action Agencies will use new climate change information to improve regional hydrological models and review existing forecasting tools. As new procedures and techniques are identified with significant potential to reduce forecast error and improve forecast reliability, the Action Agencies will review these with the RIOG and other interested parties annually. [AMIP p. 25]

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		through the customary technical and treaty review processes. • Reclamation and the Corps will complete a pilot study to develop mid-month forecasts at Hungry Horse and Dworshak dams. Depending on the preliminary results, more work may ensue. • The River Management Joint Operating Committee (composed of the Corps, BPA, and Reclamation) is working with the Climate Impacts Group and regional stakeholders to develop sets of climate change streamflow scenarios that can be used for long-term planning and modeling. The project began in October of 2009 and is expected to be completed in the fall of 2010.	
	The Action Agencies will work collaboratively with other agencies and research institutions to investigate the impacts of possible climate change scenarios to the Pacific Northwest and listed salmon and steelhead. Focus areas will cover 1) modeling the hydrology and operations of the Columbia River system using possible future climate change scenarios, 2) investigating possible adaptation strategies for the system, 3) monitoring the hydrologic system for trends, cycles, and changes, and 4) staying abreast of research and studies that address climate cycles, trends, and modeling.	<u>2010-2013</u> The Action Agencies will continue working with the Climate Impacts Group and coordinating with other ongoing efforts in the region to develop various sets of climate change streamflow scenarios that can be used to model reservoir conditions and responses to climate change and to assess generation impacts, flood control issues, and river flow management options across the Federal Columbia River Power System (FCRPS). The hydrologic system will be monitored for trends, cycles, and changes. New research and studies that address climate cycles, trends, and modeling will be a focus in this investigation.	
8	**Operational Emergencies**	The protocol for communication of all types of emergencies that	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
	The Action Agencies will manage interruptions or adjustments in water management actions, which may occur due to unforeseen power system, flood control, navigation, dam safety, or other emergencies. Such emergency actions will be viewed by the Action Agencies as a last resort and will not be used in place of operations outlined in the annual WMP. Emergency operations will be managed in accordance with TMT Emergency Protocols, the Fish Passage Plan (FPP) and other appropriate Action Agencies emergency procedures. The Action Agencies will take all reasonable steps to limit the duration of any emergency impacting fish.	affect fish protection measures is identified in the July 16, 2008, TMT Emergency Protocol. The Generation Emergency Action Plan (Appendix 1 of the TMT Emergency Protocols, dated May 27, 2009) identifies actions to be taken in a power system emergency. The Transmission Emergency Action Plan (Appendix 2 of the TMT Emergency Protocols, January 2010), identifies actions to be taken in a transmission system emergency. The Emergency Protocols and associated appendixes will be reviewed and updated in coordination with the TMT as necessary to minimize the impact on fish protection measures.	
9	**Fish Emergencies** The Action Agencies will manage operations for fish passage and protection at FCRPS facilities. They may be modified for brief periods of time due to unexpected equipment failures or other conditions. These events can result in short periods when projects are operating outside normal specifications due to unexpected or emergency events. Where there are significant biological effects of more than short duration resulting from emergencies	2010 The Fish Emergencies Coordination Procedures Plan (Appendix 3 of the TMT Emergency Protocols) will be developed and coordinated with the TMT.	

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	impacting fish, the Action Agencies will develop (in coordination with the inseason management Regional Forum (see BA Appendix B.2.1) and implement appropriate adaptive management actions to address the situation. The Action Agencies will take all reasonable steps to limit the duration of any fish emergency.		
10	**Columbia River Treaty Storage** BPA and the Corps will pursue negotiations with Canada of annual agreements to provide 1 MAF of storage in Treaty space by April 15 consistent with: • Providing the greatest flexibility possible for releasing water to benefit U.S. fisheries May through July. • Giving preference to meeting April 10 upper rule curve elevation or achieving refill at Grand Coulee Dam over flow augmentation storage in Canada in lower water supply conditions. • Releasing flow augmentation storage to avoid causing damaging flow or excessive TDG in the United States or Canada.	2010-2013 BPA and the Corps will pursue negotiations annually with Canada, with discussions in the fall of each year, with goal of completing an agreement by December 15.	
	BPA and the Corps will coordinate with	2010-2013	

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	Federal agencies, States and Tribes on Treaty operating plans	Coordination meetings will be held in the fall and spring of each year. Spring operations briefings will be scheduled in April 2010 (in Portland and Spokane).	
11	**Non-Treaty Storage (NTS)** BPA, in concert with BC Hydro, will refill the remaining non-Treaty storage space by June 30, 2011, as required under the 1990 non-Treaty storage agreement. Refill will be accomplished with minimal adverse impact to fisheries operations.	2010-2011 As of March 2010, 88 percent of the refill had been accomplished. BPA and BC Hydro will refill the remaining non-treaty storage space by June 30, 2011, as required under the current 1990 non-treaty storage agreement. Any change to this refill requirement will be coordinated with the federal agencies, states, and tribes. Refill will be accomplished with minimal adverse impact to fisheries operations.	
12	**Non-Treaty Long-Term Agreement** BPA will seek to negotiate a new long-term agreement on use of non-Treaty space in Canada so long as such an agreement provides both power and non-power benefits for BC Hydro, BPA, and Canadian and U.S. interests. As part of these negotiations, BPA will seek opportunities to provide benefits to ESA-listed fish, consistent with the Treaty.	2010-2013 Following refill of the non-treaty space under the 1990 agreement, and in coordination with U.S. agencies, states, and tribes, BPA will pursue negotiations of a long-term agreement contingent on BC Hydro's interest. BPA plans to approach BC Hydro in 2010 to begin discussions regarding a new long-term storage agreement.	
	If a new long-term non-Treaty agreement is not in place, or does not address flows for fisheries purposes, BPA will approach BC Hydro about possibly negotiating an annual/seasonal agreement to provide U.S. fisheries benefits, consistent with the Treaty.	2010-2013 BPA will approach BC Hydro annually to pursue annual and/or seasonal agreements to benefit fisheries when opportunities exist to develop agreements consistent with the treaty.	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
13	**Non-Treaty Coordination with Federal Agencies, States, and Tribes** Prior to negotiations of new long-term or annual non-Treaty storage agreements, BPA will coordinate with Federal agencies, States, and Tribes to obtain ideas and information on possible points of negotiation, and will report on major developments during negotiations.	2010 In March 2010, BPA and the Corps met with federal agencies, states, and tribes to solicit input on a plan to approach Canada about an annual agreement and plan to meet regarding a long-term non-treaty storage agreement in late spring 2010. 2011-2013 BPA and the Corps will coordinate with federal agencies, states, and tribes to solicit input prior to any new long-term or seasonal non-treaty storage agreements.	
14	**Dry Water Year Operations** Flow management during dry years is often critical to maintaining and improving habitat conditions for ESA-listed species. A dry water year is defined as the lowest 20th percentile years based on the Northwest River Forecast Center's (NWRFC) averages for their statistical period of record (currently 1971 to 2000) using the May final water supply forecast for the April to August period as measured at The Dalles. The Action Agencies will complete the following activities to further the continuing efforts to address the dry flow years: • Within the defined "buckets" of available water (reservoir draft limits identified in RPA Action 4), flexibility will be exercised in a dry water year	Dry year operations requirements per this RPA are included in the annual WMP and are coordinated in-season with the TMT.	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
	to distribute available water across the expected migration season to optimize biological benefits and anadromous fish survival. The Action Agencies will coordinate use of this flexibility in the Regional Forum TMT.		
	• In dry water years, operating plans developed under the Treaty may result in Treaty reservoirs being operated below their normal refill levels in the late spring and summer, therefore, increasing flows during that period relative to a standard refill operation. • Annual agreements between the U.S. and Canadian entities to provide flow augmentation storage in Canada for U.S. fisheries needs will include provisions that allow flexibility for the release of any stored water to provide U.S. fisheries benefits in dry water years, to the extent possible.	See RPA 10 – Columbia River Treaty Storage.	

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	• BPA will explore opportunities in future long-term NTS storage agreements to develop mutually beneficial in-season agreements with BC Hydro to shape water releases using NTS space within the year and between years to improve flows in the lowest 20th percentile water years to the benefit of ESA-listed ESUs, considering their status.	See RPA 12 – Non-Treaty Long-Term Agreement.	
	• Upon issuance of the FCRPS Biological Opinion, the Action Agencies will convene a technical workgroup to scope and initiate investigations of alternative dry water year flow strategies to enhance flows in dry years for the benefit of ESA-listed ESUs.	2010 The Action Agencies will work with the Dry Year Strategy technical work group—which includes NOAA Fisheries, the states, and tribes—to conduct a dry year study that looks at alternative operations of FCRPS projects to improve flow conditions for Upper Columbia spring migrants in the 20 percent driest water years. (Treaty and non-treaty operations are being considered in other forums.) 2011-2013 Continue evaluation and conduct further studies if needed.	
	• In very dry years, the Action Agencies will maximize transport for Snake River migrants in early spring, and will continue transport through May 31 (see RPA 30).	See RPA 30 – Juvenile Fish Transportation in the Columbia and Snake Rivers.	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
	• BPA will implement, as appropriate, its Guide to Tools and Principles for a Dry Year Strategy to reduce the effect energy requirements may pose to fish operations and other project purposes.	In dry years, BPA will use the Guide to Tools and Principles for a Dry Year Strategy, available at http://www.bpa.gov/power/pgp/dryyear.	
15	**Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers** The Action Agencies will continue to update the Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers (WQP) and implement water quality measures to enhance ESA-listed juvenile and adult fish survival and mainstem spawning and rearing habitat. The WQP is a comprehensive document which contains water quality measures needed to meet both ESA and Clean Water Act responsibilities. For purposes of this RPA, the WQP will include the following measures to address TDG and water temperature to meet ESA responsibilities:	2010-2013 A Water Quality Plan for Total Dissolved Gas and Water Temperature in the Mainstem Columbia and Snake Rivers has been completed. This plan will be updated as needed.	The Action Agencies are providing water quality information and implementing water quality measures to enhance fish survival and protect habitat. As part of this action, the Action Agencies will contribute to regional climate change impact evaluations by providing NOAA with past and future water temperature data from their existing monitoring stations, to be used as part of a regional temperature database. The Action Agencies will begin to provide data to NOAA within 6 months following establishment of a regional database and annually thereafter. NOAA anticipates having a regional database

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			established no later than 2012.
	Real-time monitoring and reporting of TDG and temperatures measured at fixed monitoring sites,	2010-2013 Water quality monitoring will continue, and an annual report will be prepared and posted at http://www.nwd-wc.usace.army.mil/tmt/wqnew.	
	Continued development of fish passage strategies with less production of TDG (e.g., removable spillway weirs [RSWs]) and update the SYSTDG model to reflect modifications to spillways or spill operations,	2010-2013 There will be annual updates to the SYSTDG model to reflect changes in spillway configurations, operations, or other features that affect total dissolved gas (TDG) loading and dissipation.	
	Continued development and use of SYSTDG model for estimating TDG production to assist in real-time decision making, including improved wind forecasting capabilities as appropriate,	2010-2013 Annual refinements to the SYSTDG model will continue. Refinements will include a statistical analysis of predictive errors, including improved wind forecasting capabilities where available.	
	Continued development of the CE-QUAL-W2 model for estimating river temperatures from Dworshak Dam on the Clearwater and Upper Snake River near confluence with the Grand Ronde River (USGS Anatone gage) through the lower Snake River (all four Corps lower Snake River projects) to assist in real-time decision making for Dworshak Dam operations.	2010-2013 The CE-QUAL-W2 model will continue to be developed and refined. Operation and maintenance of real-time data collection will continue.	

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
	Expand water temperature modeling capabilities to include the Columbia River from Grande Coulee to Bonneville dams to better assess the effect of operations or flow depletions on summer temperatures	2010-2012 The Action Agencies will coordinate development of temperature models for the Columbia River with ongoing U.S. Environmental Protection Agency (EPA) total maximum daily load (TMDL) efforts. Scoping for this effort, development of an implementation plan, and active pursuit of funding for this action will begin in 2010.	
	Investigate alternatives to reduce total mass loading of TDG at Bonneville Dam while maintaining juvenile survival performance, and	2010 A summer spill test is planned to evaluate two different spillway operations, with the primary goal being to meet the juvenile performance standard. During that study, information also will be collected regarding TDG. 2011–13 Testing will proceed to meet the juvenile performance standard as a primary goal. Alternatives to reduce total mass loading of TDG at Bonneville while achieving the juvenile performance standard will be evaluated using information gathered during the 2010 test and in conjunction with this subsequent research.	
	Continued operation of lower Snake River projects at MOP.	2010-2013 Lower Snake River minimum operating pool (MOP) operations will be consistent with RPA 5.	
16	**Tributary Projects** The tributary projects that have not yet completed ESA Section 7 consultation are located in the Yakima, Okanogan, and Tualatin river basins. Reclamation will, as	The Bureau of Reclamation submitted Biological Assessments (BAs) to NOAA on the Okanogan, Tualatin, and Yakima projects. 2010 • BiOp on the Okanogan project is expected.	

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	appropriate, work with NOAA Fisheries in a timely manner to complete supplemental, project-specific consultations for these tributary projects. These supplemental consultations will address effects on tributary habitat and tributary water quality, as well as direct effects on salmon survival in the tributaries. The supplemental consultations will address effects on mainstem flows only to the extent to which they reveal additional effects on the in-stream flow regime not considered in the FCRPS and Upper Snake River BA/Comprehensive Analysis.	2011 • Reclamation is currently working on an integrated water resource management plan for the Yakima River that is expected to be incorporated into a supplement to Reclamation's Yakima Project BA. The management plan is expected to be completed in 2011. 2012 • BiOp on the Tualatin project is expected.	
17	**Chum Spawning Flows** Provide adequate conditions for chum spawning in the mainstem Columbia River in the area of the Ives Island complex and/or access to the Hamilton and Hardy Creeks for this spawning population:	Operations for chum spawning and egg incubation will continue as described in the annual WMP and coordinated through the TMT.	
	• Provide a tailwater elevation below Bonneville Dam of approximately 11.5 feet beginning the first week of November (or when chum arrive) and ending by December 31, if reservoir elevations and climate forecasts indicate this operation can be maintained through incubation and		

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Hydropower Strategy 1—Operate the FCRPS to Provide Flows and Water Quality to Improve Juvenile and Adult Fish Survival			
	emergence.		
	• Through TMT, if water supply is deemed insufficient to provide adequate mainstem spawning or continuous tributary access, provide, as appropriate, mainstem flow intermittently to allow fish access to tributary spawning sites if adequate spawning habitat is available in the tributaries.		
	• Make adjustments to the tailwater elevation through the TMT process consistent with the size of the spawning population and water supply forecasts.		
	• After the completion of spawning, use the TMT process to establish the tailwater elevation needed to provide protection for mainstem chum redds through incubation and the end of emergence		

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	• If the emergence period extends beyond April 10th and the decision is made to maintain the tailwater, TMT will discuss the impacts of TDG associated with spill for fish in the gravel. Bonneville Dam typically starts its spring spill around April 10, but a delay in the start of spill may be needed.		
	• Revisit the chum protection level decision at least monthly through the TMT process to assure it is consistent with the need to provide spring flows for listed Columbia and Snake River stocks.		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
NOTE: For RPAs 18 through 25: The COP considers multiple configuration and operation modifications and prioritizes those into Phase I and Phase II actions to meet the overarching Hydro Performance Standard of 96 percent and 93 percent dam survival for spring and summer migrants, respectively. Phase I modifications are a menu of options that are expected to increase survival levels to meet or exceed hydrosystem performance standards. If the selected Phase I modifications fail to meet hydrosystem performance standards, then Phase II modifications will be considered. Modifications will be evaluated through RME as appropriate. Except for 2010, schedule and construction of modifications included in the COP will depend on the results of ongoing research, regional collaboration and prioritization, and future appropriations.			
18	**Configuration and Operational Plan for Bonneville Project** The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for the Bonneville Project (2008). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures	The current version of the Configuration and Operational Plan (COP), dated May 2008, is available at http://www.nwp.usace.army.mil/pm/e/reports/afep/config/BONCOP-Amendment_1.pdf. 2010 • Complete all planned modifications to the Powerhouse I sluiceway, including removal of the old juvenile bypass channel and equipment, and removal of the outfall. • Complete Powerhouse I Major Rehab, including turbine	

[1] Dates shown are scheduled planning dates for completion.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	runner replacement. • Evaluate alternate spill options during summer migration. <u>2010-2011</u> • Continue testing the effectiveness of the Behavioral Guidance System (BGS) in guiding smolts to the B2 Corner Collector (began in 2008). <u>2011</u> • Initiate the first year of performance standard evaluations with 100 thousand cubic feet per second (kfcs) spill in the spring. Summer spill program to be determined as informed by 2010 testing. <u>2010-2012</u> • Determine whether additional Powerhouse II gatewell modifications to improve fish survival are necessary. If so, begin design of prototype. • Determine whether to implement BGS long term or operate without it. <u>2012</u> • Evaluate the results of 2011 testing and test conditions and determine the schedule for further biological testing, or begin planning for additional actions. (Update the COP as necessary.) <u>2013</u>	

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Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		• If needed, initiate follow-up performance standard testing after additional modifications. • Report any expected deviations or delays in implementation with the region. • Update COPs as necessary. • Conduct prototype testing of Powerhouse II gatewell modifications (if modifications are determined to be necessary).	
	Bonneville Powerhouse I • Sluiceway modifications to optimize surface flow outlet to improve fish passage efficiency (FPE) and reduce forebay delay (2009).	Completed in 2010. No further actions planned.	
	• Minimum-gap turbine runner installation to improve survival of fish passing through turbines (2009)	Bonneville Powerhouse I Major Rehab, including turbine runner replacement, is planned for completion by December 2010.	
	Bonneville Powerhouse II • Screened bypass system modification to improve fish guidance efficiency (FGE) and reduce gatewell residence time (2008)	<u>2008</u> • Completed construction of gatewell modifications. <u>2010-2011</u> • Determine whether additional Powerhouse II gatewell modifications to improve fish survival are necessary. If so,	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		begin design of prototype. 2013 • Conduct prototype testing of new Powerhouse II gatewell modifications (if modifications are determined to be necessary).	
	• Shallow BGS installation to increase Corner Collector efficiency and reduce forebay delay (prototype 2008)	2010-11 • Test the effectiveness of the BGS at guiding smolts to the B2 Corner Collector (began in 2008). 2011-12 • Decide whether to implement the BGS long term at Bonneville or operate without it.	
	Bonneville Dam Spillway Spillway operation or structure (e.g., spillway deflectors) modification to reduce injury and improve survival of spillway passed fish; and to improve conditions for upstream migrants (2013).	• Developed and tested an operational solution in 2007 and 2008. • Development of structural improvements on hold pending results of performance testing.	
	The COP will be updated periodically and modifications may be made as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments	The COP will be updated as necessary pending performance standard testing results.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. If Phase I actions fail to meet the intended biological targets, the COP will be updated to identify additional Phase II actions for further implementation.		
19	**Configuration and Operational Plan for The Dalles Project** The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for The Dalles Project (2008). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	The current version of the COP, dated December 2009, is available at: http://www.nwp.usace.army.mil/pm/e/reports/afep/config/TDA-COP_December2009.pdf. 2010 • Complete installation of new spill wall. • Initiate first year of performance standard evaluations with 40 percent spill. 2011 • Evaluate the results of the 2010 testing and test conditions and determine the schedule for further biological testing or begin planning for additional actions. Update the COP as necessary. 2012 • If needed, make additional modifications.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		<u>2013</u> • If needed, initiate follow-up performance standard testing after additional modifications. • Report any expected deviations or delays in implementation with the region. • Update the COPs as information is available.	
	• Turbine operation optimization to improve overall dam survival (2011)	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	• Extended tailrace spill wall to increase direct and indirect survival of spillway passed fish (2010)	<u>2010</u> • Complete spillwall construction.	
	The COP will be updated periodically and modifications may be altered as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. If Phase I actions fail to meet the intended biological targets, Phase II actions, as	The COP will be updated as necessary pending performance standard testing results.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	described in the FCRPS BA—Appendix B.2.1 will be considered for further implementation.		
20	**Configuration and Operational Plan for John Day Project** The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for the John Day Project (2008). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	The current version of the Configuration and Operational Plan (COP), dated May 2007, is available at: http://www.nwp.usace.army.mil/pm/e/reports/afep/config/JDA_COP-May2007.pdf. 2010 • Finalize revision of the existing (2007) COP. • Test the relocated top-spill weirs (TSWs), extended-length flow deflector with new spill patterns, and expanded avian wire array in the tailrace planned for two spill levels (30 percent vs. 40 percent). • Complete a study of surface flow outlet and tailrace improvement alternatives using physical models. 2011-2013 • Evaluate the results of prior testing and test conditions and determine the schedule for further biological testing, or begin planning for additional actions. Update the COP as necessary.	
	• Full-flow bypass and PIT-tag detection installation to reduce handing stress of bypassed fish (2007)	Action completed.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	• Turbine operation optimization to improve overall dam survival (2011)	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	• Surface flow outlet(s) construction to increase FPE, reduce forebay delay and improve direct and indirect survival (prototype 2008 with final installation by 2013), and improve tailrace egress conditions.	Prototype installation has been completed. The final design/configuration will depend on the COP update.	
	The COP will be updated periodically and modifications may be altered as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. If Phase I actions fail to meet the intended biological targets, Phase II actions, as described in the FCRPS BA – Appendix B.2.1, will be considered for further implementation.	The COP will be updated as necessary pending performance standard testing results.	
21	**Configuration and Operational Plan for**	The COP is scheduled for completion in 2010. Items identified	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	McNary Project The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for the McNary Project (2009). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	under "2010-2013 Actions" will continue according to the schedule provided, subject to adjustments based on regional priorities. <u>2010</u> • Complete the COP. • Conduct a gatewell descaling study for turbine operation outside 1 percent. • Change the mandated frequency of trash raking to once a month during the fish passage season, to improve debris management. • Conduct design and planning for relocation of the juvenile bypass outfall. <u>2011</u> • Start construction of the relocated juvenile bypass outfall. • Evaluate fish survival through turbines at best operating point (outside 1 percent). (This continues in 2012).	
		<u>2012</u> • Finish construction of the relocated juvenile bypass outfall during 2011-2012 winter work window so that it is functional in time for the 2012 fish season. • Continue to evaluate fish survival through turbines at best	

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Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		operating point (outside 1 percent). <u>2013</u> • Initiate the first year of performance standard evaluations with spill volume as informed by prior test results.	
	• Turbine operation optimization to improve survival of fish passing through turbines (2013)	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	• Improve debris management to reduce injury of bypass and turbine passed fish (2011)	<u>2010-2013</u> • Change the mandated frequency of trash raking to once monthly.	
	• Relocate juvenile bypass outfall to improve egress, direct, and indirect survival on bypassed fish (2011)	Construction of the juvenile bypass outfall will be initiated in 2011, with relocation completed in 2012.	
	The COP will be updated periodically and modifications may be altered as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP.	The COP will be updated as necessary pending performance standard testing results.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	If Phase I actions fail to meet the intended biological targets, Phase II actions, as described in the FCRPS BA—Appendix B.2.1, will be considered for further implementation.		
22	**Configuration and Operational Plan for Ice Harbor Project** The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for the Ice Harbor Project (2008). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	A draft COP was prepared in 2008. Pending further review, a final COP will be available in 2010. Items identified under "2010-2013 Actions" will continue according to the schedule provided, subject to adjustments based on regional priorities. <u>2010</u> Complete the COP. <u>2010-2011</u> • Modify the spillway chute and deflector so that they are operational in the spring of 2011. <u>2010-2013</u> • Contract award, design, and development of plans and specs for the Unit 2 replacement runner (construction in 2014-2015, biological evaluation in 2016-2017). <u>2011-2013</u> • Test the prototype spillway passive integrated transponder (PIT) detectors installed in the flow deflector. • Initiate additional performance standard testing if required.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	• Guidance screen modification to improve FGE (2010)	This action has been indefinitely deferred by the draft COP because of a lack of regional support.	
	• Turbine operation optimization to improve survival of turbine passed fish (2011)	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	• Spillway chute and/or deflector modification to reduce injury and improve survival of spillway passed fish through the RSW (2009)	<u>2010-2011</u> • Modify the spillway chute and deflector so that they are operational in the spring of 2011.	
	• Turbine unit 2 replacement to improve the survival of fish passing through turbines and reduce oil spill potential (2012)	<u>2010-2013</u> • Contract award, design, and development of plans and specs for the Unit 2 replacement runner (construction in 2014-2015, biological evaluation in 2016-2017).	
	The COP will be updated periodically and modifications may be altered as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP.	The COP will be updated as necessary pending performance standard testing results.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	If Phase I actions fail to meet the intended biological targets, Phase II actions, as described in the FCRPS BA—Appendix B.2.1, will be considered for further implementation.		
23	**Configuration and Operational Plan for Lower Monumental Project** The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for the Lower Monumental Project (2010). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	The COP is scheduled for completion in 2011. Items identified under "2010-2013 Actions" will continue according to the schedule provided, subject to adjustments based on regional priorities. <u>2010</u> • Conduct design and planning for the relocated juvenile bypass system outfall. <u>2011</u> • Complete the COP using post-construction spillway weir test data from 2008 and 2009. <u>2011-2012</u> • If needed to meet performance standards, construct relocated juvenile bypass system outfall. Construction would be completed prior to the start of the 2012 fish season, with testing carried out during that fish season. • Initiate additional performance standard testing if required.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		2012 • Evaluate the results of performance standard testing and test conditions and determine the schedule for further biological testing, or begin planning for additional actions. Update the COP as necessary. 2013 • Conduct additional post-construction testing of the juvenile bypass outfall, if necessary.	
	• Primary bypass operations with PIT-tag detection installation to reduce handling stress of bypassed fish (2007)	No further actions are planned. This RPA has been completed.	
	• Juvenile bypass system outfall relocation to improve egress, direct and indirect survival on bypassed fish (2011)	2010 • Conduct design and planning of the relocated juvenile bypass system outfall. 2011-2012 • If needed to meet performance standards, construct relocated juvenile bypass system outfall. Construction would be completed prior to the start of the 2012 fish season, with testing carried out during that fish season. 2013 • Conduct additional post-construction testing of the juvenile	

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Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		bypass outfall, if necessary.	
	• Turbine operation optimization to improve the survival of fish passing through turbines (2013)	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	• RSW installation to improve FPE, reduce forebay delay, and improve direct and indirect survival (2008)	No further actions are planned. This RPA has been completed.	
	The COP will be updated periodically and modifications may be altered as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. If Phase I actions fail to meet the intended biological targets, Phase II actions, as described in the FCRPS BA—Appendix B.2.1, will be considered for further implementation.	The COP will be updated as necessary pending performance standard testing results.	
24	**Configuration and Operational Plan for**	The COP is scheduled for completion in 2010. Items identified under "2010-2013 Actions" will continue according to the	The COP is scheduled for completion in 2010. Items

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	Little Goose Project The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for the Little Goose Project (2009). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	schedule provided, subject to adjustments based on regional priorities. <u>2010</u> • Complete the COP. • Finish construction of the relocated primary bypass outfall (expected in March 2010, in time for the 2010 fish season). <u>2011</u> • Conduct performance standard testing. <u>2012</u> • Evaluate the results of prior testing and test conditions and determine the schedule for further biological testing, or begin planning for additional actions. Update the COP as necessary. <u>2013</u> • If needed, make additional modifications.	identified under "2010-2013 Actions" will continue according to the schedule provided.
	• Turbine operation optimization to improve the survival of fish passing through turbines (2014)	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	• Primary bypass operations with PIT-tag detection installation to reduce handling stress of bypassed fish (2008)	Action completed.	

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Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	• Primary bypass outfall relocation to improve egress, direct and indirect survival on bypassed fish (2009)	Finish construction (expected in March 2010, in time for the 2010 fish season).	
	• Surface spillway weir and deflector installation to improve FPE, reduce forebay delay and improve direct and indirect survival (2009)	Action completed.	
	The COP will be updated periodically and modifications may be altered as new biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. If Phase I actions fail to meet the intended biological targets, Phase II actions as described in the FCRPS BA—Appendix B.2.1 will be considered for further implementation.	The COP will be updated as necessary pending performance standard testing results.	
25	**Configuration and Operational Plan for Lower Granite Project**	The COP is scheduled for completion in 2010. Items identified under "2010-2013 Actions" will continue according to the	The COP is scheduled for completion in

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Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	The Corps will consider all relevant biological criteria and prepare, in cooperation with NOAA Fisheries and the co-managing agencies, a Configuration and Operational Plan for Lower Granite Project (2009). As part of the first phase of modifications, the Corps will investigate, and implement the following reasonable and effective measures to reduce passage delay and increase survival of fish passing through the forebay, dam, and tailrace as warranted. Initial modifications will likely include:	schedule provided, subject to adjustments based on regional priorities. <u>2010</u> • Complete the COP. • Prepare a design report for the new juvenile fish facility. <u>2011</u> • Prepare plans and specifications for the new juvenile fish facility. <u>2012- 2014</u> • Construct the new juvenile fish facility.	2010. Items identified under "2010-2013 Actions" will continue according to the schedule provided.
	• New juvenile fish facility including orifice configuration changes, primary dewatering, holding for transport, and primary bypass to improve direct and indirect survival of all collected fish (2012)	The scope and design of the juvenile fish facility are being discussed through the development of the COP and in regional Fish Facility Design Review Work Group (FFDRWG) meetings.	
	• Turbine operation optimization to improve survival of turbine passed fish (2014).	Turbine operation optimization is still planned, but dates depend on regional prioritization.	
	The COP will be updated periodically and modifications may be altered as new	The COP will be updated as necessary pending performance standard testing results.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	biological and engineering information is gathered. The COP and modifications will be coordinated through the Regional Forum. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. If Phase I actions fail to meet the intended biological targets, Phase II actions as described in the FCRPS BA—Appendix B.2.1 will be considered for further implementation.		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
26	**Chief Joseph Dam Flow Deflector** The Corps will complete the flow deflector construction at Chief Joseph Dam by 2009. Deflector construction was initiated in 2005 in response to RPA 136 in the 2000 Biological Opinion and previous discussions on the importance of these deflectors. Chief Joseph Dam does not have spill for fish passage, but water is spilled at this project and Grand Coulee in order to pass high flows. Investigations by the Corps concluded that installation of flow deflectors at Chief Joseph Dam, which is immediately downstream of Grand Coulee, and shifting spill and power generation between the projects is the most cost-effective alternative for gas abatement at these two dams.	This RPA was completed in 2009. Installation of all deflectors has been completed, and testing was carried out in 2009. No further testing is planned.	
27	**Turbine Unit Operations** The Action Agencies will operate turbine units to achieve best fish passage survival (currently within 1% of best efficiency at mainstem dams on the Lower Columbia and Lower Snake rivers from April 1 – October	2010-2013 Plans for turbine operations are included in Appendix C of the annual Fish Passage Plan at http://www.nwd-wc.usace.army.mil/tmt. Turbine operations are reviewed annually and adapted for fish passage as needed.	

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Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	31 (hard constraint) and from November 1 – March 31 (soft constraint) each year. Continue turbine operations evaluations and apply adaptive management to operate units in their optimum configuration for safe fish passage.		
28	**Columbia and Snake River Project Adult Passage Improvements** The Corps will implement the following structural improvements to adult passage at the mainstem Columbia and Snake river projects:		
	Bonneville Dam • Improve the Bradford Island ladder system to reduce stress and improve reliability of upstream adult passage (2013).	2009-2010 (winter work window) • Repair A-branch diffusers. • Repair fish valve FV4-3. • Refurbish the count station crowder, to include repairing structural integrity, sealing it to reduce leakage and algal growth, and sandblasting and painting. • Extend FV3-7 trashracks to prevent overtopping during high forebay elevations. • Repair the hole in the fish ladder floor at FG3-12. • Remove the wooden bulkhead in the south collection channel	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
		and replace it with a steel bulkhead.	
	The Dalles Dam • East ladder emergency auxiliary water supply system and/or modifications that return adult salmon and steelhead use of the North ladder to pre-spillwall conditions to improve reliability of upstream adult passage (2013).	2010 • Evaluate spring/summer Chinook passage at the north shore ladder to determine whether modifications are needed. 2011 • Revisit the list of alternatives for the east ladder and select a preferred alternative. 2012-2014 • Design the north shore ladder entrance improvements if the 2010 passage study suggests there is an adult passage problem there. • Design the preferred alternative for the east ladder back-up auxiliary water system (AWS). 2015-2016 • Construct the north shore ladder entrance improvements if needed. • Construct the east ladder back-up AWS. 2016-2017 • If the north shore ladder entrance modifications are constructed, evaluate their effectiveness in improving adult fish passage.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	John Day Dam • Adult ladder systems modifications to improve upstream adult passage conditions (2011).	2009-2010 • Construct and evaluate upper ladder modifications. 2012-2013 • Construct lower ladder modifications. 2013 • Evaluate the effectiveness of modifications in improving adult fish passage through the north shore ladder.	
	Ice Harbor Dam • Repair or replace north shore fishway auxiliary water supply (AWS) equipment as needed so that any two of the three pumps can meet flow criteria.	2010 • The north shore fishway auxiliary water supply equipment has been repaired so that any two of the three pumps can meet flow criteria.	
	Little Goose Dam • Investigate adult passage and determine whether structural, operational, or tailrace modifications can alleviate adult passage delays or blockages during spill operations for optimum juvenile passage (See RM&E Action 54).	2010- 2013 • Review operations annually for adult fish passage. (2009 was the first year of optimized Turbine Unit 1 operations at the upper 1 percent level.) • Evaluate the need for additional adult passage improvements or operational changes with the new spillway weir in place and consider additional model trips to update 2008 adult passage work.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 2—Modify Columbia and Snake River Dams to Maximize Juvenile and Adult Fish Survival[1] ***Once the Action Agencies meet hydrosystem performance standards, they will ensure overall system performance through appropriate monitoring and maintenance activities. The Action Agencies will decide on the tools needed to maintain performance after coordinating with NOAA Fisheries and the regional forum.***			
	Lower Granite Dam • Investigate and if necessary provide additional auxiliary water supply for the new adult trap at lower Granite so that it can operate at full capacity when the forebay is operated at MOP without affecting the fishway AWS (2012).	2010 • Monitor the 2009 main water supply improvements to the adult fish trap made to ensure that the trap can operate at full capacity when the forebay is at MOP, without affecting the fishway AWS.	
	• Adult fishway modification to improve upstream adult passage conditions impaired by temperature differentials (need will be determined by results of further research) (prototype 2011).	2010 • Develop a plan for a low water year pilot study for a prototype structure, using information from a 2008 study of temperature differential (subject to regional prioritization). 2011-2013 • In low water conditions, conduct a pilot study with a prototype structure (subject to regional prioritization).	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 3—Implement Spill and Juvenile Transportation Improvements at Columbia River and Snake River Dams			
29	**Spill Operations to Improve Juvenile Passage** The Corps and BPA will provide spill to improve juvenile fish passage while avoiding high TDG supersaturation levels or adult fallback problems. Specific spill levels will be provided for juvenile fish passage at each project, not to exceed established TDG levels (either 110 percent TDG standard, or as modified by State water quality waivers, currently up to 115 percent TDG in the dam forebay and up to 120 percent TDG in the project tailwater, or if spill to these levels would compromise the likelihood of meeting performance standards (see RPA Table, RM&E Strategy 2). The dates and levels for spill may be modified through the implementation planning process and adaptive management decisions. The initial levels and dates for spill operations are identified in Table 2 below. Future Water Management Plans will contain the annual work plans for these operations and spill programs, and will be coordinated through the TMT. The Corps and BPA will continue to evaluate and optimize spill passage survival to meet both the hydrosystem performance	2010-2013 Spill operations will be updated annually and reported in the Fish Passage Plan available at http://www.nwd-wc.usace.army.mil/tmt. Spill operations at individual dams will be determined in the future in the context of hydro performance standards. The overarching performance standard that is driving spill operations (combined with dam modifications) is the achievement of 96 percent and 93 percent dam survival for spring and summer juvenile migrants, respectively, as described in RME Strategy 2 in NOAA Fisheries' Reasonable and Prudent Alternatives Table of Actions in the 2008 FCRPS BiOp. The Action Agencies, in coordination with NOAA Fisheries, proposed that in any year where natural-origin adult returns of Snake River fall Chinook salmon are equal to or fewer than 400 fish, summer spill in the following year would continue through August 31, even in years when counts fall below the BiOp/Fish Accords trigger of 300 subyearling migrants per day at Snake River collector projects. This proposal was vetted with the RIOG in March 2010. The final step will be to notify NOAA Fisheries and the RIOG of the Action Agencies' final decision.	Summer spill – RPA Action 29 and RPA Table 2 specify the use of a biological trigger for determining the timing of cessation of voluntary summer spill in August at the four Snake River projects. The biological trigger was developed as part of the Fish Accords with the Columbia River Tribes: namely, when collection numbers of subyearling Chinook fall below 300 fish per day for 3 consecutive days at Snake River collector projects. Under this program, spill could be terminated as early as August 1, but no later than August 31. [AMIP p. 19] To further enhance the summer spill program, the Action Agencies, in coordination with NOAA and the RIOG, developed a safeguard, based on adult

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 3—Implement Spill and Juvenile Transportation Improvements at Columbia River and Snake River Dams			
	standards and the requirements of the Clean Water Act (CWA).		returns, that continues summer spill at the Snake River projects through August 31, during the subsequent juvenile outmigration. The safeguard provides that in any year when adult returns of natural-origin Snake River fall Chinook salmon are equal to or less than 400 fish, summer spill in the following year would continue through August 31, even in years when counts fall below the BiOp/Fish Accords trigger of 300 subyearling migrants per day at Snake River collector projects. The safeguard is in place for the 2010 juvenile fish migration, but based on 2009 fish returns will not be triggered in 2010. [AMIP p. 19]
30	**Juvenile Fish Transportation in the Columbia and Snake Rivers**	2010–2013 The Juvenile Fish Transportation Plan will be updated annually	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 3—Implement Spill and Juvenile Transportation Improvements at Columbia River and Snake River Dams			
	The Corps and BPA will continue the juvenile fish transportation program toward meeting system survival performance metrics of Snake and Columbia River salmon and steelhead (see RPA, RM&E Strategy 2) with some adaptive management modifications based on results of RM&E. The Corps and BPA will continue to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental, and McNary dams, although under a modified operation as described in Table 3 and Table 4 below. While the dates mentioned in this section should be considered firm planning dates, if in-season information or results of ongoing RM&E indicates a need for adaptive management (for example, if modifying these dates are likely to increase in-river or system survival and would be likely to provide equivalent or increased SARs of the species transported), the Action Agencies will consider revising the dates and operations through the Regional Forum.	based on the best available scientific information and reported in the Fish Passage Plan, at http://www.nwd-wc.usace.army.mil/tmt. Changes in the plan will be reviewed annually with the Regional Implementation Oversight Group (RIOG) and updated as new information becomes available.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 3—Implement Spill and Juvenile Transportation Improvements at Columbia River and Snake River Dams			
31	**Configuration and Operational Plan Transportation Strategy** The Corps, in coordination with the Regional Forum, will initiate a Configuration Operational Plan in 2009. The plan will be completed in 2010 and will present a strategy for prioritizing and carrying out further transportation actions at each dam. Comments developed by NOAA Fisheries on the draft COPs shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final COP. Construction actions for transportation are primarily in the context of changes to juvenile bypass systems. Changes meant to increase adult salmon returns through the juvenile fish transportation process are being evaluated. Some changes include additional barges, a new juvenile fish facility at Lower Granite Dam and modifications to the juvenile fish facilities at Little Goose, Lower Monumental and McNary dams.	2010-2013 • Update transport operations annually and report in the Fish Passage Plan (Appendixes B and E), available at http://www.nwd-wc.usace.army.mil/tmt. A separate COP will not be prepared. • Prepare a COP that identifies potential transport equipment and facility upgrades/improvements that will be developed through the Fish Facility Design Review Work Group (FFDRWG) and submitted to the System Configuration Team (SCT) for regional prioritization and funding consideration. (Operations will continue to be specified yearly in the Fish Passage Plan.) • Evaluate the results and test conditions of previous studies, which will be reported to the region. The schedule for further biological testing or planning for additional actions will be coordinated through the appropriate regional forum groups.	NOAA Fisheries recommended that spill at the three Snake River collector projects continue through the spring period in 2009 and that data from the previous years be assessed and discussed with the RIOG parties each year to inform transport/spill operation decisions for the subsequent year. There is no longer a presumptive operation for this time period as set forth in the RPA. [AMIP pp. 18-19]

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 4—Operate and Maintain Facilities at Corps' Mainstem Projects to Maintain Biological Performance			
32	**Fish Passage Plan** The Corps will annually prepare a FPP in coordination with NOAA Fisheries and the Regional Forum through the FPOM. The Corps will operate its projects (including juvenile and adult fish passage facilities) year-round in accordance with the criteria in the FPP. Comments developed by NOAA Fisheries on the draft FPP shall be reconciled by the Corps in writing to NOAA Fisheries' satisfaction before release of the final FPP. Key elements of the plan include:	2010 to 2013 The Fish Passage Plan will be reviewed and updated annually by a regional coordination team and posted at http://www.nwd-wc.usace.army.mil/tmt.	
	• Operate according to project-specific criteria and dates to operate and maintain fish facilities, turbine operating priorities, and spill patterns; • Operate according to fish transportation criteria; • Maintain turbine operations within the 1% of best efficiency range; • Maintain spillway discharge levels and dates to provide project spill for fish passage; • Implement TDG monitoring plan;		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 4—Operate and Maintain Facilities at Corps' Mainstem Projects to Maintain Biological Performance			
	• Operate according to protocols for fish trapping and handling; • Take advantage of low river conditions, low reservoir elevations or periods outside the juvenile migration season to accomplish repairs, maintenance, or inspections so there is little or no effect on juvenile fish; • Coordinate routine and non-routine maintenance that affects fish operations or structures to eliminate and/or minimize fish operation impacts; • Schedule routine maintenance during non-fish passage periods; • Conduct non-routine maintenance activities as needed; and • Coordinate criteria changes and emergency operations with FPOM.		
	Operations and Maintenance • Provide redundancy or contingency plans, developed in coordination with NOAA Fisheries and the Regional Forum, which will assure that key adult fish passage facility equipment operates as necessary to minimize long-term adult	• Evaluate the condition of items for fish passage annually and include a prioritized list of maintenance items in the annual budgeting process.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 4—Operate and Maintain Facilities at Corps' Mainstem Projects to Maintain Biological Performance			
	passage delays.		
	• Evaluate the condition of items necessary (e.g., spillway hoist systems, cranes, turbine units, AWS systems, etc.) to provide safe and effective fish passage and develop a prioritized list of these items that are likely to require maintenance now or within the term of this Opinion.	• Continue to develop, revise, and prioritize Strategic Infrastructure Investment Plan (SIIP) and pursue funding for high-priority items.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hydropower Strategy 5—Develop and Implement a Kelt Management Plan			
33	**Snake River Steelhead Kelt Management Plan** • The BPA and Corps will prepare a Snake River Kelt Management Plan in coordination with NOAA Fisheries and the Regional Forum. The BPA and Corps will implement the plan to improve the productivity of interior basin B-run steelhead populations as identified in Sections 8.5. Key considerations in the development and implementation of the plan should include: • Measures to increase the in-river survival of migrating kelts, • Potential for the collection and transport (either with or without short-term reconditioning) of kelts to areas below Bonneville Dam, • Potential for long-term reconditioning as a tool to increase the number of viable females on the spawning grounds, • Research as necessary to accomplish the elements of this plan.	2010-2013 • Review and update the existing Kelt Management Plan annually, building on data and analysis of previous efforts. Implement actions identified in the annual plan, as warranted. 2010 • Continue the evaluation of early season operations of The Dalles sluiceway and Bonneville Dam PH2 Corner Collector. • Complete the Lower Granite Dam temporary kelt collection and holding facility, pending completion of the new juvenile facility. • Complete the design of the kelt facility for the Lower Granite Dam new juvenile bypass system.	

Habitat Actions

The overall habitat objective for all ESUs is to protect and improve tributary and estuary habitat to improve fish survival. The Action Agencies will pursue two broad strategies to meet this objective:

- Habitat Strategy 1—Protect and improve tributary habitat based on biological needs and prioritized actions
- Habitat Strategy 2—Improve juvenile and adult fish survival in estuary habitat

Each strategy consists of one or more specific actions. These are summarized in the following sections.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
34	**Tributary Habitat Implementation 2007 to 2009 – Progress Toward 2018 Habitat Quality Improvement Targets.** The Action Agencies will provide funding and technical assistance necessary to implement the specific projects identified for implementation in 2007 to 2009 (FCRPS BA, Attachment B.2.2-2, Tables 1-5a) as part of a tributary habitat program to achieve the population-specific overall habitat quality improvement identified in Table 5. If projects identified for implementation in 2007-2009 prove infeasible, in whole or in part, the Action Agencies will implement comparable replacement projects in 2010-2013 to maintain estimated habitat quality improvements to achieve equivalent survival commitments at the population level, or alternatively at the major population group	The expert panels estimated changes in habitat function associated with projects completed in the 2007-2009 implementation cycle. Projects scheduled for completion in 2007-2009 that had implementation delays were carried forward to the 2010-2012 period; the associated benefits are included in the estimates for the 2010-2012 implementation cycle.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
	(MPG) or ESU level. Habitat and population-specific survival benefits in each implementation plan cycle must also compensate for not meeting estimated benefits in the previous implementation plan cycle. Replacement project selection will follow Action 35 below.		
35	**Tributary Habitat Implementation 2010-2018 – Achieving Habitat Quality and Survival Improvement Targets.** The Action Agencies will identify additional habitat projects for implementation based on the population specific overall habitat quality improvement still remaining in Table 5 below. Projects will identify location, treatment of limiting factor, targeted population or populations, appropriate reporting metrics, and estimated biological benefits based on achieving those metrics. Pertinent new information on climate change and potential effects of that information on limiting factors will be considered. a) During 2010 to 2018, the Action Agencies will provide funding and/or technical assistance to implement specific habitat projects to achieve the specified habitat quality improvements listed in Table 5. Habitat quality	The Action Agencies are providing funding and technical assistance to improve habitat for more than 90 interior Columbia Basin spring/summer Chinook and summer/winter steelhead populations, including most of the 18 priority and 38 non-priority populations listed in Table 5 of RPA Action 35. Appendix A lists tributary habitat improvement actions to be implemented in 2010-2012 with Action Agency funding and technical assistance. It also contains input from the expert panels, including: • Target population(s) • Location of action(s) • Limiting factors treated • Description of actions • Reporting metrics • Expected habitat quality improvement Links to relevant project information are also included, for more detailed implementation information. The improvements expected through the end of 2012 developed	The Action Agencies will continue to coordinate with NOAA in its efforts to use existing tributary habitat effectiveness studies, intensively monitored watersheds (IMWs), and the NOAA-enhanced life cycle modeling to track climate change impacts. Starting in September 2011, the Action Agencies will annually provide NOAA with study data to be used as part of a regional climate change database. After 2011, new climate change findings will be provided to the tributary habitat expert panels to apply and use to help identify and prioritize habitat

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
	improvements associated with projects will be estimated in advance of project selection by expert panels. The Action Agencies will convene expert panels to estimate changes in habitat limiting factors from the implementation of Action Agency habitat actions. • The Action Agencies shall convene an expert panel to evaluate the percent change in overall habitat quality at the population scale from projects implemented previously (if quantitative objectives not met) and projects proposed for the implementation until the next check-in. • The expert panel will use methods consistent with the NWR v. NMFS Remand Collaboration Habitat Workgroup process. • Project proposals will clearly describe the completed project in terms of quantitative habitat metrics which can be used to quantitatively evaluate progress and completion of individual projects.	from expert panel input provide substantial progress in achieving the targets for the Table 5 populations by 2018. As a result of the Comprehensive Evaluation in 2013, some populations may need additional implementation focus to meet 2018 performance requirements. Substantial on-the-ground momentum has now been built in many areas to support fast-paced habitat project implementation in 2010-2018. The Action Agencies are applying the following implementation strategies to deliver high-value projects: • Tributary and reach assessments have been completed or initiated in a number of areas to identify a supply of viable habitat actions that will further increase the pace of implementation and achieve targets by 2018. • In the Upper Columbia and Lower Snake regions, the Action Agencies are partnering with local entities on programmatic funding and prioritization. This approach allows for comprehensive project planning and prioritization, provides greater flexibility to select the best actions for implementation each year, provides opportunities for multi-year funding to address large-effort and complex projects, and sustains implementation through various funding and solicitation cycles. This approach will deliver the high-priority actions that address limiting factors associated with habitat degradation needed to achieve the ambitious population targets. <u>2012</u> The Action Agencies will amend this Implementation Plan by	improvement actions. The Action Agencies are identifying tributary habitat projects for implementation based on the population-specific overall habitat quality improvement identified in the RPA action. As part of this action, after 2011, the Action Agencies will include as a consideration in the expert panel project evaluation process (1) the presence of invasive species, and (2) site-specific toxicology issues, based on information made available by the appropriate state and federal agencies. The past 10 years of tributary habitat implementation experience have led the Action Agencies to conclude that certain technical studies significantly improve the odds of biologically successful project construction. Based

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
		updating Appendix A after the next expert panel project recommendations become available in 2012 to identify projects and actions for implementation in 2013.	on this information, Reclamation is completing "tributary and reach assessments." These studies characterize ecosystem conditions, geomorphic parameters, baseline conditions, and other factors for identifying, prioritizing, and implementing successful habitat improvement actions. Assessment reports are available by linking to individual states from: http://www.usbr.gov/pn/programs/fcrps/thp/index.html.
	• The Action Agencies will use the expert panels to provide input on changes in habitat quality and function as a result of limiting factor improvements from project actions for the priority population areas and this information will be used to assess improvements to salmonid survival.	2011 • Initiate planning for tributary expert panel workshops. 2012 • Convene tributary expert panels to address populations with remaining Action Agency habitat quality improvement commitments. The expert panels will: – Review progress on actions identified for 2010-2012 implementation. – Adjust estimated changes in habitat function if there are any implementation differences (substitutions, decreases, or increases) between 2010-2012 planned actions and implemented actions. – Assess actions for implementation in 2013 -2015 and estimate the associated changes in habitat function. • Based on information from expert panels, the Action Agencies will: – Calculate estimates of past and future progress toward population targets. – Determine whether tributary habitat implementation needs to be expanded, revised, or refocused to achieve the Table 5 population-level habitat quality improvement targets.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
		– Update Appendix A to amend the current Implementation Plan and identify projects and actions for implementation in 2013. The updated list will be provided to NOAA Fisheries by December 2012.	
	• If actions from the previous cycle prove infeasible, in whole or in part, the Action Agencies will ensure implementation of comparable replacement projects in the next implementation plan cycle to maintain estimated habitat quality improvements at the population level and achieve equivalent survival benefits. If infeasible at the population level, then alternatively replacement projects will be found to provide benefits at the MPG or ESU/DPS level. Selection of replacement projects to ensure comparable survival benefits will be made based on input from expert panels, regional recovery planning groups, the Northwest Power and Conservation Council, and NOAA Fisheries.	• The expert panels will re-evaluate changes in habitat function where actions that were relied upon to estimate habitat quality improvements are not implemented as expected. • The Action Agencies will recalculate population-specific habitat quality improvements based on all actions actually implemented in 2010-2012, including any that were expanded or substituted. • The expert panels will identify actions for 2013-2015 implementation and estimate changes in habitat function. • The Action Agencies will use the expert panel estimates to calculate the population-specific habitat quality and survival improvements and determine whether they are sufficient to achieve the RPA targets. • If the estimated improvements are insufficient, the Action Agencies will coordinate with expert panels, regional recovery planning groups, the Northwest Power and Conservation Council (NPCC), NOAA Fisheries, and others to identify additional actions for implementation to ensure comparable survival benefits.	
	• The Action Agencies will continue to work cooperatively with the Council to	<u>2010-2013</u> The Action Agencies will continue to cooperate with the Council to	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
	identify priorities and obtain ISRP review of projects proposed for BPA funding.	identify priorities and obtain ISRP review of projects.	
	• RM&E will inform the relationship between actions, habitat quality and salmon productivity for use in a model developed through the FCRPS RM&E Strategy 3, Action 57 and new scientific information will be applied to estimate benefits for future implementation.	See RPA 57 action plan.	
	• If new scientific or other information (except incomplete implementation or project modifications) suggests that habitat quality improvement estimates for projects from the previous cycle were significantly in error, the Action Agencies will examine the information and review the project or projects in question and their estimated benefits. This review will occur as part of the 2009 Annual Report and the Comprehensive RPA Evaluations in 2013 and 2016 and will be performed in conjunction with NOAA Fisheries. In the event such review finds that habitat quality	<u>2010-2013</u> • The Action Agencies, in conjunction with NOAA Fisheries, will examine any new information that suggests that habitat quality improvement estimates have been significantly in error. Relevant findings will be considered in the next round of expert panel processes and evaluated in the 2013 Comprehensive Evaluation. • For lower Columbia populations above Bonneville Dam that have been significantly affected by the FCRPS, the Action Agencies may provide funding and/or technical assistance for the habitat improvement projects identified in Appendix A.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 1—Protect and Improve Tributary Habitat Based on Biological Needs and Prioritized Actions			
	improvement benefits were significantly overstated, the Action Agencies will implement replacement projects (selected as per Action 35 above) to provide benefits sufficient to achieve the habitat quality improvement and population-or MPG-specific survival benefit estimated for the original project or projects.		
	b) During 2010-2018, for non-bolded populations in Table 5, the Action Agencies may provide funding and/or technical assistance for replacement projects should they become necessary for the Action Agencies to achieve equivalent MPG or ESU survival benefits. c) For those lower Columbia populations above Bonneville Dam that have been significantly impacted by the FCRPS (CR chum, LCR coho, LCR Chinook, and LCR steelhead) the Action Agencies may provide funding and/or technical assistance for habitat improvement projects consistent with basin wide criteria for prioritizing projects, including Recovery Plan priorities.		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
36	**Estuary Habitat Implementation 2007 to 2009** The Action Agencies will provide funding to implement specific actions identified for implementation in 2007-2009 (FCRPS BA, Attachment B.2.2) as part of a 10 year estuary habitat program to achieve the estimated ESU survival benefits of 9.0% and 6.0% for ocean type and stream-type ESUs respectively (CA Attachment D-1). Projects in an early state of development such that quantitative physical metrics have not been related to estimated survival benefits will be selected per Action 37. If projects identified for implementation in 2007-2009 prove infeasible, in whole or in part, the Action Agencies will implement comparable replacement projects in 2010-2013 to provide equivalent habitat benefits needed to achieve equivalent survival benefits. Replacement projects will be selected per Action 37.	Some projects scheduled for completion in 2007-2009 were delayed and are being carried forward to the 2010-2013 period; the associated benefits are included in the estimates for the 2010-2013 implementation cycle. During the 2007-2009 implementation period a number of projects proved infeasible. The Action Agencies will implement additional projects in 2010-2013 to provide survival benefits equivalent to those of the projects that proved infeasible. These additional projects will be selected and implemented in accordance with RPA 37.	RPA Action 36 called for the Action Agencies to fund implementation of the specific actions shown for the 2007-2009 period in Attachment D-1 of the Comprehensive Analysis. For the 2007-2009 commitments, the Action Agencies achieved approximately 26 percent of expected survival benefits for ocean-type fish and approximately 24 percent of expected survival benefits for stream-type fish because some of the projects proved to be infeasible or implementation was delayed. As described in RPA Action 36, the Action Agencies are committed to implementing actions to achieve make-up survival benefits during this next implementation period. The Action Agencies have developed and begun implementing strategies and actions to accelerate the pace of project development and

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
			selection and expect to achieve the total survival benefit unit commitment by 2018.
37	**Estuary Habitat Implementation 2010-2018—Achieving Habitat Quality and Survival Improvement Targets** The Action Agencies will provide funding to implement additional specific projects as needed to achieve the total estuary survival benefits identified in the FCRPS BA Attachment B.2.2). Projects will identify location, treatment of limiting factor, targeted ESU/DPS or ESUs/DPSs, appropriate reporting metrics, and estimated biological benefits based on the achieving of those metrics. Pertinent new information on climate change and potential effects of that information on limiting factors will be considered.	In 2010-2013 the Action Agencies will provide funding for implementation of projects as needed to achieve the total FCRPS BiOp estuary survival benefits by 2018. Most projects implemented in the estuary are selected on an annual basis. For 2011-2013, project lists will be provided to NOAA Fisheries annually. <u>2010 -2013</u> Appendix A lists actions to be implemented beginning in 2010 with funding from the Action Agencies. The list includes potential projects that are being evaluated for implementation in 2011-2013. The Action Agencies have developed new strategies for developing potential projects and selecting and implementing projects in order to expand the portfolio of high-quality projects in the estuary and expedite implementation. Key strategies of the plan are to: • Continue to have all estuary projects reviewed by the Expert Regional Technical Group (ERTG). Survival unit estimates for potential projects will be obtained early in project development to more efficiently identify which projects to pursue. • Expedite Washington estuary MOA projects with high survival benefits. The Corps, BPA, and the Washington Department of Fish and Wildlife (WDFW) will identify and implement estuary	The Action Agencies will implement an additional 21 projects [AMIP p. 16]. To achieve the 2010-2018 commitment, the Action Agencies have developed new strategies to more effectively develop, select, and implement estuary projects (see 2010-2013 Actions).

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
		restoration projects that provide the highest survival benefits. • Identify and implement joint BPA/Corps projects (non-Washington estuary MOA) that yield high survival benefits (see AMIP p. 16). • Develop Joint Action Agency selection criteria. The Action Agencies will work collaboratively to produce joint project selection criteria. The criteria will guide selection of habitat projects to more effectively meet estuary targets/goals in the 2008 FCRPS BiOp. • Pursue partnerships on the Oregon and Washington shoreline to identify large tracts of land suitable for implementation of habitat actions. • Identify potential projects where dredged material could be used to create, restore, or enhance shallow-water estuary habitat. • Explore the potential use or development of mitigation banks for restoration activities.	
	Action Agencies will actively engage the LCREP Science workgroup to identify project benefits in coordination with other regional experts, using recovery planning products and the modified LCREP project selection criteria (FCRPS BA Attachment B.2.2-3) to identify projects that will benefit salmon considered in this RPA.	The Action Agencies will continue to actively engage the Lower Columbia River Estuary Partnership (LCREP) science work group, whose criteria are considered in the selection of restoration projects in the lower Columbia River and estuary.	
	To support project selection the Action	The Action Agencies have convened the Expert Regional	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
	Agencies will convene an expert regional technical group. This group will use the habitat metrics to determine the estimated change in survival which would result from full implementation.	Technical Group (ERTG), whose primary purpose is to estimate the survival benefits of completed habitat projects. The ERTG also will develop preliminary survival benefit estimates for some proposed projects.	
	Project proposals will clearly describe the completed project in terms of quantitative habitat metrics which can be used to quantitatively evaluate progress and completion of individual projects.	The Action Agencies will ensure that the quantitative metrics for their estuary habitat restoration projects comply with the requirements of RPA Action 73—i.e., that they include the set of minimum metrics and meta data listed in the Katz et al. memo referred to in RPA Action 73.	
	The expert regional technical group will use the approach originally applied in the FCRPS BA (Attachment B.2.2) (Estimated Benefits of Federal Agency Habitat Projects in the Lower Columbia River Estuary) and all subsequent information on the relationship between actions, habitat and salmon productivity models developed through the FCRPS RM&E to estimate the change in overall estuary habitat and resultant change in population survival.	The ERTG is using the survival benefit estimation approach applied in the FCRPS BA (Comprehensive Analysis, Attachment D). The ERTG may, taking new information into account, modify the current methodology for estimating the change in population survival resulting from estuary habitat restoration.	
	If actions from the previous cycle prove infeasible, in whole or in part, the Action Agencies will ensure implementation of comparable replacement estuary projects in the next implementation plan cycle to maintain estimated habitat quality improvements at the ESU/DPS level and	The Action Agencies will implement projects to achieve survival units equivalent to the total estimated benefits of those 2007-2009 projects that proved infeasible. The Action Agencies have reworked their strategies for achieving the BiOp survival benefit goals, with increased emphasis on larger projects that will provide greater benefits. Therefore, the equivalent benefits will not be provided through the development	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
	achieve equivalent survival benefits. Selection of replacement projects, to ensure comparable survival benefits, will be made based on input from expert panels, regional recovery planning groups, the Northwest Power and Conservation Council, and NOAA Fisheries.	of one-for-one replacement projects. Rather, the equivalent benefits will simply be added to the regular benefits targets to be achieved during the 2010-2013 period. Selection of projects will be carried out through the normal process and will consider input from the ERTG, NOAA Fisheries, the NPCC, and other regional interests.	
	FCRPS RM&E results will actively inform the relationship between actions, estuary habitat change and salmon productivity and new scientific information will be applied to estimate benefits for future implementation.	The Action Agencies will continue to coordinate with groups such as the Estuary/Ocean RME Subgroup (EOS) in determining future estuary RME needs. The Action Agencies will continue to consider both research and project action effectiveness monitoring and other new scientific information in project selection. Should the ERTG decide to modify the existing benefit estimation methodology or develop a new one, the Action Agencies will ensure that the group considers recent RME results and other new scientific information. The Action Agencies will revise their project selection criteria based on RME findings.	
	If new scientific or other information (except incomplete implementation of project modification) suggests that habitat quality improvement estimates for projects from the previous cycle were significantly in error, the Action Agencies will examine the information and review the project or projects in question and their estimated benefits. This review will occur as part of the 2009 Annual	In the 2009 Annual Report and in the 2013 Comprehensive Evaluation, the Action Agencies will, in coordination with NOAA Fisheries, examine recent scientific and other information to see whether the survival benefits methodology should be further refined for application to projects in the 2014-2018 time period.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
	Report and the Comprehensive RPA Evaluations in 2013 and 2016 and will be performed in conjunction with NOAA Fisheries. In the event such review find that habitat based survival improvement were significantly overstated, the Action Agencies will implement replacement projects (selected as per new projects above) to provide benefits sufficient to achieve the ESU/DPS-specific survival benefit estimated for each affected project.		
38	**Piling and Piling Dike Removal Program** To increase access to productive habitat and to reduce avian predation, the Action Agencies will develop and implement a piling and pile dike removal program. In 2008, the Action Agencies will work with Lower Columbia River Estuary Program to develop a plan for strategic removal of structures that have lower value to navigation channel maintenance, present low-risk to adjacent land use, support increased ecosystem function, and are cost-effective. Beginning in 2008 and 2009, the Action Agencies will begin implementation. Implementation will continue through 2018.	2010-2013 The Action Agencies will collaborate with the Lower Columbia River Estuary Partnership to identify and remove pile structures from the lower river and estuary (note that these are non-Corps-owned structures). • The Corps will carry out a condition survey and hydraulic analyses to determine the likely effects of removal of Corps-owned pile structures. This is necessary to determine which pile structures may be removed without adversely affecting the Corps' navigation mission, nearby desirable habitat features, or property. Fieldwork is scheduled to begin in 2010; the final report will be available in 2012. • The Corps will investigate ways to make some results of the condition survey and hydraulic analyses available sooner, such as by evaluating first those structures that are the most likely candidates for removal. • Until results of the condition survey and hydraulic analyses are available, the Action Agencies will pursue removal of non-	To achieve the 2010-2018 commitment, the Action Agencies have developed new strategies to more effectively develop, select, and implement estuary projects.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Habitat Strategy 2—Improve Juvenile and Adult Fish Survival in Estuary Habitat			
		Corps-owned pile structures, such as pile fields. • For implemented projects, the ERTG will provide the estimation of survival benefit units to be credited toward achievement of the BiOp total estuary survival benefits. <u>2010</u> • The ERTG will provide an initial review and assessment of the ecological value of piles for potential removal.	

Hatchery Actions

The overall hatchery objective for all ESUs is to fund FCRPS mitigation hatchery programs in a way that contributes to reversing the decline of downward-trending ESUs. The Action Agencies will pursue two strategies to meet this overall objective:

- Hatchery Strategy 1—Ensure that hatchery programs funded by the FCRPS Action Agencies as mitigation for the FCRPS are not impeding recovery of ESUs or steelhead DPSs
- Hatchery Strategy 2—Preserve and rebuild the genetic resources through safety-net and conservation actions to reduce short-term extinction risk and promote recovery

Each strategy consists of two specific actions. These are summarized in the following sections.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 1—Ensure that Hatchery Programs Funded by the FCRPS Action Agencies as Mitigation for the FCRPS are not Impeding Recovery of ESUs or steelhead DPSs			
39	**FCRPS Funding of Mitigation Hatcheries – Programmatic** The FCRPS Action Agencies will continue funding hatcheries in accordance with existing programs, and will adopt programmatic criteria for funding decisions on mitigation programs for the FCRPS that incorporate BMPs. The Hatchery Effects Report, the August 2006 NOAA Fisheries paper to the PWG and the NOAA Fisheries 2007 Guidance Paper should be considered in developing these criteria in addition to the BMPs in the Action Agency's BA. Site specific application of BMPs will be defined in ESA Section 7, Section 10, or Section 4(d) consultations with NOAA Fisheries to be initiated and conducted by hatchery	2010 The Action Agencies have encouraged hatchery operators to complete updated Hatchery Genetic Management Plans (HGMPs) and submit them to NOAA Fisheries.	The federal Action Agencies expect updated HGMPs for all Action Agency-funded hatchery programs in the Upper Columbia, Mid-Columbia, and Snake River regions to be submitted to NOAA Fisheries by summer 2010. NOAA Fisheries will complete ESA consultations for these hatchery programs as soon as possible. The Action Agencies will continue to fund hatcheries in accordance with existing programs and funding

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 1—Ensure that Hatchery Programs Funded by the FCRPS Action Agencies as Mitigation for the FCRPS are not Impeding Recovery of ESUs or steelhead DPSs			
	operators with the Action Agencies as cooperating agencies.		criteria. The criteria are intended to ensure that hatchery programs that receive FCRPS funding do not impede—and where possible assist in—the recovery of ESA-listed salmon and steelhead.
40	**Reform FCRPS Hatchery Operations to Reduce Genetic and Ecological Effects on ESA-Listed Salmon and Steelhead** The Action Agencies will undertake/fund reforms to ensure that hatchery programs funded by the Action Agencies as mitigation for the FCRPS are not impeding recovery. The Action Agencies will work with FCRPS mitigation hatchery operators to cost effectively address needed reforms of current hatchery programs while continuing to meet mitigation responsibilities. Specific reforms to be implemented under this action (following any necessary regulatory approval) are listed in Table 6. Other reforms will be identified and implemented following the conclusion of the Columbia River Hatchery Scientific Review Group process.	2010-2013 actions and implementation schedules for reforms are identified in Table 6. Hatchery Scientific Review Group (HSRG) reforms and other scientific information will be considered as part of HGMP development and NOAA Fisheries ESA consultations.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 1—Ensure that Hatchery Programs Funded by the FCRPS Action Agencies as Mitigation for the FCRPS are not Impeding Recovery of ESUs or steelhead DPSs			
	For Lower Columbia Chinook: The COE will review the John Day Hatchery Mitigation Program.	The Corps currently is reviewing the John Day Hatchery Mitigation Program with the intent to reprogram the mitigation to better address an in-place, in-kind strategy. This review is being conducted in collaboration with Regional entities, including U.S. v Oregon parties. The Corps and U.S. v Oregon are engaged in a review of the underlying "basis" for the mitigation program and whether it should be reconsidered. Resolution of this issue is prerequisite to establishing a schedule for development and evaluation of reprogramming alternatives. When those alternatives are identified, their genetic and ecological effects will, if necessary, be addressed in ESA consultation with NOAA Fisheries. The Corps is also working with Grant County Public Utility District (PUD) to determine the role of Priest Rapids Hatchery in continuing to fulfill a component of the John Day Mitigation responsibility when the hatchery is rebuilt and expanded.	
	For Snake River Steelhead: Fund the Tucannon River steelhead supplementation program to transition to local broodstock using BMPs.[2]	For Tucannon steelhead, WDFW developed a revised HGMP to transition to local broodstock and submitted a summary of the proposed changes to the U.S. v. Oregon Production Advisory Committee for review. The proposal would increase the current Tucannon River endemic stock summer steelhead smolt production from 50,000 to 75,000 fish annually. As the program expands toward a production goal of 150,000 in the future (following needed facility modifications at the Lyons Ferry and Tucannon fish hatcheries), up to two-thirds of the	Changes from the proposed HGMP will be incorporated to include additional requirements from ESA consultation.

[2] Current operation of these programs is undergoing site-specific ESA consultation; a Section 7 determination has not yet been made.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 1—Ensure that Hatchery Programs Funded by the FCRPS Action Agencies as Mitigation for the FCRPS are not Impeding Recovery of ESUs or steelhead DPSs			
		annual production would be marked for harvest mitigation as part of the Lower Snake River Compensation Plan (LSRCP) mitigation program. The remaining one-third of the program would be used for supplementation in the Tucannon River. Production facilities, brood source, size and life history at release, and time of release would all remain the same as the current program.	
	For Middle Columbia Steelhead: Fund the Touchet River steelhead supplementation program to transition to local broodstock using BMPs.[3]	For Touchet steelhead, WDFW submitted a HGMP to NOAA Fisheries in June 2009 to comply with NOAA's request to consult on mid-Columbia stocks. The new HGMP is consistent with the current management plan and the U.S. v. Oregon agreement. WDFW is in the process of conducting statewide review of steelhead hatchery programs as required by its commission and expects that a review of the Touchet program will be completed by the end of 2010.	Changes from the proposed HGMP will be incorporated to include additional requirements from ESA consultation.
	For Upper Columbia Steelhead: For the Winthrop NFH steelhead program, implement measures to transition to local broodstock and to manage the number of Winthrop NFH-produced steelhead on the spawning grounds. Such broodstock and adult escapement reform measures, including capital construction, would be identified through development of an updated HGMP and ESA consultation. Implementation of	2010 • Complete designs for adult trap and holding facility modifications at Winthrop NFH. Improvements at Winthrop will produce fish that are more fit and have higher survivability to adulthood. Ladder improvements will facilitate adult collection operations for Chinook and steelhead. 2011 • Construct modifications to Winthrop adult trap and holding facilities. 2012	

[3] Current operation of these programs is undergoing site-specific ESA consultation; a Section 7 determination has not yet been made.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 1—Ensure that Hatchery Programs Funded by the FCRPS Action Agencies as Mitigation for the FCRPS are not Impeding Recovery of ESUs or steelhead DPSs			
	reform measures is contingent on a finding, in consultation with NOAA, that the measures are biologically and economically feasible and effective. Implementation of reforms will be prioritized and sequenced.	• Continue construction of modifications if the modifications have not been completed in 2011.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
41	**Implement Safety Net Programs to Preserve Genetic Resources and Reduce Short-term Extinction Risk** The AAs will continue to fund the operation of on-going "safety net" programs that are providing benefits to ESA-listed stocks at high risk of extinction by increasing genetic resources and will identify and plan for additional safety-net programs, as needed. Specific safety-net programs to be implemented under this action are listed in Table 7 (of the BiOp).	Ongoing safety-net programs and new or modified safety-net programs that are being planned or implemented are listed in Appendix A.	
	For Snake River sockeye: Continue to fund the safety net program to achieve the interim goal of annual releases of 150,000 smolts while also continuing to implement other release strategies in nursery lakes such as fry and parr releases, eyed-egg incubation boxes, and adult releases for volitional spawning (see Action 42 for expansion of the program for building genetic resources and assisting in promoting recovery).	BPA will continue to fund the Snake River Sockeye Captive Propagation project (#200740200) in 2010-2013.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
	For Snake River Spring/Summer Chinook: For the Tucannon River spring/summer Chinook safety-net supplementation program fund capital construction, operation and monitoring and evaluation costs to implement a program that builds genetic diversity using local broodstock and a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish.	BPA will continue to fund the Tucannon River Spring Chinook Captive Brood project (#200001900) in 2010-2013.	
	For Snake River Spring/Summer Chinook: For the Upper Grande Ronde and Catherine Creek safety net supplementation programs fund capital construction, operation and monitoring and evaluation costs to implement a program that builds genetic diversity using local broodstock, and a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish.	BPA will continue to fund the Spring Chinook Captive Propagation-Oregon project (#200740400) in 2010-2013.	
	For Snake River Spring/Summer Chinook: Fund the Johnson Creek / South Fork Salmon River safety net supplementation	BPA will continue to fund the Johnson Creek Artificial Propagation Enhancement project (#199604300) in 2010-2013.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
	program, as described in the existing Section 10 permit.		
	For Snake River Spring/Summer Chinook: Fund the experimental captive rearing program for East Fork and West Fork Yankee Fork Salmon River (until phased out by IDFG).	BPA will continue to fund the Spring Chinook Captive Propagation-Idaho project (#200740300) in 2010-2013.	
	For **Snake River Steelhead**, as a project to benefit primarily B-run steelhead, the Action Agencies will work with NOAA Fisheries to develop a trigger for future artificial propagation safety-net planning or to identify populations for immediate safety-net planning.	It is not feasible to implement this action at this time due to a lack of adequate Snake River B-run steelhead population viability data. Once sufficient data are available through enhanced steelhead monitoring (RPA 50), we will begin working with NOAA Fisheries to develop a trigger for safety-net planning.	
42	**Implement Conservation Programs to Build Genetic Resources and Assist in Promoting Recovery** The Action Agencies will implement conservation programs for ESA-listed stocks where the programs assist in recovery. Specific conservation programs to be implemented under this action are listed in Table 8 (of the 2008 FCRPS BiOp RPA).		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
	For **Upper Columbia Spring Chinook**: Fund reintroduction of spring Chinook salmon into the Okanogan Basin consistent with the Upper Columbia Salmon Recovery Plan including capital construction, operation and monitoring and evaluation costs to implement a transition to local broodstock and a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish. Reintroduction will be coordinated with the restoration and improvement of spring Chinook habitat in the Okanogan Basin and will be contingent on the availability of within ESU broodstock from the Methow Basin.	BPA will continue to fund the Chief Joseph Hatchery Program project (#200302300) in 2010-2013.	
	For **Upper Columbia Steelhead**: Fund a program to recondition natural-origin kelts for the Entiat, Methow and Okanogan basin including capital construction, operation and monitoring and evaluation costs.	BPA will continue to fund the Steelhead Kelt Reconditioning project (#200845800) in 2010-2013.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
	For **Upper Columbia Steelhead**: Fund a program that builds genetic diversity using local broodstock and accelerates steelhead recovery in the Okanogan Basin as steelhead habitat is restored and improved, including capital construction, operation, and monitoring and evaluation costs.	BPA will continue to fund the Okanogan Basin Locally Adapted Steelhead Broodstock Step 1 and 2 (Casimer Bar) project (#200721200) in 2010-2013.	
	For **Middle Columbia Steelhead:** Fund a program to recondition natural-origin kelts in the Yakima River basin including capital construction, implementation and monitoring and evaluation costs	BPA will continue to fund the Kelt Reconditioning and Reproductive Success Evaluation Research project (#200740100) in 2010-2013.	
	For **Snake River Steelhead:** For the East Fork Salmon River**,** fund a small-scale program (no more than 50,000 smolts) including trapping locally returning steelhead in the East Fork Salmon River for broodstock, and follow BMPs for rearing, release, and adult management strategies. Fund capital construction, operation and monitoring and evaluation costs to implement a program that builds genetic diversity using local broodstock and a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish.	This small-scale steelhead program continues to be funded through the Lower Snake River Compensation Program.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
	For **Snake River Spring/Summer Chinook Salmon**: For the Lostine and Imnaha rivers, contingent on a NOAA approved HGMP, fund these hatchery programs including capital construction, operation and monitoring and evaluation costs to implement supplementation programs using local broodstock and following a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish.	BPA will continue to fund the Northeast Oregon Hatchery Master Plan project (#198805301) in 2010-2013.	
	For **Snake River Sockeye:** Fund further expansion of the sockeye program to increase total smolt releases to between 500,000 and 1 million fish.	BPA will continue to fund the Snake River Sockeye Captive Propagation project (#200740200) in 2010-2013. Increasing sockeye smolt production to between 500,000 and 1 million requires the acquisition, planning, development, and construction of a new sockeye salmon artificial production facility. A site (Springfield Hatchery) has been selected and the pre-acquisition activities are nearing completion. The property was transferred to the Idaho Department of Fish and Game (IDFG) in May 2010. Following acquisition, IDFG will begin the Northwest Power and Conservation Council's three-step process for approval of a new artificial production facility. The approval process is expected to last at least 2 years, after which actual construction can begin. It is difficult to predict when actual construction will be completed and the new facility brought into full production. A gross estimate is from 3 to 5 years, i.e., by 2015.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Hatchery Strategy 2—Preserve and Rebuild Genetic Resources Through Safety-net and Conservation Actions to Reduce Short-term Extinction Risk and Promote Recovery			
	For **Snake River Sockeye:** The Action Agencies will work with appropriate parties to investigate feasibility and potentially develop a plan for ground transport of adult sockeye from LGR Dam to Sawtooth Valley lakes or artificial propagation facilities.	2010-2011 • The Action Agencies will, in coordination with NOAA Fisheries and regional interests, (1) carry out a pilot program to transport a small percentage of adult sockeye returns to the Sawtooth Valley lakes or artificial propagation facilities, and (2) develop a transportation plan defining the circumstances and manner in which future adult transport would be implemented.	
	For **Columbia River Chum:** Fund a hatchery program to re-introduce chum salmon in Duncan Creek including capital construction, implementation and monitoring and evaluation costs as long as NOAA Fisheries considers it beneficial to recovery and necessary to reduce extinction risk of the target population.	BPA will continue to fund the Reintroduction of Chum in Duncan Creek project (#200105300) and the Development of an Integrated Strategy for Chum Salmon Restoration in the Tributaries below Bonneville Dam project (#200871000) in 2010-2013.	

Table 6. Specific Projects to Implement Hatchery RPA Actions

Hatchery Strategy 1, Action 40 **Reform FCRPS Hatchery Operations to Reduce Genetic and Ecological Effects on ESA-Listed Salmon and Steelhead**	
	For **Lower Columbia Chinook:** The COE will review the John Day Hatchery Mitigation Program.
	For **Snake River Steelhead:** Fund the Tucannon River steelhead supplementation program to transition to local broodstock using BMPs.[4]
	For **Middle Columbia Steelhead:** Fund the Touchet River steelhead supplementation program to transition to local broodstock using BMPs.[5]
	For **Upper Columbia Steelhead:** For the Winthrop NFH steelhead program, implement measures to transition to local broodstock and to manage the number of Winthrop NFH-produced steelhead on the spawning grounds. Such broodstock and adult escapement reform measures, including capital construction, would be identified through development of an updated HGMP and ESA consultation. Implementation of reform measures is contingent on a finding, in consultation with NOAA Fisheries, that the measures are biologically and economically feasible and effective. Implementation of reforms will be prioritized and sequenced.

Table 7. Specific Projects to Implement Hatchery RPA Actions

Hatchery Strategy 2, Action 41 **Implement Safety-net Programs to Preserve Genetic Resources and Reduce Short-term Extinction Risk**	
	For Snake River sockeye: Continue to fund the safety net program to achieve the interim goal of annual releases of 150,000 smolts while also continuing to implement other release strategies in nursery lakes, such as fry and parr releases, eyed-egg incubation boxes, and adult releases for volitional spawning (see Action 42 for expansion of the program for building genetic resources and assisting in promoting recovery).

[4] Current operation of these programs is undergoing site-specific ESA consultation; a Section 7 determination has not yet been made.
[5] Current operation of these programs is undergoing site-specific ESA consultation; a Section 7 determination has not yet been made.

Table 7. Specific Projects to Implement Hatchery RPA Actions

Hatchery Strategy 2, Action 41 **Implement Safety-net Programs to Preserve Genetic Resources and Reduce Short-term Extinction Risk**	
	For Snake River Spring/Summer Chinook: For the Tucannon River spring/summer Chinook safety-net supplementation program: Fund capital construction, operation, and monitoring and evaluation costs to implement a program that builds genetic diversity using local broodstock and a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish.
	For Snake River Spring/Summer Chinook: For the Upper Grande Ronde and Catherine Creek safety net supplementation programs: Fund capital construction, operation, and monitoring and evaluation costs to implement a program that builds genetic diversity using local broodstock and a sliding scale for managing the composition of natural spawners comprised of hatchery-origin fish.
	For Snake River Spring/Summer Chinook: Fund the Johnson Creek / South Fork Salmon River safety net supplementation program, as described in the existing Section 10 permit.
	For Snake River Spring/Summer Chinook: Fund the experimental captive rearing program for East Fork and West Fork Yankee Fork Salmon River (until phased out by IDFG).
	For **Snake River Steelhead:** As a project to benefit primarily B-run steelhead, the Action Agencies will work with NOAA Fisheries to develop a trigger for future artificial propagation safety-net planning or to identify populations for immediate safety-net planning.

Table 8. Specific Projects to Implement Hatchery RPA Actions

Hatchery Strategy 2, Action 42 **Implement Conservation Programs to Build Genetic Resources & Assist in Promoting Recovery**	
	For **Upper Columbia Spring Chinook**: Fund reintroduction of spring Chinook salmon into the Okanogan Basin consistent with the Upper Columbia Salmon Recovery Plan, including capital construction, operation, and monitoring and evaluation costs to implement a transition to local broodstock and a sliding scale to manage the composition of natural spawners comprised of hatchery-origin fish. Reintroduction will be coordinated with the restoration and improvement of spring Chinook habitat in the Okanogan Basin and will be contingent on the availability of within-ESU broodstock from the Methow Basin.
	For **Upper Columbia Steelhead**: Fund a program to recondition natural-origin kelts for the Entiat, Methow, and Okanogan basins, including capital construction, operation, and monitoring and evaluation costs.
	For **Upper Columbia Steelhead**: Fund a program that builds genetic diversity using local broodstock and accelerates steelhead recovery in the Okanogan Basin as steelhead habitat is restored and improved, including capital construction, operation, and monitoring and evaluation costs.
	For **Middle Columbia Steelhead:** Fund a program to recondition natural-origin kelts in the Yakima River basin, including capital construction, implementation, and monitoring and evaluation costs.
	For **Snake River Steelhead:** For the East Fork Salmon River**,** fund a small-scale program (no more than 50,000 smolts), including trapping locally returning steelhead in the East Fork Salmon River for broodstock, and follow BMPs for rearing, release, and adult management strategies. Fund capital construction, operation, and monitoring and evaluation costs to implement a program that builds genetic diversity using local broodstock and a sliding scale to manage the composition of natural spawners comprised of hatchery-origin fish.
	For **Snake River Spring/Summer Chinook Salmon**: For the Lostine and Imnaha rivers, contingent on a NOAA Fisheries-approved HGMP, fund these hatchery programs, including capital construction, operation, and monitoring and evaluation costs to implement supplementation programs using local broodstock and a sliding scale to manage the composition of natural spawners comprised of hatchery-origin fish.
	For **Snake River Sockeye:** Fund further expansion of the sockeye program to increase total smolt releases to between 500,000 and 1 million fish.
	For **Snake River Sockeye:** The Action Agencies will work with appropriate parties to investigate feasibility and potentially develop a plan for ground transport of adult sockeye from Lower Granite Dam to Sawtooth Valley lakes or artificial propagation facilities.

Table 8. Specific Projects to Implement Hatchery RPA Actions

Hatchery Strategy 2, Action 42 **Implement Conservation Programs to Build Genetic Resources & Assist in Promoting Recovery**	
	For **Columbia River Chum:** Fund a hatchery program to reintroduce chum salmon in Duncan Creek, including capital construction, implementation, and monitoring and evaluation costs as long as NOAA Fisheries considers it beneficial to recovery and necessary to reduce extinction risk of the target population.
	For **Columbia River Chum:** Fund assessment of habitat potential, development of reintroduction strategies, and implementation of pilot supplementation projects in selected Lower Columbia River tributaries below Bonneville Dam.

Predation and Invasive Species Management Actions

The overall predation management objective for all ESUs is to improve the survival of juvenile and adult fish as they pass through the hydrosystem. The Action Agencies will pursue three strategies to meet this overall objective:

- Predation and Invasive Species Management Strategy 1—Implement piscivorous predation control measures to increase survival of juvenile salmonids in the lower Snake and Columbia rivers
- Predation and Invasive Species Management Strategy 2—Implement avian predation control measures to increase survival of juvenile salmonids in the lower Snake and Columbia rivers
- Predation and Invasive Species Management Strategy 3—Implement marine mammal control measures to increase survival of adult salmonids at Bonneville Dam

Each strategy consists of two specific actions. These are summarized in the following sections.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers			
43	**Northern Pikeminnow Management Program (NPMP)** Action Agencies will continue to annually implement the base program and continue the general increase in the reward structure in the northern pikeminnow sport-reward fishery consistent with the increase starting in 2004. To better evaluate the effects of the NPMP, BPA will increase the number of tagged fish. The Action Agencies will evaluate the effectiveness of focused removals of	The Northern Pikeminnow Management Program (NPMP) will continue to be implemented for the foreseeable future, including the 2010-2013 performance period. In 2004, BPA increased the reward for the catch of this predator and increased the number removed by 25 percent over prior years. The increased reward was made permanent in 2005 to sustain the higher catches. Researchers have increased cumulative tagging efforts, increasing year-over-year application of tags by an average of 75 percent in recent years. As part of the annual evaluation of the NPMP, and based on 2008 catches, managers determined that continued implementation of	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers			
	pikeminnow at The Dalles and John Day Dams and implement as warranted. Additional scoping of other mainstem dams will be based upon evaluations and adaptive management principles with input from NOAA Fisheries, and other regional fisheries managers.	the Dam Angling program component is warranted.	
44	**Develop strategies to reduce non-indigenous fish** The AAs will work with NOAA Fisheries, states and tribes to coordinate to review, evaluate, and develop strategies to reduce non-indigenous piscivorous predation. The formation of a workshop will be an initial step in the process.	In September 2008, BPA sponsored a 1-day workshop entitled "Review, Evaluate, and Develop Strategies to Reduce Non-Native Piscivorous Predation on Juvenile Salmonids." More than 100 people attended, representing states, tribes, federal fish management agencies, Action Agencies, and other stakeholders. Results of the facilitated workshop and follow-up topics were compiled and presented to NOAA Fisheries. On May 11, 2009, BPA and the Action Agencies held a follow-up half-day meeting to discuss and further refine the many ideas that were generated at the larger workshop held the previous fall. The smaller work group (n=15) was able to narrow down and prioritize the dozen or so recommendations into three topic areas from which a basic or applied research proposal would be pursued with the objective of implementing actions to address the focal areas of concern. Researchers then developed the ideas into a research proposal titled Understanding the Influence of Predation by Introduced Fishes on Juvenile Salmonids in the Columbia River Basin: Closing Some Knowledge Gaps (#2008-719-00) and presented it to the Northwest Power and Conservation Council's Independent Scientific Review Panel (ISRP) in December 2009. The proposal is currently in review and being refined based on additional	BPA developed a proposal to design a research study of predation by introduced fishes on juvenile salmonids in the Columbia River basin in November 2009 and requested an expedited review of the proposal by the Independent Scientific Review Plan (ISRP), to accelerate field implementation. The Action Agencies will implement the research study during the next field season(s), anticipated by December 2010. Once this research supports a specific management strategy, the Action Agencies could implement site-specific removals of smallmouth bass

<table>
<tr><th>Action No.</th><th>Action Description</th><th>2010-2013 Actions</th><th>Adaptive Management</th></tr>
<tr><td colspan="4">Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers</td></tr>
<tr><td></td><td></td><td>information requested by the ISRP. The goal is to have field activities initiated by fall 2010. Focal areas include shad, smallmouth bass, and channel catfish research.
A proposal was made to the ISRP by ODFW and USGS for a study of predation on salmonids by non-indigenous fish. The ISRP sent the proposal back to the sponsors with suggestions for improving the study design. As of March 31, 2010, the proposal had not been resubmitted.</td><td>and exclude adult American shad from upper mainstem dams as early as the following migration season. [AMIP p. 18]</td></tr>
<tr><td>45</td><td>Reduce Caspian Terns on East Sand Island in the Columbia River Estuary
The FCRPS Action Agencies will implement the Caspian Tern Management Plan. East Sand Island tern habitat will be reduced from 6.5 to 1.5 to 2 acres. It is predicted that the target acreage on East Sand Island will be achieved in approximately 2010.
<table>
<tr><th>Site</th><th>Acres</th><th>Proposed Year of Creation</th><th>Proposed Year in which Target Acreage Is Achieved</th></tr>
<tr><td>Fern Ridge Lake</td><td>1</td><td>2007/2008</td><td>2007/2008</td></tr>
<tr><td>Summer Lake</td><td>1.5</td><td>2008</td><td>2008</td></tr>
<tr><td>Crump Lake</td><td>1</td><td>2009</td><td>2009</td></tr>
<tr><td>Brooks Island (San Francisco Bay)</td><td>2</td><td>2008/2009</td><td>2008/2009</td></tr>
</table></td><td><u>2010-2013</u>
• Continue assessment of effectiveness of constructed sites in attracting and retaining tern populations.
• Continue monitoring of abundance and predation.
• Continue assessment of effectiveness of nesting habitat reduction at East Sand Island.
<u>2010</u>
• Complete construction of Sheepy Lake project in the Klamath Basin (spring 2010).
• Reduce tern nesting habitat on East Sand Island to 3.1 acres.
• Determine final location of San Francisco Bay projects. If San Francisco Bay projects prove impracticable, develop potential alternative locations and coordinate with NOAA Fisheries prior to construction.
<u>2011</u>
• Construct projects needed to reach 7.0-acre target.
• Reduce tern nesting habitat on East Sand Island to the target</td><td>To date, the Corps has constructed 6.0 acres of nesting habitat. However, because of drought conditions in northern California, not all of that acreage will be available in 2010. It is expected that these areas will be available in future years, which will allow a corresponding reduction in nesting habitat on East Sand Island to 2.25 acres.
San Francisco Bay projects were delayed because most potential locations already are slated for inclusion in other restoration projects with different goals. Also, the</td></tr>
</table>

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers			
	Hayward Regional Shoreline (San Francisco Bay) 0.5 2008/2009 2008/2009 Don Edwards NWR (San Francisco Bay) 0.5-1 2009 2009	of 1.5 acres.	Federal Aviation Administration has objected to the use of some locations because of the presence of several airports nearby. In 2010, the Corps will continue to work on finding suitable locations in San Francisco Bay. While working to determine San Francisco Bay project locations, the Corps constructed several alternative projects in the Klamath Basin: • Tule Lake – 0.75 acre (usable) • Orem – 1.0 acre • Sheepy Lake – 0.75 acre
46	**Double-Crested Cormorant** The FCRPS Action Agencies will develop a cormorant management plan encompassing additional research, development of a conceptual management plan, and implementation of warranted actions in the estuary.	2010-2013 • Continue monitoring of abundance and predation at East Sand Island. • Develop and implement management plan for double-crested cormorants on Corps-owned lands in the estuary.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers			
47	**Inland Avian Predation** The FCRPS Action Agencies will develop an avian management plan (for Double-Crested Cormorants, Caspian Terns, and other avian species as determined by RM&E) for Corps-owned lands and associated shallow-water habitat.	2009 • Completed programmatic framework for inland avian management plan. 2010 • Develop action plan including comprehensive analysis of tern and cormorant predation. 2011-2112 • Produce final report on Snake River steelhead and Upper and Mid-Columbia Columbia steelhead vulnerability to avian predation. 2010-2013 • Begin implementation of both habitat and dam components of the inland avian management plan finalized in 2009. (Several of the actions shown in RPA 48, below, result from this management plan.)	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers			
48	**Other Avian Deterrent Actions** The Corps will continue to implement and improve avian deterrent programs at all lower Snake and Columbia River dams. This program will be coordinated through the Fish Passage Operations and Maintenance Team and included in the FPP.	2010 • Install improved avian wire array installation at John Day Dam and monitor avian predation. • Reinstall tailrace array at The Dalles Dam after spillwall construction. • Continue existing avian deterrent program (Hazing and Wires). • Use Inland Avian Predation Management Plan process to prioritize specific problem sites at Snake River dams (see RPA 47). • Initiate avian predation data collection to aid in prioritization of problem avian sites. 2011 • Continue existing avian deterrent program (Hazing and Wires). • Modify or add wires to avian array at JDA as needed after evaluating 2010 data. • Determine if additional arrays are needed as a Phase 2 action at The Dalles Dam after performance testing. • Initiate priority action as determined from Inland Avian Plan.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
Predation and Invasive Species Management Strategy 1—Implement Piscivorous Predation Control Measures to Increase Survival of Juvenile Salmonids in the Lower Snake and Columbia Rivers			
		2012-2013 • Continue existing avian deterrent program (Hazing and Wires). • Consider additional actions at dams or island if impacts from other species such as cormorants and pelicans increase.	
49	**Marine Mammal Control Measures** The Corps will install and improve as needed sea lion excluder gates at all main adult fish ladder entrances at Bonneville dam annually. In addition, the Corps will continue to support land and water based harassment efforts by NOAA Fisheries, Oregon Department of Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), and the Tribes to keep sea lions away from the area immediately downstream of Bonneville Dam.	2010-2013 • The Corps will continue to install sea lion excluder devices at all main fish ladder entrances, in accordance with the requirements in the Fish Passage Plan. Any needed improvements to the excluder devices will be regionally coordinated. • The Action Agencies will continue to support land- and water-based harassment efforts by NOAA Fisheries, ODFW, WDFW, and the tribes.	

Research, Monitoring, and Evaluation

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
50	**Fish Population Status Monitoring** The Action Agencies will enhance existing fish population status monitoring performed by fish management agencies through the specific actions listed below. In addition, ancillary population status and trend information is being obtained through several ongoing habitat and hatchery improvement projects (see project tables in Attachment B.2.6-1).		Starting in 2010, NOAA Fisheries and the Action Agencies will jointly fund and implement updates to the existing life- cycle models to better evaluate Rapid Response and Long-term Contingency Actions. The updates will be implemented by December 2012. Results will be discussed with the RIOG and reported annually to the region. [AMIP pp. 11, 23] By December 2012, NOAA Fisheries, in coordination with the Action Agencies, will develop the component of the life-cycle model (Section III.A, "Enhanced Life-cycle Monitoring for Evaluation of
	RPA 50.1 Implement and maintain the Columbia River Basin passive integrated transponder (PIT)-Tag Information System. (Annually)	2010-2013 • This RPA is addressed through continuing actions by the Action Agencies. PTAGIS, which is funded annually, operates the PIT-tag system throughout the Columbia Basin and maintains the database. • The existing PIT-tag database will be revised and expanded to include information from interrogation systems that are being installed in tributaries to measure population-scale survival and abundance.	
	RPA 50.2	2010-2013	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
	Monitor adult returns at mainstem hydroelectric dams using both visual counts and the PIT-tag detection system (see Hydrosystem section). (Annually)	• Continue index of daytime visual counts at all dams. • Conduct nighttime video counts of sockeye at Lower Granite Dam in 2010. • Continue PIT-tag monitoring of adults over a 24-hour period at Bonneville, McNary, and Lower Granite dams. • Use regional PIT development RME meetings to determine regional needs for future PIT detection and tagging. • The Action Agencies will continue to index daytime counts at all dams and will conduct representative monitoring of adults over a 24-hour period at Bonneville, McNary, and Lower Granite dams. This will include nighttime counts of sockeye at Lower Granite for 2010.	Contingencies") for evaluation of the short-term, transitional, and long-term biological effects of dam breaching. This model will use existing and new data collected through the enhanced research, monitoring, and evaluation activities described in the AMIP. [AMIP p. 38] By December 2011, the Action Agencies will enhance the existing monitoring of juvenile production and survival for at least one population per major population group (MPG). The Action Agencies will develop a strategy to improve the management and timely reporting of juvenile salmon and steelhead monitoring data by December 2010. [AMIP p. 11]
	RPA 50.3 Monitor juvenile fish migrations at mainstem hydroelectric dams using smolt monitoring and the PIT-tag detection system (see Hydrosystem section). (Annually)	<u>2010-2013</u> • The Action Agencies will test different methods of estimating Snake River fall Chinook juvenile production and assess the precision and accuracy of survival measurements. • A larger number of natural-origin Chinook and steelhead will be PIT-tagged within populations to estimate parr-smolt survivals, and these tagged fish will contribute to additional hydro migration monitoring. Additional PIT-based performance monitoring needs will be assessed within the AA/NOAA/NPCC Hydro RM&E work group, to ensure appropriate stock coverage and an ample number of tagged fish. Power analyses will be used to estimate the number of fish that need to be tagged. This work will be accomplished	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		and coordinated within the regional PIT tagging plan (see RPA 52.6).	
	RPA 50.4 Fund status and trend monitoring as a component of the pilot studies in the Wenatchee, Methow, and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin to further advance the methods and information needed for assessing the status of fish populations. (Initiate in FY 2007-2009 Project Funding, review and modify annually to ensure that these projects continue to provide a means of evaluating the effectiveness of tributary mitigation actions).	<u>2010-2012</u> • A 3-year telemetry or PIT-tagging study will be conducted to determine origin and escapement of steelhead into the Wenatchee, Methow, and Entiat basins. Adults will be tagged at Priest Rapids Dam. <u>2010-2013</u> • The accuracy and precision of spring Chinook and steelhead smolt estimates will be improved in the Wenatchee, Entiat, and Methow basins. • A larger number of naturally produced spring Chinook and steelhead juveniles will be PIT-tagged in the Wenatchee, Methow, and Entiat basins to better estimate migration timing, residence, and life-stage survivals. • The Action Agencies will evaluate the accuracy and precision of redd counts in the Wenatchee, Entiat, and Methow basins. This work will be conducted in small watersheds within the basins. • The Action Agencies will also conduct research to estimate the number of redds/female and fish/redd.	
	RPA 50.5 Provide additional status monitoring to ensure a majority of Snake River B-Run	<u>2010-2013</u> • The Action Agencies will maintain current contracts (ISMES 19905500 and INPMEP 199107300) and reconfigure contract	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
	steelhead populations are being monitored for population productivity and abundance. (Initiate by FY 2009, then annually)	ISS 198909800 to continue to operate weirs and traps, which will be used to monitor B-run steelhead, and will collect adult and juvenile genetics information. • The Action Agencies will fund full parental genotyping through at least one funding cycle to assess DNA objectives. If this is successful, juvenile and adult monitoring will be modified in 2013. • If genetic mapping is successful, the Action Agencies will systematically sample returning adult steelhead at Lower Granite Dam for genetics and age structure, and will mark the fish with PIT tags. Placement of remote PIT-tag interrogation systems near the mouths of the South Fork Clearwater and Lolo Creek populations and in the Salmon River upstream from the confluence of the Middle Fork Salmon River will detect tagged steelhead. An interrogation system already exists near the mouth of the South Fork Salmon River. These systems will assess the distribution, abundance, and productivity of steelhead within a majority of the B-run populations. In addition, the installation of PIT-tag interrogation systems in the Imnaha River, Lower Grande Ronde River, and Joseph Creek will validate the absence of B-run steelhead in these systems. • Depending on the success of the PIT-tag interrogation systems, additional interrogators may be placed in the Selway and Lochsa systems.	
	RPA 50.6	2010-2013	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
	Review and modify existing Action Agencies' fish population status monitoring projects to improve their compliance with regional standards and protocols, and ensure they are prioritized and effectively focused on critical performance measures and populations. (Initiate in FY 2008, develop proposed modification in FY 2009, implement modifications in FY 2010)	Population status and trend monitoring will follow the NOAA Fisheries Guidance for Monitoring Recovery of Pacific Northwest Salmon and Steelhead, which will be completed in early 2010. The following changes will be made to existing population status and trend contracts. These changes will align the monitoring efforts with the NOAA Fisheries guidance document: • Contracts 200205300, 201004200, 201002600, and 201002800 (Lower Snake Steelhead): – PIT-tag juvenile steelhead in the Tucannon River to support monitoring and effectiveness of steelhead supplementation. – Monitor the status and trend of steelhead in Asotin Creek. – Estimate pre-spawn survival by using mark-recapture techniques. – Conduct redd surveys in all major spawning areas and minor spawning areas Asotin Creek and the Tucannon River. • Contracts 199800702, 199202604, 200708300, and 200301700 (Grande Ronde Steelhead): – Extend trapping period at Lostine weir and install second screw trap on Minam River. – Fund ODFW 2007-09 proposal 200733700. – Expand proposal 199703000 to quantify adult steelhead escapement in Joseph Creek. – Install PIT-tag interrogation system in the lower Grande	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		Ronde and in Joseph Creek. • Contracts 199701501 and 200301700 (Imnaha Steelhead): – Extend trapping period to enable estimate of juvenile production. – Install PIT-tag interrogation system in the lower Imnaha River. • Contracts ISMES 19905500, INPMEP 199107300, and ISS 198909800 (Clearwater Steelhead): – Fund full parental genotyping through at least one funding cycle to complete DNA objectives. • Contracts ISMES 19905500, INPMEP 199107300, and ISS 198909800 (Salmon Steelhead): – Fund full parental genotyping through at least one funding cycle to complete DNA objectives. • Contracts199801600 and 200301700 (John Day Steelhead): – Expand the work to increase density of sampling sites (using a Generalized Random Tessellation Stratification [GRTS] master-sample list) to improve population-scale resolution for VSP in the lower and upper mainstem. – Develop proportion of hatchery-origin spawners (pHOS) and DNA baseline in the MPG, including analysis of the backlog of DNA samples. • Contracts199603501 and 199506325 (Yakima Steelhead): – Conduct additional DNA evaluations at Prosser Dam and all mainstem Yakima tributaries to accurately parse out adult	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		steelhead spawners and juvenile productivity. – Conduct complete census surveys for redds in all major and minor spawning areas in Toppenish Creek. Use GRTS to sample for redds outside major and minor spawning areas in Toppenish Creek. • Contracts199506335 and 200715600 (Cascade East Slope Steelhead): – Complete the modification of Lyle Falls trap and Castile Falls trap. • Contracts ISEMP 200301700 and OBMEP 200302200 (Upper Columbia Steelhead): – Implement actions identified under RPA 50.4. • Contract 201004200 (Lower Snake Chinook): – Increase the number of PIT-tagged juvenile Chinook in the Tucannon. The following populations will be monitored for fish-in/fish-out according to the NOAA Fisheries guidance document: • Snake River Spring / Summer Chinook evolutionarily significant unit (ESU): – South Fork Salmon population within the South Fork MPG. – Middle Fork Salmon population within the Middle Fork MPG. – Lemhi population within the Upper Salmon MPG. – Pahsimeroi population within the Upper Salmon MPG.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		– Yankee Fork population within the Upper Salmon MPG. – Tucannon population within the Lower Snake MPG. – Upper Grande Ronde populations within the Grande Ronde/Imnaha MPG. – Catherine Creek population within the Grande Ronde/Imnaha MPG. • Upper Columbia Spring Chinook ESU: – Wenatchee population within the Upper Columbia MPG. – Entiat population within the Upper Columbia MPG. – Methow population within the Upper Columbia MPG. • Snake River Fall Chinook ESU: – Snake River Fall Chinook population. • Lower Columbia Chinook ESU: – Hood population within the Gorge MPG. – Snake River Steelhead distinct population segment (DPS): – Lolo Creek population within the Clearwater MPG. – Lemhi River population within the Salmon MPG. – South Fork Salmon population within the Salmon MPG. – Asotin Creek population within the Lower Snake MPG. – Upper Grande Ronde population within the Grande Ronde MPG. – Imnaha population within the Imnaha MPG.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		– Upper Columbia Steelhead DPS: – Wenatchee population within the Upper Columbia MPG. – Entiat population within the Upper Columbia MPG. – Methow population within the Upper Columbia MPG. – Okanogan population within the Upper Columbia MPG. – Middle Columbia Steelhead DPS: – Klickitat River population within the Eastern Cascades MPG. – Fifteen Mile population within the Eastern Cascades MPG. – Toppenish population within the Yakima MPG. – Lower Mainstem population within the John Day MPG. – North Fork population within the John Day MPG. – Upper Mainstem population within the John Day MPG. – Middle Fork population within the John Day MPG. – South Fork population within the John Day MPG. – Umatilla population within the Umatilla/Walla Walla MPG. • Lower Columbia Steelhead DPS: – Upper Gorge (Wind and Hamilton) population within the Gorge MPG. • Lower Columbia Coho: – Upper Gorge (Wind and Hamilton) population within the Gorge MPG.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		• Snake River Sockeye: – Red Fish Lake population.	
	RPA 50.7 Fund marking of hatchery releases from Action Agencies funded facilities to enable monitoring of hatchery-origin fish in natural spawning areas and the assessment of status of wild populations. (Annually)	2010-2013 • Dworshak Hatchery – 90 percent of total steelhead production will be adipose fin-clipped. (Pursuant to an agreement under U.S. v Oregon, 200,000 unclipped steelhead will be outplanted into Lolo Creek.) • John Day – The Dalles mitigation – 100 percent of fish produced for this purpose will be adipose fin-clipped. • Where 100 percent of the hatchery fish cannot be marked with an adipose fin clip, alternative external or internal marks and marking rates will be used to assess VSP and habitat and hatchery effectiveness called for under the BiOp and Columbia Basin Recovery Plans. All marks and marking programs will be coordinated through RMIS and other regional efforts so that all field managers will know what to look for during surveys. All mark rates will be determined and made available to minimize bias in hatchery versus wild population estimates.	
	RPA 50.8 Report available information on population viability metrics in annual and comprehensive evaluation reports. (Initiate in FY 2008)	2010-2013 • The Action Agencies will coordinate their status/trend assessments with NOAA Fisheries and the Action Agencies will ensure consistency of project level reporting with guidelines identified under RPAs 50.6 and 72. The NOAA Fisheries VSP data dictionary, metadata guidelines, and data	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
		exchange protocols will be finalized in coordination with PNAMP and other fishery co-managers and implemented through monitoring contracts. • Monitoring contracts will be implemented following guidelines on the use of terms and definitions outlined in the NOAA Fisheries VSP data dictionary and these data will be readily accessible to NOAA Fisheries and the Action Agencies. • Funding will be provided to integrate the results of the work group monitoring evaluation tables with ongoing NOAA data compilation and documentation efforts.	
51	**Collaboration Regarding Fish Population Status Monitoring** The Action Agencies will enhance existing fish populations status monitoring performed by fish management agencies through the following collaboration commitments:		
	RPA 51.1 Support the coordination, data management, and annual synthesis of fish population metrics through Regional Data Repositories and reports. (Annually)	<u>2010-2013</u> • The Action Agencies will continue to implement the actions identified in this column under RPAs 71 and 72 to support this RPA.	
	RPA 51.2 Facilitate and participate in ongoing regional RM&E collaboration process to develop a	<u>2010-2013</u> • The Action Agencies worked with regional fish management agencies to jointly develop the Columbia Basin Anadromous	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 1—Monitor the Status of Selected Fish Populations Related to FCRPS Actions ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to the status of fish populations.***			
	regional strategy for status and trend monitoring for key ESA fish populations. (Initiate in FY 2008)	Fish Monitoring Strategy. Population status and trend monitoring will follow the NOAA Fisheries monitoring guidelines. • The Action Agencies will continue coordination of a Hydro Action Plan for marking and tagging. • GRTS-based, master-sample management tools will be used in development of population status and trend programs. • The Action Agencies will continue to work collaboratively with the region to further develop and implement BiOp critical work identified in the Columbia Basin Anadromous Fish Monitoring Strategy, and to advance data management and data sharing capabilities to ensure that status and trend data are readily accessible for needed BiOp assessments.	
	RPA 51.3 Provide cost-shared funding support and staff participation in regional coordination forums such as the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) fish population monitoring workgroup and the Northwest Environmental Data Network to advance regional standards and coordination for more efficient and robust monitoring and information management. (Annually)	<u>2010-2013</u> • Cost-share funding support and staff participation will continue in regional forums such as the Regional Implementation Oversight Group (RIOG) and PNAMP. The Northwest Environmental Data Network (NED) is no longer functioning, but PNAMP has assumed the advancement of NED objectives.	

RME Strategy 2—Hydrosystem Research Monitoring and Evaluation

Fisheries concurs with the Action Agencies' strategy to support performance monitoring and adaptive management related to hydropower actions. Performance standards have been identified for average juvenile dam survival for run-of-river spring and summer migrants and adult hydro system survival. Hydrosystem action programmatic standards have also been identified and will be annually monitored with project implementation monitoring. The expected increase in total juvenile system survival associated with the hydrosystem action has been identified as a long-term performance target. This performance target will be assessed in the future using the same modeling approach used to assess the benefit of actions within the Biological Opinion, but using actual operations and configurations in place in 2012 and 2015, at the time of the comprehensive evaluation. These estimates will be based on the Comprehensive Fish Passage Model (COMPASS), calibrated and validated by the most recent years' empirical survival data.

Juvenile Dam Passage Performance Standards

The Action Agencies' juvenile performance standards are an average across Snake River and Lower Columbia River dams of 96 percent average dam passage survival for spring Chinook and steelhead and 93 percent average across all dams for Snake River subyearling Chinook. (For more detail, see the FCRPS BA, RME Hydro Performance Monitoring, in Appendix B.2.6-2, at http://www.salmonrecovery.gov/Files/BiologicalOpinions/Appendix.pdf.) Dam passage survival is defined as survival from the upstream face of the dam to a standardized reference point in the tailrace. NOAA Fisheries considers the "effect zone" of the dams to extend into the forebays. However, the available information does not support the establishment of a dam survival or delay performance standard that includes the forebay. NOAA Fisheries expects that surface passage improvements proposed in the RPA will decrease delay and increase survival through the forebays of dams that will be configured with new surface passage routes.

Juvenile In-River Survival Performance Metric

The FCRPS Action Agencies will annually measure the survival of in-river migrating fish and compare these numbers with COMPASS model estimates based on the conditions experienced and the expected benefits of completed hydro actions. (See the In-River Juvenile Survival appendix of the Supplemental Comprehensive Analysis for the FCRPS BiOp).

Juvenile System Survival Performance Targets

The Action Agencies' juvenile system survival performance targets estimate the expected increase in juvenile fish survival through the hydrosystem (system survival to below Bonneville Dam) that are associated with the proposed hydrosystem actions, relative to the 2004 base level. (For more detail see the FCRPS BA, RME Hydro Performance Monitoring, in Appendix B.2.6-2, at http://www.salmonrecovery.gov/Files/BiologicalOpinions/Appendix.pdf.). These relative survival improvements will be used as the biological performance target as the basis for performance tracking.

Adult Performance Standards

The Action Agencies' adult performance standards will track and confirm that the relatively high levels of adult survival currently observed are maintained or increased (see Table 7).

Table 7. Adult Performance Standard by ESU*

ESU	Adult Standard	Reach	Rationale
SR Fall Chinook	81.2%	BON to LGR	
SR Spring-Summer Chinook	91.0%	BON to LGR	
SR Sockeye	Surrogate, develop in future if data is sufficient.	BON to LGR	Standards will be developed when sufficient numbers of PIT-tagged SR sockeye return to Bonneville Dam to allow survival estimates to be made. Until then, assume that survival is adequate if SR spring/summer Chinook salmon and steelhead BON to LGR standards are met. (See below.)
SR steelhead	90.1%	BON to LGR	Due to some data limitations/uncertainties, the performance standards will be reviewed as new information becomes available, and standards updated as appropriate.
UCR spring Chinook	90.1%	BON to MCN	
UCR steelhead	84.5%	BON to MCN	Due to data limitations/uncertainties, the performance standards will be reviewed as new information becomes available, and standards will be updated as appropriate.
MCR steelhead	Surrogate	Variable	Assume that survival is adequate if SR steelhead BON to LGR standard is met. Due to some data limitations/uncertainties, the performance standards will be reviewed as new information becomes available, and standards will be updated as appropriate. (See below.)
CR chum	None	None	Cannot be directly measured at present. Assume that survival is adequate if SR fall Chinook BON to LGR standard is met.
LCR Chinook	None	None	Cannot be directly measured at present. Assume that survival for spring and fall populations is adequate if SR spring/summer Chinook and SR fall Chinook standards are met.
LCR coho	None	None	Cannot be directly measured at present. Assume that survival is adequate if SR fall Chinook BON to LGR standard is met.
LCR steelhead	None	None	Cannot be directly measured at present. Assume that survival is adequate if SR steelhead BON to MCN standard is met.
UWR Chinook	None	None	Not expected to migrate upstream of Bonneville Dam
UWR steelhead	None	None	Not expected to migrate upstream of Bonneville Dam

*NMFS developed these survival standards (wild- and hatchery-origin fish combined) based on detections of PIT-tagged that were known to migrate in-river as juveniles; detections were at Bonneville Dam and later at the uppermost federal dam for the species detected from 2002 to 2006. These estimates have been adjusted to account for estimated harvest and straying rates of adults within the FCRPS migration corridor, but otherwise capture all other sources of mortality manifested within the identified reaches, including those resulting from the existence and operation of the FCRPS, unquantifiable levels of mortality from other potential sources (e.g., unreported or delayed mortality caused by fisheries, marine mammal predator attacks, etc.), and unquantifiable levels of "natural" mortality (i.e., levels of mortality in the migratory corridor that would have occurred "naturally" without human influence). Estimates are generally based on 2002 to 2007 data. (See the Adult Survival Rate appendix in the Supplemental Comprehensive Analysis for the FCRPS BiOp). **Bold font** denotes ESUs that required estimates to be made using other ESUs as surrogates.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
52	**Monitor and Evaluate Fish Performance within the FCRPS** The Action Agencies will monitor the following biological responses and/or environmental attributes involved in passage through the hydrosystem, and report these estimates on an annual basis:		The Action Agencies will enhance fish population monitoring. As part of this action, in February 2011 the Corps will initiate a study at The Dalles and John Day dams to determine a cost-effective adult PIT tag detection system design and whether installation of PIT tag detectors will improve inter-dam adult survival estimates. The study will be completed by December 2012. Following the results of the study, by April 2013, the Action Agencies will determine in

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
			coordination with NOAA whether one or both of these PIT tag detectors substantially improve estimates of inter-dam adult losses. If warranted, the Action Agencies will proceed to construction. Funding will be scheduled consistent with the RPA requirement and priorities for performance standard testing and achievement of these performance standards at the projects.
	RPA 52.1 Monitor and evaluate salmonid dam survival rates for a subset of FCRPS projects.	2010 • Finalize multi-dam methodology using telemetry. 2011-2013 • Evaluate route-specific survival at Lower Snake River and Lower Columbia River dams as warranted to measure progress towards meeting performance standards. 2011-2013 • Continue assessments as results dictate. Needs are reviewed annually under the Anadromous Fish Evaluation Program (AFEP).	
	RPA 52.2 Monitor and evaluate juvenile salmonid in-	2010-2013 • Conduct seasonal transportation studies and coordinate any	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	river and system survival through the FCRPS, including estimates of differential post-Bonneville survival of transported fish relative to in-river fish (D-value) as needed.	needed changes to scope and design with NOAA Fisheries and the region. • Expand tagging to include Snake River sockeye and Upper Columbia populations (2008-724-00).	
	RPA 52.3 Monitor and evaluate adult salmonid system survival upstream through the FCRPS.	2010-2013 • Adult survival estimates will be produced annually using returning PIT-tagged adults detected at Bonneville, McNary, and Lower Granite. Strategically located stream-based PIT tag detectors within mainstem tributaries will be implemented to improve these system survival estimates. These locations will be identified in the regional PIT tagging plan and will be coordinated with habitat and hatchery work groups, as these groups also will be relying on some stream-based detectors. This planning and implementation will include a description of analytical methods and precision assessments.	
	RPA 52.4 Provide additional PIT-tag marking of Upper Columbia River populations to provide ESU specific estimates of juvenile and adult survival through the Federal mainstem dams.	2010 • Funds have been allocated to initiate this effort (2008-724-00). Releases will occur in 2010. Non-contracted efforts by PUDs may supplement the federal effort. 2011-2013 • Initiate development of a regional PIT-tagging plan through the PIT tag planning subgroup. Continue to implement project (2008-724-00) to support this RPA. The extent of tagging and stock coverage required will be specified as part of the regional PIT tagging plan. These populations would be incorporated into the annual system smolt and adult survival	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
		monitoring. Non-Action Agency contracted efforts by public utility districts may be incorporated into the study.	
	RPA 52.5 Assess the feasibility of PIT-tag marking of juvenile Snake River Sockeye Salmon for specific survival tracking of this ESU from the Stanley Basin to Lower Granite Dam and through the mainstem FCRPS projects.	2010-2011 • Carry out Years 2 and 3 of the juvenile Snake River sockeye PIT-tagging effort. This will include evaluations of collection efficiencies. 2011-2013 • Conduct pilot evaluation of smolt-adult returns of the in-river and transported Snake River sockeye PIT-tagged in 2009-2011.	
	RPA 52.6 Develop an action plan for conducting hydrosystem status monitoring (analytical approaches, tagging needs, methods, and protocols) in ongoing collaboration with the State and Federal fishery agencies and Tribes. This will be done in coordination with status monitoring needs and strategies being developed for estuary/ocean, habitat, hatcheries, and harvest. (Initiate in FY2009)	2010-2013 • The Action Agencies identified the need for a regional PIT-tagging plan and are convening the PIT Tag Planning Work Group to specify sample size and population coverage needs with NOAA, the Action Agencies, other federal agencies, and state/tribal input, and to draft the plan.	
	RPA 52.7 Cooperate with NOAA Fisheries, US v Oregon parties, Confederated Tribes of the Colville Reservation, and other co-managers to 1) review relevant information and identify factors (migration timing, spatial	2010 • An analysis is currently being conducted by the Colville Tribe and a contractor. A report will be available in summer 2010. PIT-tagged adults are used in the analysis. Harvest monitoring projects (Colville Tribes and Columbia River Inter-Tribal Fish Commission [CRITFC] Accord projects) could	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	distribution, etc.) that might explain the differential conversion rates (BON to MCN) observed for UCR steelhead and spring Chinook salmon compared to SR steelhead and spring/summer Chinook salmon (see RPA Table 7 and SCA - Adult Survival Estimates Appendix); 2) develop a monitoring plan to determine the most likely cause of these differential losses (considering the potential use of flat plate PIT tag detectors in tributaries or fishery areas, additional adult detectors at The Dalles and John Day fishways, etc. to provide improved estimates of harvest or stray rates for improved conversion rate estimates in the future); and 3) implement the monitoring plan.	provide improved harvest rate estimates, but total allowable catch (TAC) estimates are available now.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	RPA 52.8 Monitoring adult passage counts is a cornerstone monitoring activity that must be performed on an annual basis. Adult fish counting is typically performed 16 hours per day, during daylight hours, by either video or visual counting methods, at all of the Corps projects that pass fish. Adult fish counting will continue at a minimum on the schedule presented in Table 8.	2010-2013 • Continue adult passage counts as shown in Table 8, except that counts at The Dalles and John Day are conducted from April 1 through October 31. Note all times are PST only. • Nighttime adult sockeye counts are planned at Lower Granite in 2010. • The Action Agencies will investigate provisions to standardize counting procedures that may be affecting precision or bias in passage counts throughout the FCRPS and PUD-operated mainstem dams. Based on the outcome of these investigations, improvements in counting procedures may be proposed.	In the regional coordination process, duration of counting at The Dalles and John Day was cut back to April 1 through October 31.

Table 8. Minimum Adult Fish Counting Schedule

Dam	Duration of Operation	Duration of Counting	Hours of Count
Bonneville	January 1 - December 31	January 1 - December 31	04:00 - 20:00
The Dalles	February 20 – December 7	February 20 – December 7	04:00 - 20:00
John Day	February 20 – December 7	February 20 – October 31	04:00 - 20:00
McNary	March 1 – December 31	March 1 – October 31	04:00 - 20:00
Ice Harbor	March 1 – December 31	March 1 - October 31	04:00 - 20:00
Lower Monumental	March 1 – December 31	April 1 - October 31	04:00 - 20:00
Little Goose	March 1 – December 31	April 1 - October 31	04:00 - 20:00
Lower Granite	March 1 – December 31	March 1 – March 31	06:00 - 16:00
		April 1 - June 14	04:00 - 20:00
		June 15 - August 31	24 hours
		August 31 - October 31	04:00 - 20:00
		November 1 - December 31	06:00 - 16:00

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
53	**Monitor and Evaluate Migration Characteristics and River Condition** The Action Agencies will monitor and evaluate the following biological and physical attributes of anadromous fish species migrating through the FCRPS on an annual basis:		
	RPA 53.1 Monitor and estimate the abundance of smolts passing index dams.	2010-2013 • The Action Agencies will continue to provide this information to the region through the support of the Fish Passage Center. 2010 • The Action Agencies and NOAA Fisheries will explore analytical methods and approaches for improved smolt abundance estimates. 2011-2013 • New approaches with expanded coverage and improved estimates may be produced based on 2010 findings.	
	RPA 53.2 Monitor and describe the migration timing of smolts at index dams, identify potential problems, and evaluate implemented solutions.	2010– 2013 • Review the smolt monitoring program (SMP) to determine the extent to which population-specific (PIT-tagged) data are needed to describe timing, or if ESU-level information is adequate.	
	RPA 53.3 Monitor and document the condition (e.g., descaling and injury) of smolts at all dams	2010-2013 • Continue the SMP monitoring of fish conditions.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	with JBS systems, identify potential problems, and evaluate implemented solutions.		
	RPA 53.4 Monitor and enumerate adult salmonids passing through fishways in the FCRPS, identify potential problems, and evaluate implemented solutions.	2010-2013 • Corps ladder counts, in conjunction with PIT detectors as supplemental information for various analyses, will continue to be used for conversion rate estimation. These data are acquired annually.	
	RPA 53.5 In addition to current operations (generally April 10 – August 31), evaluate operation of the Bonneville PH2 corner collector from March 1 through start of spill as a potential means to provide a safer downstream passage route for steelhead kelts, and implement if warranted.[6]	2010 • Preliminary research has been completed. Management now is using the information to formulate a plan that describes operating guidelines for the corner collector in 2010.	
54	**Monitor and Evaluate Effects of Configuration and Operation Actions** The following will be conducted at specific projects for specific years as operations or configurations change, or new problems are identified.		
	RPA 54.1 Monitor and evaluate the effects of existing	2011-2012 • Evaluate Ice Harbor spillway modification with PIT detection	

[6] Planning dates and voluntary operation of the Bonneville Dam corner collector may be adjusted (increased or decreased) through the adaptive management process or for research purposes.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	spillways, modifications, and operations on smolt survival.	capability. 2010-2013 • Both dam-specific and systemwide evaluations of spill effects on smolt survival will continue to be regularly executed by several agencies, including NOAA Fisheries and USGS. Such evaluations will occur as needed under a variety of Anadromous Fish Evaluation Program and FWP projects. Each year research needs will be updated on a dam-by-dam basis.	
	RPA 54.2 Monitor and evaluate the effectiveness of traditional juvenile bypass systems and modifications to such, on smolt survival and condition.	2012-2013 • Evaluate new outfalls at Lower Monumental and McNary dams. 2010-2013 • The Anadromous Fish Evaluation Program will annually review the status of facilities and identify sites where evaluations are needed. Evaluation of bypass performance will occur as new systems are built or upgrades to existing facilities occur.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	RPA 54.3 Monitor and evaluate the effectiveness of surface bypass structures and modifications on smolt survival and condition.	2011-2012 • Evaluate route-specific survival at Lower Snake River and Lower Columbia River dams as warranted to measure progress in meeting performance standards. 2012-2013 • Evaluate McNary outfall relocation. 2013 • Evaluate Lower Monumental outfall. 2010-2013 • The Anadromous Fish Evaluation Program will annually evaluate surface flow outlet (SFO) performance at select sites where new systems are emplaced or upgrades to existing facilities occur.	
	RPA 54.4 Monitor and evaluate the effectiveness of turbine operations and modifications on smolt survival and condition.	2010 • Evaluate McNary turbine operations above 1 percent. 2012-2013 • Evaluate optimized turbine operations. 2010-2013 • Anadromous Fish Evaluation Program projects will continue to regularly evaluate the performance of new turbine designs or alternative operations as they are proposed. Ice Harbor is the likely next site for such an evaluation.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	RPA 54.5 Monitor and evaluate overall dam passage with respect to modifications at projects (including forebay delay and survival).	2011-2012 • Evaluate route-specific survival at Lower Snake River and Lower Columbia River dams as warranted to measure progress in meeting performance standards. 2010-2013 • The Anadromous Fish Evaluation Program will annually evaluate passage-related performance as identified in the needs and priority process. Relative survival estimates and/or passage route distribution are appropriate performance measures to determine best treatment operation or configuration. The newly adopted JSAT multi-dam survival study will also provide passage route distribution information.	
	RPA 54.6 Monitor and evaluate the effectiveness of the juvenile fish transportation program and modifications to operations.	2010-2012 • Alternate barge-release study (2005-2007) pending complete adult returns. 2010 • Barge transport and Lower Columbia survival study. • A delayed transport effects workshop will update the need for monitoring activities in 2011-2013. 2010-2013 • Seasonal effects of transportation. • The Anadromous Fish Evaluation Program will continue to evaluate performance of transport facilities and operations, including seasonal effects.	
	RPA 54.7	2010-2013	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	Monitor and evaluate the effects of environmental conditions affecting juvenile fish survival.	• Key factors will continue to be regularly monitored throughout the FCRPS: Total dissolved gas, temperature, turbidity, and flow. PIT-tagged fish migrating through the system from assorted projects provide response units for analyzing effects of these variables on either smolt survival or migration characteristics. The FPC, NOAA Fisheries, and CSS conduct these types of probative analyses. The Corps funds the collection and recording of temperature and TDG data, as well as index flow at dams. DART compiles and displays these and other environmental and fish data, as does the FPC.	
	RPA 54.8 Monitor and evaluate the effectiveness of reducing predation toward improving juvenile fish survival.	<u>2010-2013</u> • The Action Agencies will incorporate predation effects into the upcoming Comprehensive Analysis, using information generated by the collective predation studies conducted up to that point in time. Results from those analyses will assist in revising research and monitoring objectives through 2013. Several studies are ongoing. Projects that support this RPA's implementation in FY 2010-2013 are listed in Appendix A.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	RPA 54.9 Investigate, evaluate and deploy alternative technologies and methodologies for fish passage and the RM&E Action.	2010-2013 • Continue to assess and improve active tag technologies, including developing alternatives to reduce bias associated with fish bearing active tags and turbine passage, developing improved surgery methods, and improving receiver design. • Continue development of direct capture methods for turbine-passed fish. • Continue to assist NOAA Fisheries and BPA in their work assessing the feasibility of spillway PIT detection. • New passage technologies will continue to be prototyped, tested, and ultimately deployed as part of the Anadromous Fish Evaluation Program and CRFM. Needs will be updated annually through AFEP.	
	RPA 54.10 Determine if actions directed at benefiting juveniles have an unintended effect on migrating adults (e.g., certain spill operations).	2010 • Assess the effects of The Dalles spillwall on adult salmon passage through the North Fish Ladder. • Assess potential fallback of spring Chinook at Lower Monumental Dam. 2010-2013 This issue will continue to be addressed at each project as need arises. The Anadromous Fish Evaluation Program forum treats this matter.	
	RPA 54.11 Install and maintain adult PIT-tag detectors in fish ladders at key dams in the FCRPS and evaluate adult survival (conversion rates).	2010 The PIT tag plan (under development) will address the adequacy of coverage for conversion rate assessments considering proposed additions of detection systems at mainstem tributaries. 2010-2013	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
		PIT tag detectors are installed and will continue to be maintained in all key FCRPS ladders with the exception of The Dalles and John Day dams. Based on assessments in 2010 and the success of mainstem tributary detection systems, additional detectors may be installed at The Dalles and John Day.	
	RPA 54.12 Monitor and evaluate the effects of fish ladder operations and configurations on adult passage rates.	<u>2010</u> • Bonneville: Monitor how lamprey modifications at the Cascade Island fishway entrance affect spring Chinook passage. • The Dalles: Monitor how spillway modifications affect spring Chinook passage. • John Day: Monitor how modifications in the north ladder exit area affect spring Chinook passage. • McNary: Monitor how lamprey upgrades to the Oregon shore ladder affect adult passage. <u>2013</u> • Evaluate how effective the John Day upper and lower ladder modifications are at improving adult salmonid passage. <u>2010-2013</u> • Conduct the pilot study planned at Lower Granite. This RPA will continue to be addressed at each project through the Anadromous Fish Evaluation Program process as need arises.	
	RPA 54.13 In addition to the current sluiceway operation (generally April 1 – November 30), evaluate operation of The Dalles Dam sluiceway from March 1 – March 31 and from	<u>2010-2013</u> • Ongoing efforts as identified in the Kelt Management Plan (see RPA 33). <u>2010</u>	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	December 1 – December 15 as a potential means to provide a safer fallback passage route for overwintering steelhead and kelts, implement if warranted.[7]	• Complete the second-year evaluation of adult steelhead downstream passage at The Dalles Dam during winter. <u>2011</u> • Implement winter sluiceway operation to provide safer fallback passage if studies suggest it is warranted.	
	RPA 54.14 Investigate surface-flow outlets during wintertime to provide safer fallback opportunity for over wintering steelhead (need will be determined by results of further research).	<u>2010</u> • Complete the second-year evaluation of adult steelhead downstream passage at The Dalles Dam during winter. • As part of the Kelt Management Plan, draft a plan for operating the Bonneville II Corner Collector, using information from recent research and monitoring.	
55	**Investigate Hydro Critical Uncertainties and Investigate New Technologies** The Action Agencies will fund selected research directed at resolving critical uncertainties that are pivotal in lifecycle model analyses. These specific actions include:		The Action Agencies will undertake selected hydrosystem research to resolve critical uncertainties. As part of this action, by June 2012 the Corps will complete a report to identify the use and location of adult salmon thermal refugia in the lower Columbia and lower Snake rivers using existing information on adult migration, temperature monitoring data, and modeling efforts.
	RPA 55.1 Investigate and quantify delayed differential effects (D-value) associated with the transportation of smolts in the FCRPS as needed. (Initiate in FY 2007-2009 Projects)	<u>2010</u> • Summarize existing literature regarding delayed differential effects. • Conduct a workshop on delayed differential mortality to synthesize the existing information and identify additional research needs. That forum will identify tagging needs through 2013 for input to the regional PIT tag plan.	

[7] Planning dates and voluntary operation of The Dalles Dam sluiceway may be adjusted (increased or decreased) through the adaptive management process or for research purposes.

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
		2010-2013 • Continue to expand species coverage with the inclusion of sockeye and fall Chinook proposed for research. This effort complements RPA 52, which calls for delayed differential estimates to be incorporated into system survival evaluations. Both NOAA Fisheries and CSS analyze this information. Many PIT-tagged fish used in the calculations have come from the CSS study and SMP.	Additional investigation or action may be warranted based on the results of this report.
	RPA 55.2 Investigate the post-Bonneville mortality effect of changes in fish arrival timing and transportation to below Bonneville. (Initiate in FY 2007-2009)	2010-2013 • Continue investigation of post-Bonneville mortality effect of changes in fish arrival timing and transportation (study initiated in 2008). • Conduct a workshop on delayed differential mortality to synthesize the existing information and identify additional research needs.	
	RPA 55.3 Conduct a workshop every other year with members of the Independent Scientific Advisory Board (ISAB) to review current research and monitoring approaches on post Bonneville mortality for transported and non-transported fish. (Initiate in FY 2009)	2010 • Hold two separate but complementary workshops: one on delayed differential mortality for transported fish relative to non-transported fish, and one with the ISAB on a broader set of issues and research needs for latent mortality of both transported and non-transported fish. 2012 • Conduct another workshop with the ISAB with updated research results.	
	RPA 55.4 Investigate, describe and quantify key characteristics of the early life history of	2010-2013 • Ongoing collaboration and workshops are scheduled. Studies have been ongoing under the FWP for more than a	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	Snake River Fall Chinook Salmon in the mainstem Snake, Columbia, and Clearwater rivers. (Initiate in FY 2007-2009 Project)	decade, and complementary projects have been funded under the Anadromous Fish Evaluation Program (e.g., radio tag investigations in Snake River reservoirs). Additionally, proposed transport studies have important life history implications. This has been a multi-faceted complex of investigations over the years. In May 2010, a fall Chinook workshop will be held to synthesize research information to date and to identify future research needs. Early life history studies and transport evaluations can be viewed in the context of a cohesive well-coordinated program.	
	RPA 55.5 Complete analysis and reporting of a multi-year (2000-2007) investigation on the effects of adult passage experience in the FCRPS on pre-spawning mortality (2008). Following reporting, SRWG will review the results and provide a recommendation on the need and nature of future research. Future research will be coordinated through the Regional Forum.	2008 A report was completed and has been posted at: http://www.nwp.usace.army.mil/pm/e/reports/afep/system/SFS_Tech_Report_2009-4_Final.pdf. No future research is recommended. 2010-2013 A multi-year research study has been conducted by the University of Idaho, and the report has been published. The Action Agencies and NOAA Fisheries will determine how this information can be incorporated into the life-cycle analysis as part of the upcoming Comprehensive Analysis called for under the BiOp.	
	RPA 55.6 Continue development of state-of-the-art turbine units to obtain improved fish passage survival through turbines with the goal of using these new units in all future turbine rehabilitation or replacement programs.	2010-2013 • The Turbine Survival Program (TSP) will continue to develop and test hypotheses. As part of this program, plans and specs will be completed for construction at Ice Harbor as a proof of concept for the TSP design process.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
	RPA 55.7 Investigate feasibility of developing PIT-tag detectors for spillways and turbines.	2010 • Continue to assist NOAA Fisheries and BPA in their work assessing the feasibility of spillway PIT detection. This topic will be a critical component of the regional PIT tag plan that is under development. The PIT Tag Working Group will ensure that this topic gets thorough treatment in the plan. 2011 • Evaluate the spillway PIT detector at Ice Harbor.	
	RPA 55.8 Evaluate new tagging technologies for use in improving the accuracy and assessing delayed or indirect hydro effects on juvenile or adult fish.	2010–2013 • Continue the ongoing development of JSATs and POST (VEMCO) acoustic tags, focused on reducing tag size and increasing detection efficiency. • Further evaluate tag effects on behavior and survival. • JSAT, POST, and genetic markers are examples of new technologies that are being applied to investigate topics specified in the BiOp.	
	RPA 55.9 Assess the feasibility of developing PIT-tag detectors for use in natal streams and tributaries, or other locations, as appropriate to support more comprehensive and integrated All-H monitoring designs and assessments of stray rates.	2010 • Complete evaluation of the John Day River PIT antenna detection efficiency. • Determine the need for and management of long-term maintenance of the John Day antenna and installation of additional tributary PIT detection sites. 2010-2013 • Continue evaluation of the Walla Walla and Tucannon rivers instream PIT-tag detectors. • Continue to develop, deploy, and test devices for application	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 2—Hydrosystem Research Monitoring and Evaluation			
		at several tributary sites in the basin. In 2010, the PIT tag plan will lay out a blueprint for installations throughout the basin.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
56	**Monitor and Evaluate Tributary Habitat Conditions and Limiting Factors** The Action Agencies will:		By December 2011, the Action Agencies will expand habitat status and trend monitoring (for at least one population or watershed per MPG) and support updated modeling of the expected benefits of habitat actions. [AMIP p. 11] By December 2011, the Action Agencies will also ensure monitoring of appropriate metrics across a diversity of ecological regions and habitat types to assess responses to climate change. [AMIP p. 12] Reclamation is partnering with USGS and local partners in the Yakima and Methow River basins to develop a decision analysis framework for addressing climate change effects on natural and cultural resources. [AMIP p. 12]
	RPA 56.1 Implement research in select areas of the pilot study basins (Wenatchee, Methow and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin) to quantify the relationships between habitat conditions and fish productivity (limiting factors) to improve the development and parameterization of models used in the planning and implementation of habitat projects. These studies will be coordinated with the influence of hatchery programs in these habitat areas. Review and modify annually to ensure that these projects continue to provide a means of evaluating the effectiveness of tributary mitigation actions).	2010-2013 In the pilot basins, monitoring will continue to focus on the relationship between limiting factors, habitat actions, and fish productivity. Mechanistic research on relationships between limiting factors and fish productivity will occur within the pilot basins. PIT-tagging of juveniles will inform this research. Information generated from focused studies and correlative studies will be shared with other regions and will also be used in multi-stage Beverton-Holt models. The Action Agencies are organizing a monitoring symposium in 2010 to investigate modeling approaches that will be used to evaluate RPAs 56, 57, and 65.	
	RPA 56.2 Implement habitat status and trend monitoring as a component of the pilot	2010-2013 Ongoing habitat status and trend monitoring will continue in the Wenatchee and Entiat basins, the Lemhi and South Fork Salmon	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
	studies in the Wenatchee, Methow and Entiat river basins in the Upper Columbia River, the Lemhi and South Fork Salmon river basins, and the John Day River Basin. (Initiate in FY 2007-2009 Projects, annually review and modify annually to ensure that these project continue to provide a means of evaluating the effectiveness of tributary mitigation actions.	river basins, and the John Day River basin. In 2010, the GRTS-based master-sample management tools will be implemented to monitor habitat status and trend in the Methow Basin. Habitat monitoring that will be initiated in the Methow Basin will be informed by the results of habitat monitoring in the Wenatchee and Entiat basins.	
	RPA 56.3 Facilitate and participate in an ongoing collaboration process to develop a regional strategy for limited habitat status and trend monitoring for key ESA fish populations. This monitoring strategy will be coordinated with the status monitoring needs and strategies being developed for hydropower, habitat, hatchery, harvest, and estuary/ocean. (Initiate in FY 2008)	<u>2010-2013</u> The Action Agencies will continue to facilitate and participate in ongoing collaboration processes to develop regional strategies for habitat status and trend monitoring. Habitat within the geographic distribution of the following populations will be monitored for habitat status and trend (most of these populations will also be monitored for fish-in/fish-out according to RPA 50). This planned monitoring will also meet the habitat monitoring and climate change monitoring needs of the associated actions on page 12 of the AMIP. • Snake River Spring Summer Chinook ESU: – South Fork Salmon population within the South Fork MPG. – Big Creek population within the Middle Fork MPG. – Lemhi population within the Upper Salmon MPG. – Pahsimeroi population within the Upper Salmon MPG. – Yankee Fork population within the Upper Salmon MPG.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
		– Tucannon population within the Lower Snake MPG. – Upper Grande Ronde populations within the Grande Ronde/Imnaha MPG. – Catherine Creek population within the Grande Ronde/Imnaha MPG. • Upper Columbia Spring Chinook ESU: – Wenatchee population within the Upper Columbia MPG. – Entiat population within the Upper Columbia MPG. – Methow population within the Upper Columbia MPG. • Snake River Fall Chinook ESU: – Mainstem Snake for the Snake River fall Chinook population. • Lower Columbia Chinook ESU – Hood population within the Gorge MPG. • Snake River Steelhead DPS – Lolo Creek population within the Clearwater MPG. – Lemhi River population within the Salmon MPG. – South Fork Salmon population within the Salmon MPG. – Asotin Creek population within the Lower Snake MPG. – Upper Grande Ronde population within the Grande Ronde MPG. – Imnaha population within the Imnaha MPG. • Upper Columbia Steelhead DPS: – Wenatchee population within the Upper Columbia MPG.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
		– Entiat population within the Upper Columbia MPG. – Methow population within the Upper Columbia MPG. – Okanogan population within the Upper Columbia MPG. • Middle Columbia Steelhead DPS: – Klickitat River population within the Eastern Cascades MPG. – Fifteen Mile population within the Eastern Cascades MPG. – Toppenish population within the Yakima MPG. – Lower Mainstem population within the John Day MPG. – North Fork population within the John Day MPG. – Upper Mainstem population within the John Day MPG. – Middle Fork population within the John Day MPG. – South Fork population within the John Day MPG. – Umatilla population within the Umatilla/Walla Walla MPG. • Lower Columbia Steelhead DPS: – Upper Gorge (Wind) population within the Gorge MPG. • Lower Columbia Coho: – Upper Gorge (Wind and Hamilton) population within the Gorge MPG. Habitat monitoring will focus on measuring the metrics associated with the habitat impairments identified within each population. In addition, the Action Agencies will hold workshops in 2010 to identify the most appropriate (core) metrics to measure within all populations and how those metrics should be measured. This will be coordinated with other ongoing and existing monitoring efforts.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
		The aforementioned workshop and expanded monitoring to support the RME collaboration effort and the implementation of metadata documentation tools will ensure that the Action Agencies are capturing the appropriate metrics to meet the needs of the associated action on page 12 of the AMIP. Habitat status and trend monitoring will follow the Generalized Random Tessellation Stratification (GRTS)- based, master-sample management tools. Habitat status and trend data will be used to characterize population responses to habitat restoration actions. Habitat restoration actions occurring in the populations identified above will be monitored selectively for their physical and biological habitat effects. Increased PIT-tagging of juveniles and adults will inform this work. The expanded habitat status and trend monitoring, habitat effects monitoring, and fish population monitoring all will support further development of relationships and models under the associated action on page 12 of the AMIP.	
57	Evaluate the Effectiveness of Tributary Habitat Actions The Action Agencies will evaluate the effectiveness of habitat actions through RM&E projects that support the testing and further development of relationships and models used for estimating habitat benefits. These evaluations will be coordinated with hatchery effectiveness studies.	<u>2010-2013</u> Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. To meet the requirements of the associated AMIP action on page 24 of the AMIP, the Action Agencies will use the Columbia Basin Anadromous Fish Monitoring Strategy for viable salmonid population (VSP), hatchery, and habitat effectiveness monitoring, along with the NPCC 2010 RM&E Categorical Review Process and the work of the AA/NOAA/ NPCC BiOp RME work groups and the PNAMP Action Effectiveness work group to identify where any	By September 2010, NOAA Fisheries and the Action Agencies will complete an analysis of existing intensively monitored watersheds (IMWs) to ensure the following: • Timely funding and implementation of intensive habitat actions

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
		additional action effectiveness studies (including IMWs) could and may need to be implemented. The Action Agencies are conducting an inventory and workshop in 2010 to evaluate coverage of existing action effectiveness studies and IMWs and to determine where additional IMW research may support salmonid climate change impact assessments. The evaluation may focus on feasibility of IMWs in the Upper Grande Ronde, Yakima Basin, and Wind River drainage. BPA implemented fast-track project review in early 2010 to fund time-critical BiOp RME work identified in the Columbia Basin Anadromous Fish Monitoring Strategy. The Bureau of Reclamation and NOAA Fisheries are co-funding a landscape classification system that will aid in the assessment of IMW coverage and help direct the choices of future habitat implementation projects and the choices of RME programs to meet RPA 57.	where they are practical to implement and an adequate treatment effect can be implemented and detected. • Sufficiently diverse representation of IMWs (geographically and with respect to limiting factors) and appropriate monitoring (e.g., temperature, flow) to detect climate change impacts. • Results are applicable to future habitat planning and for the implementation of Rapid Response Actions. These results will be coordinated with the RIOG and reported annually to the region. [AMIP p.24]
	RPA 57.1 Action effectiveness pilot studies in the Entiat River Basin to study treatments to improve channel complexity and fish productivity. (Initiate in FY 2007-2009 Projects, review and modify annually to ensure that these projects continue to provide a means of evaluating the effectiveness of tributary mitigation actions).	<u>2010-2013</u> The implementation of restoration actions appears to be a gap in the Entiat Basin, which will be addressed in implementation of RPA 35. Ongoing monitoring in the Entiat Basin will continue. The number of actions to be implemented within the Entiat Basin will be evaluated through power analysis to determine if the extent and number of projects is sufficient to cause a detectable treatment effect. If not, then additional actions will need to be implemented to cause a measurable treatment effect. Potential confounding effects of hatchery operations will be evaluated. Linkages between habitat and fish productivity will benefit from	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
		increased PIT-tagging of adults and juveniles.	
	RPA 57.2 Pilot study in the Lemhi River Basin to study treatments to reduce entrainment and provide better fish passage flow conditions. (Initiate in FY 2007-2009 Projects, review and modify annually to ensure that these projects continue to provide a means of evaluating the effectiveness of tributary mitigation actions).	2010-2013 Action effectiveness studies will continue in the Lemhi River basin, and linkages between habitat and fish productivity will benefit from increased PIT-tagging of adults and juveniles.	
	RPA 57.3 Action effectiveness pilot studies in Bridge Creek of the John Day River Basin to study treatments of channel incision and its effects on passage, channel complexity, and consequentially fish productivity. (Initiate in FY 2007-2009 Projects, review and modify annually to ensure that these projects continue to provide a means of evaluating the effectiveness of tributary mitigation actions).	2010-2013 Action effectiveness studies will continue in Bridge Creek, and linkages between habitat and fish productivity will benefit from increased PIT-tagging of adults and juveniles.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 3—Tributary Habitat Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to tributary habitat actions.***			
	RPA 57.4 Project and watershed level assessments of habitat, habitat restoration and fish productivity in the Wenatchee, Methow and John Day basins. (Initiate in FY 2007-2009 Projects, review and modify annually to ensure that these projects continue to provide a means of evaluating the effectiveness of tributary mitigation actions).	2010-2013 Monitoring of habitat and fish within the Wenatchee, Methow, and John Day basins will continue, and linkages between habitat and fish productivity will benefit from increased PIT-tagging of adults and juveniles. The Action Agencies will assess the effects of passage barrier removal projects on fish populations through existing and planned status and trend monitoring programs.	
	RPA 57.5 Action Agencies will convene a regional technical group to develop an initial set of relationships in FY 2008, then annually convene the group to expand and refine models relating habitat actions to ecosystem function and salmon survival by incorporating research and monitoring results and other relevant information. (Initiate in FY 2008)	2010-2013 The existing NOAA Fisheries/Action Agency technical work group will be expanded to include technical staff from federal, state, and tribal agencies. This group will annually convene to expand and refine models relating habitat actions to ecosystem function and survival. This model development and application will further support the habitat modeling needs of the associated action on page 12 of the AMIP.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
58	**Monitor and Evaluate Fish Performance in the Estuary and Plume** The Action Agencies will monitor biological responses and/or environmental attributes, and report in the following areas:		
	RPA 58.1 Monitor and evaluate smolt survival and/or fitness in select reaches from Bonneville Dam through the estuary. (Initiate in FY 2007-2009 Projects, annually review and modify until complete)	2010-2013 The Action Agencies' JSATS and POST studies are producing survival estimates through the estuary. The Action Agencies are awaiting further recommendations on addressing fitness.	
	RPA 58.2 Develop an index and monitor and evaluate life history diversity of salmonid populations at representative locations in the estuary. (Initiate in FY 2007-2009 Projects)	2010-2013 The Action Agencies are developing the index.	
	RPA 58.3 Monitor and evaluate juvenile salmonid growth rates and prey resources at	2010-2013 The Action Agencies will continue ongoing work and do periodic roll-ups to provide up-to-date, comprehensive summaries of the	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
	representative locations in the estuary and plume. (Initiate in FY 2007-2009 Projects, annually review and modify until complete)	research.	
	RPA 58.4 Monitor and evaluate temporal and spatial species composition, abundance, and foraging rates of juvenile salmonid predators at representative locations in the estuary and plume. (Initiate in FY 2007-2009 Projects, annually review and modify until complete)	2010-2013 BPA Project 1998-014-00, Ocean Survival of Salmonids, is listed as supplying information relevant to this RPA. Additionally, a Corps-funded transport modeling project in 2008-2009 addressed avian and fish predator-related smolt mortality in the lower Columbia River to Astoria. Furthermore, both JSATS and POST provide smolt survival estimates through the estuary and near ocean environments. These estimates characterize the magnitude of smolt loss in this zone and are useful context for evaluating predator impacts. The Action Agencies will develop an issue paper that brings into sharper focus this RPA and the need to analyze the existing data collected and address additional estuarine predators.	
59	**Monitor and Evaluate Migration Characteristics and Estuary/Ocean Conditions** The Action Agencies will monitor and evaluate selected ecological attributes of the estuary, which include the following or equivalent:		
	RPA 59.1 Map bathymetry and topography of the	2010-2013 The Action Agencies will continue to implement projects to	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
	estuary as needed for RM&E. (Initiate in FY 2007-2009 Projects)	support bathymetric and topographic mapping.	
	RPA 59.2 Establish a hierarchical habitat classification system based on hydro-geomorphology, ground-truth it with vegetation cover monitoring data, and map existing habitats. (Initiate in FY 2007-2009 Projects)	2010-2013 The Action Agencies will expand work to complete the remaining seven reaches and develop input data for the classification (e.g., vegetative land cover) through a new project, if necessary.	
	RPA 59.3 Develop an index of habitat connectivity and apply it to each of the eight reaches of the study area. (Initiate in FY 2007-2009 Projects)	2010-2013 The Action Agencies are developing a habitat connectivity index that will be applicable to all eight reaches.	
	RPA 59.4 Evaluate migration through and use of a subset of various shallow-water habitats from Bonneville Dam to the mouth toward understanding specific habitat use and relative importance to juvenile salmonids. (Initiate in FY 2007-2009 Projects, then annually)	2010-2013 The Action Agencies will continue work on fish/habitat associations in existing projects and also incorporate fish/habitat research into the new Anadromous Fish Evaluation Program research summary for the 2010 planning process (i.e., a new Request for Proposal).	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
	RPA 59.5 Monitor habitat conditions periodically, including water surface elevation, vegetation cover, plan community structure, primary and secondary productivity, substrate characteristics, dissolved oxygen, temperature, and conductivity, at representative locations in the estuary as established through RM&E. (FY 2007-2009 Projects, then annually)	2010-2013 The Action Agencies will expand habitat sampling in the following projects for FY 2010-2013: • Lower Columbia River Estuary Ecosystem Monitoring (200300700) • Columbia River Estuary Habitat Restoration (200301100) • Tidal Freshwater Monitoring (200500100)	
60	**Monitor and Evaluate Habitat Actions in the Estuary** The Action Agencies will monitor and evaluate the effects of a representative set of habitat projects in the estuary, as follows:		
	RPA 60.1 Develop a limited number of reference sites for typical habitats (e.g., tidal swamp, marsh, island, and tributary delta to use in action effectiveness evaluations). (Initiate in FY 2007-2009)	2010-2013 The Action Agencies will continue existing projects. The Action Agencies will assess whether the existing suite of reference sites is sufficient given the increase in the number of habitat restoration projects and the need for action effectiveness research for a subset of them.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
	RPA 60.2 Evaluate the effects of selected individual habitat restoration actions at project sites relative to reference sites and evaluate post-restoration trajectories based on project-specific goals and objectives. (Initiate in FY 2007-2009 Projects, annually review and modify as appropriate or until complete)	2010-2013 In addition to continuing existing action effectiveness projects, as further types and intensity of actions are implemented, the Action Agencies will increase the amount of action effectiveness research, either through a request for Proposals (RFP) or increases in scopes of work for existing projects, or both. The Expert Regional Technical Group will be instructed to quantify the benefits of habitat restoration in the lower Columbia River mainstem and estuary.	
	RPA 60.3 Develop and implement a methodology to estimate the cumulative effects of habitat conservation and restoration projects in terms of cause-and-effect relationships between ecosystem and controlling factors, structures, and processes affecting salmon habitats and performance. (Initiate in FY 2007-2009 Projects, annually review and modify as appropriate or until complete)	2010-2013 Continue to implement AFEP project EST-02-P-04 for the cumulative effects methodology and an initial assessment to be completed in 2011. This methodology will provide a synthesis of information from the AER efforts under RPA 60.2. The Action Agencies will make sure the deliverables from this project are carried forward after the projects end in spring 2011. Periodic cumulative effects assessments will be performed to understand if the restoration actions are having the desired effects.	
61	**Investigate Estuary/Ocean Critical Uncertainties** The Action Agencies will fund selected research direct at resolving critical uncertainties that are pivotal in understanding estuary and ocean effects, which could		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
	include the following:		
	RPA 61.1 Continue work to define the ecological importance of the tidal freshwater, estuary, plume, and nearshore ocean environments to the viability and recovery of listed salmonid populations in the Columbia River Basin.	2010-2013 The Action Agencies will continue ongoing work, and add work elements to 1998-014-00, 2003-010-00, and 2005-001-00 to increase understanding of functional relationships in Columbia River estuary ecosystems that support juvenile salmon to do periodic roll-ups to provide up-to-date, comprehensive summaries of the research for managers to use to make decisions.	
	RPA 61.2 Continue work to define the causal mechanisms and migration/behavior characteristics affecting survival of juvenile salmon during their first weeks in the ocean.	2010-2013 • Continue the existing projects to meet this RPA subaction.	
	RPA 61.3 Investigate the importance of early life history of salmon populations in tidal fresh water of the lower Columbia River.	2010-2013 • Continue ongoing work. • Add new work elements as needed to BPA projects and perform periodic roll-ups to provide up-to-date, comprehensive summaries of the research.	
	RPA 61.4 Continue development of a hydrodynamic numerical model for the estuary and plume to	2010-2013 • Evaluate the applicability of different hydrodynamic models for design and evaluation needs related to habitat restoration.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 4—Estuary Habitat and Ocean Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to estuary habitat actions.***			
	support critical uncertainties investigations.		

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 5—Harvest Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to harvest actions.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
62	**Fund Selected Harvest Investigations** The Action Agencies will fund selected harvest investigations linked to FCRPS interests:		
	RPA 62.1 Evaluate the feasibility of obtaining PIT-tag recoveries between Bonneville and McNary dams (Zone 6) to determine whether recoveries can help refine estimates of in-river harvest rates and stray rates used to assess adult survival rates. For FY 2009, focus on a pilot to test the feasibility of PIT-tag recoveries of harvested fish in this reach (spring, summer, and fall Chinook salmon and summer steelhead). (Initiate in FY 2007-2009 Projects)	2010-2013 • Continue to implement existing projects that are fully addressing this RPA.	
	RPA 62.2 Evaluate methods to develop or expand use of selective fishing methods and gear. (Initiate in FY 2007-2009 Projects)	2010-2013 • Continue to implement projects 2007-249-00 and 1993-060-000 that address this RPA. • Support a small-scale feasibility study of selective gear types for fisheries where mixed stock fisheries occur.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 5—Harvest Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to harvest actions.***			
	RPA 62.3 Evaluate post-release mortality rates for selected fisheries. (Initiate in FY 2007-2009 Projects)	2010-2013 • Continue to implement project 2007-249-00, evaluating a subset of select fishery capture methods. • Evaluate post-release mortality from different types of fisheries across a wide range of natural temperature regimes by: – Developing a workshop that focuses on defining goals, objectives, and a methodology to measure post-release mortality of fish from release to spawning. – Developing, evaluating, and approving RFP and responses. • Implementing a study to evaluate post-release mortality from different types of fisheries across a wide range of natural temperature regimes.	
	RPA 62.4 Support coded-wire tagging and coded-wire tag recovery operations that inform survival, straying, and harvest rates of hatchery fish by stock, rearing facility, release treatment, and location. (Initiate in FY 2007-2009 Projects)	2010-2013 • Continue to implement the projects identified in Appendix A. • Begin a process to modify contract language to improve QA/QC, analysis, and data management of studies. • Begin a process to investigate implementation of additional sampling for coded-wire tag (CWT) recoveries in the ocean and river fisheries, and target sampling at least 20 percent of the spawning population. • Begin an investigation of reducing the lag time and back log between CWT collection and availability of information. • Revise contract language to improve QA/QC, analysis, and data management. • Implement additional sampling efforts, and investigate	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 5—Harvest Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to harvest actions.***			
		methods to support reduction in time needed to collect CWT information.	
	RPA 62.5 Investigate the feasibility of genetic stock identification monitoring techniques. (Initiate in FY 2007-2009 Projects)	2010-2013 Actions implemented under RPA 50.5 address this RPA, by performing a feasibility study for B-run steelhead. In addition, project 2009-005-00 addresses this RPA and will be performed in coordination with the RPA 50.5 actions.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 6—Hatchery Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to hatchery actions.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
63	**Monitor Hatchery Effectiveness** The Action Agencies will continue to fund selected monitoring and evaluation of the effectiveness of Hatchery Actions. The evaluation of hatchery projects will be coordinated with the Tributary Habitat monitoring and evaluation program. These actions include:		
	RPA 63.1 Determine the effect that safety-net and conservation hatchery programs have on the viability and recovery of the targeted populations of salmon and steelhead. (Initiate in FY 2007-2009 Projects)	<u>2010-2013</u> • The Action Agencies will continue to monitor VSP attributes of populations supported by safety-net hatchery programs. • Implement BiOp critical hatchery effectiveness monitoring that is a component of the Columbia Basin Anadromous Fish Monitoring Strategy. Facilitate the formation of a regional work group process to implement and further refine regionally based hatchery effectiveness monitoring based on the recommendations of the Ad Hoc Supplementation Work Group. This strategy will further inform the monitoring required in individual HGMPS and will help ensure that monitoring will be coordinated to address the regional hatchery effectiveness questions. • For Snake River sockeye, continue to implement existing Action Agency programs.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 6—Hatchery Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to hatchery actions.***			
		• For Snake River spring/summer Chinook, the Action Agencies will continue to implement existing Action Agency programs. • For Snake River fall Chinook, determine how long it will take under RPA 50 to get enough information that will make it possible to develop a trigger for the potential future safety-net program. • For steelhead kelt reconditioning in the Upper Columbia, ensure that the National Marine Fisheries Service (NMFS) agrees that the Yakama Nation project will adequately cover this RPA. • For Snake River steelhead, determine whether additional monitoring for adults is necessary and whether baseline monitoring is adequate prior to implementation of the hatchery program. • Evaluate whether sufficient monitoring for the East Fork Salmon River steelhead is occurring to support baseline monitoring, especially RRS; implement monitoring if it is not already occurring.	
	RPA 63.2 Determine the effect that implemented hatchery reform actions have on the recovery of targeted salmon and steelhead populations. (Initiate in FY 2007-2009 Projects)	<u>2010-2013</u> • Continue to implement the projects identified in Appendix A to support ongoing VSP monitoring and monitoring for additional performance measures to assess the effectiveness of the actions. • Implement BiOp critical hatchery effectiveness monitoring that is a component of the Columbia Basin Anadromous Fish Monitoring Strategy. Facilitate the formation of a regional work group process to implement and further refine regionally	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 6—Hatchery Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to hatchery actions.***			
		based hatchery effectiveness monitoring based on the recommendations of the Ad Hoc Supplementation Work Group. This strategy will further inform the monitoring required in individual HGMPS and will help ensure that monitoring will be coordinated to address the regional hatchery effectiveness questions. • Convene a workshop with all stakeholders to determine the best methods (and associated RME) to control pHOS for steelhead in the Methow Basin. • Implement plans to develop local broodstocks in the Winthrop NFH, Touchet, and Tucannon steelhead programs.	
64	**Investigate Hatchery Critical Uncertainties** The Action Agencies will continue to fund selected research directed at resolving artificial propagation critical uncertainties:		The Action Agencies are supporting efforts to resolve hatchery critical uncertainties. As part of this effort, beginning in December 2010, the Action Agencies will assist NOAA to further develop or modify existing studies that address the Ad Hoc Supplementation Work Group Recommenda-tions Report and that additionally address potential density-dependent impacts of FCRPS hatchery releases on listed species. These studies
	RPA 64.1 Continue to estimate the relative reproductive success (RSS) of hatchery – origin salmon and steelhead compared to reproductive success of their natural-origin counterparts for ESA-listed spring/summer Chinook population in the Upper Grande Ronde, Lostine River, and Catherine Creek; listed spring Chinook in the Wenatchee River; and listed steelhead in the Hood	<u>2010-2013</u> The Action Agencies will continue to implement the projects identified in Appendix A to support the ongoing relative reproductive success (RRS) studies.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 6—Hatchery Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to hatchery actions.***			
	River. Continue to fund the ongoing RRS feasibility study for Snake River fall Chinook to completion in 2009. (Initiate in FY 2007-2009 Projects)		would provide support for future hatchery management actions to reduce potential adverse hatchery effects. By December 2010, the Action Agencies will work with NOAA to convene a technical workbgroup with fishery managers to discuss potential studies and potential management tools. The goal for the work group will be to complete its work by December 2011.
	RPA 64.2 Determine if properly designed intervention programs using artificial production make a net positive contribution to recovery of listed populations. (Initiate in FY 2007-2009)	<u>2010-2013</u> • Continue to implement the projects identified in Appendix A. Work implemented to support RPA 63 will continue to support this RPA. • Implement additional BiOp and VSP monitoring to assess stray rates and origin of hatchery fish to non-target areas. • Ensure that the Hood River steelhead program supports this RPA. • Determine the best course of action to expand research after information is obtained from implementation of RPA 63 (in FY 2010-2013 will be covered by expanding BPA project 1993-056-00). • Implement Oregon Department of Fish and Wildlife (ODFW) Reproductive Success and Stray Impact project for Deschutes Eastside (Bakeoven-Buck Hollow) populations.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 6—Hatchery Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to hatchery actions.***			
	RPA 64.3 In collaboration with the other entities responsible for steelhead mitigation in the Methow River, BPA will fund a new RSS study for ESA-listed steelhead in the Methow River. BPA will also fund a new RSS study for listed fall Chinook in the Snake River. NOAA Fisheries will provide technical assistance to the Action Agencies in development of conceptual study designs suitable for use by the Action Agencies in obtaining a contractor to implement the new studies. (Initiate in FY 2007-2009 Projects)	2010-2013 The Action Agencies will: • Determine if a study being planned by Douglas PUD and NMFS for Methow steelhead will adequately address this RPA. If not, develop alternative study plan. • Support PUD-NMFS RRS study for Methow steelhead or implement new study plan. • For Snake River fall Chinook, see RPA Action 65.	
65	**Investigate Hatchery Critical Uncertainties** The Action Agencies will fund research directed at resolving critical uncertainties:		
	RPA 65.1 In the mainstem Snake River above the Lower Granite Dam, estimate the effectiveness/fitness in nature of hatchery-origin fall Chinook salmon from federally funded Snake River hatchery programs relative to natural-origin Snake River fall Chinook.	2010-2013 • The Action Agencies will work with appropriate stakeholders to identify the intent of RPAs 64 and 65 in relationship to Snake River fall Chinook salmon, identify methods to meet the intent, and develop a targeted RFP based on this input.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 6—Hatchery Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to hatchery actions.***			
	RPA 65.2 Estimate fall Chinook hatchery program effects on the productivity of the fall Chinook salmon ESU.	2010-2013 • The Action Agencies intend to meet the needs of this RPA through work under RPAs 64.1, 64.3, and 65.1. • Facilitate the formation of a regional work group process to implement and further refine regionally based hatchery effectiveness monitoring based on the recommendations of the Ad Hoc Supplementation Work Group.	
	RPA 65.3 NOAA Fisheries will provide technical assistance to the Action Agencies in development of conceptual study designs suitable for use by the Action Agencies in obtaining a contractor to implement new studies.	2010-2013 • The Action Agencies will develop an RFP based on technical input of NOAA Fisheries and input from members of the regional work group process identified under RPA 65.2.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 7—Predation and Invasive Species Management Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to predation management actions.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
66	**Monitor and Evaluate the Caspian Tern Population in the Columbia River Estuary** The Action Agencies will monitor the tern population in the estuary and its impacts on outmigrating juvenile salmonids, as well as the effectiveness of the Caspian tern management plan.	2010-2013 • Continue assessment of effectiveness of constructed sites in attracting and retaining tern populations. • Continue monitoring abundance and predation. • Continue assessment of effectiveness of nesting habitat reduction at East Sand Island. • This basic research effort can decrease in a few years and move toward conducting more general periodic monitoring in 2011-2013. This work is focused in the estuary and is funded jointly under the Anadromous Fish Evaluation Program and the FWP. (See also the actions for RPA 45).	
67	**Monitor and Evaluate the Double-Crested Cormorant Population in the Columbia River Estuary** The Action Agencies will monitor the cormorant population in the estuary and its impacts on outmigrating juvenile salmonids and develop and implement a management plan to decrease predation rates, if warranted.	2010-2013 • Continue basic research, which is funded under the Anadromous Fish Evaluation Program and the BPA FWP. • Continue monitoring of abundance and predation at East Sand Island. (See also the actions for RPA 46.)	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 7—Predation and Invasive Species Management Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to predation management actions.***			
68	**Monitor and Evaluate Inland Avian Predators** The Action Agencies will monitor avian predator populations in the Mid-Columbia River and evaluate their impacts on outmigrating juvenile salmonids and develop and implement a management plan to decrease predations rates, if warranted.	2010 • Surveys of over-wintering double-crested cormorants in the lower Snake River. 2010-2013 • Effectiveness monitoring of both habitat and dam components of the inland avian management plan developed pursuant to RPA action 47. (That plan was finalized in 2009. See also the actions for RPAs 46, 47, and 48.) • Research will continue under contract AVS-W-03-01 to investigate inland bird predation. The Corps, fishery agencies, and tribes will participate in a work group to address issues associated with inland predation by birds, including the scope of the effort in the near term.	
69	**Monitoring Related to Marine Mammal Predation** The Action Agencies will:	2010-2013 • The Corps will continue to visually monitor abundance of pinnipeds, predation rates, and effectiveness of deterrent actions. (Note: Additional actions in RPA 49 support this RPA.)	
	RPA 69.1 Estimate overall sea lion abundance immediately below Bonneville Dam. (Initiate in FY 2007-2009 Projects)	2010-2013 • The Corps will continue to monitor pinniped abundance. • BPA's CRITFC project 2008-004-00 will be estimating overall abundance through 2017.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 7—Predation and Invasive Species Management Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to predation management actions.***			
	RPA 69.2 Monitor the spatial and temporal distribution of sea lion predation attempts and estimate predation rates. (Initiate in FY 2007-2009 Projects)	2010-2013 • The Corps will continue to monitor spatial and temporal distribution of predation attempts and estimate predation rates. • BPA's CRITFC project 2008-004-00 will be monitoring spatial and temporal distribution and estimating predation rates of sea lions through 2017.	
	RPA 69.3 Monitor the effectiveness of deterrent actions (e.g., exclusion gates, acoustics, harassment and other measures) and their timing of application on spring runs of anadromous fish passing Bonneville Dam. (Initiate in FY 2007-2009 Projects)	2010-2013 • The Corps will continue to monitor the effectiveness of deterrent actions, including harassment efforts. • BPA's CRITFC project 2008-004-00 will be monitoring effectiveness of deterrent actions on sea lions through 2017.	
70	**Monitoring Related to Piscivorous (Fish) Predation** The Action Agencies will:		
	RPA 70.1 Continue to update and estimate the cumulative benefits of sustained removals of northern pikeminnow since 1990. (Initiate in FY 2007-2009 Projects)	2010-2013 The Biological Evaluation program component of the Northern Pikeminnow Management Program (NPMP) will annually assess the cumulative benefits of the pikeminnow removal program. These estimates will be presented in the annual reports of the NPMP	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 7—Predation and Invasive Species Management Research, Monitoring, and Evaluation ***The Action Agencies' strategy is to support performance monitoring and adaptive management related to predation management actions.***			
	RPA 70.2 Continue to evaluate if inter and intra compensation is occurring. (Initiate in FY 2007-2009 Projects)0	2010-2013 The Biological Evaluation program component of the Northern Pikeminnow Management Program (NPMP) will annually assess the cumulative benefits of the pikeminnow removal program. These estimates will be presented in the annual reports of the NPMP	
	RPA 70.3 Evaluate the benefit of additional removals and resultant increase in exploitation rate's affect on reduction in predator mortality since the 2004 program incentive increase. (Initiate in FY 2007-2009 Projects)	2010-2013 • Ongoing projects will be continued.	
	RPA 70.4 Develop a study plan to review, evaluate, and develop strategies to reduce non-indigenous piscivorous predation. (Initiate in FY 2007-2009 Projects)	2010-2013 • A 2008 workshop shifted focus to other predatory species and identified research needs. A new project involving field work is expected to be initiated in the fall of 2010, and funds have been allocated. Plans are in place to address species beyond pikeminnow.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
Appendix A lists projects to be implemented in 2010-2013 with funding and technical assistance from the Action Agencies. Implementation of the RPA actions depends on ESA take authorizations, and these actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
71	**Coordination** The Action Agencies will coordinate RM&E activities with other Federal, State and Tribal agencies on an ongoing annual basis, including:		
	RPA 71.1 Organizing and supporting the Corps AFEP.	2010-2013 • AFEP planning, RME, and the implementation process will continue to be regionally coordinated with tribes, states, federal agencies, and others through the regular annual cycle of Studies Review Work Group (SRWG), Fish Facility Design Review Work Group (FFDRWG), and Fish Passage Operations and maintenance (FPOM meetings. Regular rotating independent reviews of segments of the program by entities such as ISAB and ISRP will continue.	
	RPA 71.2 Supporting and participating in the Council's Columbia River Basin Fish and Wildlife Program project planning and review efforts.	2010-2013 • The Action Agencies and NOAA Fisheries will brief the ISRP and NPCC on the FCRPS 2008 BiOp Annual and Comprehensive Reports. The Council's Columbia River Basin Fish and Wildlife Program and the AFEP program will continue to be coordinated through joint development and tracking of implementation planning and through development of annual	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
		progress and check-in reporting.	
	RPA 71.3 Supporting the standardization and coordination of tagging and monitoring efforts through participation and leadership in regional coordination forums such as PNAMP.	2010-2013 • Continue coordination within the Columbia Basin while recognizing opportunities outside of the Columbia Basin. • Ensure adequate ongoing staff and resources are prioritized for product and infrastructure development.	
	RPA 71.4 Working with regional monitoring agencies to develop, cooperatively fund, and implement standard metrics, business practices, and information collection and reporting tools needed to cooperatively track and report on the status of regional fish improvement and fish monitoring projects.	2010-2013 The Action Agencies will work with the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) to develop standard data management guidelines for all monitoring projects that collect fish and aquatic habitat data that specify how specific categories of data should be handled, stored, and made available to the region. This will include the following: • Improve metadata documentation for all monitoring projects by supporting development of PNAMP's master-sample design, monitoring glossary, and protocol catalog projects. • Support pilot and demonstration projects such as the ISEMP, PNAMP ISTM, Upper Columbia pilot, and CRITFC's Tribal Data Network Accord Project to demonstrate implementation of coordination and standardization tools. Ensure that these projects are consistent with PNAMP Data Management Leadership Team recommendations. • Provide implementation and coordination support through a	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
		regional network of data management positions. • Investigate additional pilot efforts to demonstrate approaches to improved data sharing and transparency. • Complete the development of regional High Level Indicators, associated metrics, and information mapping to help focus coordination needs and products. • Continue to advance the data management and reporting components of the Columbia Basin Anadromous Fish Monitoring Strategy through ongoing collaboration with state and tribal fish management agencies. • Implement regionally developed guidelines and business rules for Fish and Wildlife Program, Reclamation, and AFEP RME projects through contract specifications.	
	RPA 71.5 Coordinating the further development and implementation of Hydrosystem, Tributary Habitat, Estuary/Ocean, Harvest, Hatchery, and Predation RM&E through leadership and participation in ongoing collaboration and review processes and workgroups.	<u>2010-2013</u> • The Action Agencies will continue to participate and support the collaboration processes (PNAMP, Federal Caucus RME team, Fish and Wildlife Program, Anadromous Fish Evaluation Program, Columbia Basin Fish and Wildlife Authority (CBFWA), RIOG, and other ad hoc RME collaboration processes) and products, including the current Action Agencies, NOAA Fisheries, and NPCC work group collaboration on implementation planning, annual/comprehensive progress reporting, and adaptive management of RME strategies.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
	RPA 71.6 Coordinating implementation with other appropriate regional collaboration processes. This includes coordination related to statutory provisions for the Federal government (BPA/ Council), voluntary coordination among Federal agencies (Federal Caucus), and coordination with regional processes for Federal/non-Federal engagement (Technical Management Team (TMT), System Configuration Team (SCT), PNAMP, Northwest Environmental Data-Network (NED)), and others.	2010-2013, • The Action Agencies will actively participate in regional forums and accomplishing this subaction through actions described above for RPA 71. No subsequent needed actions have been identified at this time.	
72	**Data Management** The Action Agencies will ensure that the information obtained under the auspices of the FCRPS RM&E Program is archived in appropriate data management systems. Actions include:		By December 2011, the Action Agencies and NOAA Fisheries will ensure that this information (tributary and ocean research) is appropriately managed in a database allowing changes to be tracked over time. [AMIP p. 25]
	RPA 72.1 Continue to work with regional, Federal, State and Tribal agencies to establish a coordinated and standardized information	2010-2013 NED is no longer functioning, but PNAMP has assumed the advancement of NED objectives. The Action Agencies will continue working with PNAMP to develop data management tools	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
	system network to support the RM&E program and related performance assessments. The coordination of this development will occur primarily through leadership, participation, and joint funding support in regional coordination forums such as the NED workgroup, and PNAMP and the ongoing RM&E pilot studies in the Wenatchee River, John Day River, Upper Salmon River, and Columbia River Estuary. (Initiate in FY 2007-2009 Projects)	and standards—i.e., Protocol Manager, Master Sample Design, the Monitoring Glossary, and other data management products identified in RPA 71: • Continue development and review of the Aquatic Resource Schema (ARS) and similar approaches to ensure consistency with standard metrics identified in RPA 71.4. • Continue efforts to map data flow for priority BiOp fish and habitat data for agencies at the project level consistent with ongoing methods used by NOAA's Northwest Fisheries Science Center (NWFSC) efforts to update and maintain TRT population datasets. • Develop a data strategy guide to facilitate and implement data standards and metadata consistent with the ARS Schema across the Columbia Basin that support BiOp needs. • Develop and implement a network of data support staff and infrastructure to support the ARS and data strategy guide in partnership with regional natural resource management entities and PNAMP. • Support the development of regional-level data management work groups for specific BiOp critical information to standardize development of data management tools and procedures for data collection, storage, and access. • Continue to advance the data management and reporting components of the Columbia Basin Anadromous Fish Monitoring Strategy through ongoing collaboration with state and tribal fish management agencies. In addition to advancing	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
		fish data exchange capabilities, advance these capabilities to areas of metadata, water quality and flow, a habitat environmental condition, project implementation tracking, and other data exchanges as needed. • Coordinate and develop a strategy for integrating and data sharing among regional implementation tracking systems (e.g, PISCES, PCSRF, and PNSHP databases) and regional action/program planning tools under development. • Continue to advance standard project implementation metrics.	
	RPA 72.2 Contribute funding for data system components that support the information management needs of individual Hydrosystem, Tributary Habitat, Estuary/Ocean, Harvest, Hatchery, and Predation RM&E. (Initiate in FY 2007-2009 Projects)	<u>2010-2013</u> • The Action Agencies, together with other natural resource management entities, will co-fund and provide staff support for the data support positions and infrastructure and will continue support of PNAMP data management products and guidelines identified in RPA 72.1. • Continue support of PNAMP data management products and guidelines identified in RPA 72.1, 71.3 and 71.4.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 8—Coordination and Data Management Research, Monitoring, and Evaluation ***The Action Agencies are committed to making coordination and data management more effective because FCRPS RME is part of the overall RME for recovery of salmon in the Columbia River basin.***			
	RPA 72.3 Participate in Northwest regional coordination and collaboration efforts such as the current PNAMP and NED efforts to develop and implement a regional management strategy for water, fish and habitat data. (Initiate in FY 2007-2009 Projects)	2010-2013 • The Action Agencies will continue to support funding of staff and agency participation in work groups, such as the PNAMP data management team, to advance the data strategy under RPA 72.1.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 9—Project Implementation and Compliance Monitoring Research, Monitoring, and Evaluation			
The Action Agencies have identified specific commitments or actions for each of the hydrosystem, estuary/ocean, tributary habitat, hatchery, and predator control strategies, providing clear programmatic-level measures for evaluating progress, subject to adaptive management. Implementation details will be updated in 3-year cycles. Projects will be monitored for implementation of planned deliverables and compliance to performance expectations. The following RME actions are subject to annual adjustments as necessary to conform with incidental take limitations.			
73	**Implementation and Compliance Monitoring** The Action Agencies will:		
	RPA 73.1 Annually monitor the successful implementation of projects through standard procedures and requirements of contract oversight and management, and review of project deliverables and final reports.	<u>2010-2013</u> • The Action Agencies will continue to advance the coordination, standardization, and development of their project tracking systems with NOAA Fisheries' Pacific Coast Salmon Recovery Fund (PCSRF), BPA PISCES programs, and Reclamation and Corps programs. BPA will investigate and develop capabilities for performing post–implementation (compliance) monitoring of habitat projects to verify they were implemented as stated in the contract and continue to function as intended.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 9—Project Implementation and Compliance Monitoring Research, Monitoring, and Evaluation			
	RPA 73.2 Maintain project and action level details for planning and reporting purposes. This approach will provide the most up-to-date information about the status of actions and projects being implemented.	2010-2013 • BPA will continue the process of revising PISCES and developing the TAURUS program to track RPA implementation. The U.S. Army Corps of Engineers will develop a multi-district review and spreadsheet to track RPA project-level implementation. Reclamation will incorporate implementation and compliance information into the BPA PISCES system. The Action Agencies will continue to coordinate the annual reporting of this project-level implementation to NOAA. • Continue work with PNAMP on development of a regionally endorsed data dictionary for environmental resource action and project implementation metrics. Develop and implement compatible project tracking metrics for all RPA action and project types, such as habitat restoration and protection, harvest and hatchery management, and research and monitoring.	

Action No.	Action Description	2010-2013 Actions	Adaptive Management
RME Strategy 9—Project Implementation and Compliance Monitoring Research, Monitoring, and Evaluation			
	RPA 73.3 Maintain a comprehensive habitat project tracking system where relevant project information is contained in an accessible comprehensive data system. The data system will contain project level information that is needed for both implementation and effectiveness monitoring. The system will include the set of minimum metrics and meta data for RM&E data design listed in Data Management Needs for Regional Project Tracking to Support Implementation and Effectiveness Monitoring (Katz et al. 2006). (Initiate in FY 2008)	2010-2013 • The Action Agencies will support processes to update and integrate regional habitat restoration and protection tracking metrics based on the Katz et al. standards and may include additional metrics from PCSRF, PISCES, Pacific Northwest Salmon Habitat Project Database (PNSHP), and the NPCC ISRP. When updated habitat metrics and crosswalks are drafted from NOAA Fisheries and BPA, the Action Agencies may use PNAMP as a forum to work with other environmental resource management entities to finalize and endorse the metrics for regional use. To support action effectiveness monitoring evaluations in the Northwest, the Action Agencies will provide reports consistent with the metrics to NOAA Fisheries.	

AMIP Implementation Actions

AMIP Action	Action Description	2010-2013 Actions	Adaptive Management
Early Warning Indicator	UCR Early Warning Indicator Analysis	• Evaluate status of Upper Columbia River spring Chinook, including calculating a new 4-year average abundance estimate that includes the 2009 return data. • Determine the potential for tripping the Significant Decline Trigger in 2010 or 2011. If the trigger is likely to be tripped, initiate review of potential Rapid Response Actions, initiate appropriate actions, and prioritize and accelerate development of Rapid Response Actions for this species. Completed on January 22, 2010.	
Early Warning Indicator	Additional Early Warning Indicator	2010 • The Action Agencies and NOAA Fisheries will develop, in coordination with the RIOG, at least one additional Early Warning Indicator by December 2010, which may be revised pending additional analyses and discussion. Specifically, the additional Early Warning Indicator(s) would evaluate whether a species is likely to have substantially reduced abundance (and productivity) in the future based on 2 years of adult return information, preliminary biological information, and environmental indicators or known environmental disasters. [AMIP p. 30]	
Significant Decline Trigger	Improve Significant Decline Trigger	2010 • The Action Agencies and NOAA Fisheries, in coordination with the RIOG, will further improve the Significant Decline Trigger no later than December 2010 by incorporating a metric indicative of trend. [AMIP p. 31]	

AMIP Action	Action Description	2010-2013 Actions	Adaptive Management
Rapid Response Plans	Develop ESU-specific Rapid Response Plans	2010-2011 By December 2011, the Action Agencies and NOAA Fisheries will develop a Rapid Response Plan that will include a detailed description of the potential Rapid Response Actions described in the AMIP, together with implementation milestones. Those actions are: • Hydro Actions: – The Corps will implement, in coordination with NOAA Fisheries and the other Action Agencies, hydrosystem actions that will increase the survival of the species in question beyond the current juvenile dam passage performance standards. Specific actions will be based on the most recent data available and might include targeted spills and changes in fish transportation operations based on recent survival data. • Predator Control Actions: – BPA and the Corps, in conjunction with the USFWS and the states, will implement more aggressive, targeted efforts to control predatory fish, birds, and invasive species to increase survival of listed fish. • Harvest Reductions Allowable Under Existing Agreements: – All fisheries that affect the species of concern, including ocean, mainstem, and terminal will be reviewed by NOAA Fisheries to assess whether existing harvest management agreements provide adequate protection. If it is determined that additional protection is necessary, NOAA Fisheries will use existing procedural provisions of the agreements to seek consensus among the parties to modify the agreements. (This item is included here for completeness; this is a NOAA Fisheries action rather than	

AMIP Action	Action Description	2010-2013 Actions	Adaptive Management
		an Action Agency action). • Safety Net Hatchery Programs – BPA and NOAA Fisheries use safety-net hatchery programs to address short-term extinction risk. The Action Agencies and NOAA Fisheries have determined that Rapid Response Plans should be specific to individual ESUs, notwithstanding the fact that many actions will be common to many, if not all, ESUs. The first Rapid Response Plan developed under this AMIP will apply to the Upper Columbia River spring Chinook salmon ESU.	
Long-term Contingency Plans 1	Develop Long-term Contingency Plan(s)	<u>2010-2011</u> By December 2011, the Action Agencies and NOAA Fisheries will develop a Long-term Contingency Plan that will include a detailed description of potential long-term contingency actions, a selection process, and implementation milestones. Long-term contingency actions include: • Phase II Hydro Actions: – The Corps, in coordination with NOAA Fisheries and the other Action Agencies, will identify and implement additional hydro system actions beyond those needed to meet the current juvenile dam passage performance standards. • Reintroduction: – This action will re-establish salmon populations (excluding areas upstream of the Hells Canyon Complex and Chief Joseph Dam) that are functionally extirpated, to increase the diversity and abundance of an ESU. These actions will be drawn from the results of the reintroduction review being conducted by NOAA Fisheries.	

AMIP Action	Action Description	2010-2013 Actions	Adaptive Management
		• Predator Control: – These actions to control predatory fish and birds and invasive species are in addition to those described in the BiOp or other sections of this AMIP. The Corps and BPA are working with NOAA Fisheries and USFWS to accelerate administrative processes to control Caspian terns and double-crested cormorants and predatory fish. Accelerated efforts to provide baseline information on predators include an expedited scientific review for a research proposal to address non-indigenous piscivorous predation in the mainstem Columbia River. This includes research on channel catfish, smallmouth bass, and the indirect effects American shad have on the survival of juvenile salmonids. • Harvest: – NOAA Fisheries will use the existing *United States v. Oregon* process to seek modifications to reduce take or add contingency provisions for listed species and populations of concern. NOAA Fisheries will also begin a reinitiation review of existing harvest agreements. • Conservation Hatcheries: – The federal agencies will work with hatchery operators to convert safety-net programs to longer-term conservation hatchery programs where appropriate. • Hatchery Reform: – In the event that long-term contingency actions are triggered, the evaluation of hatchery production and its effects on listed species will be accelerated to determine whether alternative operational strategies should be implemented. • John Day Reservoir Operations at Minimum Operating Pool	

AMIP Action	Action Description	2010-2013 Actions	Adaptive Management
		from April through June: – By December 2011, the Corps, in coordination with the other federal agencies, will complete study plans to include milestones, scope, and schedule, as well as an appropriate decision-making process. *Action Agencies and NOAA Fisheries have determined that Long-term Contingency Plans should be specific to individual ESUs, notwithstanding the fact that many actions will be common to many, if not all, ESUs.* By March 2010, the Corps, in coordination with NOAA Fisheries and the other Action Agencies, will complete a study plan for breaching the lower Snake River dams. The study plan will detail the scope, schedule, and budget to conduct and complete technical studies and a decision-making process. • The Corps released its study plan on March 31, 2010.	

Appendix A: Project Lists

Hydro Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
33	All	Sr Stlhd Kelt Mgmt	200871500	BPA	http://www.cbfish.org/Project.mvc/Display/200871500

Corps 2010 Hydro Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
18	Bonneville	127811	Powerhouse 2 downstream migrant follow-on/orifice mods
18	Bonneville	122654	Powerhouse 2 corner collector behavioral guidance system (BGS)
19, 54	The Dalles	122110	Spillwall completion and testing
20	John Day	122744	Configuration study - surface bypass & tailrace improvements
21	McNary	145896	Spillway weirs - phase 2
21	McNary	120903	Surface bypass alternatives evaluation
21	McNary	320395	Cylindrical dewaterer demolition
21	McNary	143133	Configuration & Operations Plan
21	McNary	320606	Juvenile bypass system outfall relocation planning & design
21	McNary	MCN02	Debris management - Juvenile fish facility screens
21, 54	McNary		Spillway weir reconfiguration
22	Ice Harbor	107832	Spillway weir clean-up contract / seal repair
22	Ice Harbor	145229	Spillway chute/deflector modification
22	System-wide	122201	Turbine passage survival program - Ice Harbor test turbine
23	Lower Monumental	107970	Juvenile bypass system outfall relocation
23	Lower Monumental	LM06	Configuration & Operations Plan

Corps 2010 Hydro Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
24	Little Goose	120902	Spillway weir stoplog replacement
24	Little Goose	128335	Dewatering structure fix and primary juvenile bypass outfall relocation
24	Little Goose	139435	Configuration & Operations Plan
25	Lower Granite	107836	Spillway weir corrective actions
25	Lower Granite	143134	Configuration & Operations Plan
25	Lower Granite	125265	Juvenile bypass facility DDR and prototype test for collection channel weir system
28	Lower Granite		Adult passage auxiliary water supply study
28	John Day	138171	North ladder entrance improvements
28	System-wide	146655	Fish ladder temperature evaluation
28	The Dalles	142630	Adult fishways & auxiliary water supply study
28, 53	John Day	138171	North shore ladder exit (weirs) improvements
31	System-wide	SYS04	Transportation Configuration and Operations Plan
31	System-wide	121437	Evaluation of juvenile fish separators
31, 52	System-wide	SYS05	Snake River sockeye survival/transportation study
33, 54	System-wide	SYS06	Kelt reconditioning planning/implementation

Planned 2010-12 Tributary Habitat Projects

Project-specific information is available at http://www.cbfish.org/Portfolio.mvc/Index.

- The first two tables summarize the limiting factors, planned metrics, and 2012 habitat quality improvement estimates for Snake River and Upper Columbia ESUs/DPSs. Unless otherwise noted, information in these tables are derived from the local expert panel workshops conducted in 2009. Web links to BPA-funded projects are provided for additional detail.
- Projects that were not included in the 2012 HQI estimates but may implement habitat improvements in 2010-12 are listed under "Additional Projects" in the 2012 HQI estimates column. Habitat improvements completed under these or other projects not considered during the expert panel processes, will be retrospectively estimated where appropriate during the next round of expert panel workshops in 2012.
- The third table summarizes the limiting factors and planned metrics for Middle Columbia steelhead populations. Habitat improvement estimates for these populations were developed using the Appendix E method described in Attachment C-1 of the FCRPS Comprehensive Analysis rather than through an expert panel process. The 2010-12 planned metrics are based on current contracts with start dates beginning October 1, 2009 or later. The Action Agencies expect that additional contracts to implement metrics beyond those summarized in the third table will be executed in the 2010-12 timeframe. Web links to BPA funded projects are provided for additional detail
- The "2018 Accord estimates" convey the population level habitat improvement estimates included in Attachment G of the 2008 Columbia Basin Fish Accords between the Three Treaty Tribes and FCRPS Action Agencies (Tribal Accords). These estimates were developed by the Umatilla, Warms Springs, and Yakama Tribes using the same methodology applied by the expert panels.

❖ Indicates populations with Reclamation involvement.

Spring/Summer Chinook
Tributary Habitat Projects

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
Snake River Spring/Summer Chinook: Grande Ronde/Imnaha MPG				
❖ Catherine Creek	• Passage barriers • Lack of diverse habitats • Low summer flows • Degraded riparian conditions • Poor water quality/elevated summer stream temperatures • Excess fine sediment	• Improve access to ≈ 45 miles of instream habitat • Treat ≈ 90 wetland acres • Protect ≈ 1 stream mile • Treat ≈ 5.5 riparian miles • Add ≈ 0.1 mile off-channel habitat	1992-026-01: Grand Ronde Model Watershed 1984-025-00: Blue Mountain Fish Habitat Improvement 1996-083-00: Grand Ronde Watershed Restoration	2018 target: 23% 2010-12 estimate: 2%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
❖ Lostine/Wallowa River	• Passage barriers • Lack of diverse habitats • Degraded riparian conditions • Floodplain connectivity • Excess fine sediment	• Improve access to ≈ 37 miles of instream habitat • Treat <10 wetland acres • Treat ≈ 1.0 miles floodplain or riparian habitat • Reconnect 0.75 miles stream channel	1992-026-01: Grand Ronde Model Watershed 2007-393-00: Protect and Restore Northeast Oregon	2018 target: 2% 2010-12 estimate: 2%
❖ Grand Ronde River upper mainstem	• Lack of diverse habitats • Degraded riparian conditions • Excess fine sediment • Poor water quality/elevated summer stream temperatures • Low summer flows	• Treat 1.5 miles stream channel • Add structures to 14.7 stream miles (complexity) • Remove 0.4 miles road along stream	1992-026-01: Grand Ronde Model Watershed 1996-083-00: Grand Ronde Watershed Restoration	2018 target: 23% 2010-12 estimate: 1% 2018 Accord estimate: 28% **Additional Projects** 2008-207-00: Umatilla Tribe Ceded Area Stream Corridor Conservation & Protection
Imnaha River mainstem	• Lack of diverse habitat • Passage barriers • Excess fine sediment	• Improve access to 0.5 miles of instream habitat • Treat ≈ 5 riparian/stream miles • Treat ≈ 5 road miles	1992-026-01: Grand Ronde Model Watershed 2007-393-00: Protect and Restore Northeast Oregon	2018 target: 1% 2010-12 estimate: <1%
Big Sheep Creek	• Passage barriers • Excess fine sediment	• Improve access to 18 miles of instream habitat • Treat 3.5 road miles • Treat 1 riparian mile	1992-026-01: Grand Ronde Model Watershed 2007-393-00: Protect and Restore Northeast Oregon	2018 target: N/A 2010-12 estimate: 1%
Snake River Spring/Summer Chinook: Middle Fork & South Fork Salmon River MPGs				
Big Creek	• Passage barriers • Excess fine sediment	• Improve access to ≈ 22 miles of instream habitat • Decommission ≈ 15 miles road	2007-127-00: East Fork of South Fork Salmon River Passage Restoration	2018 target: 1% 2010-12 estimate: 2%
Secesh River	• Passage barriers • Excess sediments	• Improve access to ≈ 12 miles of instream habitat • Decommission ≈ 45 miles road	2007-127-00: East Fork of South Fork Salmon River Passage Restoration	2018 target: 1% 2010-12 estimate: 6%
South Fork Salmon River	• Passage barriers • Excess sediments • High water temperatures	• Improve access to ≈ 18.6 miles of instream habitat • Enhance/Restore ≈ 3 riparian miles	2007-127-00: East Fork of South Fork Salmon River Passage Restoration	2018 target: <1% 2010-12 estimate: <1%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
Snake River Spring/Summer Chinook: Lower Snake MPG				
Tucannon River	• Habitat complexity and connectivity • High water temperatures • Degraded riparian conditions	• Protect ≈ 200 riparian acres • Protect ≈ 5.5 miles of streambank • Install structures in ≈ 0.6 stream miles	1994-018-06: Tucannon Stream and Riparian Restoration 1994-018-07: Garfield County Fall Chinook and Steelhead Habitat Improvement	2018 target: 17% 2010-12 estimate: 1% 2018 Accord estimate: 4% **Additional Projects** 2008-202-00: Protect and Restore Tucannon Watershed
Snake River Spring/Summer Chinook: Upper Salmon River MPG				
❖ East Fork Salmon River	• Passage barriers • Excess fine sediment • Fish entrainment • Low stream flow	• Improve access to 1.9 miles of instream habitat • Install 3 fish screens • Protect ≈ 0.5 riparian miles • Protect/acquire 3 cfs of instream water	1994-015-00: Idaho Fish Screening Project 2007-268-00: Idaho Watershed Habitat Restoration-Custer District 2007-399-00: Upper Salmon Screen Tributary Passage	2018 target: 1% 2010-12 estimate: 2%
❖ Lemhi	• Passage barriers • Fish entrainment • Low stream flow • Degraded riparian conditions • Excess sediments • High water temperature	• Install 12 fish screens • Protect/acquire ≈ 17 cfs of instream water • Improve access to ≈ 23 miles of instream habitat • Protect ≈ 43 riparian miles & 68 riparian acres • Reconnect ≈ 2.0 miles stream channel • Treat ≈ 8 stream miles	1994-015-00: Idaho Fish Screening Project 2007-394-00: Idaho Watershed Habitat Restoration-Lemhi 2007-399-00: Upper Salmon Screen Tributary Passage 2008-601-00: Upper Lemhi River – Acquisition 2008-602-00: Upper Lemhi River – Restoration 2008-605-00: Lower Lemhi Habitat-Easements 2008-606-00: Lower Lemhi Habitat-Restoration 2008-608-00: Idaho MOA/Fish Accord Water Transactions	2018 target: 7% 2010-12 estimate: 8%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
❖ Lower mainstem Salmon River	• Passage barriers • Fish entrainment • Low stream flow • Lack of complex habitat	• Add 500-1000 ft side channel • Improve access to ≈ 17 miles of instream habitat • Protect/acquire ≈ 5.5 cfs of instream water • Install 4 fish screens	1994-015-00: Idaho Fish Screening Project 1999-019-00: Restore 12 Mile Reach of Upper Salmon River 2002-013-01: Water Entity - Water Transaction Program 2007-268-00: Idaho Watershed Habitat Restoration-Custer District 2007-394-00: Idaho Watershed Habitat Restoration-Lemhi 2007-399-00: Upper Salmon Screen Tributary Passage 2008-602-00: Upper Lemhi River – Restoration	2018 target: 1% 2010-12 estimate: 2%
❖ Upper mainstem Salmon River	• Passage barriers • Low stream flows • Excess fine sediment	• Treat ≈ 1 stream mile • Protect ≈ 11 cfs of instream water	1994-015-00: Idaho Fish Screening Project Restoration-Lemhi 2002-013-01: Water Entity - Water Transaction Program 2007-268-00: Idaho Watershed Habitat Restoration-Custer District 2007-399-00: Upper Salmon Screen Tributary Passage 2008-602-00: Upper Lemhi River – Restoration 2008-608-00: Idaho MOA/Fish Accord Water Transactions	2018 target: 14% 2010-12 estimate: 3%
❖ Pahsimeroi River	• Passage barriers • Fish entrainment • Degraded riparian habitat • Low stream flows	• Improve access to ≈ 15 miles instream habitat • Install 3 fish screens • Protect ≈ 3.5 riparian miles • Protect ≈ 5 cfs instream flow	1994-015-00: Idaho Fish Screening Project Restoration-Lemhi 2002-013-01: Water Entity - Water Transaction Program 2007-268-00: Idaho	2018 target: 41% 2010-12 estimate: 6%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
		• Restore ≈ .5 riparian miles	Watershed Habitat Restoration-Custer District 2007-399-00: Upper Salmon Screen Tributary Passage 2008-603-00: Pahsimeroi River Habitat 2008-608-00: Idaho MOA/Fish Accord Water Transactions	
❖ Valley Creek	• Passage barriers • Fish entrainment • Low stream flows	• Install 4 fish screens • Improve access to 4 miles instream habitat • Protect ≈ 4 cfs instream flow	1994-015-00: Idaho Fish Screening Project Restoration-Lemhi 2007-399-00: Upper Salmon Screen Tributary Passage 2008-608-00: Idaho MOA/Fish Accord Water Transactions	2018 target: 1% 2010-12 estimate: 11%
❖ Yankee Fork NOTE: Only assessment work was identified for 2010-12 implementation during the 2009 expert panel workshops. Subsequent to the workshops, the Yankee Fork Interdisciplinary Team (IDT) is identifying actions for 2010-12 implementation while the assessments are being completed.	Expert panel identified no limiting factors to be addressed in 2010-12. The Yankee Fork IDT identified one limiting factor to be addressed in 2010-12: • Passage barriers	Expert panel identified no metrics for 2010-12 implementation. The Yankee Fork IDT will provide appropriate metrics for evaluation at the 2012 expert panel workshop for actions associated with: • Replacing structures to improve access to existing side-channel rearing ponds during low streamflow, and • Replacing culverts that inhibit access to spawning and rearing habitat		2018 target: 30% 2010-12 estimate: Implemented actions to be evaluated retrospectively in 2012 expert panel process 2018 Accord estimate: 8%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
Upper Columbia River Spring/Summer Chinook: Upper Columbia – Below Chief Joseph MPG				
❖ Entiat	• Low stream flow • Habitat complexity and connectivity	• Protect 6.5 cfs of instream water • Reconnect ≈ 0.5 miles side channel • Treat ≈ 1.9 stream miles	2002-013-01: Water Entity - Water Transaction Program 2007-231-00: Entiat River Riparian Restoration 2010-001-00: Upper Columbia Programmatic Habitat	2018 target: 22% 2010-12 estimate: 2-8% 2018 Accord estimate: 19% **Additional projects** 2009-003-00: Upper Columbia Habitat Restoration
❖ Methow	• Passage barriers • Low stream flow • Riparian and floodplain function • Habitat complexity and connectivity	• Protect ≈ 15 cfs of instream water • Improve access to ≈ .8 miles of instream habitat • Restore ≈ 18.6 riparian miles & 70 riparian acres • Reconnect ≈ 2.3 miles side channel • Treat ≈ 3.2 stream miles • Protect 1 stream mile	2002-013-01: Water Entity - Water Transaction Program 2007-035-00: Methow Basin Riparian Enhancement Program 2007-264-00: Methow River Complexity Fisheries Enhancement 2010-001-00: Upper Columbia Programmatic Habitat	2018 target: 6% 2010-12 estimate: 2% 2018 Accord estimate: 1% **Additional Projects** 2009-003-00: Upper Columbia Habitat Restoration
❖ Wenatchee	• Low stream flows • High stream temperature • Passage barriers • Riparian and floodplain function • Habitat complexity and connectivity	• Protect ≈ 7.5 cfs of instream water • Improve access to ≈ 7.2 miles instream habitat • Protect/enhance ≈ 8.4 riparian miles • Treat ≈ .2 stream miles • Reconnect ≈ 1.2 miles side channel	2002-013-01: Water Entity - Water Transaction Program 2007-325-00: Wenatchee River Complexity Fisheries Enhancement 2007-400-00: Wenatchee River Subbasin Fish Passage Enhancement 2010-001-00: Upper Columbia Programmatic Habitat	2018 target: 3% 2010-12 estimate: 1% 2018 Accord estimate: 7% **Additional Projects** 2009-003-00: Upper Columbia Habitat Restoration

Summer/Winter Steelhead
Tributary Habitat Projects

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with These Metrics	2012 Habitat Quality Improvement Estimates
Snake River Steelhead: Clearwater River MPG				
Lochsa River	• Passage barriers • Lack of diverse habitats • Degraded riparian conditions • Poor water quality/elevated stream temperatures • Excess fine sediment	• Improve access to 15 miles of instream habitat • Remove 75.2 road miles • Treat 7.9 road miles • Treat 170 riparian acres • Treat 1575 riparian/upland acres	2007-395-00: Protect and Restore Lochsa Watershed	2018 target: 16% 2010-12 estimate: 3%
Lolo Creek	• Passage barriers • Degraded riparian conditions • Excess fine sediment • Poor water quality/elevated stream temperatures	• Improve access to 23.2 miles of instream habitat • Treat 15.1 road miles • Treat 3 riparian miles • Treat 30 riparian/upland miles	1996-077-02: Lolo Creek Watershed Restoration	2018 target: 12% 2010-12 estimate: 4%
Selway River	• Passage barriers • Lack of diverse habitats • Excess fine sediment	• Improve access to 24.1 miles of instream habitat • Treat 3 riparian miles • Treat 30 riparian/upland miles	New 2010-12 project based on 2007-092-00: Restore Selway River Watershed	2018 target: <1% 2010-12 estimate: 1%
South Fork Clearwater River	• Passage barriers • Lack of diverse habitats • Degraded riparian conditions • Excess fine sediment	• Improve access to 23.6 miles of instream habitat • Add structures to 5.5 stream miles (complexity) • Remove 76.5 road miles • Treat 8.5 stream miles • Treat 34.1 riparian miles • Treat 31 riparian acres • Treat 100 upland acres • Treat 55 riparian/upland acres	1996-077-05: Meadow Creek Watershed Restoration 2000-035-00: Newsome Creek Watershed Restoration 2000-036-00: Mill Creek Watershed Restoration 2002-072-00: Red River Watershed Restoration New 2010-12 projects based on: 2007-134-00: Restore and Protect Crooked River Watershed, and 2007-142-00: Restore and Protect American River	2018 target: 14% 2010-12 estimate: 3%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with These Metrics	2012 Habitat Quality Improvement Estimates
			Watershed	
Clearwater River Lower Mainstem NOTE: Population not evaluated by 2009 expert panel process because it is not included in RPA 35 Table 5. Included here due to potential improvements to MPG.	• Channel morphology • High summer water temperature • Reduced channel complexity • Riparian and channel alteration • Sediment, nutrients, & flashiness from agricultural runoff • Collapsed streambanks, channel incision, & channel alteration from historic railroad logging • Stream bed instability - channels frequently scour to bedrock	• Treat ≈ 14 riparian acres and 20 riparian miles • Add structures to ≈ 1.5 stream miles (complexity) • Protect ≈ 2.7 riparian miles (fencing) • Treat ≈ 0.2 road miles	1999-017-00: Protect and Restore Lapwai Creek Watershed 2002-070-00: Lapwai Creek Anadromous Habitat 2008-604-00: Lower Clearwater and Potlatch Watersheds Habitat Improvements	2018 target: N/A 2010-12 estimate: to be evaluated retrospectively in 2012 expert panel process
Snake River Steelhead: Grande Ronde River and Imnaha MPGs				
Grande Ronde River lower mainstem tributaries	• Excess fine sediment	• Road decommissioning	1992-026-01: Grand Ronde Model Watershed	2018 target: <1% 2010-12 estimate: <1%
❖ Grande Ronde River upper mainstem	• Passage barriers • Habitat complexity and connectivity • Degraded riparian conditions • Excess fine sediment • Low summer Flows • Poor water quality/low dissolved oxygen	• Improve access to ≈ 50 miles of instream habitat • Add structures to 20.2 stream miles (complexity) • Remove 0.4 road miles • Treat 7 riparian miles and 220 riparian acres • Protect 12-80 riparian acres and 1.5 stream miles • Reconnect/add 0.4 miles channel habitat	1992-026-01: Grand Ronde Model Watershed 1984-025-00: Blue Mountain Fish Habitat Improvement 1996-083-00: Grand Ronde Watershed Restoration	2018 target: 4% 2010-12 estimate: 1% 2018 Accord estimate: 28% **Additional Projects** 2008-207-00: Umatilla Tribe Ceded Area Stream Corridor Conservation & Protection
Joseph Creek	• Habitat complexity and connectivity • Excess fine sediment • Poor water quality/elevated summer stream temperatures • Excess nutrients	• Road decommissioning • Treat/protect 1 riparian miles	1992-026-01: Grand Ronde Model Watershed 2007-393-00: Protect and Restore Northeast Oregon	2018 target: <1% (Oregon) and 4% (Washington) 2010-12 estimate: <1%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with These Metrics	2012 Habitat Quality Improvement Estimates
❖ Wallowa River	• Passage barriers • Habitat complexity and connectivity • Low summer flow • Degraded riparian conditions • Excess fine sediment	• Improve access to instream habitat • Treat 1.4 miles floodplain or riparian habitat • Treat <10 wetland acres • Protect 1 cfs of instream water • Reconnect .75 miles stream channel	1992-026-01: Grand Ronde Model Watershed 2007-393-00: Protect and Restore Northeast Oregon	2018 target: <1% 2010-12 estimate: <1%
Imnaha River	• Passage barriers • Habitat complexity and connectivity • Degraded riparian conditions • Excess fine sediment	• Improve access to ≈ 23 miles of instream habitat • Treat ≈ 10 riparian/stream miles • Decommission ≈ 5 road miles	1992-026-01: Grand Ronde Model Watershed 2007-393-00: Protect and Restore Northeast Oregon	2018 target: N/A 2010-12 estimate: 1%
Snake River Steelhead: Lower Snake MPG				
Tucannon	• Habitat complexity and connectivity • High water temperatures • Degraded riparian conditions	• Protect ≈ 200 riparian acres • Protect ≈ 5.5 miles of streambank • Install structures in ≈ 0.6 stream miles	1994-018-06: Tucannon Stream and Riparian Restoration 1994-018-07: Garfield County Fall Chinook and Steelhead Habitat Improvement	2018 target: 5% 2010-12 estimate: 1% 2018 Accord estimate: 8% **Additional Projects** 2008-202-00: Protect and Restore Tucannon Watershed
Asotin Creek	• Habitat complexity and connectivity • High water temperatures • Degraded riparian conditions	• Protect ≈ 15 riparian miles • Enhance ≈ 30 riparian acres	1994-018-05: Asotin Creek Enhancement and Restoration 2002-050-00: Riparian Buffers on Couse and Tenmile Creeks in Asotin County	2018 target: 4% 2010-12 estimate: 1%
Snake River steelhead: Salmon River MPG				
Lower Middle Fork Salmon River (Big, Camas, and Loon Creeks)	• Passage barriers • Excess fine sediment	• Improve access to ≈ 2 miles of instream habitat • Decommission ≈ 15 miles road	2007-127-00: East Fork of South Fork Salmon River Passage Restoration	2018 target: 2% 2010-12 estimate: 3%
❖ East Fork Salmon River	• Passage barriers • Excess fine sediment • Fish entrainment • Low stream flow • Lack of complex habitat	• Improve access to 3.9 miles of instream habitat • Install 3 fish screens • Protect ≈ 0.5 riparian miles • Protect/acquire 7.5 cfs of	1994-015-00: Idaho Fish Screening Project 2007-268-00: Idaho Watershed Habitat Restoration-Custer District	2018 target: 2% 2010-12 estimate: 2%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with These Metrics	2012 Habitat Quality Improvement Estimates
		• instream water • Connect ≈ 500-1000' side channels	2007-399-00: Upper Salmon Screen Tributary Passage 2008-608-00: Idaho MOA/Fish Accord Water Transactions	
❖ Lemhi	• Passage barriers • Fish entrainment • Low stream flow • Degraded riparian conditions • Excess sediments • High water temperature	• Install 10 fish screens • Protect/acquire ≈ 26 cfs of instream water • Improve access to ≈ 25 miles of instream habitat • Protect ≈ 50 riparian miles & 68 riparian acres • Reconnect ≈ 2.0 miles stream channel • Treat ≈ 1 stream miles	1994-015-00: Idaho Fish Screening Project Restoration-Lemhi 2007-394-00: Idaho Watershed Habitat Restoration-Lemhi 2007-399-00: Upper Salmon Screen Tributary Passage 2008-601-00: Upper Lemhi River – Acquisition 2008-602-00: Upper Lemhi River – Restoration 2008-608-00: Idaho MOA/Fish Accord Water Transactions	2018 target: 3% 2010-12 estimate: 12%
❖ Pahsimeroi River	• Passage barriers • Fish entrainment • Degraded riparian habitat • Excess sediment • Low stream flows	• Improve access to ≈ 30 miles instream habitat • Install 4 fish screens • Protect ≈ 3.5 riparian miles • Protect ≈ 6 cfs instream flow • Treat ≈ 0.5 riparian miles	1994-015-00: Idaho Fish Screening Project Restoration-Lemhi 2002-013-01: Water Entity - Water Transaction Program 2007-268-00: Idaho Watershed Habitat Restoration-Custer District 2007-399-00: Upper Salmon Screen Tributary Passage 2008-603-00: Pahsimeroi River Habitat 2008-608-00: Idaho MOA/Fish Accord Water Transactions	2018 target: 9% 2010-12 estimate: 2%
❖ Upper mainstem Salmon River	• Passage barriers • Entrainment • Low stream flows • Excess fine sediment	• Improve access to ≈ 4 miles instream habitat • Treat ≈ 1 stream mile • Protect ≈ 15 cfs of instream water	1994-015-00: Idaho Fish Screening Project Restoration-Lemhi 2002-013-01: Water Entity - Water Transaction Program 2007-268-00: Idaho Watershed Habitat Restoration-Custer District	2018 target: 6% 2010-12 estimate: 3%

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with These Metrics	2012 Habitat Quality Improvement Estimates
			2007-399-00: Upper Salmon Screen Tributary Passage 2008-602-00: Upper Lemhi River – Restoration 2008-608-00: Idaho MOA/Fish Accord Water Transactions	
Secesh River	• Passage barriers • Excess sediments	• Improve access to ≈ 12 miles of instream habitat • Decommission ≈ 45 miles road	2007-127-00: East Fork of South Fork Salmon River Passage Restoration	2018 target: 6% 2010-12 estimate: 8%
South Fork Salmon River	• Passage barriers • Excess sediments • High water temperatures	• Improve access to ≈ 18.6 miles of instream habitat • Enhance/Restore ≈ 3 riparian miles	2007-127-00: East Fork of South Fork Salmon River Passage Restoration	2018 target: 1% 2010-12 estimate: <1%
Little Salmon and Rapid River NOTE: Population not evaluated by 2009 expert panel process because it is not included in RPA 35 Table 5. Included here due to potential improvements to MPG.	• Altered mainstem and tributaries	• Improve access to 3.0 miles of instream habitat	2007-064-00: Slate Creek Watershed Restoration	2018 target: N/A 2010-12 estimate: to be evaluated retrospectively in 2012 local expert process
Upper Columbia Steelhead: Upper Columbia River – below Chief Joseph MPG				
❖ Entiat	• Low stream flow • Habitat complexity and connectivity	• Protect 6.5 cfs of instream water • Reconnect ≈ 0.5 miles side channel • Treat ≈ 1.9 stream miles	2002-013-01: Water Entity - Water Transaction Program 2007-231-00: Entiat River Riparian Restoration 2010-001-00: Upper Columbia Programmatic Habitat	2018 target: 8% 2010-12 estimate: 1-4% 2018 Accord estimate: 13% **Additional Projects** 2009-003-00: Upper Columbia Habitat Restoration
❖ Methow	• Passage barriers • Low stream flow • Riparian and floodplain function • Habitat complexity and connectivity	• Protect ≈ 15 cfs of instream water • Improve access to ≈ .8 miles of instream habitat • Restore ≈ 18.6 riparian miles & 70 riparian acres • Reconnect ≈ 2.3 miles side channel	2002-013-01: Water Entity - Water Transaction Program 2007-035-00: Methow Basin Riparian Enhancement Program 2007-264-00: Methow River Complexity Fisheries Enhancement	2018 target: 4% 2010-12 estimate: 1% 2018 Accord estimate: 2% **Additional Projects** 2009-003-00: Upper Columbia Habitat Restoration

Population	Limiting Factors to Be Addressed in 2010-12	Summary of 2010-12 Planned Metrics	Projects Associated with These Metrics	2012 Habitat Quality Improvement Estimates
		• Treat ≈ 3.2 stream miles • Protect 1 stream mile	2010-001-00: Upper Columbia Programmatic Habitat	
❖ Wenatchee	• Low stream flows • High stream temperature • Passage barriers • Riparian and floodplain function • Habitat complexity and connectivity	• Protect ≈ 7.5 cfs of instream water • Improve access to ≈ 7.2 miles instream habitat • Protect/enhance ≈ 8.4 riparian miles • Treat ≈ .2 stream miles • Reconnect ≈ 1.2 miles side channel	2002-013-01: Water Entity - Water Transaction Program 2007-325-00: Wenatchee River Complexity Fisheries Enhancement 2007-400-00: Wenatchee River Subbasin Fish Passage Enhancement 2009-003-00: Upper Columbia Habitat Restoration 2010-001-00: Upper Columbia Programmatic Habitat	2018 target: 4% 2010-12 estimate: 2% 2018 Accord estimate: 6% **Additional Projects** 2009-003-00: Upper Columbia Habitat Restoration
❖ Okanogan	• Low stream flows • High stream temperature • Habitat complexity and connectivity • Passage barriers • Riparian and floodplain function	• Protect ≈ 5 cfs of instream flow • Improve access to ≈ 26 miles instream habitat • Reconnect ≈ 2 miles side channel • Install 30 fish screens • Protect/enhance ≈ 17 riparian miles and ≈ 246 riparian acres • Protect ≈ 3540 acres land • Treat 15 miles road	1996-042-00: Restore Salmon Creek Anadromous Fish 2000-001-00: Omak Creek Anadromous Fish Habitat and Passage 2002-013-01: Water Entity - Water Transaction Program 2007-034-00: Columbia Cascade Pump Screen Correction 2007-145-00: Okanogan Livestock and Water for Habitat Improvement 2007-224-00: Okanogan Subbasin Habitat Implementation Program 2008-102-00: Okanogan Habitat Acquisition and Restoration 2008-104-00: Land & Water Acquisition 2010-001-00: Upper Columbia Programmatic Habitat	2018 target: 14% 2010-12 estimate: 25% 2018 Accord estimate: 64%

Middle Columbia Steelhead
Tributary Habitat Projects

The RPA 35 habitat quality improvement targets for Middle Columbia steelhead populations were estimated to be met from actions implemented in the 2007-09 timeframe. The following table lists projects with planned habitat metrics in current contracts that will improve habitat quality for Middle Columbia steelhead in 2010 and beyond. Projects listed under "Additional Projects" in the 2012 HQI Estimates column include those that were identified in Attachment G of the Tribal Accords as providing population-specific habitat improvements, but do not have current contracts with planned habitat metrics for that specific population.

❖ Indicates populations with Reclamation involvement.

MPG	Population	Summary of 2010 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
Cascade Eastern Slope Tributaries	Deschutes River – eastside	• Protect 200 riparian acres and 20 riparian miles • Treat 10.5 riparian acres and 1.6 riparian miles	1998-028-00: Trout Creek Watershed Restoration 2002-019-00: Develop Riparian Buffer Systems in Lower Wasco County	2018 target: 1% 2018 Accord estimate: 2% **Additional Projects:** 2008-301-00: Deschutes River Restoration
	Deschutes River - westside	• None for FY10		2018 target: <1% 2018 Accord estimate: 31% **Additional Projects:** 2008-301-00: Deschutes River Restoration
	Fifteen mile Creek (winter run)	• Fence 1.25 riparian miles • Protect 280 riparian acres and 14 riparian miles • Protect 2 cfs instream water	1993-040-00: Fifteenmile Creek Habitat Improvement 2001-021-00: 15 Mile Creek Riparian Buffers 2002-013-01: Water Entity - Water Transaction Program	2018 target: <1%
	Klickitat River	• Treat ≈ 17 riparian acres and 0.75 riparian miles	1997-056-00: Klickitat Watershed Enhancement	2018 target: 4% 2018 Accord estimate: 13% **Additional Projects:** 1988-120-25: Yakima River Management, Data and Habitat-

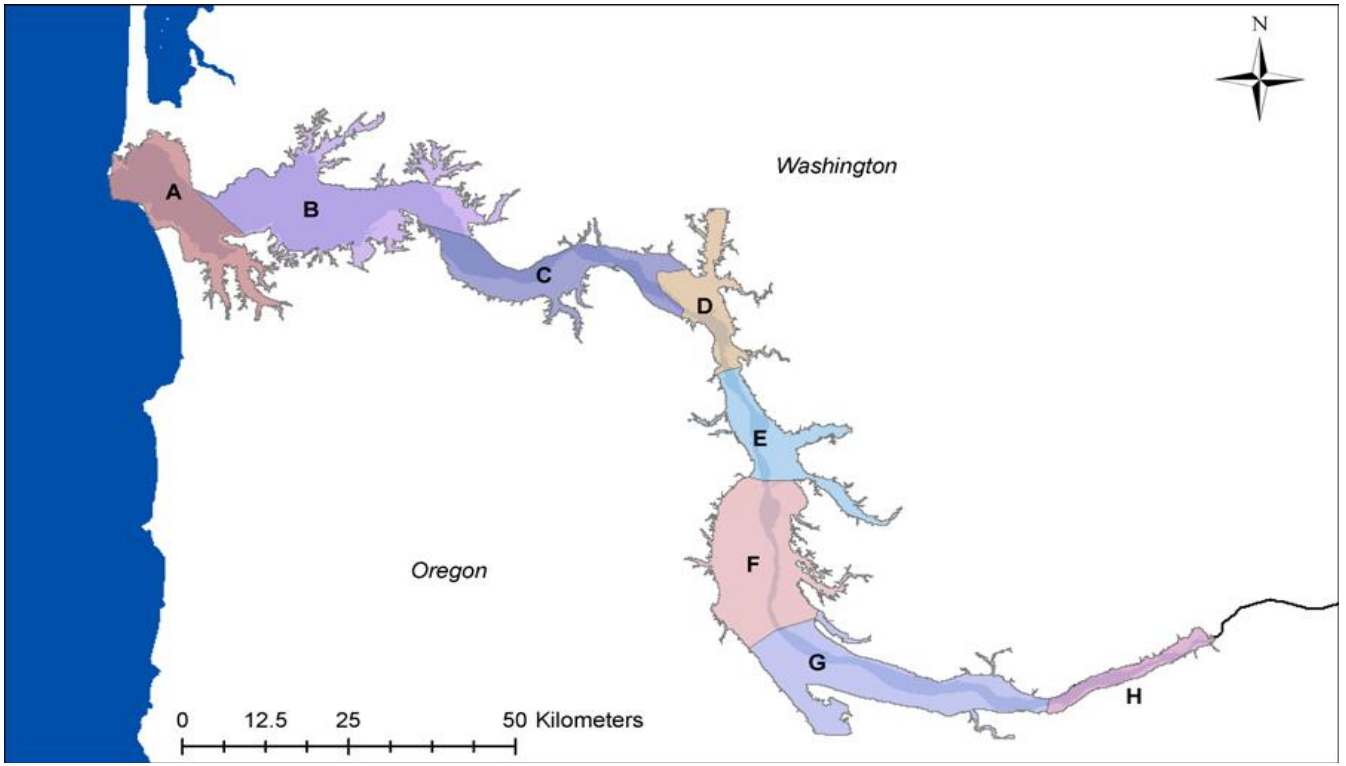
MPG	Population	Summary of 2010 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
				Yakima/Klickitat Fisheries Project 1988-120-35: Klickitat River Management, Data and Habitat-Yakima/Klickitat Fisheries Project
John Day River	John Day River lower mainstem tributaries	• Protect ≈ 1168 riparian acres and 141 riparian miles • Treat ≈ 20 riparian acres, 345 upland acres, and 14 riparian miles • Decommission ≈ 29 riparian acres & 0.2 miles of road • Fence 6 riparian & stream miles • Install fish screens	1984-021-00: John Day Habitat Enhancement 1993-066-00: Oregon Fish Screens Project 1998-022-00: Pine Creek Conservation Area' 1999-010-00: Pine Hollow and Jackknife Watershed Restoration 2002-015-00: Coordination and Technical Assistance to Watershed Councils and Individuals in Sherman County, Oregon 2002-034-00: Riparian Buffers in Wheeler County 2002-035-00: Riparian Buffers in Gilliam County 2003-017-00: Integrated Status and Effectiveness Monitoring Program (ISEMP) 2007-397-00: John Day Passage, Flow and Habitat Enhancement	2018 target: <1% 2018 Accord estimate: 60%
	❖ John Day River upper mainstem	• Address 6 barriers • Treat 3 riparian acres and 2.5 riparian miles • Install fish screens	1993-066-00: Oregon Fish Screens Project 2007-397-00: John Day Passage, Flow and Habitat Enhancement	2018 target: <1% 2018 Accord estimate: 84% **Additional Projects:** 2001-041-01: Forrest Ranch Conservation Area
	❖ Middle Fork John Day River	• Address 3 barriers • Treat 0.01 riparian acres and 1.5 riparian miles • Install fish screens	1993-066-00: Oregon Fish Screens Project 2001-041-01: Forrest Ranch Conservation Area 2007-397-00: John Day	2018 target: <1% 2018 Accord estimate: 104%

MPG	Population	Summary of 2010 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
			Passage, Flow and Habitat Enhancement	
	❖ North Fork John Day River	• Protect 2 cfs instream water • Protect 200 riparian acres and 3.8 riparian miles • Fence 10.5 riparian/stream miles	1984-021-00: John Day Habitat Enhancement 2002-013-01: Water Entity - Water Transaction Program	2018 target: <1% 2018 Accord estimate: 17% **Additional Projects:** 2000-031-00: Enhance Habitat in the North Fork John Day River
	❖ South Fork John Day River	• Protect 10 riparian acres and 0.6 riparian miles • Treat 2 riparian acres and 5 riparian miles • Address 1 barrier • Install fish screens	1984-021-00: John Day Habitat Enhancement 1993-066-00: Oregon Fish Screens Project 2007-397-00: John Day Passage, Flow and Habitat Enhancement	2018 target: 1% 2018 Accord estimate: 47% **Additional Projects:** 2008-201-00: Umatilla Tribe Ceded Land Culvert and Passage Implementation
Umatilla and Walla Walla River	Touchet River	• None for FY10		2018 target: 4% **Additional Projects** 2000-026-00: Rainwater Wildlife Area Operations
	Umatilla River	• Treat ≈ 4 riparian acres and ≈ 0.3 riparian miles • Protect ≈ 31 riparian acres • Address 1 barrier • Install, operate and maintain fish screens	1983-436-00: Umatilla Passage Operations and Maintenance 1987-100-01: Umatilla Anadromous Fish Habitat-Umatilla Tribe 1987-100-02: Umatilla Anadromous Fish Habitat-Oregon Department of Fish and Wildlife (ODFW) 1993-066-00: Oregon Fish Screens Project 1995-060-01: Isqúulktpe Watershed Project	2018 target: 4% 2018 Accord estimate: 37% **Additional Projects** 1988-022-00: Umatilla Fish Passage Operations 2008-203-00: Assess Reintroduction of Steelhead in Butte, McKay & Willow Creeks 2008-206-00: Instream Flow Restoration
	Walla Walla River	• Protect 6.4 cfs instream water • Operate and maintain fish screens and ladder	2007-217-00: Walla Walla River Passage O&M 2007-396-00: Walla Walla Basinwide Tributary Passage and Flow	2018 target: 4% 2018 Accord estimate: 43% **Additional Projects** 1996-046-01: Walla Walla River

MPG	Population	Summary of 2010 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
				Basin Fish Habitat Enhancement 2000-033-00: Walla Walla River Fish Passage Operations 2008-206-00: Instream Flow Restoration
Yakima River Group	Naches River	• Protect 200 riparian acres and 4.7 riparian miles • Protect 15.7 cfs of instream water • Address 3 barriers • Treat ≈ 1 riparian mile • Operate and maintain fish screens	1988-120-25: Yakima River Management, Data and Habitat-Yakima/Klickitat Fisheries Project (YKFP) 1992-009-00: Yakima Phase II Fish Screens O&M with WDFW 1995-033-00: Yakima Phase II Fish Screens O&M with BOR 1992-062-00: Lower Yakima Valley Riparian Wetlands Restoration 2002-013-01: Water Entity - Water Transaction Program 2007-398-00: Yakima Basinwide Tributary Passage and Flow	2018 target: 4% 2018 Accord estimate: 9% **Additional Projects** 1997-051-00: Yakima Basin Side Channels Land Acquisition
	Satus Creek	• Protect 5 riparian acres and 1 riparian mile	1992-062-00: Lower Yakima Valley Riparian Wetlands Restoration	2018 target: 4% 2018 Accord estimate: 7% **Additional Projects** 1988-120-25: Yakima River Management, Data and Habitat-Yakima/Klickitat Fisheries Project (YKFP) 1996-035-01: Yakama Reservation Watershed Project 1997-051-00: Yakima Basin Side Channels Land Acquisition
	Toppenish	• Protect 5 riparian acres and 0.75 riparian miles • Treat 300 riparian acres • Operate and maintain fish screens	1992-062-00: Lower Yakima Valley Riparian Wetlands Restoration 1995-033-00: Yakima Phase II Fish Screens O&M with BOR	2018 target: 4% 2018 Accord estimate: 13% **Additional Projects** 1988-120-25: Yakima River Management, Data and Habitat-Yakima/Klickitat Fisheries Project (YKFP)

MPG	Population	Summary of 2010 Planned Metrics	Projects Associated with Planned Metrics	2012 Habitat Quality Improvement Estimates
				1996-035-01: Yakama Reservation Watershed Project 1997-051-00: Yakima Basin Side Channels Land Acquisition
	Yakima River upper mainstem	• Treat 51 riparian acres and 5 riparian miles • Protect 65 riparian acres • Address 2 barriers • Remove 0.9 miles diking • Operate and maintain fish screens	1988-120-25: Yakima River Management, Data and Habitat-Yakima/Klickitat Fisheries Project (YKFP) 1992-009-00: Yakima Phase II Fish Screens O&M with WDFW 1995-033-00: Yakima Phase II Fish Screens O&M with BOR 2006-004-00: Wenas Wildlife Mitigation 2007-112-00: Teanaway River Watershed Protection 2007-398-00: Yakima Basinwide Tributary Passage and Flow	2018 target: 4% 2018 Accord estimate: 10% **Additional Projects** 1992-062-00: Lower Yakima Valley Riparian Wetlands Restoration 1997-051-00: Yakima Basin Side Channels Land Acquisition
	Rock Creek	• Treat 4.5 riparian acres and 0.5 riparian miles	2007-156-00: Rock Creek Fish and Habitat Assessment	2018 target: n/a 2018 Accord estimate: 20%

Lower Columbia River Estuary Reaches



Reprinted from Northwest Power and Conservation Council 2004, "Mainstem Lower Columbia River and Columbia River Estuary Subbasin Plan." In *Columbia River Basin Fish and Wildlife Program*, Portland, OR. A hydrogeomorphic reach indicates where different terrestrial ecoregions intersect with hydrological and geomorphic changes along the 233 kilometers of the estuarine gradient, from Bonneville Dam to the ocean entrance. The map above shows Reach A (River Mile [RM] 2-14), Reach B (RM 14-38), Reach C (RM 38-64), Reach D (RM 64-74), Reach E (RM 74-85), Reach F (RM 85-102.5), Reach G (RM 102.5-127), and Reach H (RM 127-145).

Estuary Habitat Projects

Action No.	Subaction No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
38	1, 2	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100

AA Habitat Project List 2010 – 2013 (Under Contract)							
BPA/Corps Project Number & Title	**Project Name**	**Lead Agency/ Sponsor**	**Location (Reach A-H)**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
2003-011-00	Mirror Lake	BPA /Oregon Dept. of Parks (Parametrix)	H	Riparian Plantings	Water temperature Reduced macrodetrital inputs Exotic plants	X	X
2003-011-00 1999-025-00	Sandy River Delta	BPA / USFS (Ash Creek Forestry)	E	Riparian Plantings	Water temperature Reduced macrodetrital inputs Exotic plants	X	X
2003-011-00	Tryon Creek	BPA / City of Portland	E	Riparian Plantings	Water temperature Reduced macrodetrital inputs Exotic plants	X	X
2003-011-00	Oaks Bottom	BPA / City of Portland	E	Riparian Plantings Invasives removal	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants Water temperature	X	X
	Oaks Bottom Section 536	Corps / City of Portland	E	Culvert Replacement Riparian plantings	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants Water temperature	X	X

AA Habitat Project List 2010 – 2013 (Under Contract)							
BPA/Corps Project Number & Title	**Project Name**	**Lead Agency/ Sponsor**	**Location (Reach $^{A-H}$)**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
2010-004-00 2003-011-00	Megler Creek	BPA / CREST	B	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Deer Island Restoration	BPA / Columbia SWCD	E	Tidegate Retro	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Mudd Lake Restoration	BPA /Clark County	E	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Mill Road (Grays River)	BPA / Columbia Land Trust	B	Dike Breach	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00 2003-011-00	Fort Columbia	BPA / CREST	A	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00 2003-011-00	Otter Point	BPA / CREST	A	Dike Breach	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2#145653	Dairy Creek / Sturgeon Lake	Corps / WMSWCD	F	Tidal Reconnection in multiple locations	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X

AA Habitat Project List 2010 – 2013 (Under Contract)							
BPA/Corps Project Number & Title	**Project Name**	**Lead Agency/ Sponsor**	**Location (Reach [A-H])**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
P2#142455	Vancouver Water Resources Wetland	Corps / City of Vancouver	E	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2#1173986	Julia Butler Hansen	Corps / USFWS	B	Tidegate replacement-fish friendly	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2#142456	Sandy River Dike Breach	Corps / USFS	G	Dam Removal	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2#323863 2009-016-00	Abernathy Creek Tidal Restoration	Corps / WDFW BPA / WDFW	C	Tidal Reconnection to wetlands-stream complexity	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2#323863 2009-016-00	Cottonwood Island	Corps / WDFW BPA / WDFW	D	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2#323863 2009-016-00	Hump-Fisher Shallow Water	Corps / WDFW BPA / WDFW	C	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
P2# 331430	Post Office Lake	Corps / USFWS	F	Tidal Reconnection-levee breach	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X

AA Habitat Project List 2010 – 2013 (Under Contract)							
BPA/Corps Project Number & Title	**Project Name**	**Lead Agency/ Sponsor**	**Location (Reach A-H)**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
P2# 323863 2009-016-00	Shillapoo Wildlife Area	Corps / WDFW BPA / WDFW	F	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
1991-078-00	John R Palensky	Corps / BPA	F	Tidal Reconnection-levee breach	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Pile Structure Removal	BPA / Estuary Partnership	TBD	Piling Removal	Sediment-nutrient-related estuary changes Sediment/nutrient-related plume changes Exotic fish Native birds Bioaccumulation toxicity	X	X
2003-011-00	Pile Structure Removal	BPA / Estuary Partnership	TBD	Piling Removal	Sediment-nutrient-related estuary changes Sediment/nutrient-related plume changes Exotic fish Native birds Bioaccumulation toxicity	X	X
2003-011-00	Pile Structure Removal	BPA / Estuary Partnership	TBD	Piling Removal	Sediment-nutrient-related estuary changes Sediment/nutrient-related plume changes Exotic fish Native birds Bioaccumulation toxicity	X	X
2003-011-00	Lower Chinook River Acquisition	BPA / Columbia Land Trust	A	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X

AA Habitat Project List 2010 – 2013 (Under Development)							
BPA/Corps Project Number & Title	**Project Name**	**LEAD Agency / Sponsor**	**Location (Reach $^{A-H}$)**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
TBD	Reach A-H Acquisition/ Restoration	BPA / Columbia Land Trust	TBD	Acquisition/ Restoration	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
TBD	Reach A-H Acquisition/ Restoration	BPA / Columbia Land Trust	TBD	Acquisition/ Restoration	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
TBD	Reach A-H Acquisition/ Restoration	BPA / Columbia Land Trust	TBD	Acquisition/ Restoration	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
TBD	Reach A-H Acquisition/ Restoration	BPA / Columbia Land Trust	TBD	Acquisition/ Restoration	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
TBD	Reach A-H Acquisition/ Restoration	BPA / Columbia Land Trust	TBD	Acquisition/ Restoration	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
TBD	Reach A-H Acquisition/ Restoration	BPA / Columbia Land Trust	TBD	Acquisition/ Restoration	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Riparian Plantings	Water temperature Reduced macrodetrital inputs Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Riparian Plantings	Water temperature Reduced macrodetrital inputs Exotic plants	X	X

AA Habitat Project List 2010 – 2013 (Under Development)							
BPA/Corps Project Number & Title	**Project Name**	**LEAD Agency / Sponsor**	**Location (Reach [A-H])**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Restore Degraded Off-Channel Habitats	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Restore Degraded Off-Channel Habitats	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Tidegate replacement-fish 2003-011-00friendly	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Tidegate replacement-fish friendly	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2003-011-00	Reach A-H Restoration	BPA / TBD	TBD	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00	Reach A-H Restoration	BPA / CREST	TBD	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00	Reach A-H Restoration	BPA / CREST	TBD	Tidal Reconnection	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X

AA Habitat Project List 2010 – 2013 (Under Development)							
BPA/Corps Project Number & Title	**Project Name**	**LEAD Agency / Sponsor**	**Location (Reach $^{A-H}$)**	**Type of Action**	**Limiting Factors**	**Biological Benefits**	
						Ocean	**Stream**
2010-004-00	Reach A-H Restoration	BPA / CREST	TBD	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00	Reach A-H Restoration	BPA / CREST	TBD	Culvert Replacement	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00	Reach A-H Restoration	BPA / CREST	TBD	Dike Breach	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X
2010-004-00	Reach A-H Restoration	BPA / CREST	TBD	Dike Breach	Reduced macrodetrital inputs Sediment/nutrient-related estuary changes Bankfull elevation changes Sediment/nutrient-related plume changes Exotic plants	X	X

Hatchery Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
41	(none)	Listed Stock Chinook Salmon Gamete Preservation	199703800	BPA	http://www.cbfish.org/Project.mvc/Display/199703800
41	1	Snake River Sockeye Captive Propagation	200740200	BPA	http://www.cbfish.org/Project.mvc/Display/200740200
41	2	Tucannon River Spring Chinook Captive Brood	200001900	BPA	http://www.cbfish.org/Project.mvc/Display/200001900
41	3	Spring Chinook Captive Propagation-Oregon	200740400	BPA	http://www.cbfish.org/Project.mvc/Display/200740400
41	4	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
41	5	Spring Chinook Captive Propagation-Idaho	200740300	BPA	http://www.cbfish.org/Project.mvc/Display/200740300
42	1	Chief Joseph Hatchery Program	200302300	BPA	http://www.cbfish.org/Project.mvc/Display/200302300
42	2	Steelhead Kelt Reconditioning	200845800	BPA	http://www.cbfish.org/Project.mvc/Display/200845800

Hatchery Projects

42	3	Okanogan Basin Locally Adapted Steelhead Broodstock Step 1 and 2 (Casimer Bar)	200721200	BPA	http://www.cbfish.org/Project.mvc/Display/200721200
42	4	Kelt Reconditioning and Reproductive Success Evaluation Research	200740100	BPA	http://www.cbfish.org/Project.mvc/Display/200740100
42	6	Northeast Oregon Hatchery Master Plan	198805301	BPA	http://www.cbfish.org/Project.mvc/Display/198805301
42	7	Snake River Sockeye Captive Propagation	200740200	BPA	http://www.cbfish.org/Project.mvc/Display/200740200
42	9	Reintroduction of Chum in Duncan Creek	200105300	BPA	http://www.cbfish.org/Project.mvc/Display/200105300
42	9	Development of an Integrated strategy for Chum Salmon Restoration in the tributaries below Bonneville Dam	200871000	BPA	http://www.cbfish.org/Project.mvc/Display/200871000

Predation Management Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
43	All	Development of Systemwide Predator Control	199007700	BPA	http://www.cbfish.org/Project.mvc/Display/199007700
44	All	Non-Native Fish Hot Spots	200871800	BPA	http://www.cbfish.org/Project.mvc/Display/200871800
44	All	Research Non-Indigenous Actions	200871900	BPA	http://www.cbfish.org/Project.mvc/Display/200871900
45	All	Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
46	All	Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
47	All	Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
49	All	Sea Lion Non-Lethal Hazing and Monitoring	200800400	BPA	http://www.cbfish.org/Project.mvc/Display/200800400

Corps 2010 Predation Management Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
45, 46	Estuary	122681	Estuary avian predation: terns and cormorants
45, 46	Estuary	107844	Estuary avian PIT tag recovery
49, 69	Bonneville	O&M	Pinniped mangement and monitoring
47, 48, 54	System-wide		Avian deterrence at dams
47, 48, 68	System-wide	120121	Inland avian predation

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	1	Evaluate Umatilla Juvenile Salmonid Outmigration	198902401	BPA	http://www.cbfish.org/Project.mvc/Display/198902401
50	1	Umatilla Hatchery Monitoring and Evaluation (M&E)	199000500	BPA	http://www.cbfish.org/Project.mvc/Display/199000500
50	1	Columbia Basin Pit-Tag Information	199008000	BPA	http://www.cbfish.org/Project.mvc/Display/199008000
50	1	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
50	1	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
50	1	Adult Pit Detector Installation	200100300	BPA	http://www.cbfish.org/Project.mvc/Display/200100300
50	1	Upper Columbia Spring Chinook and Steelhead Juvenile and Adult Abundance, Productivity and Spatial Structure Monitoring	201003400	BPA	http://www.cbfish.org/Project.mvc/Display/201003400
50	2	Survival Estimate for Passage through Snake and Columbia River Dams and Reservoirs	199302900	BPA	http://www.cbfish.org/Project.mvc/Display/199302900

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	2	Adult Pit Detector Installation	200100300	BPA	http://www.cbfish.org/Project.mvc/Display/200100300
50	2	Lower Granite Dam Adult Trap Operations	200500200	BPA	http://www.cbfish.org/Project.mvc/Display/200500200
50	2	Upper Columbia Spring Chinook and Steelhead Juvenile and Adult Abundance, Productivity and Spatial Structure Monitoring	201003400	BPA	http://www.cbfish.org/Project.mvc/Display/201003400
50	3	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
50	3	Evaluate Umatilla Juvenile Salmonid Outmigration	198902401	BPA	http://www.cbfish.org/Project.mvc/Display/198902401
50	3	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
50	3	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
50	3	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	3	Natural Production Management and Monitoring	200831100	BPA	http://www.cbfish.org/Project.mvc/Display/200831100
50	3	Pittag Sr Sockeye-Uc Sp.Chnook	200872400	BPA	http://www.cbfish.org/Project.mvc/Display/200872400
50	3	Project to provided VSP Estimates for Yakima Steelhead MPG	201003000	BPA	http://www.cbfish.org/Project.mvc/Display/201003000
50	3	Upper Columbia Spring Chinook and Steelhead Juvenile and Adult Abundance, Productivity and Spatial Structure Monitoring	201003400	BPA	http://www.cbfish.org/Project.mvc/Display/201003400
50	4	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
50	4	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
50	4	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303
50	4	Statistical Support For Salmon	198910700	BPA	http://www.cbfish.org/Project.mvc/Display/198910700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	4	Idaho Natural Production Monitoring. Clearwater, Lochsa, Selway, SF Clearwater, Chamberlain, EF Salmon, Lemhi, Little Salmon, Lower MF Salmon, NF Salmon, Pahsimeroi, Panther Cr, Secesh, SF Salmon, Upper MF Salmon, Upper Salmon	199107300	BPA	http://www.cbfish.org/Project.mvc/Display/199107300
50	4	Escapement and Productivity of Spring Chinook and Steelhead	199801600	BPA	http://www.cbfish.org/Project.mvc/Display/199801600
50	4	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
50	4	Okanogan Basin Monitoring & Evaluation Program (OBMEP)	200302200	BPA	http://www.cbfish.org/Project.mvc/Display/200302200
50	4	Monitor and Evaluate (M&E) Reproductive Success and Survival in Wenatchee River	200303900	BPA	http://www.cbfish.org/Project.mvc/Display/200303900
50	4	Status and Trend Annual Reporting	200900200	BPA	http://www.cbfish.org/Project.mvc/Display/200900200
50	4	Upper Columbia Spring Chinook and Steelhead Juvenile and Adult Abundance, Productivity and Spatial Structure Monitoring	201003400	BPA	http://www.cbfish.org/Project.mvc/Display/201003400

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	5	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
50	5	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
50	5	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
50	5	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
50	5	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
50	5	Idaho Natural Production Monitoring. Clearwater, Lochsa, Selway, SF Clearwater, Chamberlain, EF Salmon, Lemhi, Little Salmon, Lower MF Salmon, NF Salmon, Pahsimeroi, Panther Cr, Secesh, SF Salmon, Upper MF Salmon, Upper Salmon	199107300	BPA	http://www.cbfish.org/Project.mvc/Display/199107300
50	5	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	5	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
50	5	Lower Granite Dam Adult Trap Operations	200500200	BPA	http://www.cbfish.org/Project.mvc/Display/200500200
50	5	Distribution and Abundance Monitoring of Oncorhynchus mykiss within the Lower Clearwater Subbasin	200723300	BPA	http://www.cbfish.org/Project.mvc/Display/200723300
50	5	Chinook and Steelhead Genotyping for Genetic Stock Identification (GSI) at Lower Granite Dam	201002600	BPA	http://www.cbfish.org/Project.mvc/Display/201002600
50	5	Snake River Chinook and Steelhead Parental Based Tagging	201003100	BPA	http://www.cbfish.org/Project.mvc/Display/201003100
50	5	Captial construction of permant weir and PIT tag Array in Lolo Creek. One time cost.	201003800	BPA	http://www.cbfish.org/Project.mvc/Display/201003800
50	6	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
50	6	Coded Wire Tag-Oregon Department of Fish and Wildlife (ODFW)	198201302	BPA	http://www.cbfish.org/Project.mvc/Display/198201302

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Coded Wire Tag-US Fish and Wildlife Service (USFWS)	198201303	BPA	http://www.cbfish.org/Project.mvc/Display/198201303
50	6	Coded Wire Tag-Washington Department of Fish and Wildlife (WDFW)	198201304	BPA	http://www.cbfish.org/Project.mvc/Display/198201304
50	6	Nez Perce Tribal Hatchery Operations and Maintenance (O&M)	198335000	BPA	http://www.cbfish.org/Project.mvc/Display/198335000
50	6	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
50	6	Blue Mountain Fish Habitat Improvement	198402500	BPA	http://www.cbfish.org/Project.mvc/Display/198402500
50	6	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
50	6	Umatilla Fish Passage Operations	198802200	BPA	http://www.cbfish.org/Project.mvc/Display/198802200
50	6	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Hood River Production Monitor and Evaluation (M&E)-Oregon Department of Fish and Wildlife (ODFW)	198805304	BPA	http://www.cbfish.org/Project.mvc/Display/198805304
50	6	Hood River Production Operations and Maintenance (O&M) and Powerdale	198805308	BPA	http://www.cbfish.org/Project.mvc/Display/198805308
50	6	Evaluate Umatilla Juvenile Salmonid Outmigration	198902401	BPA	http://www.cbfish.org/Project.mvc/Display/198902401
50	6	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
50	6	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
50	6	Idaho Natural Production Monitoring. Clearwater, Lochsa, Selway, SF Clearwater, Chamberlain, EF Salmon, Lemhi, Little Salmon, Lower MF Salmon, NF Salmon, Pahsimeroi, Panther Cr, Secesh, SF Salmon, Upper MF Salmon, Upper Salmon	199107300	BPA	http://www.cbfish.org/Project.mvc/Display/199107300
50	6	Grand Ronde Early Life History of Spring Chinook and Steelhead	199202604	BPA	http://www.cbfish.org/Project.mvc/Display/199202604

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Yakima River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506325	BPA	http://www.cbfish.org/Project.mvc/Display/199506325
50	6	Klickitat River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506335	BPA	http://www.cbfish.org/Project.mvc/Display/199506335
50	6	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
50	6	Yakama Reservation Watershed Project	199603501	BPA	http://www.cbfish.org/Project.mvc/Display/199603501
50	6	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
50	6	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
50	6	Chinook Salmon Adult Abundance Monitoring	199703000	BPA	http://www.cbfish.org/Project.mvc/Display/199703000
50	6	Grande Ronde Supplementation Operations and Maintenance (O&M) and Montiring and Evaluation (M&E) on Lostine River	199800702	BPA	http://www.cbfish.org/Project.mvc/Display/199800702

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Grande Ronde Supplementation O&M on Catherine Creek/Upper Grande Ronde River	199800703	BPA	http://www.cbfish.org/Project.mvc/Display/199800703
50	6	Spawning Distribution of Snake River Fall Chinook Salmon	199801003	BPA	http://www.cbfish.org/Project.mvc/Display/199801003
50	6	Escapement and Productivity of Spring Chinook and Steelhead	199801600	BPA	http://www.cbfish.org/Project.mvc/Display/199801600
50	6	Wind River Watershed	199801900	BPA	http://www.cbfish.org/Project.mvc/Display/199801900
50	6	Walla Walla River Basin Monitoring and Evaluation (M&E)	200003900	BPA	http://www.cbfish.org/Project.mvc/Display/200003900
50	6	Snake River Fall Chinook Salmon Life History Investigations	200203200	BPA	http://www.cbfish.org/Project.mvc/Display/200203200
50	6	Asotin Creek Salmon Population Assessment	200205300	BPA	http://www.cbfish.org/Project.mvc/Display/200205300
50	6	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Okanogan Basin Monitoring & Evaluation Program (OBMEP)	200302200	BPA	http://www.cbfish.org/Project.mvc/Display/200302200
50	6	Monitor and Evaluate (M&E) Reproductive Success and Survival in Wenatchee River	200303900	BPA	http://www.cbfish.org/Project.mvc/Display/200303900
50	6	Evaluate the Relative Reproductive Success of Hatchery-Origin and Wild-Origin Steelhead Spawning Naturally in the Hood River	200305400	BPA	http://www.cbfish.org/Project.mvc/Display/200305400
50	6	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
50	6	Distribution and Abundance Monitoring of Oncorhynchus mykiss within the Lower Clearwater Subbasin	200723300	BPA	http://www.cbfish.org/Project.mvc/Display/200723300
50	6	Oregon Plan Monitoring of Steelhead Status, Trend, and Habitat in the Grande Ronde River Subbasin	200733700	BPA	http://www.cbfish.org/Project.mvc/Display/200733700
50	6	Spring Chinook Captive Propagation-Idaho	200740300	BPA	http://www.cbfish.org/Project.mvc/Display/200740300
50	6	Spring Chinook Captive Propagation-Oregon	200740400	BPA	http://www.cbfish.org/Project.mvc/Display/200740400

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Deschutes fall chinook research	200830600	BPA	http://www.cbfish.org/Project.mvc/Display/200830600
50	6	Natural Production Management and Monitoring	200831100	BPA	http://www.cbfish.org/Project.mvc/Display/200831100
50	6	Implement a rotating panel sampling of small steelhead streams (tributary to Asotin, Tucannon and Snake)	201002800	BPA	http://www.cbfish.org/Project.mvc/Display/201002800
50	6	Project to provided VSP Estimates for Yakima Steelhead MPG	201003000	BPA	http://www.cbfish.org/Project.mvc/Display/201003000
50	6	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
50	6	Upper Columbia Spring Chinook and Steelhead Juvenile and Adult Abundance, Productivity and Spatial Structure Monitoring	201003400	BPA	http://www.cbfish.org/Project.mvc/Display/201003400
50	6	Abundance, productivity and life history of Fifteenmile Creek Winter Steelhead	201003500	BPA	http://www.cbfish.org/Project.mvc/Display/201003500
50	6	Toppenish Creek Steelhead Status and Trend Monitoring	201003700	BPA	http://www.cbfish.org/Project.mvc/Display/201003700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	6	Tucannon Expanded Pit Tagging	201004200	BPA	http://www.cbfish.org/Project.mvc/Display/201004200
50	7	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
50	7	Coded Wire Tag-Oregon Department of Fish and Wildlife (ODFW)	198201302	BPA	http://www.cbfish.org/Project.mvc/Display/198201302
50	7	Coded Wire Tag-US Fish and Wildlife Service (USFWS)	198201303	BPA	http://www.cbfish.org/Project.mvc/Display/198201303
50	7	Coded Wire Tag-Washington Department of Fish and Wildlife (WDFW)	198201304	BPA	http://www.cbfish.org/Project.mvc/Display/198201304
50	7	Nez Perce Tribal Hatchery Operations and Maintenance (O&M)	198335000	BPA	http://www.cbfish.org/Project.mvc/Display/198335000
50	7	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
50	7	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	7	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303
50	7	Hood River Production Monitor and Evaluation (M&E)-Oregon Department of Fish and Wildlife (ODFW)	198805304	BPA	http://www.cbfish.org/Project.mvc/Display/198805304
50	7	Hood River Production Operations and Maintenance (O&M)-Warm Springs	198805307	BPA	http://www.cbfish.org/Project.mvc/Display/198805307
50	7	Hood River Production Operations and Maintenance (O&M) and Powerdale	198805308	BPA	http://www.cbfish.org/Project.mvc/Display/198805308
50	7	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
50	7	Umatilla Hatchery Monitoring and Evaluation (M&E)	199000500	BPA	http://www.cbfish.org/Project.mvc/Display/199000500
50	7	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
50	7	Yakima River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506325	BPA	http://www.cbfish.org/Project.mvc/Display/199506325

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	7	Klickitat River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506335	BPA	http://www.cbfish.org/Project.mvc/Display/199506335
50	7	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
50	7	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
50	7	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
50	7	Grande Ronde Supplementation Operations and Maintenance (O&M) and Montiring and Evaluation (M&E) on Lostine River	199800702	BPA	http://www.cbfish.org/Project.mvc/Display/199800702
50	7	Grande Ronde Supplementation O&M on Catherine Creek/Upper Grande Ronde River	199800703	BPA	http://www.cbfish.org/Project.mvc/Display/199800703
50	7	Wind River Watershed	199801900	BPA	http://www.cbfish.org/Project.mvc/Display/199801900
50	7	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
50	7	Spring Chinook Captive Propagation-Oregon	200740400	BPA	http://www.cbfish.org/Project.mvc/Display/200740400
50	7	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
51	1	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
51	1	Coded Wire Tag-Washington Department of Fish and Wildlife (WDFW)	198201304	BPA	http://www.cbfish.org/Project.mvc/Display/198201304
51	1	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	198810804	BPA	http://www.cbfish.org/Project.mvc/Display/198810804
51	1	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
51	1	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
51	1	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
51	1	Chinook Salmon Adult Abundance Monitoring	199703000	BPA	http://www.cbfish.org/Project.mvc/Display/199703000
51	1	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
51	1	Streamnet Library	200850500	BPA	http://www.cbfish.org/Project.mvc/Display/200850500
51	1	Nutrient Enhancement Project	200860700	BPA	http://www.cbfish.org/Project.mvc/Display/200860700
51	2	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
51	2	Regional Strategy-Status/Trend	200873300	BPA	http://www.cbfish.org/Project.mvc/Display/200873300
51	3	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
51	3	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	198810804	BPA	http://www.cbfish.org/Project.mvc/Display/198810804

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
51	3	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
51	3	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
51	3	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
51	3	Pacific NW Aquatic Monitoring Program (PNAMP) Research, Monitoring and Evaluation (RM&E) Design and Protocols	200721600	BPA	http://www.cbfish.org/Project.mvc/Display/200721600
51	3	Streamnet Library	200850500	BPA	http://www.cbfish.org/Project.mvc/Display/200850500
52	1	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
52	1	Modeling and Evaluation Statistical Support for Life-Cycle Studies	199105100	BPA	http://www.cbfish.org/Project.mvc/Display/199105100
52	1	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
52	2	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
52	2	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
52	2	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
52	2	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
52	2	Survival Estimate for Passage through Snake and Columbia River Dams and Reservoirs	199302900	BPA	http://www.cbfish.org/Project.mvc/Display/199302900
52	2	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
52	2	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
52	2	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
52	3	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
52	3	Modeling and Evaluation Statistical Support for Life-Cycle Studies	199105100	BPA	http://www.cbfish.org/Project.mvc/Display/199105100
52	3	Lower Granite Dam Adult Trap Operations	200500200	BPA	http://www.cbfish.org/Project.mvc/Display/200500200
52	4	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
52	4	Pittag Sr Sockeye-Uc Sp.Chnook	200872400	BPA	http://www.cbfish.org/Project.mvc/Display/200872400
52	5	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
52	5	Pittag Sr Sockeye-Uc Sp.Chnook	200872400	BPA	http://www.cbfish.org/Project.mvc/Display/200872400
52	6	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
52	7	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
52	7	Okanogan Basin Monitoring & Evaluation Program (OBMEP)	200302200	BPA	http://www.cbfish.org/Project.mvc/Display/200302200
52	7	Lower Granite Dam Adult Trap Operations	200500200	BPA	http://www.cbfish.org/Project.mvc/Display/200500200
53	1	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
53	1	Research, monitoring, and evaluation of emerging issues and measures to recover the Snake River fall Chinook salmon ESU	199102900	BPA	http://www.cbfish.org/Project.mvc/Display/199102900
53	1	Modeling and Evaluation Statistical Support for Life-Cycle Studies	199105100	BPA	http://www.cbfish.org/Project.mvc/Display/199105100
53	1	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
53	1	Smolt Monitoring Video Feasibility Project	200850600	BPA	http://www.cbfish.org/Project.mvc/Display/200850600

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
53	2	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
53	2	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
53	2	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
53	2	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
53	2	Research, monitoring, and evaluation of emerging issues and measures to recover the Snake River fall Chinook salmon ESU	199102900	BPA	http://www.cbfish.org/Project.mvc/Display/199102900
53	2	Modeling and Evaluation Statistical Support for Life-Cycle Studies	199105100	BPA	http://www.cbfish.org/Project.mvc/Display/199105100
53	2	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
53	2	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
53	2	Gas Bubble Disease Monitoring	199602100	BPA	http://www.cbfish.org/Project.mvc/Display/199602100
53	2	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
53	2	Smolt Monitoring Video Feasibility Project	200850600	BPA	http://www.cbfish.org/Project.mvc/Display/200850600
53	3	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
53	3	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
53	3	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
53	3	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
53	3	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
53	3	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
53	3	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
53	3	Smolt Monitoring Video Feasibility Project	200850600	BPA	http://www.cbfish.org/Project.mvc/Display/200850600
53	4	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
53	5	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
54	1	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
54	1	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
54	1	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
54	1	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
54	1	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
54	2	Survival Estimate for Passage through Snake and Columbia River Dams and Reservoirs	199302900	BPA	http://www.cbfish.org/Project.mvc/Display/199302900
54	2	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
54	5	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
54	5	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
54	5	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
54	5	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
54	5	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
54	6	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
54	6	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
54	6	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
54	6	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
54	6	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
54	6	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
54	7	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
54	7	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
54	7	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
54	7	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
54	7	Survival Estimate for Passage through Snake and Columbia River Dams and Reservoirs	199302900	BPA	http://www.cbfish.org/Project.mvc/Display/199302900
54	7	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
54	7	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
54	8	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
54	8	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
54	8	Development of Systemwide Predator Control	199007700	BPA	http://www.cbfish.org/Project.mvc/Display/199007700
54	8	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
54	8	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
54	8	Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
54	8	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
54	9	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
54	9	Physical and Biological Testing of a Flow Velocity Enhancement System (FVES)	200753500	BPA	http://www.cbfish.org/Project.mvc/Display/200753500
54	10	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
54	10	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
54	10	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
54	10	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
54	11	Adult Pit Detector Installation	200100300	BPA	http://www.cbfish.org/Project.mvc/Display/200100300
54	12	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
54	12	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
54	12	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
54	12	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
54	12	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
54	13	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
54	13	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
54	14	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
55	1	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
55	1	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
55	1	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
55	1	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
55	1	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
55	1	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
55	1	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400
55	1	Lower Granite Dam Adult Trap Operations	200500200	BPA	http://www.cbfish.org/Project.mvc/Display/200500200
55	1	Pittag Sr Sockeye-Uc Sp.Chnook	200872400	BPA	http://www.cbfish.org/Project.mvc/Display/200872400
55	2	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
55	2	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
55	2	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
55	2	Pit Tagging Wild Chinook	199102800	BPA	http://www.cbfish.org/Project.mvc/Display/199102800
55	2	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
55	2	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
55	2	Evaluate Delayed (Extra) Mortality Associated with Passage of Yearling Chinook Salmon through Snake River Dams	200304100	BPA	http://www.cbfish.org/Project.mvc/Display/200304100
55	2	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400
55	2	Lower Granite Dam Adult Trap Operations	200500200	BPA	http://www.cbfish.org/Project.mvc/Display/200500200
55	2	Pittag Sr Sockeye-Uc Sp.Chnook	200872400	BPA	http://www.cbfish.org/Project.mvc/Display/200872400
55	4	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
55	4	Smolt Monitoring by Non-Federal Entities	198712700	BPA	http://www.cbfish.org/Project.mvc/Display/198712700
55	4	Research, monitoring, and evaluation of emerging issues and measures to recover the Snake River fall Chinook salmon ESU	199102900	BPA	http://www.cbfish.org/Project.mvc/Display/199102900
55	4	Snake River Fall Chinook Salmon Life History Investigations	200203200	BPA	http://www.cbfish.org/Project.mvc/Display/200203200
55	5	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
55	5	Pittag Sr Sockeye-Uc Sp.Chnook	200872400	BPA	http://www.cbfish.org/Project.mvc/Display/200872400
55	7	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
55	8	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
55	8	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
55	9	New Marking Monitoring Techniques	198331900	BPA	http://www.cbfish.org/Project.mvc/Display/198331900
56	1	Fish Pop Genetics	USBRIA142506AAIC4797	USBR	
56	1	Methow Fish Production, Food Webs,	USBRIAw/USGS142508AA1C4887	USBR	
56	1	Develop Effectiveness Monitoring Population Models	TBA	USBR	
56	1	Landscape Classification	USBRIAw/NOAA142506AA1C4806	USBR	
56	1	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
56	1	John Day Habitat Enhancement	198402100	BPA	http://www.cbfish.org/Project.mvc/Display/198402100
56	1	Blue Mountain Fish Habitat Improvement	198402500	BPA	http://www.cbfish.org/Project.mvc/Display/198402500

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	1	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303
56	1	Hood River Production Monitor and Evaluation (M&E)-Oregon Department of Fish and Wildlife (ODFW)	198805304	BPA	http://www.cbfish.org/Project.mvc/Display/198805304
56	1	Evaluate Umatilla Juvenile Salmonid Outmigration	198902401	BPA	http://www.cbfish.org/Project.mvc/Display/198902401
56	1	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
56	1	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
56	1	Grand Ronde Early Life History of Spring Chinook and Steelhead	199202604	BPA	http://www.cbfish.org/Project.mvc/Display/199202604
56	1	Asotin Creek Enhancement and Restoration	199401805	BPA	http://www.cbfish.org/Project.mvc/Display/199401805
56	1	Tucannon Stream and Riparian Restoration	199401806	BPA	http://www.cbfish.org/Project.mvc/Display/199401806

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	1	Trout Creek Operations and Maintenance (O&M)	199404200	BPA	http://www.cbfish.org/Project.mvc/Display/199404200
56	1	Klickitat River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506335	BPA	http://www.cbfish.org/Project.mvc/Display/199506335
56	1	Comparative Survival Study (CSS)	199602000	BPA	http://www.cbfish.org/Project.mvc/Display/199602000
56	1	Yakama Reservation Watershed Project	199603501	BPA	http://www.cbfish.org/Project.mvc/Display/199603501
56	1	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
56	1	Klickitat Watershed Enhancement	199705600	BPA	http://www.cbfish.org/Project.mvc/Display/199705600
56	1	Spawning Distribution of Snake River Fall Chinook Salmon	199801003	BPA	http://www.cbfish.org/Project.mvc/Display/199801003
56	1	Wind River Watershed	199801900	BPA	http://www.cbfish.org/Project.mvc/Display/199801900

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	1	Walla Walla River Basin Monitoring and Evaluation (M&E)	200003900	BPA	http://www.cbfish.org/Project.mvc/Display/200003900
56	1	Snake River Fall Chinook Salmon Life History Investigations	200203200	BPA	http://www.cbfish.org/Project.mvc/Display/200203200
56	1	Yankee Fork Salmon River Restoration	200205900	BPA	http://www.cbfish.org/Project.mvc/Display/200205900
56	1	Potlatch River Watershed Restoration	200206100	BPA	http://www.cbfish.org/Project.mvc/Display/200206100
56	1	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
56	1	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
56	1	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
56	1	Monitor and Evaluate (M&E) Reproductive Success and Survival in Wenatchee River	200303900	BPA	http://www.cbfish.org/Project.mvc/Display/200303900

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	1	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
56	1	East Fork of South Fork Salmon River Passage Restoration	200712700	BPA	http://www.cbfish.org/Project.mvc/Display/200712700
56	1	Rock Creek Fish and Habitat Assessment Full Screen	200715600	BPA	http://www.cbfish.org/Project.mvc/Display/200715600
56	1	Distribution and Abundance Monitoring of Oncorhynchus mykiss within the Lower Clearwater Subbasin	200723300	BPA	http://www.cbfish.org/Project.mvc/Display/200723300
56	1	Upper Columbia Nutrient Supplementation	200847100	BPA	http://www.cbfish.org/Project.mvc/Display/200847100
56	1	Upper Columbia Habitat Restoration	200900300	BPA	http://www.cbfish.org/Project.mvc/Display/200900300
56	1	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
56	1	Umatilla Basin IMW	201005600	BPA	http://www.cbfish.org/Project.mvc/Display/201005600

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	2	John Day Habitat Enhancement	198402100	BPA	http://www.cbfish.org/Project.mvc/Display/198402100
56	2	Blue Mountain Fish Habitat Improvement	198402500	BPA	http://www.cbfish.org/Project.mvc/Display/198402500
56	2	Yankee Fork Salmon River Restoration	200205900	BPA	http://www.cbfish.org/Project.mvc/Display/200205900
56	2	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
56	2	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
56	2	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
56	2	Upper Columbia Nutrient Supplementation	200847100	BPA	http://www.cbfish.org/Project.mvc/Display/200847100
56	2	Upper Columbia Habitat Restoration	200900300	BPA	http://www.cbfish.org/Project.mvc/Display/200900300

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	2	Upper Columbia Water Quality and Water Quantity Gauges	201005100	BPA	http://www.cbfish.org/Project.mvc/Display/201005100
56	3	Yakama Reservation Watershed Project	199603501	BPA	http://www.cbfish.org/Project.mvc/Display/199603501
56	3	Snake River Fall Chinook Salmon Life History Investigations	200203200	BPA	http://www.cbfish.org/Project.mvc/Display/200203200
56	3	Evaluate Stream Habitat- Nez Perce Tribe Watershed Monitoring and Evaluation (M&E) Plan.	200206800	BPA	http://www.cbfish.org/Project.mvc/Display/200206800
56	3	Grays River Watershed assessment	200301300	BPA	http://www.cbfish.org/Project.mvc/Display/200301300
56	3	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
56	3	Snake River Sockeye Captive Propagation	200740200	BPA	http://www.cbfish.org/Project.mvc/Display/200740200
56	3	Project to provided VSP Estimates for Yakima Steelhead MPG	201003000	BPA	http://www.cbfish.org/Project.mvc/Display/201003000

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
56	3	Toppenish Creek Steelhead Status and Trend Monitoring	201003700	BPA	http://www.cbfish.org/Project.mvc/Display/201003700
56	3	Upper Columbia Water Quality and Water Quantity Gauges	201005100	BPA	http://www.cbfish.org/Project.mvc/Display/201005100
56	3	Upper Grande Ronde and Catherine Creek IMW	201005500	BPA	http://www.cbfish.org/Project.mvc/Display/201005500
57	1	Yankee Fork Salmon River Restoration	200205900	BPA	http://www.cbfish.org/Project.mvc/Display/200205900
57	1	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
57	1	Upper Columbia Water Quality and Water Quantity Gauges	201005100	BPA	http://www.cbfish.org/Project.mvc/Display/201005100
57	2	Water Entity - Water Transaction Program	200201301	BPA	http://www.cbfish.org/Project.mvc/Display/200201301
57	2	Yankee Fork Salmon River Restoration	200205900	BPA	http://www.cbfish.org/Project.mvc/Display/200205900

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
57	2	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
57	3	Yankee Fork Salmon River Restoration	200205900	BPA	http://www.cbfish.org/Project.mvc/Display/200205900
57	3	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
57	3	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
57	4	Methow Channel Restoration and Fish Productivity Response	USGSIA142508AA1C4887	USBR	
57	4	John Day Habitat Enhancement	198402100	BPA	http://www.cbfish.org/Project.mvc/Display/198402100
57	4	Blue Mountain Fish Habitat Improvement	198402500	BPA	http://www.cbfish.org/Project.mvc/Display/198402500
57	4	Trout Creek Operations and Maintenance (O&M)	199404200	BPA	http://www.cbfish.org/Project.mvc/Display/199404200

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
57	4	Mid-Columbia Reintroduction Feasibility Study	199604000	BPA	http://www.cbfish.org/Project.mvc/Display/199604000
57	4	Water Entity - Water Transaction Program	200201301	BPA	http://www.cbfish.org/Project.mvc/Display/200201301
57	4	Yankee Fork Salmon River Restoration	200205900	BPA	http://www.cbfish.org/Project.mvc/Display/200205900
57	4	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
57	4	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
57	4	Upper Columbia Habitat Restoration	200900300	BPA	http://www.cbfish.org/Project.mvc/Display/200900300
57	5	Landscape Influences on Stream Condition	NWFSCIA142506AA1C4806	USBR	
57	5	Wind River Watershed	199801900	BPA	http://www.cbfish.org/Project.mvc/Display/199801900

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
57	5	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
57	5	Biomonitoring of Fish Habitat Enhancement	200901400	BPA	http://www.cbfish.org/Project.mvc/Display/200901400
58	1	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400
58	2	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
58	2	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
58	3	Ocean Survival of Salmonids	199801400	BPA	http://www.cbfish.org/Project.mvc/Display/199801400
58	3	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
58	3	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
58	3	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
58	4	Ocean Survival of Salmonids	199801400	BPA	http://www.cbfish.org/Project.mvc/Display/199801400
58	4	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
59	1	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
59	1	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100
59	1	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
59	2	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
59	4	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
59	4	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
59	4	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
59	5	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
59	5	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100
59	5	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
60	1	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
60	1	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100
60	1	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
60	2	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
60	2	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100
60	2	Grays River Watershed Assessment	200301300	BPA	http://www.cbfish.org/Project.mvc/Display/200301300
60	2	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
60	2	Eelgrass Enhancement And Restoration	200751300	BPA	http://www.cbfish.org/Project.mvc/Display/200751300
60	3	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100
61	1	Ocean Survival of Salmonids	199801400	BPA	http://www.cbfish.org/Project.mvc/Display/199801400
61	1	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
61	1	Canada-USA Shelf Salmon Survival Study	200300900	BPA	http://www.cbfish.org/Project.mvc/Display/200300900
61	1	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
61	1	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400
61	1	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
61	1	Impact of American Shad in the Columbia River	200727500	BPA	http://www.cbfish.org/Project.mvc/Display/200727500
61	2	Ocean Survival of Salmonids	199801400	BPA	http://www.cbfish.org/Project.mvc/Display/199801400
61	2	Canada-USA Shelf Salmon Survival Study	200300900	BPA	http://www.cbfish.org/Project.mvc/Display/200300900
61	2	Pacific Ocean Survey Tracking (POST)	200311400	BPA	http://www.cbfish.org/Project.mvc/Display/200311400

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
61	3	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
61	3	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
61	3	Columbia River Estuary Habitat Restoration	200301100	BPA	http://www.cbfish.org/Project.mvc/Display/200301100
61	3	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
61	4	Ocean Survival of Salmonids	199801400	BPA	http://www.cbfish.org/Project.mvc/Display/199801400
61	4	Historic Habitat Food Web Link	200301000	BPA	http://www.cbfish.org/Project.mvc/Display/200301000
62	1	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
62	1	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	1	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
62	1	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
62	1	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
62	1	Kelt Reconditioning and Reproductive Success Evaluation Research	200740100	BPA	http://www.cbfish.org/Project.mvc/Display/200740100
62	1	Expanded Tribal Catch Sampling	200850200	BPA	http://www.cbfish.org/Project.mvc/Display/200850200
62	1	Power Analysis Catch Sampling Rates	200850800	BPA	http://www.cbfish.org/Project.mvc/Display/200850800
62	1	FCRPS Water Studies & Passage of Adult Salmon & Steelhead	200890800	BPA	http://www.cbfish.org/Project.mvc/Display/200890800
62	1	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	2	Select Area Fisheries Enhancement	199306000	BPA	http://www.cbfish.org/Project.mvc/Display/199306000
62	2	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
62	2	Evaluation of Live Capture Gear	200724900	BPA	http://www.cbfish.org/Project.mvc/Display/200724900
62	2	Selective Gear Deployment	200810500	BPA	http://www.cbfish.org/Project.mvc/Display/200810500
62	3	Selective Gear Deployment	200810500	BPA	http://www.cbfish.org/Project.mvc/Display/200810500
62	3	FCRPS Water Studies & Passage of Adult Salmon & Steelhead	200890800	BPA	http://www.cbfish.org/Project.mvc/Display/200890800
62	4	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
62	4	Coded Wire Tag-Oregon Department of Fish and Wildlife (ODFW)	198201302	BPA	http://www.cbfish.org/Project.mvc/Display/198201302

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	4	Coded Wire Tag-US Fish and Wildlife Service (USFWS)	198201303	BPA	http://www.cbfish.org/Project.mvc/Display/198201303
62	4	Coded Wire Tag-Washington Department of Fish and Wildlife (WDFW)	198201304	BPA	http://www.cbfish.org/Project.mvc/Display/198201304
62	4	Nez Perce Tribal Hatchery Operations and Maintenance (O&M)	198335000	BPA	http://www.cbfish.org/Project.mvc/Display/198335000
62	4	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
62	4	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303
62	4	Hood River Production Operations and Maintenance (O&M)-Warm Springs	198805307	BPA	http://www.cbfish.org/Project.mvc/Display/198805307
62	4	Umatilla Hatchery Monitoring and Evaluation (M&E)	199000500	BPA	http://www.cbfish.org/Project.mvc/Display/199000500
62	4	Yakima River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506325	BPA	http://www.cbfish.org/Project.mvc/Display/199506325

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	4	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
62	4	Nez Perce Harvest Monitoring on Snake and Clearwater Rivers	200206000	BPA	http://www.cbfish.org/Project.mvc/Display/200206000
62	4	Selective Gear Deployment	200810500	BPA	http://www.cbfish.org/Project.mvc/Display/200810500
62	4	FCRPS Water Studies & Passage of Adult Salmon & Steelhead	200890800	BPA	http://www.cbfish.org/Project.mvc/Display/200890800
62	4	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
62	4	Lower Columbia – CWT Recovery Project	201003600	BPA	http://www.cbfish.org/Project.mvc/Display/201003600
62	4	Tucannon GRTS Redd Sampling	201004200	BPA	http://www.cbfish.org/Project.mvc/Display/201004200
62	4	Snake River steelhead annual run-reconstruction	201004800	BPA	http://www.cbfish.org/Project.mvc/Display/201004800

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	5	Nez Perce Tribal Hatchery Operations and Maintenance (O&M)	198335000	BPA	http://www.cbfish.org/Project.mvc/Display/198335000
62	5	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
62	5	Hood River Production Monitor and Evaluation (M&E)-Oregon Department of Fish and Wildlife (ODFW)	198805304	BPA	http://www.cbfish.org/Project.mvc/Display/198805304
62	5	Hood River Production Operations and Maintenance (O&M)-Warm Springs	198805307	BPA	http://www.cbfish.org/Project.mvc/Display/198805307
62	5	Genetic Monitoring and Evaluation (M&E) Program for Salmon and Steelhead	198909600	BPA	http://www.cbfish.org/Project.mvc/Display/198909600
62	5	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
62	5	Idaho Steelhead Monitoring and Evaluation (M&E) Studies	199005500	BPA	http://www.cbfish.org/Project.mvc/Display/199005500
62	5	Yakima River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506325	BPA	http://www.cbfish.org/Project.mvc/Display/199506325

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	5	Klickitat River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506335	BPA	http://www.cbfish.org/Project.mvc/Display/199506335
62	5	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
62	5	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
62	5	Chinook Salmon Adult Abundance Monitoring	199703000	BPA	http://www.cbfish.org/Project.mvc/Display/199703000
62	5	Listed Stock Chinook Salmon Gamete Preservation	199703800	BPA	http://www.cbfish.org/Project.mvc/Display/199703800
62	5	Grande Ronde Supplementation Operations and Maintenance (O&M) and Montiring and Evaluation (M&E) on Lostine River	199800702	BPA	http://www.cbfish.org/Project.mvc/Display/199800702
62	5	Escapement and Productivity of Spring Chinook and Steelhead	199801600	BPA	http://www.cbfish.org/Project.mvc/Display/199801600
62	5	Salmonid Progeny Markers	200203000	BPA	http://www.cbfish.org/Project.mvc/Display/200203000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	5	Asotin Creek Salmon Population Assessment	200205300	BPA	http://www.cbfish.org/Project.mvc/Display/200205300
62	5	Monitor and Evaluate (M&E) Reproductive Success and Survival in Wenatchee River	200303900	BPA	http://www.cbfish.org/Project.mvc/Display/200303900
62	5	Evaluate the Reproductive Success of Wild and Hatchery Steelhead in Natural and Hatchery Environments	200305000	BPA	http://www.cbfish.org/Project.mvc/Display/200305000
62	5	Evaluate the Relative Reproductive Success of Hatchery-Origin and Wild-Origin Steelhead Spawning Naturally in the Hood River	200305400	BPA	http://www.cbfish.org/Project.mvc/Display/200305400
62	5	Evaluate the Relative Reproductive Success of Wild and Hatchery Origin Snake River Fall Chinook Spawners Upstream of Lower Granite Dam	200306000	BPA	http://www.cbfish.org/Project.mvc/Display/200306000
62	5	Natural Reproductive Success and Demographic Effects of Hatchery-Origin Steelhead in Abernathy Creek, Washington	200306300	BPA	http://www.cbfish.org/Project.mvc/Display/200306300
62	5	Spring Chinook Captive Propagation-Oregon	200740400	BPA	http://www.cbfish.org/Project.mvc/Display/200740400
62	5	White River supplementation	200831000	BPA	http://www.cbfish.org/Project.mvc/Display/200831000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
62	5	Natural Production Management and Monitoring	200831100	BPA	http://www.cbfish.org/Project.mvc/Display/200831100
62	5	Genetic Assessment of Columbia River Stocks	200890700	BPA	http://www.cbfish.org/Project.mvc/Display/200890700
62	5	Chinook and Steelhead Genotyping for Genetic Stock Identification (GSI) at Lower Granite Dam	201002600	BPA	http://www.cbfish.org/Project.mvc/Display/201002600
62	5	Project to provided VSP Estimates for Yakima Steelhead MPG	201003000	BPA	http://www.cbfish.org/Project.mvc/Display/201003000
62	5	Snake River Chinook and Steelhead Parental Based Tagging	201003100	BPA	http://www.cbfish.org/Project.mvc/Display/201003100
62	5	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
62	5	Snake River steelhead annual run-reconstruction	201004800	BPA	http://www.cbfish.org/Project.mvc/Display/201004800
63	1	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
63	1	Genetic Monitoring and Evaluation (M&E) Program for Salmon and Steelhead	198909600	BPA	http://www.cbfish.org/Project.mvc/Display/198909600
63	1	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
63	1	Grand Ronde Early Life History of Spring Chinook and Steelhead	199202604	BPA	http://www.cbfish.org/Project.mvc/Display/199202604
63	1	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
63	1	Chinook Salmon Adult Abundance Monitoring	199703000	BPA	http://www.cbfish.org/Project.mvc/Display/199703000
63	1	Grande Ronde Supplementation Operations and Maintenance (O&M) and Montiring and Evaluation (M&E) on Lostine River	199800702	BPA	http://www.cbfish.org/Project.mvc/Display/199800702
63	1	Grande Ronde Supplementation O&M on Catherine Creek/Upper Grande Ronde River	199800703	BPA	http://www.cbfish.org/Project.mvc/Display/199800703
63	1	Grande Ronde Spring Chinook on Lostine/Catherine Creek/ Upper Grande Ronde Rivers	199800704	BPA	http://www.cbfish.org/Project.mvc/Display/199800704

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
63	1	Escapement and Productivity of Spring Chinook and Steelhead	199801600	BPA	http://www.cbfish.org/Project.mvc/Display/199801600
63	1	Reintroduction of Chum in Duncan Creek	200105300	BPA	http://www.cbfish.org/Project.mvc/Display/200105300
63	1	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
63	1	Northeast Oregon Hatchery Monitoring and Evaluations Implemenation	200713200	BPA	http://www.cbfish.org/Project.mvc/Display/200713200
63	1	Snake River Sockeye Captive Propagation	200740200	BPA	http://www.cbfish.org/Project.mvc/Display/200740200
63	1	Spring Chinook Captive Propagation-Idaho	200740300	BPA	http://www.cbfish.org/Project.mvc/Display/200740300
63	1	Spring Chinook Captive Propagation-Oregon	200740400	BPA	http://www.cbfish.org/Project.mvc/Display/200740400
63	1	Development of an Integrated strategy for Chum Salmon Restoration in the tributaries below Bonneville Dam	200871000	BPA	http://www.cbfish.org/Project.mvc/Display/200871000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
63	1	Project to provided VSP Estimates for Yakima Steelhead MPG	201003000	BPA	http://www.cbfish.org/Project.mvc/Display/201003000
63	1	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
63	1	Tucannon GRTS Redd Sampling	201004200	BPA	http://www.cbfish.org/Project.mvc/Display/201004200
63	1	Snake River steelhead annual run-reconstruction	201004800	BPA	http://www.cbfish.org/Project.mvc/Display/201004800
63	1	B-run steelhead supplementation effectiveness research	201005700	BPA	http://www.cbfish.org/Project.mvc/Display/201005700
63	1	Tucannon Spring Chinook PIT tagging.	201006000	BPA	http://www.cbfish.org/Project.mvc/Display/201006000
63	2	Grand Ronde Early Life History of Spring Chinook and Steelhead	199202604	BPA	http://www.cbfish.org/Project.mvc/Display/199202604
63	2	Advance Hatchery Reform Research	199305600	BPA	http://www.cbfish.org/Project.mvc/Display/199305600

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
63	2	Tucannon Expanded Pit Tagging	201004200	BPA	http://www.cbfish.org/Project.mvc/Display/201004200
63	2	Evaluation of the Touchet endemic program	201004900	BPA	http://www.cbfish.org/Project.mvc/Display/201004900
63	2	Evaluation of the Tucannon endemic program	201005000	BPA	http://www.cbfish.org/Project.mvc/Display/201005000
64	1	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
64	1	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303
64	1	Hood River Production Monitor and Evaluation (M&E)-Oregon Department of Fish and Wildlife (ODFW)	198805304	BPA	http://www.cbfish.org/Project.mvc/Display/198805304
64	1	Hood River Production Operations and Maintenance (O&M)-Warm Springs	198805307	BPA	http://www.cbfish.org/Project.mvc/Display/198805307
64	1	Hood River Production Operations and Maintenance (O&M) and Powerdale	198805308	BPA	http://www.cbfish.org/Project.mvc/Display/198805308

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	1	Genetic Monitoring and Evaluation (M&E) Program for Salmon and Steelhead	198909600	BPA	http://www.cbfish.org/Project.mvc/Display/198909600
64	1	Grand Ronde Early Life History of Spring Chinook and Steelhead	199202604	BPA	http://www.cbfish.org/Project.mvc/Display/199202604
64	1	Grande Ronde Supplementation Operations and Maintenance (O&M) and Montiring and Evaluation (M&E) on Lostine River	199800702	BPA	http://www.cbfish.org/Project.mvc/Display/199800702
64	1	Grande Ronde Supplementation O&M on Catherine Creek/Upper Grande Ronde River	199800703	BPA	http://www.cbfish.org/Project.mvc/Display/199800703
64	1	Grande Ronde Spring Chinook on Lostine/Catherine Creek/ Upper Grande Ronde Rivers	199800704	BPA	http://www.cbfish.org/Project.mvc/Display/199800704
64	1	Monitor and Evaluate (M&E) Reproductive Success and Survival in Wenatchee River	200303900	BPA	http://www.cbfish.org/Project.mvc/Display/200303900
64	1	Evaluate the Relative Reproductive Success of Hatchery-Origin and Wild-Origin Steelhead Spawning Naturally in the Hood River	200305400	BPA	http://www.cbfish.org/Project.mvc/Display/200305400

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	1	Evaluate the Relative Reproductive Success of Wild and Hatchery Origin Snake River Fall Chinook Spawners Upstream of Lower Granite Dam	200306000	BPA	http://www.cbfish.org/Project.mvc/Display/200306000
64	1	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
64	1	Study Reproductive Success of Hatchery and Natural Origin Steelhead in the Methow	201003300	BPA	http://www.cbfish.org/Project.mvc/Display/201003300
64	2	Nez Perce Tribal Hatchery Operations and Maintenance (O&M)	198335000	BPA	http://www.cbfish.org/Project.mvc/Display/198335000
64	2	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
64	2	Umatilla Hatchery Satellite Fac O&M	198343500	BPA	http://www.cbfish.org/Project.mvc/Display/198343500
64	2	Northeast Oregon Hatchery Master Plan	198805301	BPA	http://www.cbfish.org/Project.mvc/Display/198805301

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	2	Hood River Production Monitoring and Evaluation (M&E)-Warm Springs	198805303	BPA	http://www.cbfish.org/Project.mvc/Display/198805303
64	2	Hood River Production Monitor and Evaluation (M&E)-Oregon Department of Fish and Wildlife (ODFW)	198805304	BPA	http://www.cbfish.org/Project.mvc/Display/198805304
64	2	Hood River Production Operations and Maintenance (O&M)-Warm Springs	198805307	BPA	http://www.cbfish.org/Project.mvc/Display/198805307
64	2	Hood River Production Operations and Maintenance (O&M) and Powerdale	198805308	BPA	http://www.cbfish.org/Project.mvc/Display/198805308
64	2	Genetic Monitoring and Evaluation (M&E) Program for Salmon and Steelhead	198909600	BPA	http://www.cbfish.org/Project.mvc/Display/198909600
64	2	Salmon Studies in Idaho Rivers-Idaho Department of Fish and Game (IDFG)	198909800	BPA	http://www.cbfish.org/Project.mvc/Display/198909800
64	2	Umatilla Hatchery Monitoring and Evaluation (M&E)	199000500	BPA	http://www.cbfish.org/Project.mvc/Display/199000500
64	2	Umatilla Basin Natural Production Monitoring and Evaluation (M&E)	199000501	BPA	http://www.cbfish.org/Project.mvc/Display/199000501

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	2	Grand Ronde Early Life History of Spring Chinook and Steelhead	199202604	BPA	http://www.cbfish.org/Project.mvc/Display/199202604
64	2	Yakima River Monitoring and Evaluation-Yakima/Klickitat Fisheries Project (YKFP)	199506325	BPA	http://www.cbfish.org/Project.mvc/Display/199506325
64	2	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
64	2	Imnaha River Smolt Monitoring	199701501	BPA	http://www.cbfish.org/Project.mvc/Display/199701501
64	2	Chinook Salmon Adult Abundance Monitoring	199703000	BPA	http://www.cbfish.org/Project.mvc/Display/199703000
64	2	Listed Stock Chinook Salmon Gamete Preservation	199703800	BPA	http://www.cbfish.org/Project.mvc/Display/199703800
64	2	Grande Ronde Supplementation Operations and Maintenance (O&M) and Montiring and Evaluation (M&E) on Lostine River	199800702	BPA	http://www.cbfish.org/Project.mvc/Display/199800702
64	2	Grande Ronde Supplementation O&M on Catherine Creek/Upper Grande Ronde River	199800703	BPA	http://www.cbfish.org/Project.mvc/Display/199800703

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	2	Grande Ronde Spring Chinook on Lostine/Catherine Creek/ Upper Grande Ronde Rivers	199800704	BPA	http://www.cbfish.org/Project.mvc/Display/199800704
64	2	Spawning Distribution of Snake River Fall Chinook Salmon	199801003	BPA	http://www.cbfish.org/Project.mvc/Display/199801003
64	2	Monitor and Evaluate (M&E) Performance of Juvenile Snake River Fall Chinook Salmon from Fall Chinook Acclimation Project	199801004	BPA	http://www.cbfish.org/Project.mvc/Display/199801004
64	2	Tucannon River Spring Chinook Captive Brood	200001900	BPA	http://www.cbfish.org/Project.mvc/Display/200001900
64	2	Salmonid Progeny Markers	200203000	BPA	http://www.cbfish.org/Project.mvc/Display/200203000
64	2	Growth Modulation in Salmon Supplementation	200203100	BPA	http://www.cbfish.org/Project.mvc/Display/200203100
64	2	Monitor and Evaluate (M&E) Reproductive Success and Survival in Wenatchee River	200303900	BPA	http://www.cbfish.org/Project.mvc/Display/200303900
64	2	Evaluate the Reproductive Success of Wild and Hatchery Steelhead in Natural and Hatchery Environments	200305000	BPA	http://www.cbfish.org/Project.mvc/Display/200305000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	2	Evaluate the Relative Reproductive Success of Hatchery-Origin and Wild-Origin Steelhead Spawning Naturally in the Hood River	200305400	BPA	http://www.cbfish.org/Project.mvc/Display/200305400
64	2	Evaluate the Relative Reproductive Success of Wild and Hatchery Origin Snake River Fall Chinook Spawners Upstream of Lower Granite Dam	200306000	BPA	http://www.cbfish.org/Project.mvc/Display/200306000
64	2	Natural Reproductive Success and Demographic Effects of Hatchery-Origin Steelhead in Abernathy Creek, Washington	200306300	BPA	http://www.cbfish.org/Project.mvc/Display/200306300
64	2	Grande Ronde Supplementation Monitoring and Evaluation (M&E) on Catherine Creek/Upper Grande Ronde River	200708300	BPA	http://www.cbfish.org/Project.mvc/Display/200708300
64	2	Investigation of Relative Reproductive Success of Stray Hatchery & Wild Steelhead & Influence of Hatchery Strays on Natural Productivity in Deschutes	200729900	BPA	http://www.cbfish.org/Project.mvc/Display/200729900
64	2	Kelt Reconditioning and Reproductive Success Evaluation Research	200740100	BPA	http://www.cbfish.org/Project.mvc/Display/200740100
64	2	Snake River Sockeye Captive Propagation	200740200	BPA	http://www.cbfish.org/Project.mvc/Display/200740200

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	2	Spring Chinook Captive Propagation-Idaho	200740300	BPA	http://www.cbfish.org/Project.mvc/Display/200740300
64	2	Spring Chinook Captive Propagation-Oregon	200740400	BPA	http://www.cbfish.org/Project.mvc/Display/200740400
64	2	White River supplementation	200831000	BPA	http://www.cbfish.org/Project.mvc/Display/200831000
64	2	Natural Production Management and Monitoring	200831100	BPA	http://www.cbfish.org/Project.mvc/Display/200831100
64	2	Steelhead Kelt Reconditioning	200845800	BPA	http://www.cbfish.org/Project.mvc/Display/200845800
64	2	Expand Multispecies Acclimation Wenatchee/Methow	200900100	BPA	http://www.cbfish.org/Project.mvc/Display/200900100
64	2	Imnaha River steelhead status monitoring	201003200	BPA	http://www.cbfish.org/Project.mvc/Display/201003200
64	2	Study Reproductive Success of Hatchery and Natural Origin Steelhead in the Methow	201003300	BPA	http://www.cbfish.org/Project.mvc/Display/201003300

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
64	2	Tucannon Expanded Pit Tagging	201004200	BPA	http://www.cbfish.org/Project.mvc/Display/201004200
64	3	Nez Perce Tribal Hatchery Monitoring and Evaluation (M&E)	198335003	BPA	http://www.cbfish.org/Project.mvc/Display/198335003
64	3	Evaluate the Relative Reproductive Success of Wild and Hatchery Origin Snake River Fall Chinook Spawners Upstream of Lower Granite Dam	200306000	BPA	http://www.cbfish.org/Project.mvc/Display/200306000
64	3	Kelt Reconditioning and Reproductive Success Evaluation Research	200740100	BPA	http://www.cbfish.org/Project.mvc/Display/200740100
64	3	Study Reproductive Success of Hatchery and Natural Origin Steelhead in the Methow	201003300	BPA	http://www.cbfish.org/Project.mvc/Display/201003300
65	1	Fish Pop Genetics	USBRIA142506 AAIC4797	USBR	
65	1	Research, monitoring, and evaluation of emerging issues and measures to recover the Snake River fall Chinook salmon ESU	199102900	BPA	http://www.cbfish.org/Project.mvc/Display/199102900

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
65	1	Spawning Distribution of Snake River Fall Chinook Salmon	199801003	BPA	http://www.cbfish.org/Project.mvc/Display/199801003
65	1	Monitor and Evaluate (M&E) Performance of Juvenile Snake River Fall Chinook Salmon from Fall Chinook Acclimation Project	199801004	BPA	http://www.cbfish.org/Project.mvc/Display/199801004
65	1	Evaluate the Relative Reproductive Success of Wild and Hatchery Origin Snake River Fall Chinook Spawners Upstream of Lower Granite Dam	200306000	BPA	http://www.cbfish.org/Project.mvc/Display/200306000
65	2	Research, monitoring, and evaluation of emerging issues and measures to recover the Snake River fall Chinook salmon ESU	199102900	BPA	http://www.cbfish.org/Project.mvc/Display/199102900
65	2	Spawning Distribution of Snake River Fall Chinook Salmon	199801003	BPA	http://www.cbfish.org/Project.mvc/Display/199801003
65	2	Monitor and Evaluate (M&E) Performance of Juvenile Snake River Fall Chinook Salmon from Fall Chinook Acclimation Project	199801004	BPA	http://www.cbfish.org/Project.mvc/Display/199801004
65	2	Evaluate the Relative Reproductive Success of Wild and Hatchery Origin Snake River Fall Chinook Spawners Upstream of Lower Granite Dam	200306000	BPA	http://www.cbfish.org/Project.mvc/Display/200306000

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
65	3	Research, monitoring, and evaluation of emerging issues and measures to recover the Snake River fall Chinook salmon ESU	199102900	BPA	http://www.cbfish.org/Project.mvc/Display/199102900
66		Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
67		Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
68		Avian Predation on Juvenile Salmonids	199702400	BPA	http://www.cbfish.org/Project.mvc/Display/199702400
69	1	Sea Lion Non-Lethal Hazing and Monitoring	200800400	BPA	http://www.cbfish.org/Project.mvc/Display/200800400
69	2	Sea Lion Non-Lethal Hazing and Monitoring	200800400	BPA	http://www.cbfish.org/Project.mvc/Display/200800400
69	3	Sea Lion Non-Lethal Hazing and Monitoring	200800400	BPA	http://www.cbfish.org/Project.mvc/Display/200800400
70	1	Development of Systemwide Predator Control	199007700	BPA	http://www.cbfish.org/Project.mvc/Display/199007700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
70	2	Development of Systemwide Predator Control	199007700	BPA	http://www.cbfish.org/Project.mvc/Display/199007700
70	3	Development of Systemwide Predator Control	199007700	BPA	http://www.cbfish.org/Project.mvc/Display/199007700
70	4	Research Non-Indigenous Actions	200871900	BPA	http://www.cbfish.org/Project.mvc/Display/200871900
71	3	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
71	3	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
71	3	Johnson Creek Artificial Propagation Enhancement	199604300	BPA	http://www.cbfish.org/Project.mvc/Display/199604300
71	3	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
71	3	Pacific NW Aquatic Monitoring Program (PNAMP) Research, Monitoring and Evaluation (RM&E) Design and Protocols	200721600	BPA	http://www.cbfish.org/Project.mvc/Display/200721600

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
71	4	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
71	4	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
71	4	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	198810804	BPA	http://www.cbfish.org/Project.mvc/Display/198810804
71	4	Fish Passage Center	199403300	BPA	http://www.cbfish.org/Project.mvc/Display/199403300
71	4	Lower Columbia River Estuary Ecosystem Monitoring	200300700	BPA	http://www.cbfish.org/Project.mvc/Display/200300700
71	4	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
71	4	Okanogan Basin Monitoring & Evaluation Program (OBMEP)	200302200	BPA	http://www.cbfish.org/Project.mvc/Display/200302200
71	4	Habitat and Biodiversity Information System for Columbia River Basin	200307200	BPA	http://www.cbfish.org/Project.mvc/Display/200307200

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
71	4	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
71	4	Spring Chinook Captive Propagation-Idaho	200740300	BPA	http://www.cbfish.org/Project.mvc/Display/200740300
71	4	Streamnet Library	200850500	BPA	http://www.cbfish.org/Project.mvc/Display/200850500
71	5	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
71	5	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700
71	5	Habitat and Biodiversity Information System for Columbia River Basin	200307200	BPA	http://www.cbfish.org/Project.mvc/Display/200307200
71	5	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
71	5	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
71	6	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
71	6	Habitat and Biodiversity Information System for Columbia River Basin	200307200	BPA	http://www.cbfish.org/Project.mvc/Display/200307200
71	6	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
72	1	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
72	1	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
72	1	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	198810804	BPA	http://www.cbfish.org/Project.mvc/Display/198810804
72	1	Implement Wy - Kan - Ush - Mi Wa - Kis	199803100	BPA	http://www.cbfish.org/Project.mvc/Display/199803100
72	1	Integrated Status and Effectiveness Monitoring Program (ISEMP)	200301700	BPA	http://www.cbfish.org/Project.mvc/Display/200301700

Research, Monitoring, and Evaluation Projects

Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
72	1	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
72	1	Tidal Freshwater Monitoring	200500100	BPA	http://www.cbfish.org/Project.mvc/Display/200500100
72	1	Streamnet Library	200850500	BPA	http://www.cbfish.org/Project.mvc/Display/200850500
72	1	Regional Data Management Support and Coordination	200872700	BPA	http://www.cbfish.org/Project.mvc/Display/200872700
72	2	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
72	2	Methow Data Management Support	TBA	USBR	
72	2	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	198810804	BPA	http://www.cbfish.org/Project.mvc/Display/198810804
72	2	Data Access in Real Time (DART)	199601900	BPA	http://www.cbfish.org/Project.mvc/Display/199601900

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Action No.	Sub-Action No.	Project Name	Project Reference Number	Lead Agency	Project Information Internet Link
72	2	Regional Data Management Support and Coordination	200872700	BPA	http://www.cbfish.org/Project.mvc/Display/200872700
72	3	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	1425-09-AA-IC-4930	USBR	
72	3	Coded Wire Tag-Pacific States Marine Fisheries Commission (PSMFC)	198201301	BPA	http://www.cbfish.org/Project.mvc/Display/198201301
72	3	StreamNet - Coordinated Information System (CIS)/ Northwest Environmental Database (NED)	198810804	BPA	http://www.cbfish.org/Project.mvc/Display/198810804
72	3	Implement Wy - Kan - Ush - Mi Wa - Kis	199803100	BPA	http://www.cbfish.org/Project.mvc/Display/199803100
72	3	Pacific Northwest Aquatic Monitoring Program (PNAMP) Coordination	200400200	BPA	http://www.cbfish.org/Project.mvc/Display/200400200
72	3	Streamnet Library	200850500	BPA	http://www.cbfish.org/Project.mvc/Display/200850500

Corps 2010 Research, Monitoring, and Evaluation Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
66, 67	Estuary	122681	Estuary avian predation: terns and cormorants
66, 67	Estuary	107844	Estuary avian PIT tag recovery
69	Bonneville	O&M	Pinniped mangement and monitoring
47, 48, 54	System-wide		Avian deterrence at dams
47, 48, 68	System-wide	120121	Inland avian predation
50	System-wide	SYS07	NWW survival methodology hydraulic influence modeling
50, 51, 55	System-wide		PIT detection development
50, 52	System-wide	O&M	Adult fish counting at dams
50, 52, 55	System-wide	Sys03	Survival study methodologies
18, 52, 54	Bonneville		Passage survival testing
19, 52, 54	The Dalles		Performance verification monitoring

Corps 2010 Research, Monitoring, and Evaluation Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
20, 52, 54	John Day		Post-construction passage survival testing
22, 52, 54	Ice Harbor	IHR02	Performance verification monitoring
23, 52, 54	Lower Monumental	LM08	Performance verification monitoring
24, 52, 54	Little Goose	LGO05	Performance verification monitoring
52, 54, 55	System-wide	149671	Snake River Fall Chinook system survival study
53	System-wide	O&M	Smolt monitoring facilities fish condition monitoring
28, 53, 54	System-wide	118618	Adult migration studies
53, 54, 55, 58	Estuary	135993	Estuary survival (post-FCRPS passage)
54	System-wide	129463	Spillway Risk/Reliability Study - stilling basin and gate inspections
18, 54, 55	System-wide		Lower River BIOP performance testing
21, 54	McNary	139436	Surface bypass biological studies - Mid-Columbia 2009 Analysis

Corps 2010 Research, Monitoring, and Evaluation Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
21, 54	McNary	139436	Surface bypass biological studies - data synthesis and multi-year analysis
21, 54	McNary	139346	Surface bypass biological studies - gatewell evaluation
31, 54, 55	System-wide	O&M	Transportation studies: juvenile and adult sockeye
54, 55	System-wide	107846	Delayed mortality of juvenile salmonids - data synthesis and workshop
55	System-wide	122201	Turbine passage survival program
35, 37, 38, 58, 59, 61	Estuary	123452	Estuary habitat studies - Contribution of tidal fluvial habitats in the Columbia River estuary to the recovery of diverse salmon ESUs
37, 38, 58, 59, 61	Estuary	123452	Estuary habitat studies - Juvenile salmon ecology and restoration of tidal freshwater habitats
58, 59, 60	Estuary	123452	Estuary habitat studies - Evaluation of life history diversity, habitat connectivity, and survival benefits associated with habitat restoration actions in the lower Columbia River and estuary
36, 37, 60	Estuary	123452	Estuary habitat studies - Action effectiveness research and monitoring of ecosystem restoration actions within the lower Columbia River and estuary

Corps 2010 Research, Monitoring, and Evaluation Projects

Note: The projects below are those scheduled for implementation in 2010 only. Projects are determined on a year-by-year basis, using existing regional processes.

RPA Action No.	Project Location	Project ID	Project Title
37, 38, 58, 59, 61	Estuary	123452	Estuary habitat studies - Cumulative ecosystem response to habitat restoration projects in the lower Columbia River and estuary (final year)
40, 63	John Day	122434	John Day mitigation evaluation (Ringold Springs)