Final

Endangered Species Act

2003/2003-2007 Implementation Plan

for the

Federal Columbia River Power System

Bureau of Reclamation
US Army Corps of Engineers
Bonneville Power Administration

October 2002

Table of Contents

1. OVERVIEW OF THE 2003/2003-07 IMPLEMENTATION PLAN

1.1 Background

The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) issued *Biological Opinions* (BiOps) in December 2000 for the operation and maintenance of the Federal Columbia River Power System (FCRPS). This complex of dams and reservoirs is operated by the U.S. Army Corps of Engineers (Corps), the U.S. Bureau of Reclamation (Reclamation), and the Bonneville Power Administration (BPA), referred to collectively as the Action Agencies.

The BiOps guide implementation of measures by the Action Agencies to protect and further the recovery of ESA-listed Columbia River Basin salmon, steelhead, bull trout, and Kootenai River white sturgeon (See Table 1.1). They provide a flexible framework of performance standards for the FCRPS and other conservation measures over the 10-year period from 2000 to 2010.

Table 1.1 Fish identified as Evolutionary Significant Units (ESUs) that are threatened or endangered throughout the Columbia River Basin.

Anadromous Fish Populations (12)	
Chinook salmon	Snake River spring/summer and fall; Upper Columbia River spring; Upper Willamette River, Lower Columbia River
Steelhead	Snake River, Columbia River (Upper, Mid-, and Lower), Upper Willamette River
Chum salmon	Columbia River
Sockeye salmon	Snake River
Freshwater Fish Populations (2)	
Bull trout, Kootenai River white sturgeon	

Implementation plans are called for under the BiOps and provide the conceptual foundation and the management framework for coordinating actions to further recovery. These plans are intended to inform, and be informed by, other on-going state, tribal and regional planning efforts, such as the Northwest Power Planning Council's (Council's) Fish and Wildlife Program.

The Action Agencies first implementation plan, the Endangered Species Act Implementation Plan (2002-2006) for the Federal Columbia River Power System (2002-2006 5-Year Plan), was published as a draft in July 2001 and circulated for review. The Action Agencies discussed the draft 2002-2006 5-Year Plan with states, tribes, and Columbia Basin stakeholders throughout the region. Although the 2002-2006 5-Year Plan was not finalized, the Action Agencies incorporated or responded to comments received in subsequent implementation plans.

The 2002-2006 5-Year Plan was quickly followed by the release our first annual implementation plan in November 2001. The Endangered Species Act 2002 Annual Implementation Plan for the Federal Columbia River Power System (2002 1-Year Plan) provided details about the Action Agencies' measures planned for implementation in FY 2002, and summarized expected modifications from the BiOps.

The NMFS BiOp also calls for annual progress reports as well as comprehensive "check-ins" in 2003, 2005, and 2008. (See box on next page.) In May 2002, the Action Agencies issued their Endangered Species Act 2001 Progress Report for the Federal Columbia River Power System (2001 Progress Report). The 2001 Progress Report documented the Columbia River Basin fish recovery measures implemented by the three Action Agencies in fiscal year 2001. The Action Agencies' overall conclusion was that implementation of the BiOps was on track and expected to meet BiOp benchmarks set for the first interim "check-in" in 2003.

In July 2002, NMFS issued a Findings Letter to the Action Agencies regarding the adequacy of their 2001 implementation efforts and 2002 1-Year Plan. NMFS found that the Action Agencies had made sufficient progress implementing hydrosystem improvements and offsite mitigation measures in 2001 and through the 2002 1-Year Plan. NMFS also found that other federal agencies began implementing complementary activities anticipated by the Final Basinwide Salmon Recovery Strategy (*All-H Strategy*) and that states and tribes had taken measures to help recover stocks in a manner consistent with NMFS' expectations when the BiOp was issued in December 2000. The Findings Letter also emphasized areas where future efforts should be focused and identified issues needing resolution.

NMFS BiOps set "check-ins" for 2003, 2005 and 2008

NMFS has specified mid-point evaluations, or "check-ins" for 2003, 2005, and 2008. The 2003 evaluation will primarily look at progress made towards obtaining funding, initiating studies, developing performance standards and other programmatic issues. The later check-ins will shift toward assessments of biological results of program implementation, including population growth rates, abundance, and other biological factors. More information about the mid-point check-ins is included in Section 5.0.

Also, beginning in July 2002, BPA's initiated its financial choices process. While not specifically related to BiOp implementation planning, the financial choices process has provoked comments and concerns from many in the region who participate or are interested in BiOp implementation planning. BPA is approaching the financial choices process with a commitment to achieve performance standards and meet the requirements for the 3-, 5-, and 8-year check-ins. If this process results in major changes to the Action Agencies' ability to fund measures identified in this Plan, then the Action Agencies will amend this Plan in coordination with states, tribes, and others.

Building on the lessons from our first year of BiOp planning and implementation, the Action Agencies are issuing this year's 1- and 5-year implementation plans as a single combined document. This 2003/2003-2007 Implementation Plan (Plan) is particularly important due to the first comprehensive check-in scheduled for 2003. The Action Agencies have made special efforts to ensure that this Plan includes sufficient work so they will be prepared for the first comprehensive evaluation.

1.2 Implementation Plan Framework

This Plan presents a disciplined, structured approach designed to ensure clear direction, effective use of Action Agency resources, accountability for results, and adaptive management over time as implementation of actions and studies yields new information about results and resolution of current uncertainties. The Plan focuses on meeting the biological requirements of listed fish, guided by the structure illustrated in Figure 1.1 and described in this section.

Goals

The Plan's goals are essentially a summary of what the Action Agencies want to accomplish, working in combination with other recovery efforts in the Columbia Basin. The goals are based in large part on various legal obligations, the goals described in various regional plans, and the performance standards and/or recovery goals envisioned by the NMFS and USFWS BiOps.

Strategies

Strategies explain *how* the Action Agencies propose to achieve performance standards. As noted above, the overall strategy relies on a life cycle, or the **All-H Approach**. The Plan also describes strategies for each H category—**Hydrosystem Improvements**, **Habitat Protection and Enhancement**, **Hatchery and Harvest Reforms—**as well as strategies for **Resident Fish and Research, Monitoring and Evaluation (RM&E)**. Over time, specific strategies for each ESU will be incorporated into the implementation plans. Strategies may also be adjusted as new data are developed.

Priorities

Within strategies, priorities and outcomes are identified for the next 5-year period. There are more than 200 actions called for in the NMFS and USFWS BiOps. Some are specifically targeted for implementation within the next 5 years because they are:

- expected to result in near-term survival benefits for listed stocks;
- preparations for implementation of additional survival improvement measures; or
- planning, research, and monitoring actions important for implementation, evaluation of progress, and monitoring the status of target populations.

From a practical standpoint, it is not possible to fully implement all of the actions identified in the BiOps in the next 5 years. Many of these actions have an implementation timeline of 10 or more years and action implementation needs to be responsive to the application of adaptive management decisions as new information becomes available. Consequently, those actions are not fully definable within the 5-year implementation plan timeframe.

Performance Standards

Performance Standards for salmon and steelhead are linked to the Plan's goals. They provide measures of success at several levels.

Assessments of population targets derived from the NMFS BiOp help define the **Population Level** *(Tier 1)* **Performance Standards**, which are the responsibility of many parties in the region, not merely the FCRPS and Action Agencies. The NMFS BiOp also helps to define the **Life-Stage Specific** *(Tier 2)* **Performance Standards** necessary to achieve the population level standards, dividing them into hydrosystem survival standards and a composite of other survival needs. **H-specific or Physical** *(Tier 3)* **Performance Standards** will describe improvements in biological and environmental conditions.

And finally, **Programmatic** *(Tier 4)* **Performance Standards** will be tracked to see if the goals in the 5-Year Action Tables are met. Performance standards will be adjusted over time.

1.3 Structure of the 2003/2003-07 Plan

This Plan is different from last year's implementation plans in that the 5- and 1-year plans have been combined into a single document. This allows a better understanding of the interrelationship of the two plans; particularly, how the 5-year plan provides a broader context for the 1-year plan. Construction projects and research studies which span several years, for example, may only be discussed piecemeal in the 1-year plan, whereas the 5-year plan shows how the year-to-year pieces fit together to produce a cohesive, future outcome (e.g., dam improvement or finalized study).

Here is an overview of sections included in this document:

Section 1.0 – Overview
Describes the context for the Action Agencies' 5- and 1-year implementation plans, the structure of this year's document, responses to stakeholders' comments, and how stakeholders can be involved in subsequent implementation plans.

Section 2.0 – Goals

Section 3.0 – Performance Standards

Section 4.0 – Strategies to Achieve Performance Standards
These sections describe more fully the Action Agencies' objectives, measuring tools, and strategies for fish recovery efforts over the next 10 years.

Section 5.0 – Priorities, Work Plans and Outcomes (2003-07)
Details the 5- and 1-year objectives for fish recovery actions in the FCRPS. The 5-year portion serves as a "big picture" blueprint that organizes collective efforts by the three Action Agencies to achieve certain outcomes by 2007. The 1-year portion provides a more detailed description of implementation measures planned for the upcoming fiscal year (October 2002 to September 2003). Included are work plans describing the specific tasks that need to be accomplished to achieve the identified outcomes.

Section 6.0 – Coordination Forums
Describes the regional forums and other entities with which the Action Agencies coordinate fish recovery measures.

Section 7.0 – Adaptive Management and Updates to the NMFS BiOp RPA Actions

Clarifies modifications to BiOp requirements recommended, based on experience gained through the process of implementing fish recovery measures in 2001 and 2002.

Action Tables

Provides lists of specific projects the Action Agencies propose to implement from 2003 to 2007, based on the strategies and priorities for Hydrosystem, Habitat, Hatcheries, and Harvest, respectively. All "reasonable and prudent alternative" (RPA) actions and Conservation Measures from the NMFS and USFWS BiOps are addressed. Related BiOp actions are cross-referenced by number. New and ongoing actions planned for implementation by the Action Agencies are also included.

As expected, the implementation plans are dynamic and will continually evolve as information and experience advance. Each year, new implementation plans and a progress report will be issued and will inform NMFS' annual Findings Letter. Each year, the plans will be further refined as progress and results are reported. Future updates to the plans will reflect new information, including recommendations from the fish recovery planning processes.

1.4 Comments

1.4.1 Responses to comments received on implementation plans

When the Action Agencies released the draft 2002-2006 5-Year Plan in July 2001, they asked for input from states, tribes, and others. Informal and formal comments were received through the NMFS Regional Forum, Regional Executive meetings, staff discussions, written letters, and other opportunities. Many of those comments were reflected in the 2002 1-Year Plan or are reflected in this Plan.

In this section, we summarize and respond to key comments received on last year's plans and the draft 2003/2003-2007 Plan. In the draft 2003/2003-2007 Plan we summarized and generally responded to state and tribal comments. We also summarized comments received under the appropriate "H" category (hydro, habitat, hatchery, or harvest).

In this final Plan, we have again summarized and generally responded to the key comments received. This summary includes comments received last year as well as any additional comments received on the draft 2003/2003-2007 Plan.

This Plan does not address the numerous comments expressed that differed from the recommendations provided by NMFS and USFWS in their BiOps. The Action Agencies have forwarded meeting summaries and comment letters to both of those regulatory agencies for their consideration.

Funding, Budgeting and Accountability

Given the uncertainty of the appropriations process, how will the Action Agencies guarantee funding for BiOp implementation and how will funding gaps be addressed. How BPA's Financial Choices process might impact implementation of this Plan. The Action Agencies are aware that many in the region want to know the various agency funding levels for BiOp implementation. The projects and measures presented in our implementation plans reflect currently available budgets and appropriations levels. Although the Action Agencies are using all appropriate means to obtain funding for BiOp implementation, it is possible that funding could fall short of full implementation in a given year. The Corps and Reclamation activities are funded through the Congressional appropriations process. Regional support of fish recovery efforts has been very helpful in bringing Congressional attention to Northwest fish needs. BPA is currently going through a Financial Choices exercise with the region to determine

how to address its current financial situation. The Action Agencies and the region will continue to examine least cost alternatives for fish restoration actions, and to leverage Federal and ratepayer dollars to best achieve success. If funding falls short, the Action Agencies will work with NMFS and the region to prioritize actions to achieve maximum benefit from available funds. Also, the Action Agencies will amend this Plan if measures identified for implementation are not adequately funded.

Need more clarification and understanding of how the Council's Fish and Wildlife Program integrates with the implementation plans. The Action Agencies will rely primarily on using the Council Provincial Review and subbasin planning processes to integrate the Fish and Wildlife Program with BiOp implementation needs. This relationship is further described and clarified in Sections 4.0 and 5.2.

How is RM&E being funded? The RM&E program called for in the NMFS BiOp and the *All-H Strategy* is comprehensive and requires close regional coordination. The Action Agencies and NMFS are working together to identify appropriate funding levels and coordination relative to the RM&E work and the responsibilities of other regional, state, and federal entities.

There is a perception that projects won't get funded unless they are focused exclusively on listed species. The Action Agencies should clarify their position. Clarify how the Action Agencies will balance ESA with Northwest Power Act responsibilities. BPA and the Council are working with regional stakeholders to clarify BPA's intent to ensure the avoidance of jeopardy and progress towards recovery of listed populations while satisfying the broader requirements of the Northwest Power Act. While the Action agencies are not specifically targeting unlisted species, many of the actions will benefit those species as well. We recognize the Council's Fish and Wildlife program, Provincial Review process, and Subbasin Planning as a good basis for regional planning to link actions for restoring listed species with those that will continue to provide protection for other fish and wildlife populations.

What are other agencies spending on fish recovery actions? The Federal Caucus agencies publicly released the "cross-cut budget" shown in Figure 1.2. The cross-cut budget shows the actual and planned funding for fish recovery efforts in FY 2001 through 2003 for Federal Caucus agencies. The Federal Caucus plans to release an updated cross-cut budget after the FY 2004 President's Budget is available. Although the BiOp, the *All-H Strategy*, and this Plan recognize that other state, tribal, and local entities must do their share to achieve recovery, this Plan does not include information regarding others budgets for fish recovery.

Figure 1 Federal Caucus Cross-cut Budget

Columbia River Federal Basinwide Salmon Funding
(millions of dollars)

Department/Agency	FY 2001 Enacted	FY 2002 President's Budget	FY 2002 Enacted	FY 2003 President's Budget
Annual Appropriated Congressional Funding:				
Department of the Army				
Army Corps of Engineers	***102.7***	***106.7***	**108.75**	**128.2**
Department of the Interior				
Bureau of Land Management	1.5	1.5	1.5	1.5
Bureau of Reclamation	5.6	11.0	11.0	15.0
United States Fish and Wildlife Service	2.5	6.0	10.0	9.7
Bureau of Indian Affairs	0.0	0.4	0.4	0.4
United States Geological Survey	0.4	0.4	0.4	0.4
Department of the Interior Total	***10.0***	***19.3***	**23.3**	**27.0**
Department of Commerce				
National Marine Fisheries Service	***25.5***	***24.6***	**24.6**	**36.6**
Department of Agriculture				
United States Forest Service	***15.4***	***13.0***	**13.0**	**13.0**
Environmental Protection Agency	***14.5***	***14.6***	**14.6**	**14.6**
Total Discretionary Appropriations	**168.1**	**178.2**	**184.2**	**219.4**
Other Funding Authority:				
Department of Energy				
Bonneville Power Administration Direct Fish Costs	***184.0***	***253.3***	**253.3**	**286.7**
Total Columbia Basin (Appropriated and Other)	**352.1**	**431.5**	**437.5**	**506.1**

Priorities

How will the Action Agencies balance ESA with Northwest Power Act responsibilities? BPA and the Council are working with regional stakeholders to clarify BPA's intent to ensure the avoidance of jeopardy and the attainment of progress towards recovery of listed populations while satisfying the broader requirements of the Northwest Power Act.

Implementation plan needs to better identify and acknowledge resident fish priorities. We concur, and have identified the 5-year priorities for ESA-listed resident fish in Section 5.5 of this Plan. For Kootenai River white sturgeon, the priority is to improve the population's ability to produce juveniles and to help ensure that those progeny grow to maturity. Monitoring of bull trout use of FCRPS areas where appropriate will also be emphasized for the next few years. Eventually, there will be considerable evaluation of these monitoring results and potentially – where warranted – an increasing emphasis on protection. Additional resident fish implementation priorities may be identified through recovery planning processes, subbasin planning, and other technical forums which allow further opportunity for involvement by states, tribes, and others.

How will federal/state/tribal priorities be balanced, especially between upstream and downstream water uses? Hydrosystem operation priorities are provided in the BiOps and are reflected in the Action

Agencies' implementation plans and the annual Water Management Plan. These priorities reflect an initial balance between competing water uses. Further refinement to this balance occurs during in-season operation. This occurs through the NMFS Regional Forum's in-season management process (Technical Management Team and Implementation Team {TMT and IT}). The Council's subbasin planning process will also promote local coordination and identification of priorities. Although the subbasin plans will display some unique elements, they will also address common elements which will enable the identification of priorities across subbasins, within an ESU, or across the Columbia Basin.

There is little or no priority setting among the Hs. A mechanism is needed to prioritize among actions to ensure that the most critical actions are being funded and implemented in as efficient manner as possible. The Action Agencies agree that cross-H prioritization would be extremely beneficial to informed decisions about salmon recovery actions. Although a mechanism does not currently exist, as the program and science evolves and information becomes available about the performance benefits of specific actions, we expect to use relevant information to help us prioritize accordingly. We also expect that subbasin planning will eventually provide a mechanism to prioritize the offsite mitigation actions.

Independent Review

An objective body needs to evaluate research programs and to decide what information is really needed. An independent auditor should evaluate BiOp planning and implementation. The Action Agencies agree that an independent review would be helpful and plan to request review of this Plan by the Independent Scientific Review Panel. We expect to be able to incorporate any findings in the next cycle of implementation planning.

Goals

Achieving the Performance Standards should be the primary goal of BiOp implementation activities. The Action Agencies agree and have geared the FCRPS BiOp implementation activities towards achieving available performance standards. However, the BiOp implementation activities represent the Action Agency share of Columbia River fish recovery efforts and would not in themselves achieve full recovery. The Action Agencies adopted the goals of the *All-H Strategy* so that the FCRPS fish recovery efforts would be consistent with the recovery efforts of others.

Goal 4, Balancing Other Needs, is misplaced and contravenes the express policy of ESA. The Action Agencies do not agree with this statement and continue to work to balance the needs of the many resources they manage. However, the Action Agencies acknowledge that ESA and BiOp implementation is a high priority need.

Performance Standards/Allocation of Responsibility/All-H Approach

How will the Action Agencies define and use performance standards, properly functioning conditions, and metrics for measuring success? The Action Agencies should propose a weighting scheme. The Action Agencies plan to continue to work with the NMFS Technical Recovery Teams (TRTs), the NMFS Regional Forum, the Federal Caucus, states, and tribes and focus on these issues through the RM&E Work Group described in Section 5 of this Plan.

The hydrosystem performance standards should be clearly identified as the responsibility of the Action Agencies and the implementation plan should outline the process for adjustment of performance standards. The Action Agencies accept responsibility for mitigating for fish survival impacts that are caused by the operations and maintenance of the FCRPS. Our Hydrosystem strategies

are focused on improving adult and juvenile fish survival as they use waters affected by the FCRPS. Hydrosystem performance standards are well defined, but work remains to be done to identify appropriate performance standards and measures for offsite recovery measures. The RM&E Work Group described in Section 5.6 will develop the processes for identifying and adjusting performance standards.

The use of performance standards should not be a substitute for on-the-ground measures. The Action Agencies are not using performance standards in place of on-the-ground measures. Instead, we use performance standards as the primary indicator of the biological and physical changes that result from implemented on-the-ground measures. As we gain experience and knowledge about the effects of our many offsite activities, performance standards and measures will allow us to focus our efforts on on-the-ground activities with the greatest benefits to ESA-listed species.

Consistency with State Laws

Implementation should be consistent with state laws and policies. We agree that, to the extent possible, BiOp implementation should be consistent with state laws and policies. The Council's subbasin planning processes will provide the opportunity for state and local agencies and interest groups to ensure that the Action Agencies BiOp implementation is consistent with state laws and policies. Furthermore, any project- or site-specific environmental review processes include analyses of existing laws and policies and provide another opportunity to resolve inconsistencies between state laws and BiOp implementation.

BiOp Issues – Findings Letter – Progress Report

The Action Agencies are not on track with BiOp implementation. The Action Agencies do not agree with this comment and refer the commenters to NMFS' July 2002 Findings Letter that states:

"NMFS finds that the 2002 IP, when viewed in the context of the 2001 Progress Report, the draft 2002-2006 IP, and reports of other Federal Agencies regarding implementation of the Basinwide Salmon Recovery Strategy, is generally consistent with the Opinion and adequate to implement the RPA during 2002. The 2002 IP is likely to meet the schedule and scope anticipated by the 2003 mid-point evaluation for the great majority of RPA Actions."

Tribal fishing rights

How will the goal to "assure tribal treaty fishing rights" be measured? The Action Agencies don't have the authority to assure tribal fishing rights and recommend that the goal be changed to "assure sustainable long-term harvest opportunities." The BiOp does not meet treaty obligations and is a stumbling block to tribal participation. The Action Agencies have not proposed measurements for their stated goals. However, our ability to achieve identified performance standards will be the ultimate measure of our success. Consistent with the *All-H Strategy*, the Action Agencies recognize their responsibility to help restore salmon and steelhead populations over time to a level that provides a sustainable harvest sufficient to allow for the meaningful exercise of tribal fishing rights and, where possible, provide non-tribal fishing opportunities.

Cultural Resources

Subbasin restoration must include cultural, socio-economic, and tribal trust considerations by the federal agencies. We agree and fully anticipate tribal involvement in subbasin planning as provided for in the master contract between BPA and the Council. Tribal involvement in subbasin planning is critical for identifying cultural, socio-economic, and tribal trust concerns.

Efforts to recover ESA-listed species should not adversely affect other resources, such as non-listed populations and cultural resources. The need to balance fish, wildlife, and human needs is the reason we have adopted the Federal Caucus' *All-H Strategy*. Through environmental reviews that will be conducted on specific implementation projects, full disclosure and consideration of impacts to sensitive resources, including non-listed fish and cultural resources, will occur. The Action Agencies will use environmental review processes, including cultural resource consultations, to make informed decisions and to achieve an appropriate balance.

The Action Agencies should enter into a Memorandum of Agreement (MOA) to formalize the process for considering impacts to cultural resources during BiOp implementation. The Action Agencies should also designate a lead agency for cultural resources consultation. There are already reservoir-specific agreements in place with tribes for considering and resolving issues related to impacts of reservoir operations, regardless of the whether or not the affecting operation was related to BiOp actions. The Action Agencies will continue to work through the relationships established under those MOAs to improve actions intended to reduce impacts to cultural resources.

Regional Planning

Participation in regional forums such as the RM&E Technical Oversight and Data Support System committees should be opened to others. The Action Agencies recognize the importance of regional coordination, especially when implementing an All-H approach to further the recovery of ESA-listed fish. We will continue to use the NMFS Regional Forum and Council's Fish and Wildlife Program and related processes as our primary coordination forums. Additionally, NMFS and the Action Agencies are cooperatively developing an FCRPS RM&E plan with the intent that it will complement and integrate with other regional activities to the greatest extent practicable. Work groups, including a Regional Coordination work group, have been formed to develop and coordinate the components of a comprehensive RM&E plan. The Regional Coordination work group will invite participation from the Council, NMFS, USFWS, states, tribes, and others to encourage increased participation.

The Action Agencies should move the TRT's timeframe for development of Tier 1 performance standards from 5 years to 3 years. Recovery standards need to be developed by the 2003 check-in and the implementation plan should include an evaluation of whether those recovery standards can be met, given the current plans. The 2003 check-in evaluation is programmatic in nature and will not need established recovery standards to be completed. The Action Agencies will consider developed recovery standards as appropriate in future implementation plans.

Coordination and Consultation

The Action Agencies should include others in implementation planning and related decision-making processes. We agree and propose to work with the states and tribes to develop a management framework providing for early participation in the offsite mitigation component of the implementation plans. We believe the annual Progress Reports can provide a good starting point for state and tribal involvement. We propose to review the Progress Reports for the previous year with states and tribes to scope key implementation issues and priorities for development of future implementation plans. This review would occur at a time determined in conjunction with the states and tribes, and take into account the schedule for plan development each year. Section 1.4.2 now includes this proposal.

Need more clarity about Action Agency responsibilities to implement actions, measures, etc., so the states and tribes can figure out how to work with them. We agree that more clarity is helpful and have tried to do so in this Plan by identifying specific 5-year strategic outcomes, specific 1- and 5-year work plans to lead us towards achieving those outcomes, and detailed project tables. The Federal Caucus

is also attempting a similar effort. As we continue to coordinate through existing regional forums, we believe that the states, tribes, and others will be able to determine how to get involved in BiOp implementation.

The tribes request government-to-government consultation for implementation planning and on subsequent agency actions. We recognize the importance of meeting with tribes and value their input. To that end, we plan to conduct a series of annual workshops with up-river and down-river tribes. We also anticipate holding yearly face-to-face meetings with regional and tribal executives to discuss our ESA implementation planning. In addition, we will honor tribal requests for individual consultations as resources and schedules allow. As mutually agreed, consultations may occur for individual implementation actions as they progress through the planning process, including environmental review.

The tribes ask that plans be developed with states and tribes in a comprehensive, cooperative forum that recognizes the tribes as co-managers of the basin's resources. "Review and comment" is not adequate. We understand the tribes' desire to be involved to the fullest extent possible. As noted above, we propose to work with the states and tribes to develop a management framework providing for early participation in the offsite mitigation component of the implementation plans. We believe the annual Progress Reports can provide a good starting point for state and tribal involvement. We propose to review the Progress Reports for the previous year with states and tribes to scope key implementation issues and priorities for development of the next 1- and 5-year Plans. This review would occur at a time determined in conjunction with the states and tribes, and take into account the schedule for plan development each year.

The tribes must be consulted about projects that take place on their land (whether reservation, ceded lands, or traditional use areas) or that may impact their rights and resources. We intend to consult with tribes when our actions have the potential to impact their rights and resources. Our site-specific environmental review process for ESA implementation projects will identify potential impacts to tribal resources and appropriate mitigation. Consultation will be in accordance with federal laws, policies, and guidance for tribal consultations.

The tribes often do not have sufficient resources to meaningfully participate in the proliferation of processes. We understand the demand on resources and are committed to using existing and useful regional processes to engage others in BiOp implementation planning. We will continue to use the NMFS Regional Forum and Council's Fish and Wildlife Program as our primary forums for BiOp implementation discussions. Because we are focusing our efforts primarily through those two forums, the Action Agencies believe it should reduce the amount of resources required of others to stay involved. As noted earlier, the Action Agencies also propose to provide for earlier and more meaningful participation in BiOp implementation planning.

There needs to be a better partnership between the agencies and tribes on this Plan. They proposed that the Action Agency policy-level representatives should meet with tribal representatives at least three times a year, and more if conditions warrant, in late winter, mid summer, and fall to review implementation of the Plan. This suggestion has been referred to the Federal Caucus for consideration.

The Action Agencies have not addressed concerns about lack of collaboration and affirmation of shared decision making. The Action Agencies recognize the need to provide more meaningful opportunities for implementation planning input. To that end and as described earlier, we propose to provide meaninfult opportunities for participation prior to development of our future implementation plans. Although some shared decision making may occur, the Action Agencies may need to make some unilateral decisions. However, we agree to provide opportunities for input in our decisions through existing regional processes.

1.4.2 Involvement in the implementation planning processes

Many commenters said that they want earlier and more meaningful participation in BiOp implementation planning. To the extent possible, the Action Agencies are using existing forums to include others in BiOp implementation planning. The NMFS Regional Forum provides the primary regional coordination vehicle for hydrosystem implementation. The Council's subbasin planning processes will also serve as the preferred forum for regional coordination of offsite mitigation implementation. The Action Agencies will work with the states, tribes, and others within these forums to provide for early participation in preparing future implementation plans. The Action Agencies propose to use current plans and annual progress reports as a starting point for collaboratively identifying key implementation issues and priorities with states, tribes, and others for development of the next implementation plans.

Comments on this or future plans can be e-mailed to: federalcaucus@bpa.gov.

Our mailing address is: Action Agencies Implementation Plan, c/o BPA-KEWS, P.O. Box 3621, Portland, OR 97208

2.0 GOALS

The strategies and priorities in Sections 4.0 and 5.0 are designed to achieve Action Agency goals, as measured through the performance standards described in Section 3.0. The following long-term goals are derived from the *All-H Strategy*. The Action Agencies expect to achieve these goals by accomplishing the outcomes and priorities identified in this Plan and measuring progress through RM&E and performance standards.

Goal 1

Avoid jeopardy and assist in meeting recovery standards for Columbia Basin salmon, steelhead, bull trout, sturgeon, and other ESA-listed aquatic species that are affected by the FCRPS.

- Halt declining population trends within 5 to 10 years.
- Establish increasing trends in naturally sustained fish populations in each subregion accessible to the fish and for each ESA-listed population within a timeframe determined through recovery planning.
- Maintain and expand the current distribution of fish.
- Conserve genetic diversity and allow natural patterns of genetic exchange to persist.

Goal 2

Conserve critical habitats upon which salmon, steelhead, bull trout, sturgeon, and other listed aquatic species depend, including watershed health.

- Avoid adverse modification of critical habitat for ESA-listed fish, including salmon, steelhead, bull trout, and sturgeon.
- Prevent further degradation of tributary, mainstem, and estuary habitat conditions and water quality.
- Protect existing high-quality habitats.
- Protect and enhance habitats on a priority basis.
- In the long-term, attain state and tribal water quality standards in critical habitats in the Columbia River and Snake River basins.

Goal 3

Assure tribal fishing rights and provide non-tribal fishing opportunities.

- Rebuild salmon and steelhead populations over time to a level that provides a sustainable harvest sufficient to provide for the meaningful exercise of tribal fishing rights, and where possible, provide non-tribal fishing opportunities.

Goal 4

Balance other needs.

- Ensure that salmon, steelhead, sturgeon, and bull trout conservation and RPA measures are integrated with the Council's Fish and Wildlife Program and balanced with the needs of other native fish and wildlife species.
- Ensure that salmon, steelhead, sturgeon, and bull trout conservation and RPA measures are balanced with human needs, including FCRPS project purposes.
- In implementing recovery measures, seek to preserve resources important to maintaining the traditional culture of basin tribes.

3.0 PERFORMANCE STANDARDS

Performance standards are central to this Plan. For the long term, performance standards establish the level of improvement needed for survival and recovery in each stage of the salmon and steelhead life cycle. For the short term, performance standards provide clear but flexible objectives for evaluating the success of actions under the BiOps.

At present, the performance standards apply only to salmon and steelhead. In the future, performance standards will be developed for bull trout and white sturgeon as recovery planning for these species progresses. What follows is a summary of the proposed performance standards.

The performance standards proposed in this Plan are still evolving. For salmon and steelhead, the draft framework developed by the Action Agencies and federal fisheries agencies, and the standards presented in the NMFS BiOp provide the basis for the Action Agencies' performance standards. Current performance standards will no doubt be adjusted and revised as implementation progresses and new information emerges from RM&E. The Action Agencies welcome parties in the region to help build on these performance standards.

A RM&E program is being used to measure progress toward or compliance with these performance standards. The structure of the RM&E program detailed in Section 5.6 links directly with the performance standard framework identified in this section.

Terminology

The term performance standard is often used in this section to include performance measure as well. Here is a clarification of the distinction between the terms.

A Performance Standard is a specified goal or target deemed necessary to improve ecosystem function, improve salmon survival, and ultimately result in recovery for listed fish. A performance standard can be expressed in terms of an absolute quantitative target, a change in condition from some baseline, or simply verifying the proper implementation of a particular management action.

A Performance Measure is the biological or physical condition or response that is monitored through time. Either an actual measurement or an estimate, a performance measure is the response that is tracked over the course of the RM&E program. It is the pulse that is monitored to assess progress toward or compliance with specified standards. A performance standard should have a performance measure associated with it.

3.1 Classes or Tiers of Performance Standards/Measures

Performance standards and associated performance measures can be organized as a hierarchy as shown in Table 3.1, configured to reflect a chain of physical/environmental and biological responses to management actions. Management actions are implemented (Tier 4) to cause changes in physical conditions and/or biological responses (Tier 3), which in turn affect life-stage specific survival (Tier 2) that collectively are reflected as a population response (Tier 1). This Plan anticipates that performance standards can be identified over time at each tier to document progress toward recovery.

Table 3.1 Relationship (chain of effects) between management actions and the different response levels (Tiers 1 through 4) with examples of performance measures.

Response Levels	Performance Measure Examples
Tier 4 Management Actions ↓	• Build surface bypasses • Fence riparian zones. • Remove barriers • Complete subbasin plans
Tier 3 Performance Measures (Physical/Environ. Conditions) ↓	• Enumeration of healthy habitat units secured. • Improved measurement of temperature, stream flows, total dissolved gas (TDG). • Improvement in riverine-riparian habitat condition.
Tier 3 Performance Measures (Biological) ↓	• Egg-fry survival • Dam survival • Distribution/habitat use
Tier 2 Performance Measures (Life-Stage Survival) ↓	• Egg-to-smolt survival • Migrant survival
Tier 1 Performance Measures (Population Responses)	• Population growth rate • Abundance estimates

3.2 Tier 1 Population Level Performance Standards

Population-based performance standards (Tier 1) are intended to provide long-term measures of success at the level of populations. The NMFS BiOp focuses on population growth rate (lambda) and spawner abundance estimates as the most useful indicators of population health at this time. Technical Recovery Teams (TRT), established as part of NMFS recovery planning, will be investigating additional parameters as part of their charge.

These population responses are the highest and broadest scale for performance standards. They do not readily reflect effects incurred during any particular life stage, or effects of any single management action or suite of H-specific actions. They do reflect the combined effects of all region-wide human actions and natural processes in both the freshwater and marine environments. As a consequence, inadequate progress toward meeting population-level performance standards may require reassessment of the conservation and RPA measures identified in the NMFS BiOps.

Population Growth Rate as a Performance Standard

The NMFS BiOp currently focuses on population growth rate (lambda) as the primary Tier 1 performance standard and defers to the recovery planning process and TRTs to further develop population-level performance standards and measures over the next 3 years. The NMFS BiOp also anticipates updates to the current methods of assessing population growth rates through an ongoing scientific review forum. NMFS will report on this review by March 1, 2005, prior to the first population level check-in assessment. Additional details regarding the methods of testing compliance with population-level performance standards also need to be developed beyond the description provided in the NMFS BiOp. In the interim period, the lambda-based tests proposed by NMFS in the BiOp will be used as provisional performance standards.

Population Abundance as a Performance Standard

In addition to lambda, adult abundance constitutes another type of Tier 1 performance standards. As an interim abundance-based performance standard, the Action Agencies propose adopting a test described in the NMFS BiOp for evaluation at the end of 5 and 8 years. According to the test, each ESU and population may not have more than 2 consecutive years of adult returns below the 5-year geometric mean at the date of the BiOp.

3.3 Tier 2 Life-Stage Performance Standards

- Tier 2 performance standards are life-stage-specific survival rates. The values for life-stage survivals proposed by the Action Agencies as interim performance standards are derived from the NMFS BiOp. The BiOp presents survival needs based on H-related categories: one set of absolute survival performance standards linked to hydrosystem actions (Table 3.2), and another set of relative performance standards that reflect additional survival are required from actions across all the remaining Hs (Table 3.3).
- For the hydrosystem , the NMFS BiOp identifies FCRPS survival performance standards separately for juvenile and adult migration life stages. It is expected to take approximately 10 years to fully achieve these performance standards.
- The NMFS BiOp also specifies a range of survival improvements needed in all other stages of the life cycle; improvements that would be addressed through a combination of actions by others and by "offsite mitigation" performed by the Action Agencies. However, these values have practical limitations for their use as Tier 2 performance standards at this time, particularly because they are not specific to particular life stages.
- Additional work on Tier 2 performance standards is continuing, to provide better guidance for the Action Agencies' habitat and hatchery investments. As noted in the BiOp, NMFS intends to refine its analyses by defining and apportioning the composite life-cycle improvements to specific life stages. Further guidance from NMFS about which life stages and/or offsite actions are most likely to help achieve the increases in survival are needed. In the meantime, Tier 2 performance standards will have primary value for assessing hydrosystem survival improvements, but somewhat limited value for directing and gauging the Action Agencies' offsite mitigation efforts. Nevertheless, the Action Agencies hope to see Tier 2 performance standards developed so they can be used to gauge the Action Agencies' progress, and progress of other parties in the Basin over time.

Table 3.2. Tier 2: Hydrosystem survival performance standard (%) for affected life stages.

ESU	Adult Survival Rate		Juvenile Survival Rate		
	FCRPS System	Per FCRPS Project[1]	FCRPS In-river Only		FCRPS Combined[2] (Transport + In-river + Differential Mortality of Transported Fish)
			System	Per Project[1]	
Chinook Salmon					
SR spring/summer	85.5	98.1	49.6	91.6	57.6
SR fall	74.0	96.3	14.3	78.4	12.7
UCR spring	92.2	98.1	66.4	90.3	66.4
UWR	N/A	N/A	N/A	N/A	N/A
LCR	98.1	98.1	90.7	90.7	90.7
Steelhead					
SR	80.3	97.3	51.6	92.1	50.8
UCR	89.3	97.3	67.7	90.7	67.7
MCR	89.3	97.3	67.7	90.7	67.7
UWR	N/A	N/A	N/A	N/A	N/A
LCR	97.3	97.3	90.8	90.8	90.8
CR chum salmon	N/A	N/A	N/A	N/A	N/A
SR sockeye salmon	88.7	98.5	N/A	N/A	N/A

Source: Adult standards taken from NMFS BiOp, Table 9.7-2. Juvenile standards taken from Table 9.7-1.

[1] Per-project in-river survival rate calculated as the xth root of the system in-river survival rate (where x = number of FCRPS projects encountered). They are provided for illustrative purposes only. They are *NOT* intended to be interpreted as project-specific standards, or to be used in any way to support curtailment of survival improvement measures at an individual project.

[2] Values represent averages over the water years and D values in Table 9.7-1.

Table 3.3. Tier 2 Estimated Survival: Estimated percentage change (i.e., additional improvement in life-cycle survival) needed to achieve survival and recovery indicator criteria after implementing the hydrosystem survival improvements in the RPA. (A value of 26, for example, indicates that the egg-to-adult survival rate, or any constituent life-stage survival rate, must be multiplied by a factor of 1.26 to meet the indicator criteria.)

Spawning Aggregation	Needed Survival Change	
	Low	High
Snake River Spring/Summer		
Bear Valley/Elk Creeks	0	0
Imnaha River	26	66
Johnson Creek	0	0
Marsh Creek	0	12
Minam River	0	28
Poverty Flats	0	0
Sulphur Creek	0	5
Snake River Fall Chinook		
Aggregate	0	44
Upper Columbia River Spring		
Wenatchee R.	51	178
Snake River Steelhead		
A-run Aggregate	44	214
B-run Aggregate	92	333
Upper Columbia River Steelhead		
Methow R.	0	110
Mid-Columbia River Steelhead		
Deschutes R Sum	102	226
Warm Springs NFH Sum	36	36
Umatilla R Sum	27	31
Yakima R Sum	0	0
Columbia River Chum Salmon		
Grays R. west fork	0	0
Grays R. mouth to head	18	18
Hardy Creek	0	0
Crazy Johnson Creek	0	0
Hamilton Creek	36	36
Hamilton Springs	0	0

Notes: Low and high estimates are based on a range of assumptions, as described in the text.

The values presented in this table are intended to provide perspective and enable NMFS to make a qualitative judgment regarding the potential to improve the productivity of listed ESUs enough to avoid jeopardy. As discussed in the text accompanying this table, effects of this uncertainty are particularly significant for SR steelhead and UCR chinook and steelhead.

3.4 Tier 3 Physical and Biological Performance Standards

Tier 3 performance standards demonstrate the physical and biological effects of Tier 4 management actions. Cumulatively, these effects contribute to meeting Tier 1 Population and Tier 2 Life-Stage performance standards. They are linked to classes of H-specific actions (Table 3.4).

Tier 3 performance standards are provisional at this time. The Action Agencies will rely on emerging regional assessments to refine the performance standards over the next year. The objective is to identify final Tier 3 performance standards that are practical and measurable.

Table 3.4. Summary of provisional Tier 3 Performance Standards.

	PHYSICAL	BIOLOGICAL
HYDRO	- BiOp flow targets (dependent on water conditions) - BiOp TDG standards	- FCRPS juvenile and adult survival Performance Standards (see Table 3.2) - System and project survivals preferred.
HABITAT **tributary** **mainstem** **estuary**	- Progress toward achieving PFCs, using simplified indicators - This might include enumeration of healthy habitat units secured; improvements in measured temperature, streamflow, and sediment; amount of habitat access restored; or improvement in riparian/riverine habitat.	- Preliminary biological standards might include habitat use and distribution, fish condition, or over-winter survival
HATCHERY	**Marking** Hatchery populations are properly marked so as to not mask the status of the natural-origin populations or the capacity and proper functioning of critical habitat. **Hatchery Planning** Hatchery goals and objectives, operational protocols, monitoring and evaluation, anticipated effects, and relationship to other critical management and planning processes are fully described in approved HGMPs.	**Broodstock** - Local, within-ESU broodstock is used in propagation programs within critical habitat unless associated with an isolated program. - Hatchery broodstock used in supplementation programs represent the genetic and life-history characteristics of the natural population(s) they are intended to supplement. - Non-isolated hatchery programs regularly infuse natural-origin fish into the broodstock as described in an approved HGMP. ***Hatchery Fish Straying*** For naturally-spawning populations in critical habitats, non-ESU hatchery-origin fish do not exceed 5 percent; ESU hatchery-origin fish do not exceed 5 to 30 percent unless specified in an HGMP for a conservation propagation program.

	PHYSICAL	BIOLOGICAL
HATCHERY (continued)		***Population Thresholds*** Hatchery operations do not appreciably slow a listed population from attaining its viable population abundance. Hatchery operations do not reduce listed populations that are at, or below, critical population abundance. ***Harvest Effects*** Federal hatchery mitigation fish produced for harvest do not cause subsequent over-harvest of listed stocks such that their recovery is appreciably slowed. Harvesting reforms are implemented to maintain and enhance harvest of mitigation fish in consideration of the constrained productivity of listed stocks caused by the FCRPS and other development. ***Quality and Survival*** The quality and survival of hatchery supplementation fish is increasing. - Increase tributary escapement rate or spawning success for each ESU, as referenced, from mouth of the Columbia - No increase in the rate of incidental take of wild fish, above an acceptable base level
	- Selective harvest techniques implemented and evaluated	

3.4.1 Tier 3 Hydrosystem Standards

Physical Performance Standards

Our physical standards for the hydrosystem emphasize river flow and dissolved gas. This Plan adopts the mainstem flow targets proposed in the NMFS BiOp as provisional performance standards (Table 3.5 and 3.6). These flow targets are not absolute performance standards because they are not capable of being fully achieved under average and below average water conditions. The Action Agencies recognize the debate regarding permissible dissolved gas saturation levels is unresolved. Therefore, at this time the Action Agencies accept the operational guidelines offered in the NMFS BiOp as interim performance standards for managing gas saturation in the FCRPS.

Biological Performance Standards

The Action Agencies recommend applying the FCRPS juvenile and adult survival performance standards specified at Tier 2 as interim standards for Tier 3 also. System survivals are preferred for Tier 3 performance standards, with project survivals as more general targets.

Table 3.5. Tier 3 Flow Targets: Proposed Performance Standards for hydro-operations. NMFS BiOp Table 9.6-1. Seasonal flow objectives and planning dates for the mainstem Columbia and Snake rivers.

Location	Spring		Summer	
	Dates	Objective	Dates	Objective
Snake River at Lower Granite Dam	4/03 - 6/20	85 - 100[1]	6/21 - 8/31	50 - 55[1]
Columbia River at McNary Dam[2]	4/10 - 6/30	220 - 260[1]	7/01 - 8/31	200
Columbia River at Priest Rapids Dam	4/10 - 6/30	135	NA	NA
Columbia River at Bonneville Dam	11/1-emergence	125 - 160[3]	NA	NA

[1] Objective varies according to water volume forecasts (see below).
[2] NMFS is contemplating moving the flow measurement location from McNary Dam to Bonneville or The Dalles dams by creating new objectives for Bonneville Dam (Conservation Recommendation 11.5).
[3] Objective varies based on actual and forecasted water conditions

Table 3.6. Tier 3 Spill Levels: Tier 3 Proposed performance standards for managing dissolved gas levels in the mainstem Columbia River System. NMFS BiOp Table 9.6-3. Estimated spill levels and gas caps for FCRPS projects during spring (all) and summer (non-transport projects).

Project[1]	Estimated Spill Level[2]	Hours	Limiting Factor
Lower Granite	60 kcfs	6 p.m. - 6 a.m.	gas cap
Little Goose	45 kcfs	6 p.m. - 6 a.m.	gas cap
Lower Monumental	40 kcfs	24 hours	gas cap
Ice Harbor	100 kcfs (night) 45 kcfs (day)	24 hours	nighttime - gas cap daytime - adult passage
McNary	120-150 kcfs	6 p.m. - 6 a.m.	gas cap
John Day	85-160 kcfs/60% [3] (night)	6 p.m. - 6 a.m.[4]	gas cap/percentage
The Dalles	40% of instant flow	24 hours	tailrace flow pattern and survival concerns (ongoing studies)
Bonneville	90-150 kcfs (night) 75 kcfs (day)	24 hours	nighttime - gas cap daytime - adult fallback

[1] Summer spill is curtailed beginning on or about June 20 at the four transport projects (Lower Granite, Little Goose, Lower Monumental, and McNary dams) due to concerns about low in-river survival rates.
[2] Estimated spill levels shown in the table will increase for some projects as spillway deflector optimization measures are implemented.
[3] The TDG cap at John Day Dam is estimated at 85 to 160 kcfs, and the spill cap for tailrace hydraulics is 60 percent. At project flows up to 300 kcfs, spill discharges will be 60 percent of instantaneous project flow. Above 300 kcfs project flow, spill discharges will be at the gas cap (up to the hydraulic limit of the powerhouse).
[4] Spill at John Day Dam will be 7 p.m. to 6 a.m. (night) and 6 a.m. to 7 p.m. (day) between May 15 and July 31.

3.4.2 Tier 3 Habitat Standards

Physical Performance Standards

This Plan relies on the concept of Properly Functioning Conditions (PFC) for physical habitat standards. Interim performance standards will be based on progress toward achieving PFCs using simplified indicators. For example, the Action Agencies' provisional physical performance might track enumeration of healthy habitat units secured; improvements in temperature, stream flows, or sediment; or improved riverine habitat conditions at the 2005 and 2008 check-ins. Until fully developed, the PFC concept will be applied as an interim set of Performance Standards.

Biological Performance Standards

In the short term, habitat standards will consider measurements of biological performance such as habitat use and distribution; fish condition; and over-winter survival. As experience and information improve in the longer term, appropriate performance standards might include egg-to-fry, egg-to-smolt, and prespawn survivals.

Over time, the Action Agencies plan to improve on this admittedly simplified approach, particularly by developing physical and biological performance standards for the 2005 and 2008 check-ins. The Action Agencies will work closely with the Council's subbasin planning process and the NMFS recovery planning process to collect physical and biological information, and improve existing models so that the effect of Tier 4 actions can be assessed more accurately. The Action Agencies plan to complete a review and selection of key physical attributes/indicators to be used as part of the monitoring and evaluation efforts within approximately 1 year's time.

3.4.3 Tier 3 Hatchery Performance Standards

Performance standards for hatcheries take the form of general guidelines and specified quantitative targets shown in Table 3.4. They address important physical standards related to hatcheries, including hatchery planning and using HGMPs and fish marking. Also proposed are biological performance standards related to hatcheries, including broodstock selection and use; limits on hatchery fish straying; population thresholds to ensure that hatchery operations do not appreciably slow a listed population from attaining recovery; consideration of harvest effects, so that hatchery fish produced for harvest do not lead to subsequent over-harvest of listed stocks; and quality and survival improvements.

3.4.4 Tier 3 Harvest Performance Standards

The harvest-related performance standards specified in Table 3.4 reflect an overall goal to increase the tributary escapement rate or spawning success for all listed ESUs as gauged from entry at the mouth of the Columbia River. These are the principal performance standards the Action Agencies will use to judge the impacts of harvest actions implemented by BPA.

3.5 Tier 4 Programmatic Performance Standards

Documenting the execution of management actions specified in the NMFS BiOp and this Plan will form the most immediate test of compliance. In 2003 and again in 2005, the Action Agencies will evaluate

whether management actions, including necessary coordination and action development processes, have been implemented as expected.

Tier 4 performance standards include the actions and the schedule defined in the BiOp, as modified by this planning process. Along with certain aspects of Tier 3, these performance standards will be a primary means of gauging progress in 2003 and 2005. At this level, the Action Agencies will document the degree to which each action has been implemented. In addition, the cumulative effects of actions, such as miles of stream fenced or numbers of barriers removed or improved, will be summarized.

3.6 Timing and Performance Standards Refinement

The NMFS BiOp emphasizes the overarching importance of Tier 1 population-level performance standards. These are designed to evaluate and confirm assumptions about population trajectories that are considered in the BiOp's analysis. They are not designed to evaluate the effects associated with management actions implemented through this Plan in 2005 and 2008, since population-level effects of these actions may not be discernable at the population level until well beyond that time. Intermediate and/or surrogate measures that can be tracked in the near-term are essential for assessing short-term progress. Performance measures and performance standards at Tiers 2 and 3 will eventually fill that need. Responses at those levels are likely to be detected prior to the population responses, since they collectively comprise the population response.

Performance standards at the Tier 3 and 4 levels will provide the most immediate information regarding the implementation of the NMFS BiOp. In the very near term, documenting the cumulative extent to which management actions have been implemented will be the most realistic and informative assessment. Preliminary use and testing of Tier 3 performance standards will also occur during this time period.

In particular, the time it will take to achieve the various Tier 3 performance standards for habitat will vary depending on the nature of the standard and the nature of the management action. Physical standards related to water quality, water volume, or fish access can be measured relatively quickly and simply. Projects restoring channel condition, in contrast, will be more difficult to measure and will take longer to show results. Biological Performance standards will also require longer periods for assessment. Short-term or transitional levels of performance can be used for these longer-term projects pending RM&E results.

Table 3.7. Example of temporal responses of various performance measures. These are generalized estimates of the time required for various responses to be manifested, following the implementation of some habitat actions.

Performance Measures	Short-Term (<5 yrs)	Mid-Term (5-10 yrs)	Long-Term (>10 yrs)
Tier 4 (Actions)	• Number and distribution of actions implemented	• Number and distribution of actions implemented	• Number and distribution of actions implemented
Tier 3 Performance Measures (Physical/Environ. Conditions)	• Amount of habitat access restored • Number of healthy habitat units secured • Change in TDG • Reduction in surface-water withdrawal • Reduction in road density	• Amount of habitat access restored • Number of healthy habitat units secured • Reductions in TDG • Changes in temperature • Reduction in surface-water withdrawal • Reduction in road density • Reduction in fine sediment recruitment	• Amount of habitat access restored • Number of healthy habitats secured • Reductions in TDG • Changes in temperature • Reduction in surface-water withdrawal • Reduction in road density • Reduction in fine sediment recruitment • Km of streams at or near PFC.
Tier 3 Performance Measures (Biological)	• Habitat use/distribution. • Fish condition • Overwinter survival	• Egg-fry survival • Egg-smolt survival • Prespawn survival	• Egg-fry survival • Egg-smolt survival • Prespawn survival
Tier 2 Performance Measures (Life-Stage Survival)	• Juvenile migration	• Egg-smolt survival • Juvenile migration	• Egg-smolt survival • Juvenile migration • Estuary-ocean survival • Adult migration
Tier 1 Performance Measures (Population Responses)	• Population distribution • Population growth rate and population abundance per BO's 5-year check-in criteria	• Population distribution • Redd counts • Escapements • Population growth rate and population abundance per BO's 8-year check-in criteria	• Population distribution • Redd counts • Escapements • Population structure • Population growth rate • Population abundance

4.0 STRATEGIES TO ACHIEVE PERFORMANCE STANDARDS

4.1 All-H Approach

This Plan is guided by a fundamental strategy – the implementation of recovery actions broadly and comprehensively across all aspects of the salmon life cycle. This "All-H" approach is the centerpiece of the Federal Caucus' *All-H Strategy*, is supported by scientific reviews, and is consistent with principles in the Council's Fish and Wildlife Program, the Tribal Salmon Recovery Plan, the Four Governors Recommendations, and other state plans. More importantly, the *All-H Strategy* addresses fish recovery actions by all federal agencies. The Federal Caucus is currently discussing how to track implementation progress by other agencies, who must do their fair share to aid listed species.

Supported by the *All-H Strategy*, the NMFS BiOp – and this Plan – rely on measures that extend well beyond the FCRPS. In addition to improvements in dams and dam operations, they provide "offsite mitigation" for federal hydrosystem effects in the form of habitat protections and improvement, hatchery reforms, and support for more selective harvest. These offsite mitigation efforts must be integrated with efforts undertaken through existing mitigation programs such as the Council's Fish and Wildlife Program. Although the USFWS BiOp does not require implementation of offsite mitigation actions for bull trout or Kootenai white sturgeon, many of the Action Agencies' offsite activities provide protection to a wide variety of fish and wildlife.

This section describes the strategies identified by the Action Agencies to carry out their share of implementing the *All-H Strategy* in all of these areas. Others must also implement actions for Columbia Basin fish recovery to succeed. Because an All-H approach provides the best chance for meeting recovery goals, the scientific principles agreed to by the members of the Federal Caucus were adopted as part of the foundation for this Plan. These principles are:

- Conservation and recovery of Columbia Basin fish and aquatic species must address all aspects of the ecosystem and the species' life cycle.
- Conservation and recovery requires a network of diverse, high quality, interconnected habitats, and high water quality. Natural systems functioning properly are crucial to rebuilding fish populations.
- Conservation and recovery requires preservation of life history diversity, genetic diversity, and metapopulation organization. These characteristics affect the response of anadromous and resident fish populations to both demographic variation and variation in climate and environment.
- Because human activity, development, and population growth will continue, conservation and recovery depend on managing these human impacts to achieve suitable ecosystem conditions for fish.
- Technology and research can be used to complement natural functions but cannot replace them.
- Viability (or status) of salmon and steelhead populations can be evaluated based on abundance, productivity, population structure, and genetic diversity.

The strategies and substrategies of this Plan support the approach of the *All-H Strategy*. Table 4.1 illustrates these strategies and associated BiOp "reasonable and prudent alternative" actions (listed by number). Strategies and substrategies – and specific activities and measures planned for the next year and next 5 years – are more fully described in Section 5.0. Further detail is provided in the Action Tables.

Table 4.1. Action Agencies Strategies and Substrategies

Strategies & Substrategies	BiOp Reference
HYDROSYSTEM STRATEGIES	
1. Configure Dam Facilities to Improve Juvenile and Adult Fish Passage and Survival. Includes Bonneville, The Dalles, John Day, McNary, Lower Monumental, Little Goose, Ice Harbor and Lower Granite.	
Mainstem juvenile passage improvement	NMFS: 53, 59-81, 94-101, 146.
Mainstem adult passage improvement	NMFS: 50, 93, 106, 108, 110-116, 119, 120, 122-124, 127-129.
Measures that address temperature and dissolved gas	NMFS: 5, 130, 134, 135, 138, 140-142.
Project configuration RM&E	NMFS: 47, 82, 83, 104, 107, 109,115, 118, 186, 189, 195-197.
2. Manage Water to Improve Juvenile and Adult Fish Survival	
Reservoir operations to improve fish survival	NMFS: 20, 58 USFWS: 8.1.a, f1- f5, f20, f23, f43, f65, 10.A.1
System flow management to improve fish survival	NMFS: 14-16, 18, 19, 21, 23, 32.
Spill operations for project passage	NMFS: 5, 40-43, 54.
Transmission reinforcements in support of spill	NMFS: 55-57.
Other actions to improve water management	NMFS: 17, 19, 20, 22, 24-32, 35-39, 131-133, 143, 198. USFWS: 8.1.a.f1, f2, f6-f12, f14, f16, f22, f24, f26, f29, f61, f68.
3. Operate and Maintain Fish Passage Facilities to Improve Fish Survival	
Operation and maintenance of FCRPS fish facilities	NMFS: 40, 44, 91, 93, 114, 144, 146, 191.
Non-routine maintenance on fish and wildlife facilities	NMFS: 44, 50, 91, 93, 101, 117, 120, 125, 126, 129, 144-146, 191.
Juvenile fish transport actions to improve fish survival	NMFS: 40, 41, 43.
Operations RM&E	NMFS: 45-47, 49, 52, 93, 109, 114, 139, 185, 186, 189, 195, 199.
HABITAT STRATEGIES	
1. Protect and Enhance Tributary Habitat	
Water quantity	NMFS: 149, 150, 151
Water quality	NMFS: 150, 152.
Passage and diversion improvements	NMFS: 149.
Subbasin planning and assessment	NMFS: 154.
Watershed health	NMFS: 150, 153.
2. Protect and Enhance Mainstem Habitat	
Watershed health	NMFS: 155, 156, 157.
Subbasin planning and assessment	NMFS: 154.
3. Protect and Enhance Estuary Habitat	
Water quantity	N/A
Water quality	N/A
Watershed health	NMFS: 158-162.
Subbasin planning and assessment	NMFS: 154, 159.

Strategies & Substrategies	BiOp Reference
HATCHERY STRATEGIES	
1. Implement a safety-net program as an interim measure to avoid extinction	NMFS: 178.
2. Reduce Potentially Harmful Effects of Artificial Production to Aid Recovery Through Hatchery Reform	
Develop Hatchery & Genetic Management Plans	NMFS: 169-173.
3. Contribute to the Development and Implementation of a Comprehensive Marking Plan	NMFS: 174.
HARVEST **STRATEGIES**	
1. Develop Fishing Techniques to Enable Fisheries to Target Non-listed Fish While Reducing Harvest-Related Mortality on ESA-Listed Species	
Gear efficacy testing and fishery integration on the mainstem Columbia/Snake rivers	NMFS: 164.
Research to address incidental mortality in selective fisheries	NMFS: 167.
Develop mechanism for crediting harvest reforms	NMFS: 168.
2. Improve Harvest Management Assessments, Decisions, and Evaluations	
Improved escapement assessments and other critical population-specific data to support conservation-based harvest management	NMFS: 166.
Alternative modeling systems that work in the context of selective fisheries	NMFS: 165.
Identify sources of unaccounted harvest-related mortality	NMFS: 167.
3. Support Sustainable Fisheries for the Meaningful Exercise of Tribal Fishing Rights and Non-tribal Fishing Opportunities Consistent with the Recovery Effort	
Value-added projects	NMFS conservation recommendation: 11.13.
Potential alternative/terminal fishing locations	NMFS conservation recommendation: 11.12.
4. Fishery Effort Reduction Programs	NMFS conservation recommendation: 11.13.
RESIDENT FISH STRATEGIES	
1. Promote the Reproduction and Recruitment of Kootenai River White Sturgeon (KWS).	
Conditions below Libby Dam that facilitate KWS natural reproduction and juvenile survival	USFWS: 8.1.a-g; 8.2.a.1-4, 7-9; 8.2.b-d; 8.3.a, c, d-j; 8.4.b.
Kootenai River white sturgeon conservation hatchery program	USFWS: 8.4a, b.
2. Determine the Impacts of the FCRPS on Bull Trout and Mitigate for Those Impacts.	
Determine the extent to which bull trout use and are affected by FCRPS dams and reservoirs	USFWS: 10.8; 10.A.2.2; 10.A.3.2; 11.3, 6; 11.A.2.1.a-g; 11.A.3.1.a-d, f; 11.A.3.2.a.
Operate and modify FCRPS dams to protect, provide, and reconnect bull trout habitats	USFWS: 8.1.g; 10.A.1.1, 2; 10.A.2.2, 4; 11.4; 11.A.1.1.b-c; 11.A.1.2.a; 11.A.1.4.a,d; 11.A.2.2.a; 11.A.2.3.a; 11.A.3.1.e.
Performance standards for bull trout	USFWS: 11.1.
RM&E STRATEGIES	
1. Status Monitoring	
System monitoring	NMFS: 179-181, 193, 198.
Tributary monitoring	NMFS: 180, 190.
Hydrosystem corridor monitoring	NMFS: 191, 192.
Estuary/ocean monitoring	NMFS: 196, 197.

Strategies & Substrategies	BiOp Reference
2. Action Effectiveness Monitoring and Research	
Hydrosystem monitoring	NMFS: 82, 83, 100, 107, 183.
Habitat monitoring	NMFS: 183
Hatchery monitoring	NMFS: 184.
Harvest monitoring	NMFS: 166
3. Critical Uncertainties Research	NMFS: 182, 185 - 189, 194 -196
4. Project Implementation Monitoring	
5. Data Management System	NMFS: 198
6. Regional Coordination	

4.2 Integrating BiOp Implementation with the Council's Fish and Wildlife Program

Consistent with the principles of the *All-H Strategy*, the Action Agencies are implementing many of the offsite mitigation actions required by the NMFS BiOp through the Council's Fish and Wildlife Program. Under the 1980 Northwest Power Act, the Fish and Wildlife Program is tasked with protection, mitigation, and enhancement of Columbia River Basin fish and wildlife affected by the development and operation of the FCRPS. The Provincial Review process, sponsored by the Council, provides the mechanism for integrating activities under the existing Fish and Wildlife Program with the measures focused on ESA-listed fish stocks in the NMFS and USFWS BiOps. Even while there is current focus on ESA-listed fish, including bull trout and Kootenai River white sturgeon, unlisted species including resident fish and wildlife will also benefit because of the holistic, ecosystem approach which is the basis of the *All-H Strategy*.

The Council and BPA are working together to integrate BiOp implementation requirements within the existing administrative process of the Council. For example, using the Provincial Review cycle as the source of proposals for both the Fish and Wildlife Program and BiOp implementation directly engages a broad range of entities in support of ESA objectives in the near term. In the future, subbasin planning will trigger integration of Fish and Wildlife Program and ESA objectives at the local level, thereby involving many entities, that may not have previously participated in the Council process and providing synergy between actions taken by a variety of entities within a subbasin using a variety of funding sources toward agreed-upon biological priorities.

The Provincial Review Process

The Council and BPA have agreed to use the Provincial Review cycle as the predominant mechanism for funding projects in support of BiOp requirements. Provincial Reviews occur on a rolling 3-year basis within the 11 Council-designated geographical provinces and the Systemwide and Mainstem category.[1] The first round of Provincial Reviews are based on subbasin assessments as well as review by the Independent Science Review Panel (ISRP), NMFS, BPA, Columbia Basin Fish and Wildlife Authority (CBFWA), and others. As the Review progresses, province by province solitication criteria are evolving which facilitate evaluation of proposals based on their likelihood to contribute towards progress in achieving NMFS BiOp performance standards and may be recommended by the Council to BPA for

[1] The System-wide and Mainstem category is broader in scope. Many of the projects solicited under this category cross subbasin and provincial boundaries.

funding. These initial Provincial Reviews should be completed by the end of calendar year 2002 or early in 2003 and will enable implementation of up to 3 years of carefully selected, scientifically based projects. Subsequent Provincial Reviews will benefit from the inventory, assessment, and management plans expected from completed subbasins plans. The current Provincial Review schedule posted at http://www.nwppc.org/fw/subbasinplanning/timeline.htm is shown in Figure 2.

In the Provincial Review process to date, BPA has applied the following general criteria to guide project selection:

- Consistency with the Council's Fish & Wildlife Program,
- Consistency with NMFS or USFWS 2000 BiOps or the Action Agencies' Implementation Plan,
- Consistency with the All-H Strategy,
- Consistency with federal trust and treaty responsibilities,
- Scientific merit (based largely on ISRP),
- Technical feasibility; and
- Mitigation responsibility of the FCRPS.

The Action Agencies will continue to prioritize funding of fish and wildlife projects, including BiOP implementation, and focus funding on those projects that provide the most biological benefit at the least cost, and satisfy both FCRPS ESA obligations and measures in the Council Fish and Wildlife Program. In addition to the general criteria above, specific criteria, including factors for selecting projects focused on targeted ESUs, are further refined as BPA and the region gain experience with the Provincial Review processes.

Given the broad interface between the existing Fish and Wildlife Program and immediate and future BiOp implementation needs it is possible that gaps will emerge. These will be addressed by the limited use of very specific targeted solicitations or requests for proposals. By working closely with subbasin and state planning coordinators, the Action Agencies will rely on the subbasin planning process to address ESA obligations within specific provinces. The Systemwide/Mainstem Review provides one potential venue for addressing issues that cross province boundaries. For example, many proposals were submitted for monitoring and evaluation projects that would span many subbasins. Thus, the Systemwide/Mainstem Review provides a mechanism for linking activity across the subbasins. This review is expected to be completed in early 2003.

Subbasin Planning

The Action Agencies are implementing subbasin planning in two general phases: (1) use subbasin assessments, BiOp criteria, and ISRP reviews to inform the Provincial Reviews, and (2) develop and complete detailed subbasin plans prior to the next round of Provincial Reviews.

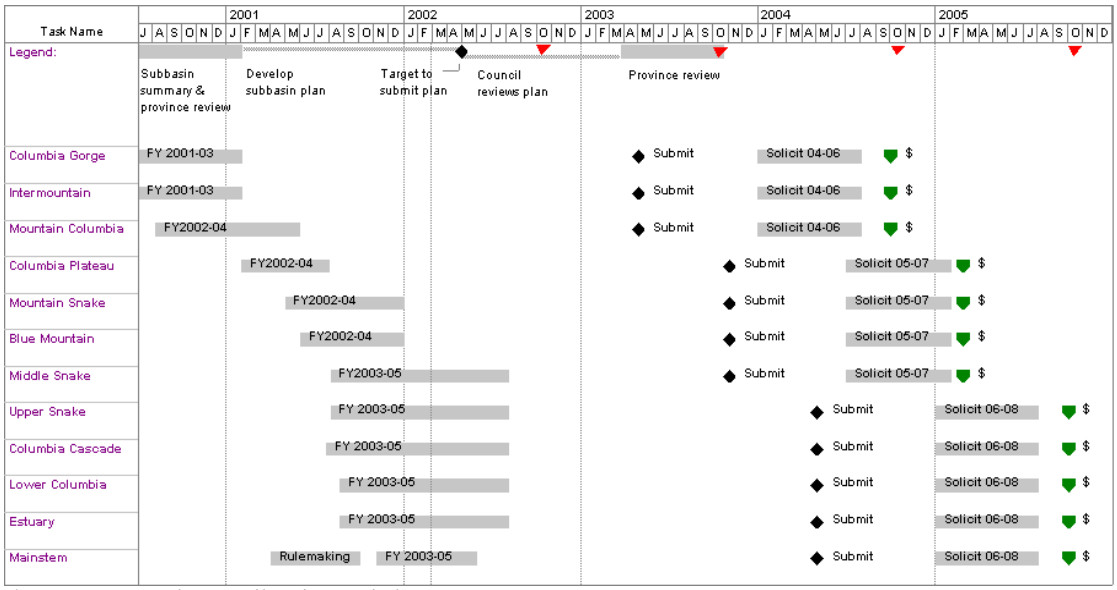
During the first phase the Action Agencies selected ESA-beneficial projects to be implemented over the following three years by using subbasin assessments, specific BiOp criteria, and ISRP reviews to inform the Provincial Review project selection. The second phase was launched in 2002 when BPA entered into contracts with the Council to develop subbasin plans for the entire Columbia River Basin. Under the contracts state subbasin planning coordinators were designated in Idaho, Montana, Oregon, and Washington. The contract also provides for a subbasin planning template, a regional coordination board, and subbasin work plans. It is anticipated that by the end of 2004 plans for all 62 subbasins will be completed. This second phase of subbasin planning will better inform the next round of Provincial Reviews and actions taken by all entities in each subbasin by addressing global issues such as out-of

subbasin effects and the review and evaluation of artificial production as well as identify common management priorities and limiting factors for achieving those priorities.

The subbasin plans will be developed in close coordination with NMFS and the USFWS to ensure the integration and prioritization of ESA-focused project activities in the Council's Fish and Wildlife Program. The subbasin plans are expected to further inform the selection of projects received under the Provincial Reviews.

Figure 2 includes the Provincial Review and subbasin planning schedule currently available on the Council's website.

Figure 2 Provincial Review Schedule with target dates for submitting subbasin plans *



*Assumes 8 month Council review period
Assumes 7 month solicitation and review process
Gray bars with "solicit xx-xx" indicate project solicitation process for referenced fiscal years
Top triangles indicate start of fiscal year
Diamonds indicate target subbasin plan submission dates for each Province
$ and shield symbols indicate when project funding would be available

The Action Agencies participate in the subbasin planning process in the following manner:

1. Action Agency staff will participate in initial planning efforts by providing information generated through past agency efforts.
2. Action Agency staff, in concurrence with Council staff, regional, state, and local coordinators, will participate in subbasin planning meetings with the necessary frequency to make available the full benefit of their expertise.
3. Action Agency staff will work with entities within a subbasin over the long-term to facilitate projects that meet federal ESA obligations and implement the recommendations of the completed plans.
4. Action Agency staff will concurrently participate in the state and regional level coordination groups.

The Provincial Review Process and 2003 Implementation Plan

This Implementation Plan captures the benefit of many ongoing Council Fish and Wildlife Program projects that address specific actions set forth in the NMFS BiOp. These projects have been reviewed and, if necessary, modified through the ISRP review process and on limited occasions, with BPA and NMFS to ensure consistency with BiOp requirements, and the Council recognizes them as priority projects addressing federal ESA obligations. This Plan also contains actions ongoing or being initiated by the Corps and Reclamation; e.g., for tributary, mainstem, and estuary research and habitat improvements. Each of the Action Agencies must approach habitat improvement under different statutory authorities and processes. (Each agency's programs or projects are identified separately under the habitat substrategies.)

This Plan relies on use of the Council's planning processes, including public input. New projects to address BiOp actions not yet addressed by the Plan will be identified as part of the Council's Provincial Reviews and the subbasin planning process. If necessary to achieve measurable progress towards the existing and anticipated performance standards in the FCRPS BiOps, the Council's planning processes can be supplemented through direct appropriations requests and targeted solicitations by the Action Agencies for projects consistent with the strategies and substrategies outlined in this Plan. In light of the individual authorities and funding processes of the Action Agencies, it may not be possible to simultaneously begin implementation of the full range of projects necessary to achieve the goals of those strategies and substrategies. For instance, many of the projects that the Council will be recommending for BPA funding in 2003 will not be identified until well into the fiscal year. Likewise, funding requests by the ACOE and the BOR made several years in advance of the current Fiscal Year through the Congressional Appropriations Process may not anticipate 'gaps' in Biological Opinion Implementation left by the Council planning processes.

To identify those substrategies which may require additional actions to achieve necessary progress, the Action Agencies will periodically update our planning database and tracking system through iterative analyses of the possible 'gaps' as was accomplished during the Mainstem/Systemwide Review during the past year. These analyses will be made available to regional, state, and local subbasin planning coordinators, and posted for public review on the www.salmonrecovery.gov Web site. The Biological Opinion and the Action Agencies recognize, and plan to accommodate, the potential need to adjust this Plan as the Council's Provincial Review process evolves during the development of subbasin plans, and the eventual integration of those plans into a Systemwide framework to address fish and wildlife needs in the Columbia Basin.

The Action Agencies are currently developing a coordinated database and tracking system to facilitate the identification of those substrategies which may be lacking the full range of actions (the 'gaps') necessary to achieve adequate progress towards BiOp performance standards. This tracking system, when fully developed, will provide:

1. consistent and comparable information and level of detail on all projects and their annually required work products within the Plan's substrategies;
2. base documentation of each project's intended effects and the means employed to quantify progress in achieving those effects);
3. a database designed to facilitate the comparison and accumulation of project effects within a substrategy (within and across subbasins and ESUs) in a way that supports internal (to the FCRPS) and external (co-reporting with non-FCRPS Action Agencies) progress reporting; and,
4. a framework for coordinating implementation activities with non-FCRPS Action Agencies and among state agencies and regional Tribes.

4.3 Integrating BiOp Implementation with Other Regional Processes

Under the guidance of NMFS, Technical Recovery Teams (TRTs) have been formed for the Willamette/Lower Columbia and the Interior Columbia Regions. The TRTs are charged with identifying and gathering the information needed to provide the scientific basis for anadromous salmonid recovery and the Council subbasin plans. The Action Agencies anticipate that the TRT work products will provide additional information necessary to conclusively prioritize NMFS BiOp implementation projects among those meeting the broader range of regional fish and wildlife needs. These products and their projected completion dates include: the identification of fish populations (December 2002); population viability goals for abundance (April 2003); ESU-wide de-listing scenarios (September 2003); habitat characterizations and limiting factors/factors for decline analyses (December 2003). Consequently, our ability to locate projects in direct support of the populations at greatest risk will improve significantly as these products are developed.

In a similar fashion, the USFWS has formed TRTs for Kootenai River white sturgeon (KWS) and bull trout. The completed KWS Recovery Plan recommended the continuation of the KWS hatchery program and called for implementation of VARQ to increase the likelihood of spring flow augmentation for the benefit spawning KWS. The KWS TRT is overseeing a U.S. Geological Service investigation of mainstem habitat modification and is also investigating increased discharge capacity to enable flow augmentation at Libby Dam.

The bull trout TRT is tasked with designating critical habitat, and the development of a draft Recovery Plan. The USFWS plans to have this draft bull trout recovery plan available in late 2002 and the final recovery plan complete by late 2003.

We anticipate the Council will continue to consider the broad range of projects through their Provincial Reviews as they have in the past. However, the focus and design of these projects may be adaptively managed in response to the results of on-going projects and the recommendations and priorities forthcoming from other regional processes. The mix of projects identified as necessary in the Plan will evolve as our decision-making becomes informed by the results of the two important planning efforts for region-wide fish recovery — subbasin planning and ESA recovery plans.

4.4 Evaluating BiOp Implementation: the Importance of RM&E

This Plan covers more than a hundred individual BiOp actions throughout the Columbia River Basin. While some BiOp actions may be addressed by a single project, others may require multiple projects or a comprehensive basinwide program, e.g., monitoring and evaluation. To meet recovery goals, the management of fish and wildlife restoration projects will require increased accountability, and a shift from the past approach of evaluating progress at the level of individual projects to evaluation of progress on a larger scale. Adaptive management will provide a valuable tool for ensuring that activities can be re-directed if necessary in response to what we learn as projects progress. The RM&E program described in this Plan will provide the feedback loop for evaluating future priorities for projects. Our ability to mount a focused and comprehensive effort basinwide will increase as the subbasin plans and TRT products are completed, the Provincial Review process moves forward, and the elements of the *All-H Strategy* are implemented by others. Ultimately, a monitoring and evaluation program that spans both federal activities and those of the states and tribes is our best hope of developing a mechanism for evaluating the cumulative effects of our diverse actions in support of recovery planning.

This Plan covers more than a hundred individual BiOp actions throughout the Columbia River Basin. While some BiOp actions may be addressed by a single project, others may require multiple projects or a comprehensive basinwide program, e.g., monitoring and evaluation. To meet recovery goals, the management of fish and wildlife restoration projects will require increased accountability, and a shift

from the past approach of evaluating progress at the level of individual projects to evaluation of progress on a larger scale. Adaptive management will provide a valuable tool for ensuring that activities can be re-directed if necessary in response to what we learn as projects progress. The RM&E program described in this Plan will provide the feedback loop for evaluating future priorities for projects. Our ability to mount a focused and comprehensive effort basinwide will increase as the subbasin plans and TRT products are completed, the Provincial Review process moves forward, and the elements of the *All-H Strategy* are implemented by others. Ultimately, a monitoring and evaluation program that spans both federal activities and those of the states and tribes is our best hope of developing a mechanism for evaluating the cumulative effects of our diverse actions in support of recovery planning.

4.5 Linking Related Planning Initiatives

The three major planning initiatives underway in the Columbia Basin should not be viewed apart. Action Agency implementation of the BiOps will be conducted through the Provincial Review process which will be informed by the outcomes of subbasin planning and recovery planning efforts. The Federal Caucus has acknowledged that subbasin plans provide an appropriate platform for coordinating Action Agency, regulatory agency, and land use agency efforts to coordinate efforts in support of recovery. For example, NMFS has proposed that subbasin plans provide the framework for "local recovery plans." Upon completion, recommendations from the TRTs and the Council's subbasin plans will provide guidance to future Action Agency implementation actions and plans.

Although all subbasin plans will display some unique characteristics, the fact that they will address a set of common elements enables the Action Agencies to use their recommendations to identify priorities across subbasins, within an ESU, or across the Columbia River Basin. Finally, the development of a monitoring and evaluation program will provide a mechanism for program course corrections not previously available in the region.

The Action Agency Implementation Plans will facilitate achievement of the goals of the *All-H Strategy* by integrating three distinct layers of planning efforts (Provincial Reviews, subbasin plans, and recovery plans) and by developing a monitoring and evaluation program that will provide a mechanism for evaluation. The convergence of these processes will provide the foundation for an integrated region-wide, coordinated approach to life-cycle improvements. This coordination is essential for comprehensive and effective protection, improvement, and restoration projects under All-Hs.

4.6 Policy and Information Updates

Policy and information updates may cause this Plan to be adjusted. For instance, hatchery policy and ESU status reviews are anticipated for release by NMFS in 2002, BPA's Financial Choices process is due to be finalized in 2003, and FERC relicensing of non-federal dams may occur. Adjustments may result in the Action Agencies issuing amendments to this Plan. NMFS, USFWS, states, and tribes will be notified if it is determined that Plan amendments are warranted.

5.0 PRIORITIES, WORK PLANS AND OUTCOMES (2003-07)

The activities listed in this Plan presume known and anticipated resources and funding to implement the recommended actions in the BiOp. The Action Agencies considered several factors in the prioritization and selection of activities. The following questions were implicitly considered in the preparation of this plan:

1. Does the action(s) provide immediate and significant measurable survival or production benefits to listed stocks?
2. Does the action benefit listed stocks that need the most improvement in survival?
3. Can the action provide broad ecological benefits to multiple life stages, species, stocks, or ESUs of listed species?
4. Does the action reduce critical uncertainties or provide information needed to support adaptive management, accountability, or crediting for listed species?
5. Does the action support efficient and feasible implementation of projects furthering the de-listing of listed species?
6. Does the action build on or complement ongoing, beneficial actions that support de-listing of listed species?
7. Is the action specifically recommended in the BiOp?
8. Is there known or anticipated assurance of funding?

The following factors also influenced priority-setting:

- **Near-term opportunities.** The 5-year priorities for 2003-07 reflect specific initiatives or projects called for in the NMFS and USFWS BiOps as near-term actions. These actions fall in to one or more of several important categories: 1. early-action opportunities with clear potential survival benefits to listed stocks; 2. preliminary work in preparation for implementation of such actions; and 3. RM&E actions that address key uncertainties.

- **Funding availability.** The Reclamation and Corps measures identified in this Plan assume appropriations will be received at levels requested in the President's Budget.

- **Least-cost planning.** The Action Agencies are evaluating least-cost planning principles as an effort to ensure investments achieve the greatest survival benefits at least cost. In essence, the Action Agencies would create a structured approach for evaluating alternatives across the Hs to meeting the NMFS BiOp performance standards at least cost. A least-cost methodology will be developed and shared when complete.

- **Mid-point check-ins.** In addition, the Action Agencies are placing a high priority on implementing those actions that specifically contribute to the progress expected by NMFS for the 2003, 2005, and 2008 mid-point evaluations noted in their BiOp. The 2003 evaluation will be primarily programmatic. NMFS states in its BiOp it will focus on the progress made towards obtaining funding and authority; initiating studies, research and monitoring projects; development and adoption of performance standards; development of off-site mitigation plans; and implementing actions in the All-H Strategy. Consequently, many of the activities in this Plan reflect the Action Agencies' initiation of programs, especially in the areas of new off-site mitigation and RM&E activities. These will supplement numerous ongoing actions that are the result of previous ESA consultations or the Council's Fish and Wildlife Program, e.g., flow augmentation, spills for juvenile fish passage, project

configurations, juvenile fish transportation, predator control, watershed improvements, hatchery reforms, and others.

The 2005 mid-point evaluation will shift from evaluation of programmatic accomplishments toward assessments of biological results of program implementation. The assessments of results are expected to include population growth rates, abundance, and other biological factors. Consequently, the plan includes efforts to monitor the biological results of actions implemented to improve fish survival.

The 2008 evaluation will be a refinement of the analyses performed in the 2005 evaluation. It is expected to focus even more on the biological results of actions. Although 2008 is just outside the scope of this 2003-07 plan, all the actions in the plan are intended to improve fish survival and provide the information ultimately needed for the 2008 evaluation.

There have been varying levels of priority setting within the Hs. Some of these priorities have been set in the BiOp and those priorities are reflected in this Plan. For example, many of the water management actions for flow augmentation came from the BiOp. Some priorities are established in ongoing regional processes. Many of the Corps project configuration actions had priorities set in the Columbia River Fish Mitigation (CRFM) program.

At this point, there has been little or no priority setting between Hs. For example, we have not considered the effectiveness of a flow augmentation action relative to a habitat improvement action because we currently have insufficient information to support such decisions. If appropriate, we will do this in future years as the program and science evolves.

The remainder of this section provides, by strategy and substrategy, information on the priorities and expected outcomes of the actions in this plan. Information is provided in this order:

- **5-Year (2003-07) Outcomes**, which identify fish recovery actions the Action Agencies intend to complete by 2007.
- **2003 Work Plans**, detailing specific projects planned for FY03.
- **2004-07 Work Plan**, highlighting key projects or scope of work planned in the following years.
- **Regional Coordination**, which identifies regional forums involved with the implementation of certain strategies. (Readers can then refer to Section 6.0 to learn more about where to participate.)

5.1 Hydrosystem Priorities

During development of the 2000 BiOps, the effect of current hydrosystem operations and dam configuration on threatened and endangered fish was estimated using the Simpas model (NMFS 2000 BiOp, Appendix D, tables D-1, D-2 and D-3). The projected increase in juvenile survival that may be achieved by altering hydrosystem operations and installing new dam configurations was also estimated (Appendix D, Tables D-4, D-5 and D-6). These operation and configuration changes were used by NMFS as a basis to determine performance standards.

The Hydrosystem strategies below were developed to guide hydrosystem actions and achievement of hydrosystem survival performance rates outlined in the BiOps. Priority criteria were used to determine the completion order for configuration projects. Water management priorities in this Plan are those provided in the BiOps. The implementation of these priorities is adaptively managed in-season using

actual hydrological conditions. Operation and maintenance (O&M) priorities were established to develop O&M plans and allocate staff and funds.

The NMFS BiOp acknowledged long-term Clean Water Act goals for total dissolved gas (TDG) and water temperature, which were considered complementary to other recovery actions. The near-term and primary focus is to achieve the juvenile and adult survival performance standards. Efforts to meet Clean Water Act standards have been viewed as long-term goals and variations to the 110 percent TDG standard are coordinated with the states to enhance achievement of ESA performance standards.

Hydrosystem Actions Under Consideration

Since the BiOps were issued in December 2000, research and evaluation has continued, revealing new information about BiOp implementation and performance results. In addition, BPA recently conducted a Financial Choices public process in which the agency asked the region (customers, constituents, states, tribes, interest groups, etc.) to comment on a range of actions that BPA might take to eliminate its forecasted revenue shortfall over the remainder of the current rate period (FY03 through FY06).

In September and October 2002, the Action Agencies together with NMFS and USFWS jointly reviewed configuration, spill and flow operations to see whether modifications or changes could be made that would sustain or accelerate progress in achieving hydrosystem performance standards but potentially reduce hydrosystem operational costs. The actions include some that were already under consideration based on experience learned through research studies and implementation.

Our intent is to discuss these potential actions through the NMFS Regional Forum teams in November and December of 2002, and to make decisions on actions to be implemented in 2003 early in the year. The following actions are being considered for implementation during the 2003-2007 period:

Configuration Alternatives

The intent of the following options is to improve upon existing project survivals, or provide equivalent survival, while reducing spill levels. As we develop the options, and if implemented, we would adaptively address necessary spill/operational requirements with the goal of meeting biological opinion performance objectives.

- Accelerate installation of a Removable Spillway Weir (RSW) and Behavioral Guidance System (BGS) at Ice Harbor Dam.

- Accelerate installation of an RSW and BGS at Lower Monumental Dam.

- Accelerate installation of a forebay physical guidance device at The Dalles Dam and reduce spill from levels called for in the BiOp.

Water Management Alternatives

- Discontinue spill at Bonneville Dam to assist passage of the Spring Creek Hatchery release in March. This alternative may involve reprogramming of hatchery funds or other actions to move fish production to facilities below Bonneville Dam.

- Eliminate daytime spill testing at John Day in the spring. Information to date does not show a survival advantage of 24-hour spill for spring migrants. Review of 2002 research results is needed to make a determination.

- Test alternative levels of nighttime spill at John Day Dam in the spring. Survival studies at John Day show no significant difference in tailrace egress for 30% and 60% spill levels. Reduced spill levels

may not impact survival and would increase generation. Review of 2002 research results is needed to determine what level of intermediate spill may be appropriate for testing.

- Modify spill at Ice Harbor Dam to optimize tailrace egress. Reassessment of a spill cap based on tailrace condition (similar to what NMFS developed for other projects) will be considered for the summer passage period, and perhaps the spring. Recent evaluation results suggest survival through nighttime spill in the summer is lower than expected.

- Assess whether operations to maintain flows to chum salmon warrant recognition that flows to benefit chum should be consistently maintained through emergence in low water years. This assessment will also take into account Vernita Bar flows.

Those interested in these additional/modified implementation plan measures are encouraged to participate in the System Configuration Team (for configuration alternatives), the Technical Management Team (for water management alternatives), and other regional technical teams. Policy issues will be addressed in the Implementation Team. Information on the scope of topics and contacts for each Regional Forum group is provided in Chapter 6.0.

5.1.1 Hydrosystem Strategy 1: Configure Dam Facilities to Improve Juvenile and Adult Fish Passage and Survival

Much attention has been given over the last decade to improving juvenile and adult passage survival through the complex hydrosystem facilities. In 2001, fish bypass systems, spillway improvements, and modified system operations enabled 27 to 50 percent of Snake River spring/summer chinook salmon and steelhead smolts to survive in-river migration through the hydrosystem , as compared with an estimated survival rate of 5 to 40 percent in the 1970s. However, even with improvements throughout the system, Bonneville, The Dalles and Lower Monumental dams currently have the lowest passage survival rates. Highest priority has been given to defining and installing additional configuration improvements that will raise the passage survival rates at these projects.

To improve *juvenile* passage survival, the NMFS BiOp recommends construction of new dam configurations such as surface bypass and collection systems, mechanical bypass system improvements, relocation of bypass system outfall pipes, minimum-gap turbine runners, and extended length intake screens. To improve *adult* passage survival, the BiOp recommends improving auxiliary water supplies, adult ladder improvements, and installing adult PIT detectors to collect information on the use and effectiveness of adult passage facilities.

Since 1989, physical improvements to fish facilities at the Lower Columbia and Lower Snake passage dams are made primarily through the Columbia River Fish Mitigation (CRFM) project. Funding for this program is provided through Congressional appropriations. Each year, the System Configuration Team (SCT), a regional committee made up of state, tribal, and federal representatives, provides recommendations to the Corps regarding priorities of projects proposed for funding. The priority criteria used by SCT are listed in Table 5.1 on the next page.

The current suite of configuration measures and their respective details presented in this document for fiscal year 2003 (FY03) and beyond are based on a requested FY03 budget of $98 million, and are presented prior to having results of the FY02 research and completion of ongoing priority determinations underway with the SCT. The actual FY03 appropriation has not been established at this writing and final consensus on the priorities will be dependent on that appropriation and, for some measures, FY02

research results. We anticipate completing updated workplans by the end of November, which will incorporate these issues. The updated workplans will be distributed when completed.

Physical improvements to hydroelectric facilities at non-Columbia River Fish Mitigation (CRFM) projects are also recommended in the both the NMFS and USFWS BiOps. The Corps may implement these improvements at Libby, Dworshak, and Chief Joseph when funding becomes available.

Table 5.1 SCT Criteria and Guidelines for Prioritization of the FY02 CRFM Program

Priority Level:	Criteria Description:	Guidelines:
High	* BiOp 2003 Category II Check-In Items as needed to meet check-in requirements. * Construction Items underway from FY01. * Juvenile studies and passage improvements for Bonneville, TDA or Lower Monumental (including incremental gas abatement measures). * Key system and project evaluations to answer uncertainties for future implementation decisions. (includes "D" value & multi-bypass mortality) * Significant adult passage facility and high risk reliability issues (fallback, ladder temperature, holding).	(1) Higher priority for passage alternatives with multi-species, multi-life stage approach. (2) Higher priority for multiple-purpose passage alternatives, (for example: an alternative which improves survival and water quality) (3) Cost-effectiveness should be considered in evaluating priority level.
Medium	* Juvenile studies and passage improvements with moderate potential survival benefits (including incremental gas abatement and temperature measures). * Less significant adult passage facility issues. * Adult migration, unaccounted loss, spawning success studies. * Studies to determine system and project effects on unlisted species of concern (lamprey).	
Low	* Juvenile and adult evaluations and passage improvements with relatively lower expected survival improvements. * Lower risk adult facility reliability issues. * Other Measures	

Last Updated 7/20/01

Hydrosystem Substrategy 1.1: Mainstem juvenile passage improvement

5-Year (2003-07) Outcomes

Ongoing use of existing fish passage devices, plus the following key juvenile passage enhancement outcomes, are anticipated by 2007:

- Major juvenile fish passage projects will be underway or completed by 2007.
- Juvenile pit-detection systems will be installed and providing data to evaluate the effectiveness of actions and assess progress toward hydrosystem survival performance standards.
- Minimum gap runner installation will be ongoing to improve juvenile fish survival.
- Data from 2001-05 adult returns will be sufficient to evaluate significance of delayed mortality, if any, from transport and dam passage.
- Removable spillway weirs (RSWs) will be evaluated for their performance and implemented, if warranted, which may reduce total dissolved gases (TDG) and potentially reduce total spill volumes.
- The first new prototype turbine will be installed at McNary to evaluate turbine passage survival rates and reduce TDG and involuntary spill.
- Spillway modifications will be made at The Dalles Dam to improve survival of fish passing through that route.

2003 Work Plan

Juvenile passage projects that will be worked on in 2003 are listed below. Individual project work plans are listed in more detail in Appendix A.

Bonneville Dam

- Flat plate juvenile passive integrated transponder (PIT) tag detector - continue operation.
- 1st powerhouse fish guidance efficiency improvements - testing with new prototype porosity plate.
- 1st powerhouse surface bypass - remove prototype powerhouse surface collector.
- 1st powerhouse juvenile bypass system (JBS) improvements - prepare construction plans and specifications.
- 2nd powerhouse surface bypass (corner collector) – continue construction.
- 2nd powerhouse fish guidance efficiency improvements – complete evaluations, initiate plans and specifications for permanent facilities if warranted.
- 2nd powerhouse JBS improvements – complete follow-on improvements.

The Dalles Dam

- Sluiceway outfall and emergency auxiliary water system – complete reanalysis, update design report and make decision on whether to proceed.
- Surface bypass – intake roof test, complete prototype tests.

John Day Dam

- Extended-length Submerged Bar Screen (ESBS) - complete prototype testing.

McNary Dam
- Forebay debris control – complete design for debris removal craft.
- ESBS improvements – complete improvements.
- Bypass system outfall – complete technical report.

Lower Monumental Dam
- Juvenile bypass system outfall relocation – complete modeling and technical report.
- ESBS evaluations – prepare design documentation report.

Little Goose Dam
- ESBS improvements – complete improvements.

Lower Granite Dam
- Extended-length submerged bar screen improvements – complete improvements.
- JBS – complete design documentation.

System
- Lower Snake River JBS improvements - complete initial evaluation report.
- McNary/Lower Snake River – decisions analysis completed.

2004-07 Work Plan

Actions planned at these dams in 2004-2007, include the following:

Bonneville
- 2nd powerhouse corner collector - construction complete and operational
- Complete decision on 1st powerhouse configuration
- Complete improvements to 2nd powerhouse FGE
- Complete spill/survival studies

The Dalles
- Complete installation of stilling basin divider walls
- Complete spill/survival studies
- Configuration decisions
- Tentative pending study results, complete installation of surface bypass (J-blocks) (tentative pending study results)
- Complete construction of sluiceway outfall relocation (tentative pending study results)

John Day
- Complete spill/survival studies
- Configuration decisions
- Complete extended screen construction (tentative pending study results)

McNary
- Juvenile facility improvements at collector projects

Little Goose
- Additional flow deflectors
- Juvenile facility improvements at collector projects

Lower Monumental
- Outfall relocation construction
- RSW investigations
- Juvenile facility improvements at collector projects
- Investigate/install stilling basin divider walls

Ice Harbor
- RSW investigations

Lower Granite
- JBS improvements
- RSW investigations
- Juvenile facility improvements at collector projects

System
- Delayed mortality study continues
- Spill survival/project survival research
- Full flow bypass juvenile PIT detection

Regional Coordination

Priorities for the FY03 CRFM program are being developed by the Corps in coordination with the System Configuration Team (SCT). Related RM&E activities are developed through the Corps' Anadromous Fish Evaluation Program (AFEP).

Hydrosystem Substrategy 1.2: Mainstem adult passage improvement

5-Year (2003-07) Outcomes

A number of CRFM measures provide for improvements to adult passage facilities at the mainstem projects. Generally the adult measures are directed at investigation and potential correction of conditions that may delay adult migration or that improve the passage facilities and assure their serviceability and reliability. The following key outcomes are expected by 2007:

- Adult PIT detection systems will be installed and operational.
- Adult fallback studies are complete and configuration changes needed to minimize fallback at Bonneville and McNary are installed or under construction.
- Fish ladder and transitional pool dynamics are better understood and methods to remove passage delay are implemented.
- Adult passage facility auxiliary water supply improvements are installed or under construction.

2003 Work Plan

Adult passage projects that will be worked on in 2003 are listed below. Individual project work plans are detailed in Appendix A.

Bonneville Dam
- Adult PIT tag detector - initiate modifications to system.
- 2nd powerhouse fish unit trash rake - complete construction.
- 2nd powerhouse emergency auxiliary water supply - complete construction.

The Dalles Dam

- Adult channel dewatering - complete construction.
- Emergency auxiliary water supply - complete reanalysis, update design report and make decision to proceed.

John Day Dam
- Adult PIT tag detector - initiate modifications to system.
- North shore auxiliary water supply system - complete design report.
- Ladder water temperature - initiate alternatives and design report.
- Modifications to reduce holding and jumping in the south fish ladder - complete construction.

Ice Harbor Dam
- Install adult PIT tag detector- construction complete.
- Emergency auxiliary water supply - complete phase 2 construction (install north shore pumps #1, #2 and #3).

Lower Monumental Dam
- Emergency auxiliary water supply - complete plans and specifications and award contract.

Little Goose
- Auxiliary water supply - initiate construction.

Lower Granite Dam
- Install adult PIT tag detector- construction complete.
- Auxiliary water supply - complete construction, gear reducer demolition/installation.

2004-07 Work Plan

Installation of adult PIT tag detection systems will continue at Bonneville, Lower Granite and Ice Harbor dams. New PIT tag detection systems will be installed at The Dalles, John Day, Lower Monumental and Little Goose dams. Auxiliary water supply modifications will be completed at priority mainstem dams. Based on adult fallback studies at Bonneville, McNary and Snake River dams, actions to minimize fallback will be developed and implemented.

Regional Coordination

Priorities for the FY03 CRFM program are being developed by the Corps in coordination with the SCT. Related RM&E activities are developed through the AFEP.

Hydrosystem Substrategy 1.3: Measures that address temperature and dissolved gas

5-Year (2003-07) Outcomes

The Action Agencies, other federal agencies, states, and tribes have undertaken a comprehensive water-quality planning effort to address water quality in the mainstem Columbia and Snake rivers. The goal is to develop a Columbia/Snake River Mainstem System Water Quality Plan as described in Appendix B of the NMFS 2000 BiOp. Within the CRFM program, several measures are planned to continue to address dissolved gas and temperature issues affecting fish passage and survival at various projects.

The following key outcomes are expected by 2007:

- A comprehensive Columbia/Snake River water quality plan will be developed to continue making progress towards meeting water quality standards.
- Spillway modifications (e.g., deflectors and training walls) intended to reduce total dissolved gas (TDG) levels and improve juvenile fish survival at mainstem dams will be complete or under construction. This will result in higher fish survival and more efficient spill operations.
- Measures to understand water temperature related problems will continue.

2003 Work Plan

Priorities for 2003 actions focus on TDG and water temperature. Spillway improvements at Snake River and The Dalles projects (including evaluation of training walls) will continue to be developed and spill survival issues will continue to be investigated at The Dalles. With regard to water temperature, investigations of ladder temperature effects on adult passage will continue at Snake River projects and at John Day Dam. A study of McNary forebay temperature effects on juvenile passage facilities will continue and an evaluation of Dworshak Dam operations to improve Snake River water temperatures will continue.

Water quality projects that will be worked on in 2003 are listed below. Individual project work plans are developed in coordination with the WQT and SCT and are listed in Appendix A.

Bonneville Dam
- Spillway deflectors (gas fast track) - complete decision on additional bays, initiate construction (tentative).

The Dalles Dam
- Spillway deflectors (gas fast track) - complete alternatives analysis (tentative).

John Day Dam
- Spillway deflectors (gas fast track) - complete tailrace egress test.

McNary Dam
- Forebay temperature improvements – develop Computational Fluid Dynamics (CFD) model.
- Spillway deflectors (gas fast track) – complete design of north shore training wall.

Lower Monumental Dam
- Install spillway deflectors (gas fast track) - complete deflector construction.

Little Goose Dam
- Spillway deflectors - complete design and award construction contract.

Lower Granite Dam
- Spillway deflectors - test general model and complete technical report.

Dworshak Dam
- Dworshak National Fish Hatchery water supply reuse (system 1) - finish construction of phase 1 and phase 2 modifications.
- Dissolved gas abatement - initiate report.

System
- Forebay monitors review (Lower Granite to McNary) - begin field investigations and analysis and identify recommended site locations.

- Redundant TDG monitors (Dworshak to McNary) - procure additional TDG monitoring instruments and physical infrastructure modifications.
- Water temperature modeling plan alternative study - phase 1 plan development - final report.
- Mainstem Columbia and Snake River Water Quality Plan - regional coordination and plan development.

2004-07 Work Plan

Spillway deflectors and other modifications (*e.g.,* training walls) will be installed at all FCRPS projects and at Chief Joseph to minimize spill caused total dissolved gas saturation. RSW effects on TDG will be understood and RSWs will be installed or under construction at appropriate sites. A Mainstem Columbia and Snake River Water Quality Plan will be completed.

Regional Coordination

The Action Agencies, other federal agencies, states, and tribes have begun discussions on a comprehensive water-quality planning effort to address water quality in the mainstem Columbia and Snake rivers. A Water Quality Plan development group is building off of the states Total Maximum Daily Load (TMDL) process for TDG and water temperature in the mainstem Columbia and the Council's Mainstem/System-wide Water Quality Program Summary. The goal is to develop the Columbia/Snake River Mainstem System Water Quality Plan as described in Appendix B of the NMFS 2000 Biological Opinion.

Hydrosystem Substrategy 1.4: Project configuration RM&E

5-Year (2003-07) Outcomes

RM&E for configuration and O&M activities is intended to provide information necessary to design, build/modify, and operate fish passage facilities, provide baseline information on passage efficiencies and survival through past projects, and post-construction evaluation of new or modified passage facilities. Data from RM&E efforts will also be used in determining success in meeting performance standards (see more detail in section 5.6 RM&E Priorities). The following key outcomes are expected by 2007:

- Data from 2001-07 adult returns will be sufficient to better establish the relationship of differential mortality to environmental and operational conditions.
- Causes of juvenile mortality during passage through spillways (e.g., The Dalles and John Day dams) will be identified and options to minimize mortality (e.g., possibly a RSW) are identified and/or under construction.
- RSWs will be evaluated to determine their influence on juvenile fish passage survival, TDG, and potential for reducing spill volumes.
- Adult head burn causes will be identified and methods to minimize head burn will be defined and implemented.
- Mechanical bypass system modifications will be evaluated for passage survival in relation to total project survival.
- Optimum spill configuration will be defined and implemented at John Day Dam.

2003 Work Plan

Configuration RM&E plans for 2003 are listed below. Individual work plans for RM&E projects are developed through AFEP and in coordination with the SCT. More detailed plan descriptions are included in the Action Tables.

Bonneville Dam

- Juvenile fish studies –estimate total project and route-specific survival for 1st powerhouse sluiceway and dam.
- Adult fallback – final year of adult fallback evaluation.
- Adult lamprey passage - continue evaluation of collection channel prototype, spillway entrance, and blood chemistry.
- 2nd powerhouse FGE – assist implementation of STS improvements.

The Dalles Dam

- Project survival study – characterize stilling basin hydraulic conditions, estimate direct plus indirect survival and injury rates, and estimate juvenile fish travel paths through the stilling basin.

John Day Dam

- Spillway survival (12 vs. 24 hour) and passage efficiency - estimate project and route specific survival rates, fish passage efficiency and spill passage efficiency, forebay retention time, tailrace egress and fish presence in tailrace stop log slots.

McNary Dam

- Juvenile survival - estimate project and route specific survival rates.
- Cylindrical dewatering study - prepare plans and specifications for prototype removal/relocation; prepare final report; plan for feasibility recommendations, as warranted.
- Juvenile fish transportation evaluation – spring/summer chinook, fall chinook and steelhead evaluations.
- New turbine study – complete evaluation of turbine passage survival for new turbine design and make decisions on future turbine replacements.

Ice Harbor Dam

- Separator evaluation - evaluate high velocity flume with high fish densities.
- Juvenile fish survival evaluation – optimize spillway and project survival.

Little Goose Dam

- Trash boom - complete high flow sampling.

Lower Granite Dam

- Surface bypass and collection - evaluate RSW with behavioral guidance structure (BGS) installed.
- Fish ladder transition pool evaluation - complete final report, decision to construct permanent raised weirs.
- Juvenile salmon water temperature studies – temperature impact biological indicators.

Lower Monumental

- Spillway efficiency/survival study

System

- Turbine passage survival study - complete second Bonneville minimum gap runner (MGR) test, complete phase 1 Turbine Survival Program (gain understanding of turbine environment, optimize

turbine operation, identify most promising turbine modifications, and define best strategy for incorporating improvements into rehabilitation programs), and scope and initiate phase 2 (develop implementation plan and test on draft tube effects and tailrace egress).

- Adult migration studies - continue adult passage telemetry and head burn studies and complete bioenergetic field work.
- Adult temperature evaluation - report on effects between McNary and Lower Granite.
- Fish ladder temperature evaluation - complete summary report.
- Multiple bypass study - data review report for study completion (comparative survival, differential recovery, physiological differences, bypass vs. undetected, guided vs. unguided, and pathogens).
- Avian predation study - PIT tag recovery on bird colonies. Continue study with increased emphasis on inland colonies and development of management alternatives to reduce predation in these locales.
- Estuary studies - evaluate salmonid estuary and plume use and influences of the hydrosystem flows.
- Kelt research - evaluate passage, returns, and long-term survival of steelhead in the lower Columbia.
- Unaccounted losses and straying of adult salmonids - account for adults undetected in traditional monitoring program through improved technology and effort.
- Marine mammal monitoring - evaluate effects of sea lions on adult salmonids immediately below Bonneville Dam.
- High flow juvenile PIT tag system - evaluate potential system to improve precision of reach survival estimates during high flow conditions from McNary through Bonneville dams.

2004-07 Work Plan

Many of the above studies will continue throughout the 2004-2007 time period. It is anticipated that these studies may provide additional information for future configuration or operational changes to improve passage survival rates. It is expected that PIT tag detection systems for both juveniles and adults will have been developed and installed in the 2003-2005 time period to enable passage survival rates to be quantitatively calculated for the 2008 BiOp check-in. Adult return data during the 2004-2007 timeframe should be used to verify/establish the delayed system mortality rate.

Regional Coordination

Development and coordination of the Corps RM&E program is through AFEP. Priorities and technical peer review occurs in a technical work group (Studies Review Work Group – SRWG) and coordination for funding priority occurs with the SCT. Activities will also be coordinated with the Action Agencies' RM&E program (see section 5.6) that will interface with other regional RM&E processes (*e.g.,* TRT and Council's subbasin planning process).

5.1.2 Hydrosystem Strategy 2: Manage Water to Improve Juvenile and Adult Fish Survival

The Action Agencies' goal for 2003-07 is to implement water management measures consistent with other project purposes and available water supply. These measures include system flow objectives for juvenile fish migration, reservoir operations to help meet needs of fish at or near the project, spill for juvenile fish passage, and other aspects of water management.

Each year, the Action Agencies manage a varying amount of natural flow that enters the FCRPS as runoff from precipitation and melting snowpack. This water is used to meet multiple purposes, including irrigation, flood control, power production, fish recovery, navigation, and recreation. The Action

Agencies expect to implement most of the water-management measures for fish survival in the BiOps under most water conditions. Where conflicts occur between BiOp measures, the Action Agencies plan to resolve them using the priorities recommended in the BiOps. Some detail on these priorities is discussed in the following substrategy discussions. Additional detail will be available in the annual Water Management Plan (WMP).

The one-year implementation plan and the WMP are prepared when little is known about the actual water supply conditions to be experienced in an upcoming year. Therefore, the Action Agencies will develop detailed seasonal updates (fall/winter and spring/summer) to the WMP to better reflect priorities based on actual and anticipated water conditions. The implementation of water management measures is accomplished through in-season operations coordinated through the TMT. The 2002 WMP and seasonal updates are posted on the TMT Web site at **http://www.nwd-wc.usace.army.mil/TMT**.

Hydrosystem Substrategy 2.1: Reservoir operations to improve fish survival

5-Year (2003-07) Outcomes

The Action Agencies will annually implement several independent FCRPS project operations to benefit fish at or near a given project or its reservoir. These reservoir operations vary by project. The Action Agencies expect the following key outcomes:

- Project outflows will provide minimum recommended flows for listed resident fish.
- Outflow fluctuations will be limited to avoid stranding fish.
- Lower Snake River reservoirs will be maintained at or above their minimum operating pool (MOP) and John Day reservoir near its minimum irrigation pool to reduce cross-sectional area and help speed juvenile passage.
- Temperature of water releases will be regulated to improve water temperatures for fish.

These operations are generally the highest priority, not likely to change from the BiOp recommendations, and are generally complementary to system requirements. The Action Agencies will consider and coordinate any potential changes through the Technical Management Team (TMT) process.

The annual Water Management Plan is the work plan for this substrategy.

2003 Work Plan

The key actions in this substrategy include the following:

Libby Dam

- Maintain minimum outflows for bull trout.
- Provide flows for Kootenai River white sturgeon spawning/recruitment.
- Regulate outflow temperatures to meet local resident fish needs.
- Maintain outflow changes within hourly and daily change recommendations issued by USFWS.

Hungry Horse Dam

- Maintain minimum outflows from the dam and at Columbia Falls gage for bull trout.
- Regulate outflow temperatures to meet local resident fish needs.
- Maintain outflow changes within hourly and daily change recommendations issued by USFWS.

Dworshak

- Maintain minimum outflows from the dam for resident fish and regulate outflow temperatures to meet salmon and steelhead needs in the lower Snake River fish needs.
- If conditions allow, conduct September operations to duplicate the 2002 study to provide up to 200 kaf without drafting below 1520' elevation.

Corps lower Snake River Projects and John Day

- Maintain forebays at or above the minimum operating pool from April 10 through Sept. 30 to increase water velocities during juvenile fish migration.

Corps mainstem projects

- Operate turbine unites at 1 percent efficiency range during the time specified in Appendix C of the Fish Passage Plan.

2004-07 Work Plan

The Action Agencies expect to repeat activities in the 2003 work plan annually for the foreseeable future. No significant additional actions are expected to be implemented during this time period unless new information becomes available that indicates changes would be beneficial to listed species with acceptable impacts to other uses.

Regional Coordination:

The principal forum for these water management actions is the NMFS Regional Forum (TMT and the Implementation Team {IT}).

Hydrosystem Substrategy 2.2: System flow management to improve fish survival

5-Year (2003-07) Outcomes

The Action Agencies will annually provide coordinated water releases from the FCRPS storage projects for system purposes, to provide mainstem flow augmentation and improve system water quality. The Agencies have developed the following BiOp-based priorities (in order) for flow management:

- Operate reservoirs to meet independent reservoir operation objectives from Hydrosystem Substrategy 2.1.
- Refill the storage projects by approximately June 30 to provide summer flow augmentation.
- Operate storage projects to be at their April 10 flood control elevation to increase flows for spring flow management.
- Provide fall and winter flows for chum spawning.

The Action Agencies expect the following outcomes to be achieved annually:

- Available storage will be used to augment juvenile migration flows, although seasonal flow objectives will not be met in all years at all times during migration season.
- Adult and juvenile mainstem passage survival performance standards will be met.
- Depending on actual runoff conditions and in-season fish requirements, consider conducting September operations to duplicate the 2002 study to provide up to 200 kaf of volume, without drafting below 1520 feet elevation, for improving adult survival in the Snake River.

The Action Agencies recognize that flow management measures of this substrategy are but one component of meeting passage survival standards. Other measures, such as juvenile passage spill, predation control, transportation, and natural flows, will also contribute.

2003 Work Plan

The current version of the WMP provides the details for this flow management strategy. The Action Agencies plan to annually implement this plan in consideration of varying annual water supply, fish migration timing, and other system uses, including power production, flood control, irrigation, navigation, and recreation.

In an operating year that begins on Oct. 1, flow needs are not encountered in the same order as the priorities, i.e., the first decision to be made is for chum spawning flows, which have a lower priority than summer flows. Therefore, chronologically, the Action Agencies will attempt to operate during the year as follows:

- **The initial objective** will be to operate the storage reservoirs (Dworshak, Hungry Horse, Libby, Albeni Falls, and Grand Coulee) to be at flood control levels by early April. This level varies with runoff forecast. The ability to reach early April flood control levels will be affected by how much water was released for flood control, power generation, and fishery flows to support both chum and Hanford reach spawning. There may be years when chum and Hanford Reach flows may need to be reduced in order to be at the early April flood control levels.
- **The next objective** is to refill the storage reservoirs to full by about June 30 to maximize available water storage to benefit summer migrants. The June 30 refill would have priority over spring (April, May, June) flow objectives although there would be an attempt to meet the spring targets and other fish needs.
- **The final objective** is management of available storage to augment summer (July, August) flows to achieve flow objectives and for water temperature control. The storage reservoirs will be drafted to their specified Aug. 31 draft limits to augment summer flows. These limits would have a higher priority over the summer flow objectives in order to meet other project uses and reserve water in storage for 2003. The Aug. 31 limits are elevation 2439 feet at Libby (20 feet from full), 3540 feet at Hungry Horse (20 feet from full), 1280 feet at Grand Coulee in above average water conditions (10 feet from full), 1278 feet at Grand Coulee in below average water conditions (12 feet from full), and 1520 feet at Dworshak (80 feet from full).

The Action Agencies will balance these fish measures with other system needs and will seek and coordinate a balance through the TMT process.

The annual WMP is the work plan for this substrategy. It is prepared by the Action Agencies in coordination with the NMFS Regional Implementation Forum. The action agencies annually coordinate WMP preparation in the TMT by submitting a first draft and taking TMT advice and comments prior to preparing a final plan that is posted on the TMT Web site (http://www.nwd-wc.usace.army.mil/TMT/index.html). Seasonal updates are developed to reflect changing water supply forecasts, actual stream flows, and other factors.

2004-07 Work Plan

The Action Agencies expect to repeat the activities in the 2003 work plan annually for the foreseeable future. No significant additional actions are expected to be implemented during this time period unless new information becomes available that indicates changes that would be beneficial to listed species with acceptable impacts to other uses.

Regional Coordination

The principal forum for these water management actions is the NMFS Regional Forum (TMT and IT).

Hydrosystem Substrategy 2.3: Spill operations for project passage

5-Year (2003-07) Outcomes

This substrategy includes spill at certain FCRPS projects, depending on runoff conditions, to provide better project passage for juvenile fish while avoiding high TDG supersaturation levels or adult fallback problems. Four general areas contribute to establishing spill priorities:

1. **Spread the Risk.** Spill is provided at both transport and non-transport projects to "spread the risk" between transportation and in-river migration under average or above-average spring runoff conditions. Spill is provided only at non-transport projects to enable maximum transportation under low-flow conditions and during the summer outmigration.
2. **Dissolved gas management.** Specific spill levels for juvenile fish passage are provided at each project, not to exceed established TDG levels (either the 110 percent standard, or as modified by state water quality waivers to 120 percent). Additionally, spill is managed on a system basis according to a priority list to distribute spill across the region in high runoff conditions to prevent dissolved gas supersaturation "hotspots."
3. **Adult salmon fallback.** Spill for juvenile fish passage is also limited at Bonneville and Ice Harbor Dam to reduce adult fish fallback over the spillways.
4. **Passage survival research.** Spill-related research priorities include evaluation of juvenile and adult passage survival, spill effectiveness in relation to spill levels and duration, effect of spill on juvenile fish retention in forebays and tailraces, and effect of spill on adult fallback. In some cases, normal spill operations may be modified to support such research.

The WMP, prepared by the Action Agencies through the NMFS Regional Implementation Forum, is the work plan for this substrategy.

2003 Work Plan

The Action Agencies intend to provide spill for juvenile fish passage at the FCRPS projects according to the schedules and spill amounts identified in the 2000 NMFS BiOp, which incorporates Table III-2 of the 1998 Supplemental Biological Opinion, and in accordance with the spill priorities discussed above.

2004-07 Work Plan

The Action Agencies expect to repeat the activities in the 2003 work plan annually for the foreseeable future. No significant additional actions are expected to be implemented during this time period unless new information becomes available and indicates changes that would be beneficial to listed species with acceptable impacts to other uses.

Regional Coordination

The principal forum for these water management actions is the NMFS Regional Forum (TMT, IT and the Water Quality Team). Spill-related research occurs under the AFEP process.

Hydrosystem Substrategy 2.4: Transmission reinforcements in support of spill

Transmission capacity in many areas within the FCRPS service area is currently fully allocated and often constrained. Spring river operations (high flows) have a correspondingly high need for transmission capacity to deliver the electricity to often-remote markets. Spill operations tend to reduce limited transmission capacity during both spring and summer. The NMFS and USFWS BiOp's identify some of these transmission constraints, which at times pose limitations on operational flexibility. The BiOp's recommend several actions to study and/or reinforce the transmission system to enable greater flexibility for implementation of the spill and flow management actions. The Action Agencies are preparing the environmental analysis needed to support transmission reinforcement decisions.

5-Year (2003-07) Outcomes

Several transmission system improvements are being evaluated and implemented to increase operational flexibility for implementation of fishery operations.

2003 Work Plan

- The final environmental impact statement (EIS) and Record of Decision (ROD) are expected to be issued for BPA's planned Schultz-Wautoma 500-kV line (formerly called "Schultz-Hanford"). Line design will be completed and land and material acquisition will continue in 2003. Actual construction of the line and terminal facilities will also begin in 2003. The line is expected to be completed and energized by October 2004.
- BPA's Grand Coulee-Bell 500-kV Transmission Line Project (formerly known as "West of Hatwai") is required for initiation of summer spill evaluation in the lower Snake River. The final EIS and ROD are expected to be issued in 2003. The transmission line design will be completed, land and material acquisition will continue, and actual construction of the line and terminal facilities will begin after the ROD is issued.
- BPA's Transmission Business Line will continue preparing EISs and developing new transmission facilities to integrate generation from a number of planned energy resources in the Pacific Northwest. One example is the new 75-mile 500-kV transmission line from McNary Dam to John Day Dam, planned by October 2004, to integrate the new Wallula generating project. This generation project is north of the John Day cut-plane but should provide some relief of the congestion there. Several other studies of new generating resources are also being undertaken in 2003.

2004-07 Work Plan

Transmission capacity from the Kootenai/Flathead River Valleys is currently limited. This condition became worse when the Columbia Falls Aluminum plant stopped production. Studies to define methods to increase transmission capacity will be completed and solutions developed and implemented in 2004-07.

Regional Coordination

National Environmental Policy Act (NEPA) processes.

Hydrosystem Substrategy 2.5: Other actions to enhance water management

5-Year (2003-07) Outcomes

This hydrosystem substrategy includes several independent water-management-related measures with potential to improve fish survival. Key outcomes expected include:

- The Corps and Reclamation will complete the Banks Lake Drawdown EIS and VarQ NEPA studies. This will support long-term decision making on project operations that may provide additional water for augmentation flows and still have acceptable impacts on other uses.
- Reclamation will complete ESA consultations on its projects below Chief Joseph Dam. This may contribute to increased fish survival in several major tributaries.
- Reclamation will complete and/or continue several ongoing activities that may improve fish survival. These include water conservation projects, water quality monitoring of the Columbia Basin Project return flows, resolution of unauthorized water usage cases, acquisition of water for flow augmentation from Reclamation's Snake River basin projects.

2003 Work Plan

Key activities planned in 2003 include the following:

- **VARQ.** The Corps and Reclamation plan to release the Draft EIS of the Upper Columbia River Flood Control and Fish Operations EIS in 2003. In the interim Reclamation will operate Hungry Horse using VARQ criteria. The Corps will also consider interim implementation of VARQ at Libby beginning in 2003 pending its findings in an Environmental Assessment scheduled for completion by the end of December 2002.
- **Banks Lake Drawdown.** Reclamation will complete its EIS on the impacts of drafting Banks Lake an additional 5 feet for summer flow augmentation. A ROD will be signed in time for August 2003 operations.
- **Reclamation ESA consultations.** Consultations with NMFS and USFWS will be completed in 2003 for the Yakima, Umatilla, Deschutes, and Tualatin Projects.
- **Reclamation water-conservation projects.** Reclamation will fund conservation projects selected from numerous proposals received from irrigation districts, canal companies, and others. Project selection criteria have an ESA emphasis that will give higher priority to proposals with potential to benefit ESA-listed fish species.
- **Reclamation report on unauthorized water use.** Reclamation will prepare this report by December 2002 and continue its work to resolve specific issues with its districts and their water users.
- **Water acquisition from Reclamation's Upper Snake River Projects.** Reclamation, NMFS, and others are participating in settlement discussions under the Snake River Basin Adjudication (SRBA). In the interim, Reclamation will continue to provide up to 427,000 acre-feet of water from storage in the Snake River to benefit summer migrants. The targeted annual amount of water available from Reclamation storage for flow augmentation beyond 2003 will be determined following settlement and consultation discussions. The actual annual amount will also depend on available water supply from storage and natural flows and the willingness of sellers.
- **Columbia Basin Project water quality monitoring.** Reclamation will continue water quality monitoring and evaluation of return flows.

2004-07 Work Plan

- **VARQ**. The Corps and Reclamation will complete the EIS and make RODs on long-term implementation by 2005
- **Reclamation activities.** Several individual projects are expected to be developed and initiated under ongoing programs for water conservation, resolution of unauthorized use, Snake River water acquisition, and water quality monitoring.

- **System flood control.** Comprehensive evaluation of current system flood control requirements expected to be initiated pending funding appropriations. This would evaluate current basin flood control regulations and provide for additional flexibility to provide for increased spring migration flow augmentation.

Regional Coordination

The Upper Columbia EIS and Banks Lake Drawdown EIS are being conducted as NEPA processes and are open to public participation. The SRBA settlement discussions are a legal process open only to parties in the adjudication. The Regional Implementation Forum (Implementation Team) is the most convenient forum for obtaining information on the remainder of the activities in this substrategy.

5.1.3 Hydrosystem Strategy 3: Operate and Maintain Fish Passage Facilities to Improve Fish Survival

Anadromous fish passage facilities, such as fish ladders and bypasses and/or mitigation hatcheries, were provided at the time many FCRPS projects were built. The original facilities have been updated and new facilities, such as bypass systems, collection and transport facilities, PIT tag detection systems, and TDG monitoring equipment, have been added at the dams. The Corps District Offices in Seattle, Walla Walla and Portland coordinate operations and maintenance (O&M) activities at the dams. Each dam has a staff to carry out day-to-day O&M requirements. The Fish Passage Operations and Maintenance Team (FPOM) develops operational priorities and operating criteria that are summarized in the Fish Passage Plan. This plan is updated annually and implemented by project personnel and others involved with river operations. It can be referenced at: http://www.nwd-wc.usace.army.mil/tmt/documents/fpp/fpp2002.pdf.

O&M tasks are categorized and implemented as follows: routine O&M; non-routine O&M that includes capital improvements; juvenile fish transportation; and operations RM&E. Plans for each of these O&M substrategies are described below.

Key O&M Outcomes and Priorities for 2003-07

The following O&M outcomes and priorities are expected during the next five years:

- Project personnel will implement the Fish Passage Plan each year.
- All routine O&M activities necessary to assure that fish facilities operate properly will be implemented.
- Capital improvements critical to assure continual reliability and/or performance of fish passage facilities are prioritized and implementation has begun.
- The juvenile fish transportation program is conducted in accordance with the BiOps and decreased reliance on truck transport has been maintained as a result of extended barging periods.
- Fish passage system reliability has been increased and projected outage times have been decreased due to the acquisition of critical spare parts.
- The backlog of deferred maintenance has been reduced within funding capabilities. Emphasis has been placed on those facilities identified as highest risk.

Hydrosystem Substrategy 3.1: Operation and maintenance of FCRPS fish facilities

2003 Work Plan

The following routine operations and maintenance activities are planned at each of the FCRPS dams:

Operate fish passage facilities
- Daily operations
- Facility inspections including cleaning and minor facility adjustments
- Calibration of control equipment
- Fish biologist oversight
- Fish counting
- ESA consultation.

Maintain fish passage facilities
- Annual maintenance of fish screens
- Fish bypass systems
- Adult fish ladders
- Powerhouse collection systems
- Adult fish pumps.

Debris control
- Investigation and implementation of methods to improve debris handling and removal.

O&M of mitigation fish hatcheries
- Facility O&M funding
- Providing electrical power for hatchery operations
- Maintenance support.

Avian predation
- Contract with USDA to discourage avian predation at projects.

Fish Passage Plan
- Annual update and implementation.

2004-07 Work Plan

Routine O&M work in 2004-2007 will be comparable to that described for 2003. Preventative maintenance programs would be developed for additional projects. Additional spare parts will be acquired to assure the reliability of critical passage systems. O&M staff will support RM&E studies at many of the projects.

Regional Coordination

Fish facility O&M activities are coordinated with the region through the FPOM and issue resolution will be through the IT if needed. On an as-needed basis the FPOM provides technical support and coordination for the TMT.

Hydrosystem Substrategy 3.2: Non-routine maintenance of fish and wildlife facilities

2003 Work Plan

Non-routine O&M activities are one-time activities or are very extensive and so are differentiated from routine O&M. The following non-routine operations and maintenance activities are planned at each of the FCRPS dams:

- Acquire fish facility spare parts – projects will continue to acquire the necessary spare parts to minimize facility outages due to equipment failures.
- Rehabilitate adult fish counting systems – rehabilitation needs will be reviewed at each project and plans will be developed for necessary work.
- Report real-time data on turbine and spillway settings on the Internet.
- Implement preventative maintenance programs to ensure the long-term reliability of fish passage facilities.
- Obstructions in turbine units – continue program to identify and remove obstructions that may injure fish.

Examples of project-specific actions are shown below. For a detailed listing, see the Action Tables.

Bonneville Dam
- Rehabilitation of the Bradford Island and Cascades Island fishways.
- Refurbish aging submersible traveling screens (STSs) in the 2nd powerhouse.

The Dalles Dam
- Begin installation of new lifting cable extensions for the main entrances.

John Day Dam
- Rebuild powerhouse auxiliary water system (AWS) fish water pumps.

McNary Dam
- Contract and install new fish ladder tilting weir controls.
- Prepare contract for replacing mesh on vertical barrier screens (VBSs).

Ice Harbor Dam
- Replace south shore fish pump hydraulic systems.
- Award contract for fabrication of new fish pump dewatering bulkheads.
- Award contract for replacement of adult collection system entrance hoists (tentative).
- Prepare contract to replace powerhouse adult collection channel dewatering valves.

Lower Monumental Dam
- Continue contract for adult fish pump rehabilitation (1 pump).
- Develop and install auxiliary water sensor systems if determined feasible.

Little Goose Dam
- Prepare contract plans and specifications for painting juvenile fish facility dewatering structure.

Lower Granite Dam
- Finish preparing contract and then contract to paint the interior holds of two 8000-series fish barges.

2004-07 Work Plan

Major non-routine O&M projects anticipated in 2004-2007 are listed in the Action Tables.

Regional Coordination

Fish facility O&M activities are coordinated with the region through the FPOM and issue resolution is through the IT, if needed.

Hydrosystem Substrategy 3.3: Juvenile fish transport actions to improve fish survival

This substrategy includes actions to collect and transport juvenile fish at Lower Granite, Little Goose, Lower Monumental and McNary dams. Transport is carried out in accordance with a NMFS Section 10 permit associated with the 2000 NMFS BiOp. The work plan for this substrategy is described in Appendix B to the FPP.

Priority for juvenile fish transportation varies, depending on runoff and river flow levels. During the spring, under normal and greater flow conditions, all fish collected at Snake River projects are transported. Non-collected fish migrate in-river with passage provided through spill. NMFS has identified this strategy to provide a balance between transported and in-river migrants. At McNary, all spring migrants are bypassed except during extreme low flow conditions. Collection and transportation is maximized (no volitional bypass spill) at the three Snake River projects during the summer and transportation begins at McNary when "spring-like" conditions (favorable flow and water temperature) no longer prevail.

2003 Work Plan

Actions for 2003 include:

- Updating the annual work plan in association with Fish Passage Plan (FPP) development.
- Collecting and transporting fish in accordance with the work plan - operating juvenile collection facilities, operating fish trailers and barges, in-season maintenance of transportation equipment, rental of trucks and towboats, and contracting for state biologist participation.
- Continuing extended barging season to increase the number of fish barged (vs. trucked).
- Continuing to evaluate transport program operations and facilities and make annual recommendations for improvements.

2004-07 Work Plan

This is an annual program carried out in accordance with provisions described above. Activities will be adaptively managed with consideration of in-season fish migration conditions and application of research results.

Regional Coordination

The transportation program, including annual updates, is coordinated through the FPOM and NMFS permitting process. In-season operational changes may also be recommended by the TMT and dispute resolution, if needed, is handled through the IT.

Hydrosystem Substrategy 3.4: Operations RM&E

Monitoring and evaluation of FCRPS fish facilities is conducted to determine if facilities are operating as intended to improve their performance. Examples of O&M-related RM&E include evaluation of juvenile fish transportation and adult passage at dams.

2003 Work Plan

RM&E activities planned in 2003 are listed below. For more details, see Appendix A.

- **Juvenile fish transportation evaluation.** Evaluate 1. survival and adult return rates of transported juvenile salmon compared to in-river migrating fish (spring and summer); 2. post-release losses and barging strategies that minimize post-release mortality; 3. benefits of trucking juvenile salmon; and 4. effectiveness of late-season transportation at McNary Dam.
- **Delayed mortality study.** Continue the study to determine comparative post-system delayed mortality, isolate areas of loss, evaluate behavioral changes, and evaluate logistical and mechanical barging process.

2004-07 Work Plan

The RM&E efforts described above are expected to continue during 2004-2007. Depending on results, additional/modified studies may be initiated.

Regional Coordination

Corps-funded RM&E is developed and coordinated through AFEP. Priorities and technical peer review occurs in a technical work group (Studies Review Work Group – SRWG) and coordination for funding priority occurs within the SCT. Activities will also be coordinated with the Action Agencies' RM&E program (see section 5.6), which will interface with other regional RM&E processes (*e.g.,* TRT and Council's subbasin planning process).

5.2 Habitat Priorities

The Action Agencies have formulated a habitat protection and restoration program to improve survival of anadromous species found to be jeopardized by the FCRPS. Our habitat program is designed to provide improvements needed to compensate for those losses associated with the hydrosystem . In the short term, the Action Agencies will implement actions proven to provide immediate benefits, *e.g.,* removing in-stream barriers, screening diversions, and increasing and protecting stream flows. Concurrently, the Action Agencies are implementing projects and programs that will generate benefits over a longer time period, *e.g.,* riparian protection and restoration. Taken together, the short- and long-term efforts will fulfill BiOp habitat objectives of:

- Protecting existing high quality habitat.
- Restoring degraded habitats
- Preventing further habitat degradation

Our approach to meeting these objectives is geographically focused, with individual strategies tailored for tributary habitat, mainstem habitat, and estuary habitat. These objectives will be achieved through the implementation of a diverse pool of several hundred projects spread across the Columbia River Basin.

In the following sections, the habitat strategies and substrategies provide a comprehensive approach to achieving the objectives of habitat protection, restoration, and enhancement. The strategies utilized by the Action Agencies are consistent with those of the *All-H Strategy*. The substrategies link specific RPA actions with broader mandates of the Action Agencies and the non-FCRPS Action Agencies. The substrategies identify projects that implement the habitat RPAs and address gaps in RPA coverage.

In light of the number and diversity of the habitat projects, this Plan provides a profile of our overall approach to implementing the strategies and substrategies, how they address specific RPA actions, and a general description of the types of projects that will be initiated or are already underway. The accompanying tables (see Appendix A) provide project-specific information, including identification of lead agency.

Regional Coordination

The Action Agencies will work with the Federal Habitat Team, states, tribes and other interested parties to identify a region-wide forum to coordinate actions for habitat protection and improvement. Coordination is already taking place in the watersheds and at other levels, including state and tribal forums and the Federal Habitat Team. The Council's subbasin planning process will also provide opportunities for local coordination. However, there is a need for a forum to coordinate the many on-going habitat efforts at the region-wide scale. The Action Agencies will work with the states and tribes on the development of a region-wide habitat coordination forum during FY03**.**

5.2.1 Habitat Strategy 1: Protect and Enhance Tributary Habitat

In 2001, the Independent Scientific Advisory Board of the Council published "A Review of Salmon Recovery Strategies for the Columbia River Basin" (ISAB 2001-7). In this review they evaluated the probability of success of the salmon recovery strategies outlined in the Four Northwest States Governors' Plan, the Council's 2000 Fish and Wildlife Program, the *All-H Strategy*, and the NMFS BiOp. In brief, the ISAB recommended that the region concentrate on three elements essential for success: increasing flows, removing blockages and making the shift to an ecosystem management approach. rIn keeping with

these recommendations, the Action Agencies' focus in the tributaries is on activities that will result in increased flows and decreased blockages.

5-Year (2003-07) Outcomes

In this section we generally describe the tributary habitat efforts that are planned for the next five years. A more detailed discussion of projects planned for 2003 and 2004-07 follows under each substrategy.

By 2007, the Action Agencies expect to achieve the following outcomes:

- **Coordinate off-site habitat enhancement measures to improve water quality** by:
  - identifying locations of habitats at risk of being degraded on non-federal lands.
  - funding protection of productive non-federal habitat through acquisitions and easements.
- **Improve water quantity and increase tributary flows** by:
  - processing water solicitations and complete transactions; and,
  - coordinating water and habitat objectives
  - Develop stream flow protocol methodologies/studies and water acquisition processes.
- **Implement passage and diversion improvements.**
- **Fund protection of productive non-federal habitat through acquisitions and easements.**
- **Secure long-term protection of riparian buffers.**
- **Work with the Council to complete subbasin plans.**

The remainder of this section addresses the Action Agencies' 2003 and 2004-07 work plans to achieve tributary habitat priorities and deliverables.

Habitat Substrategy 1.1: Water Quantity

2003 Work Plan

Reclamation Projects -

- **Initiate and continue In-stream Flow Incremental Methodology (IFIM) studies.** IFIM studies initiated by Reclamation or funded by Reclamation in four priority subbasins in FY02 will continue and new IFIM studies will be initiated for two more subbasins in FY03. The results of the IFIM studies will be shared with the appropriate state water regulatory agencies for consideration under state water law.
- **Lease/acquire stream flows.** Reclamation will continue to work through the state of Idaho's water banks to lease stream flows in the lower reaches of the Lemhi River during critical low water periods at the end of the summer. Other potential water acquisition initiatives will continue to be explored with the state of Washington through its adjudication process and with state of Oregon agencies and entities. Reclamation utilizes authorities under Section 5 of the ESA to acquire water for in-stream flows

- **Replace headgates.** Reclamation will provide technical assistance for eight headgate replacement projects located in the Lemhi and upper Salmon River subbasins. Seven of these projects are scheduled to be completed during that year. Headgate replacement projects are designed to control the amount of water diverted from the stream and so provide better flow management. In addition, Reclamation will provide technical assistance for two pump exchange projects in the Methow River subbasin designed to alleviate low tributary migration flows.

- **Continue implementing streamflow programs** in the Lemhi, Upper Salmon, Methow, Wenatchee, Upper John Day, and Middle Fork John Day subbasins in 2003 to meet the tributary habitat restoration objective. During 2003, Reclamation will establish new subbasin liaison contacts for the Middle Clearwater, Entiat, and North Fork John Day subbasins.

- **Continue Programmatic NEPA studies** for the four Idaho priority subbasins (Lemhi, Upper Salmon, Middle Clearwater, and Little Salmon) that were initiated in 2002.

BPA Projects -

- **Explore innovative types of water transactions –** A regional water entity has been established to facilitate tributary water transactions basinwide. After a Request for Qualifications process, BPA selected the National Fish and Wildlife Foundation (NFWF) to serve as the regional entity and qualified ten local entities (QLEs) to begin the Columbia Basin Water Transactions Program (CBWTP). NFWF will administer this program to implement NMFS Action 151. This regional entity will work through qualified local entities to identify and develop opportunities for providing cost-effective in-stream flows. NFWF will submit a report evaluating its efforts annually and at the end of five years. One major focus of the regional entity's efforts is to support local entity efforts to test the effectiveness of various transactional strategies for increasing tributary flows to improve habitat throughout the Columbia Basin.

  Additional information about the regional entity and the Columbia Basin Water Transactions Program (CBWTP) is available at http://www.nfwf.org/watertransactionsprogram/index.htm. The website currently provides background information on the program, the upcoming implementation timeline, a description of the ten current QLEs, criteria and information for submitting proposals, maps of the basin, and contact information. NFWF has already begun receiving proposals from QLEs for implementation in 2002-2003. The regional entity has organized a September 19-20 conference at Portland State University on water transaction strategies and a roundtable working session with representatives of the ten QLEs to further implement the program. BPA expects to continue supporting this program to cost-effectively implement innovative strategies to increase tributary flows. BPA intends to utilize the regional entity structure and the CBWTP in order to test transactional strategies in each of the Columbia Basin states and apply the effective strategies in the field to make progress toward meeting performance standards.

- **Build a regional structure for flow improvements –** The regional water entity described above will also pursue**:**
  - coordination of water transactions and associated habitat projects.
  - development of a competitive process to supply water to increase flows.
  - development of water solicitations and selection of the most promising transaction proposals.
  - development of a regional clearinghouse and public information site for water transactions.

- **Develop criteria and priorities –** BPA has worked with NMFS, Council staff and other interested parties to develop criteria and priorities for the regional water entity to use in the selection of water

transactions and transfers. The Action Agencies will also work with NMFS, USFWS and others to develop a methodology for evaluating the biological effectiveness of documented increases in quantity of in-stream water.

- **Acquire/improve flows at diversions –** BPA will field at least nine projects that increase tributary flows through water acquisitions and improvements at diversions in the following five subbasins: Deschutes (2), Fifteenmile (1), John Day (4), Methow (1), Umatilla (1). Examples of projects include:
  - emergency flow augmentation for Buck Hollow in the Deschutes;
  - the Columbia Plateau Water rights acquisition projects in the Deschutes and Umatilla;
  - 15-mile water rights acquisition in the Fifteenmile;
  - Oregon Water Trust Early Action project, and the Oxbow and Pine Creek ranch acquisitions in the John Day; and,
  - the Methow Valley Irrigation District Rehabilitation project in the Methow.
- **Identify additional in-stream flow improvements –** The regional water entity is structured to identify and facilitate additional promising water transactions for the purposes of increasing in-stream flows.

2004-07 Work Plan

In addition to the continuing activities described above, the Action Agencies plan to:

- Develop stream flow protocol methodologies/studies and water acquisition processes or incorporate the protocols provided by NMFS. BPA is coordinating with BOR to use the results of six current IFIM studies to enhance water acquisition strategies. NMFS has also assumed responsibility to provide BPA with an IFIM methodology capable of ascertaining in-stream flows that meet ESA requirements.
- Enable the regional entity, the National Fish and Wildlife Foundation, to qualify additional local entities, pursue cost-sharing agreements, and further implement the Columbia Basin Water Transactions Program over the next five years.
- Coordinate with the Oregon Water Resources Department (OWRD), Washington Department of Ecology (WDOE), Idaho Department of Water Resources (IDWR), and the Montana Fish Wildlife and Parks (FWP) to improve water transaction efficacy and ensure transactional strategies are consistent with state water law.
- Complete a report evaluating the efficacy of the regional water entity and the CBWTP, including a decision on whether to continue the program.

Regional Coordination

Reclamation subbasin liaisons, Reclamation programmatic NEPA processes, and the regional water entity.

Habitat Substrategy 1.2: Water Quality

2003 Work Plan

- **Coordinate off-site habitat enhancement measures to improve water quality** —BPA will continue to implement several dozen existing Fish and Wildlife projects which foster collaboration among multiple entities and support off-site habitat enhancement. Most of these projects will benefit water quality though only a portion of them can be modified this year to fit within the context and timing of TMDL development or implementation. Examples of projects that directly support TMDL development or implementation are:
  - Project No. 2001-021-00, formerly Proposal 25021, Reduce Water Temperatures in Teanaway. This project was awarded to Washington Dept. of Ecology (WDOE) in June 2002 but with an extended first year budget period to accommodate loss of most of the field season due to late award, and the uncertain timing of water rights and permit issuance. On-the-ground implementation will be by the Kittitas County SWCD and NRCS. The project will implement the recently completed TMDL.
  - Project No. 1998-035-01, Watershed Scale Response of Stream Habitat to Abandoned Mine Waste. Project completion is March 2003 and is using a load allocation methodology for several streams in the Methow Subbasin. The University of Washington researchers are coordinating their approach and sharing reports and water quality, habitat, and fish health and toxicity data with WDOE, Washington Department of Natural Resources (WDNR), Environmental Protection Agency (EPA), USFWS and U. S. Forest Service (USFS). WDOE has agreed to accept the data for use in 303(d) list development, site cleanup and, if needed, TMDL development.
  - Project No. 1998-019-00, Wind River Watershed Restoration. The Underwood Conservation District supported WDOE development of 303(d) list information and a TMDL for the Wind River watershed. BPA funds several other habitat and research projects in the watershed.
  - BPA recommended another TMDL support project in its August 2, 2002 errata letter to the Council on Columbia Cascade Province projects. Proposal #29015 Thermal Imaging of the Okanogan Watershed will be a combined FLIR – temperature modeling – TMDL development effort of the Colville Confederated Tribes (CCT) and Washington Department of Ecology. It will include a temperature monitoring program which will serve both BiOp and TMDL.
  - Project 1988-108-04, StreamNet (CIS/NED). Working with EPA staff, this project created a map and data layers which combine 303(d) listing and fish presence. These maps were used in Provincial review summaries and are available for future subbasin planning.

- **Improve coordination and documentation of TMDL efforts** — BPA will share technical expertise, policy information, and training with stakeholders to integrate multi-agency activities into the TMDLs during the two- to three-year subbasin planning process. Specifically, BPA will meet with state water quality agencies and EPA to:
  - obtain up-to-date schedules and agendas for TMDL development activities and 303(d) meetings,
  - furnish the water quality agencies with lists of BPA-funded projects sorted by province, subbasin and BPA project manager.
  - provide water quality agencies with subbasin planning schedules and contacts for each subbasin where they have an interest and encourage their participation;
  - agree on activities needed to ensure progress on meeting the Federal consistency provisions of Section 319 of the Clean Water Act;
  - scope activities to provide state agencies with water quality, biological and habitat data from BPA-funded projects which can be of use in 303(d) listing, 305(b) assessment, TMDLs and ambient monitoring programs; these arrangements may be formalized by an memorandum of

agreement or understanding between the agencies. Initial discussions occurred between BPA and WDOE in FY02.

- seek integration of Action Agency, fish and wildlife agency, and water quality agency monitoring approaches, particularly in the context of BiOp RM&E needs and subbasin planning monitoring and assessment.

BPA will document its participation and resulting accomplishments that support the states, tribes, and watershed councils in the TMDL process and in subbasin planning. BPA will use the following criteria in refining its project list for water quality improvements: (1) timing – project occurs during a window of opportunity when the state or tribe is required by its court-ordered schedule to produce the TMDL and can benefit from the BPA project data; (2) location – priority for inclusion or co-funding by BPA is based on Columbia Basin ESA needs, not only the stream's listing on the 303(d) list or TMDL schedule; (3) co-share by the water quality agency during or before and after TMDL development and implementation; and (4) M&E integration – the possibility of integration of monitoring and evaluation efforts in the project area.

2004-07 Work Plan

The Action Agencies will continue to coordinate off-site habitat enhancement measures to improve water quality and will work closely with state and tribal TMDL programs to identify mutual priorities and share technical expertise and training.

2004 - BPA staff and those of the water quality and fish and wildlife agencies will be encouraged to identify their watershed counterparts, agree on periodic meetings and exchanges of information which will benefit Fish & Wildlife projects and TMDL activities;

2004 or early 2005 - BPA will develop ongoing, queryable databases of project information and ensure that information is accessible via the Web;

2004 - Meet with Tribal water quality agencies with Water Quality Standards or TMDL responsibilities; seek the same level of exchange of project information and water quality or other desired data;

2005 to 2007 - Continued coordination with states, tribes and watershed organizations in BPA's project areas; work to link TMDL, F&W project and subbasin planning activities, emphasizing ESA priority streams; progress in agreement on common water quality data standards within the context of the evolving Columbia Basin Cooperative Information System.

Regional Coordination

State and tribal TMDL processes, Council's Fish and Wildlife Program, subbasin planning, Federal Habitat Team.

Habitat Substrategy 1.3: Passage and Diversion Improvements

2003 Work Plan

Reclamation Projects – In 2001, Reclamation initiated programs to improve habitat in priority subbasins by screening diversions and removing obstructions to passage in the Lemhi, Methow, and Upper and Middle Fork John Day subbasins. In 2002, Reclamation initiated similar programs in the Wenatchee and upper Salmon subbasins.

In 2003, Reclamation will initiate or be actively working on at least 8 screen replacement projects and 17 barrier replacement projects during 2003 in these subbasins. Of these, one screen project and five barrier projects are scheduled to be completed in 2003, with construction funding provided by BPA or other sources. Other as-yet-unidentified projects may be initiated.

The subbasin liaison offices scheduled to be established in the Middle Fork Clearwater, Entiat, and North Fork John Day subbasins may also initiate a few new projects, but the location of those projects will not be known until later in 2003.

Reclamation will also work to resolve important procedural issues including clarification of RPA 149 language, adoption of engineering design criteria for barrier projects, resolution of certain programmatic ESA consultation issues, and acquisition of construction funding authority for Reclamation.

The Council's Subbasin Plans and local recovery plans established from the TRT process will, when completed, provide the context for prioritizing projects for Reclamation's program. In the interim, Reclamation will select projects in the subbasins based upon the following general criteria:

1. Willingness of landowners to participate in the program;
2. Migration barriers at diversion structures which block access to otherwise available habitat;
3. Unscreened diversions on streams to which fish currently have access;
4. Diversion screens which do not meet current criteria and are located on streams to which fish currently have access;
5. Those stream flow barriers or screens which appear to affect the largest number of fish – those lower in the stream system, versus those higher in the system; and
6. Availability of appropriated funds.

Reclamation anticipates introduction of a Congressional bill authorizing their authority to fund the construction of screen or barrier projects in the tributaries. In the interim, landowners, states, and BPA will continue to fund project construction costs and Reclamation will continue to fund and/or perform the engineering and environmental and permitting analyses.

BPA Projects – Based on subbasin assessments, ISRP Review, and BiOp priorities, BPA will support 39 projects during 2003 in 10 subbasins as follows: Clearwater (6), John Day (2), Klickitat (2), Methow (2), Okanagan (2), Salmon (10), Umatilla (3), Walla Walla (3), Wenatchee (1), Yakima (10). BPA will be replacing pushup dams between Wall Creek and Kimberly in the North Fork of the John Day by installing site-specific permanent pumping stations at six locations. BPA will also support the NE Oregon pump screening project, the preliminary design for passage and improvement in the Klickitat subbasin and screening in the Methow subbasin.

BPA will enhance passage of juvenile and adult salmon in Idaho's anadromous fish corridors by consolidating and screening diversions and restoration of passage in the lower Lehmi/Salmon Rivers. In the Upper Salmon River, BPA will implement fish-passage restoration projects, including fishways, diversion headgates, and improved water distribution. In the Salmon, BPA will also support the Idaho fish screen improvement project, the restoration of anadromous fish access to Hawley Creek, and the fish passage and enhancement project of the Custer Soil and Water Conservation District.

BPA will support fish passage operations in the Walla Walla River and remove barriers and restore in-stream habitat on Chumstick Creek of the Wenatchee subbasin. In the Yakima, BPA will improve passage and stream flow for Simcoe Creek steelhead; increase fish passage on WDFG lands in Yakima; and fabricate and install Yakima Basin Phase II fish screens.

Corps Projects – The Corps plans to continue a general investigation study for the Walla Walla River. A three-year feasibility study will begin in 2003 to gather baseline information. This, in turn, will help develop potential alternatives for multiple habitat improvement projects to restore in-stream flows, improve riparian habitat and improve fish passage.

The Corps will also continue to use existing authorities for ongoing cost-shared ecosystem restoration projects, and work with interested parties to identify potential new projects. Work will continue in 2003 through 2005 in a 12-mile stretch of the Salmon River in Challis, Idaho, to restore natural channel and geomorphic function. This project is a partnership with BPA, University of Idaho and a consortium of state and local agencies and the Upper Salmon Basin Watershed Project.

In partnership with the Washington Department of Fish and Wildlife (WDFW), the Corps will complete a feasibility study in 2003 to restore flows to the Steigerwald Lake floodplain, allowing improved fish access/egress and habitat conditions for juvenile salmonids. In southwest Washington, the Corps and WDFW will initiate a feasibility study of a project to restore adult and juvenile salmonid access to affected streams, restore a significant portion of 7.6 miles of former stream and 15 acres of wetlands, and reconnect upstream and downstream chum salmon supplementation areas. Construction of both projects is planned for 2004-2005. The Corps will continue to explore ways to leverage resources with others to support subbasin planning and restoration actions.

2004-07 Work Plan

The Action Agencies will continue to implement passage and diversion improvements in the high priority subbasins during this time period. They will initiate stream flow barrier and screening programs, and initiate administrative and NEPA processes to support entry into high priority subbasins.

Regional Coordination

Reclamation subbasin liaison offices to be established in priority subbasins will provide coordination services. Regional coordination will also occur via the subbasin planning processes. The Federal Habitat Team will address the removal or retrofitting of small blockages.

Habitat Substrategy 1.4: Subbasin Planning and Assessment

2003 Work Plan

- **Coordinate with states, tribes, and local planning initiatives**—BPA is supporting the development and implementation of the Wy-Kan-Ush-Mi Wa-Kish-Wit Watershed Plan. The Federal Habitat Team, guided by the Federal Caucus, will work to establish effective working relationships with state, tribal, and other non-federal entities. The Federal Habitat Team has been convened and has provided Council staff with comments on the technical guidelines for subbasin planning.

- **Support development of subbasin assessments and plans** —The *All-H Strategy* recommends targeting habitat actions by means of subbasin assessment and planning through the Council and through watershed assessment and planning at the local level with federal assistance. The Action Agencies will continue to provide a share of technical support for subbasin assessments and plans and are working with the Council to ensure that subbasin plans are completed by 2006.

  In 2003, BPA will implement over 12 projects that support individual subbasin assessment and planning efforts in six subbasins. These include:

  1. providing coordination and technical assistance to watershed councils and individuals in Sherman County, OR, in the John Day subbasin;
  2. supporting the Klickitat River subbasin assessment in the Klickitat subbasin; and
  3. providing administrative and implementation support for the Upper Salmon Basin Watershed project in the Salmon subbasin.

Furthermore, under the master contract between BPA and the Council for subbasin planning, BPA will support subbasin planning systemwide. Specifically, subcontracts will be let to initiate subbasin planning in all 62 subbasins. The Action Agencies are also working through the Federal Caucus to identify and work on subbasin planning issues pertinent to implementation of the *All-H Strategy*.

2004-07 Work Plan

The Action Agencies plan to use subbasin plans to identify habitat projects that meet BiOp objectives and will continue to provide technical support that will further the completion of remaining subbasin plans.

Regional Coordination

Coordination will occur through the subbasin planning processes.

Habitat Substrategy 1.5: Watershed Health

2003 Work Plan

During 2003 BPA will utilize a two-tier approach to leverage agricultural incentive programs in funding long-term protection for riparian buffers. It is expected that a two-tier approach will initially be necessary to leverage agricultural incentive programs to fund long-term protection for riparian buffers. Tier 1 will be a continued effort to develop and implement a program for establishing long-term protection for lands enrolled in these programs. Tier 2 consists of continued support of the U. S. Department of Agriculture Conservation Reserve Enhancement Program (CREP) implementation and other similar federal programs as needed to develop, refine, implement and support the long-term protection program. To this end, BPA, working with NMFS, FSA, NRCS, the States, and others, will collaboratively develop and implement a multi-agency program to strengthen the CREP in areas within the range of listed fish species. The objective of this multi-agency program is to ultimately achieve long-term or permanent protection of 100 miles of riparian habitat per year. NMFS and BPA will annually evaluate the implementation of the multi-agency program and conclude whether and how the program could be adjusted for more effective implementation.

- **Negotiate and fund long-term protection for 100 miles of riparian buffers** — Under the Council's Fish and Wildlife Program, BPA is directly funding 17 projects that protect over 100 miles of riparian habitat. Six projects are set up to specifically provide increased participation in the CREP program. These are with conservation districts in Wasco (two projects), Wheeler, Gilliam, Morrow, and Asotin Counties, Oregon. Protected streams will be in the Deschutes, Fifteenmile, John Day, Umatilla, and Asotin subbasins. The 2003 CREP enrollment goal of these projects is 92 stream miles.

  BPA projects – BPA will work to enroll appropriate land associated with projects that provide physical riparian protection in long-term programs.

  - There are four projects in the Clearwater subbasin of the Mountain Snake province. These projects include riparian planting, fencing, and conservation management planning. Idaho does not have a CREP program, but enrollment in the parent CRP program is also included.
  - In the Columbia Plateau province, there is one project in the Deschutes subbasin, two projects in the John Day subbasin, and one project in the Walla Walla subbasin. These include riparian planting, fencing, stream restoration, and possible CREP enrollment.
  - In the Columbia Gorge province, there is one project in both the Fifteenmile and Hood subbasins. These projects include riparian fencing and other habitat improvement projects.

- In the Columbia Cascade province, there is one project in the Okanogan subbasin. This project includes road decommissioning, and riparian fencing and planting.

Since none of the projects discussed above address long-term (greater than 15 years) protection, BPA will conduct targeted efforts to implement a long-term riparian protection program that works with agricultural incentive programs.

Corps projects – Corps projects contributing to watershed health substrategy include:

- A Salmon Creek, Vancouver, Wash., project to re-establish riparian forest and native wetland plant communities in Salmon Creek floodplain and restore side channels to floodplain. Potential modifications to Salmon Creek channel and construction of a fish ladder could improve fish access to upper reaches of Salmon Creek. Initiate construction in 2003; complete in 2004.
- Construction will be completed in 2003 on the Trout Creek project to restore natural sinuosity of the main channel and reestablish connection between the creek and floodplain, by removing levees, dikes, and berms along a 4-5 mile stretch of the stream. The project would restore water quality, improve riparian habitat and stabilize streambanks.

- **Developing an Agricultural Incentive Program in Support of Recovery** - BPA, working with NMFS, Farm Services Agency (FSA), NRCS, the States, and others, will collaboratively develop a multi-agency program to strengthen the CREP Program so that it provides a pool from which 100 miles of key habitats can be identified annually, and it becomes a significant source of benefits for the BPA/NWPPC Fish and Wildlife Program, e.g., helps preclude additional listings. Program enhancements may include elements such as
  - Increasing CREP enrollment by funding a portions of specific items (e.g. staffing at the local level to provide outreach and technical assistance, funding for protections of areas that strongly support riparian watershed health but do not meet CREP criteria, etc.)
  - Marketing the long-term protection program in conjunction with CREP.

- **Protect currently productive non-federal habitat at risk of being degraded** — The Action Agencies and NMFS have developed a list of interim criteria and priorities for identification and protection of productive non-federal anadromous fish habitat, especially if at risk of being degraded. This interim list will be broadened to address factors salient to protection of uplands and wildlife. The list will be used throughout 2003, subject to modification based on public input, peer review, and our implementation experience.

  To improve watershed health, BPA has placed a high priority on protecting, by acquisitions and easements, productive non-federal habitat where such habitats are at risk of being degraded.

  Based on subbasin assessments, ISRP Review, and BiOp priorities, BPA will field over 25 projects in 2003 in 11 subbasins, including:
  - Protection and restoration of Big Canyon Creek, Little Canyon Creek, and Lapwai Creek watersheds in the Clearwater;
  - Restoration of spawning and rearing habitat for winter steelhead in the Fifteen-mile Creek Subbasin.
  - Grouse Creek restoration in the Grande Ronde;
  - Hood River fish habitat project;
  - Acquisition of the Wagner Ranch to provide a contiguous corridor of habitat along the lower mainstem John Day River.
  - Forrest Ranch acquisition in the John Day.

- Lower Klickitat riparian and in-channel habitat enhancement project in the Klickitat.
- Hancock Springs passage and habitat restoration improvements and Goat Creek in-stream restoration for salmonids in the Methow.
- Holistic restoration of the Twelvemile Ranch of the Salmon River and the reconnection of the Little Morgan Creek to the mainstem of the Pahsimeroi in the Salmon subbasin.
- Wilson Creek Snowden parcel acquisition, Satus watershed restoration project, and the restoration of the Upper Toppenish watershed in the Yakima.

2004-07 Work Plan

The Action Agencies will continue to protect 100 miles of riparian buffers per year. They will implement the riparian buffer protection program through work with the CREP. Other continuing activities include identification and protection of non-federal habitats that are at risk of being degraded. The Action Agencies will fund protection of those habitats through acquisitions and easements.

Regional Coordination

Provincial Reviews, subbasin planning processes.

5.2.2. Habitat Strategy 2: Protect and Enhance Mainstem Habitat

5-Year (2003-2007) Outcomes

The *All-H Strategy* and the Independent Scientific Group's "Return to the River" report both suggest that important gains in salmon productivity could come from increases in mainstem spawning and rearing habitat. In particular, actions are needed to improve the spawning habitat for chum salmon in the lower Columbia River. The Council's 2000 Fish and Wildlife Program states that "protection and restoration of mainstem habitat conditions must be a critical piece of this habitat based program."

The NMFS BiOp and the *All-H Strategy* call for an experimental program to identify ways to increase spawning and rearing habitat in the mainstem of the Columbia and Snake Rivers. BPA and other agencies are to survey mainstem habitats, develop plans for improvement, and initiate improvements in three reaches. Consequently, the Action Agencies will initiate projects in the mainstem that implement substrategies to improve Watershed Health and Subbasin Planning and Assessment.

Habitat Substrategy 2.1: Watershed Health

2003 Work Plan

Ten projects implementing this substrategy are underway in the Columbia Lower, Mainstem, and Cowlitz subbasins. These projects will improve tributary and mainstem chum habitat by protecting tributary and mainstem habitats through purchase, easement, and restoration projects. Specific tasks in 2003 include:

- **Identifying research needs; develop improvement plans; and initiate improvements in three mainstem reaches –** The Action Agencies plan to improve mainstem habitat by increasing habitat diversity, complexity, and productivity. NMFS RPA 155 calls for a program to develop habitat improvement plans for mainstem reaches and initiate improvements. The Corps is exploring its existing authority and potential for expanded authority under the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP) for further actions to enhance habitat in Snake River mainstem areas. Some potential actions include: develop sloughs and backwater areas, add habitat complexity,

develop riparian zones, re-establish/enhance wetlands and wetland channel sloughs. Effort will be given to protection, preserving and perpetuating the natural salmon spawning and rearing habitat.

In the Columbia Lower subbasin BPA is working with the Oregon Department of Fish and Wildlife (ODFW) to determine whether Chinook and chum salmon spawning populations exist below each of the four mainstem Columbia River dams. Specifically, under this substrategy we will collect baseline data to address uncertainties; identify cause-and-effect relationships; identify potential restoration sites; and report results annually.

- **Improve spawning conditions for chum salmon in the Ives Island area –** BPA is working with several agencies to determine whether Chinook and chum spawning populations exist below four mainstem Columbia River dams (Project 1999-00300). In 2001, baseline information was collected on habitat type, use and riverbed temperatures in the Ives Island area. The Action Agencies, led by the Corps, have begun studying the feasibility (both biological benefits and ecological risks) of habitat modification to improve spawning conditions for chum salmon in the Ives Island area. Once the feasibility study is completed in 2003, it will be presented to NMFS and shared with other interested agencies and tribes. Action Agencies will also continue to transplant adults from Ives Island. BPA will continue to fund a WDFW effort to rehabilitate and stock Duncan Creek with chum and an evaluation of spawning channel performance for chum habitat. BPA will also continue to fund a Duncan Creek project jointly submitted by the Pacific States Marine Fisheries Commission and WDFW. The project will ascertain whether releasing adult brood stock from genetically similar stocks into newly restored habitat significantly accelerates the establishment of a self-sustaining population or whether simple recolonization by strays is sufficient. What is discovered at Duncan Creek may have profound effects on chum recovery throughout the Lower Columbia. This project promises to benefit chum salmon, coho salmon, and sea-run cutthroat in the lower Columbia River through an innovative approach to natural restoration of salmonids.

- **Evaluate factors limiting chum salmon production –** The Action Agencies are also supporting a USFWS project to evaluate factors limiting chum salmon production, spawning group relationships, population dynamics, biological and ecological characteristics of chum in tributaries and mainstem below Bonneville Dam; and chum movements above Bonneville Dam. The project generate information useful for protecting these remnant chum salmon in the Lower Columbia.

- **Improve and restore tributary and mainstem habitat for Columbia River chum salmon –** The Action Agencies will develop and implement an effective habitat improvement plan to protect, restore, and/or create potential spawning habitat in the Columbia River mainstem and adjacent tributaries through purchase, easement, or other means.

2004-07 Work Plan

- **Increase habitat diversity, complexity, and productivity in the mainstem.** The Action Agencies will continue to work with appropriate regional entities and initiate improvements in three mainstem reaches, and annually report results in the Progress Reports. In 2006, the Action Agencies will assess the results and decide whether to make changes in the program.

- **Determine benefits of increasing access to, and extent of, chum spawning habitat and factors limiting chum salmon production.** In 2004, the Action Agencies will continue funding WDFW, ODFW, and USFWS RM&E efforts to assess effectiveness of chum habitat modifications. In 2005, they will continue to monitor chum populations.

- **Protect tributary and mainstem habitats.** The Action Agencies will continue to protect via purchase, easement, or other means existing or potential chum spawning habitat in this and adjacent reaches. They will also continue to monitor chum habitat improvements and transplant adults from Ives Island.

- **Predator control.** The Action Agencies will continue to promote the increased catch of northern pikeminnow through reward incentives.

Regional Coordination

The Action Agencies will coordinate their implementation of mainstem habitat activities through interactions with the Lower Columbia River Estuary Partnership (LCREP) and the Council's Provincial Review and subbasin planning processes.

Habitat Substrategy 2.2: Subbasin Planning and Assessment

2003 Work Plan

The Action Agencies recognize the importance of developing a cohesive approach for identifying and implementing actions to improve mainstem habitat for both listed and non-listed species. We also recognize the importance of mainstem/estuary habitat connectivity and the complex dynamics between habitat and native and non-native species and the associated challenges of determining actions that provide expected biological benefit without unintended risks. The Action Agencies will continue discussions with regional interests to integrate planning under the Mainstem/Systemwide review, mainstem rulemaking, and LCREP. The Action Agencies have in place coordination contracts and anticipate there may be possible opportunities for use of these contractors to facilitate the coordination of mainstem/estuary/ocean plans that are consistent with, complementary to, subbasins plans being developed region-wide. The Action Agencies view systemwide planning as one potential venue to integrate the various subbasin plans and develop of a cohesive basin-wide planning framework to address regional fish and wildlife needs.

2004-07 Work Plan

The Action Agencies plan to use the results of the Mainstem/Systemwide subbasin planning effort to identify additional activities for implementation.

Regional Coordination

The Action Agencies will coordinate mainstem habitat activities primarily through the Mainstem/System-wide Provincial Review process and rulemaking. The Action Agencies will also coordinate through the LCREP.

5.2.3. Habitat Strategy 3: Protect and Enhance Estuary Habitat

To rebuild productivity for ESA-listed salmon populations, the Corps and BPA plan to continue a 10-year program to protect/enhance tidal wetlands and other key estuary habitats. Because much is unknown about salmonid use of the estuary and Columbia River plume at this time, the approach includes concurrent research, planning and restoration activities. This approach will allow important on-the-ground recovery efforts to assist in salmon recovery to proceed while research and planning efforts occur to better inform future actions. The Action Agencies will continue to work closely with NMFS and the

LCREP to assess, prioritize and move forward with habitat planning, research and acquisition and improvement projects.

Current Federal activity in the estuary includes research by NMFS and others that is supported by BPA and the Corps, and habitat restoration activities. The Action Agencies will continue to work with LCREP to assess, prioritize and move forward with habitat acquisition and improvement projects.

5-Year (2003-2007) Outcomes

The Action Agencies will support the protection and restoration of the estuary by implementing and achieving the following outcomes and priorities.

Planning. The Corps and LCREP are developing a long-range plan for protection and restoration of the estuary that is broader in scope than the needs of NMFS BiOP implementation. This General Investigation (GI) study for ecosystem restoration in the Columbia River estuary (covering from the river mouth to river mile 145) is expected to continue from 2003 to 2007, but results will inform actions for the estuary along the way. The Action Agencies plan to address the habitat needs of salmon and steelhead in the estuary in coordination with the GI feasibility study to avoid duplication of effort

BPA is concurrently funding a project by Battelle, with LCREP and the Columbia River Estuary Study Taskforce (CREST), to address the planning requirements of RPA 159. This study was initiated in 2002 and will continue into 2003 and will provide an immediate plan for the activities in the estuary while the more comprehensive GI study proceeds. This effort should help in the development of performance standards and measures for the estuary. BPA is supporting an LCREP project with the Corps to assess and map habitat in the Lower Columbia River.

On-the-ground restoration projects. The Corps will use existing and new authorities to protect and enhance 5,000 acres of estuary habitat during this 5-year period. Congress provided a new authority (Section 536) to the Corps for habitat work in the estuary. This authority requires cost sharing which may be provided by the States, local governments, LCREP or BPA through the Council's Provincial Review and subbasin planning processes. Under this authority, the Corps plans to implement ecosystem restoration projects to protect, monitor and restore fish and wildlife habitat in close coordination with LCREP. This program is expected to generate a mosaic of restoration projects that will address RPA 160 of the NMFS BiOp and augment the comprehensive master plan generated by the GI study.

The Corps will also continue to seek and pursue opportunities for habitat restoration or enhancement projects in the estuary under available authorities such as the Section 1135 and 206 restoration authorities. These authorities may be used to accomplish work in 2003 if funding is not appropriated under Section 536.

Research. Research will continue in the estuary, guided by the Research, Monitoring and Evaluation Estuary/Ocean Work Group, with input from NMFS, and by regional review processes including the Corps Anadromous Fish Evaluation Program (AFEP) and the Council's Provincial Review and subbasin planning processes. The RM&E Estuary/Ocean Work Group was developed in 2002 and is currently evaluating on-going and proposed RM&E efforts to determine what is being done and identify any gaps that need to be addressed. The Work Group will develop an RM&E plan for the estuary and ocean (plume) requirements in the BiOp in 2003. Integration of estuary research in the overall RM&E plan is covered in more detail under the RM&E section of this document.

Habitat Substrategy 3.1: Water quantity and Habitat Substrategy 3.2 Water quality

The Action Agencies have determined that the Watershed Health and Subbasin Planning and Assessment substrategies are a better fit for the Columbia River Estuary program activities. While Water Quantity and Water Quality will improve as actions are implemented, specific estuary work does not fit well in either of these substrategy categories. Actions that were included under these categories in the draft Implementation Plan have been reorganized into the remaining substrategies.

Habitat Substrategy 3.3: Watershed health

2003 Work Plan

- **Planning –**The feasibility phase of the Corps ecosystem restoration study for the Columbia River estuary, covering from the river mouth to river mile 145, will continue in 2003 with completion expected in 2007 (RPA 158). Results will inform actions for the estuary along the way. (An expedited reconnaissance study was completed in May 2001.) The feasibility phase will be cost-shared with regional partners, possibly assisted by BPA funds. The expected outcome of the study is a strategic master plan for the estuary identifying long-range, larger projects.
    - BPA is funding a project by Battelle, with LCREP and the Columbia River Estuary Study Taskforce (CREST) to provide a "landscape" scale restoration plan for the estuary (RPA 159). This study will provide a near-term plan for the activities in the estuary while the longer term GI study proceeds.
    - The Corps and BPA have entered into an agreement with LCREP to map the estuary and Lower River. This will help define the baseline for further planning.

- **Protect, enhance, or restore estuary habitat** — The Corps and BPA have begun a 10-year program to protect/enhance 10,000 acres of tidal wetlands and other key estuary habitats in the Columbia River Estuary Province in the Columbia Estuary. The following habitat enhancement projects identified from findings from an Estuary Workshop held by the Corps, LCREP, American Rivers and Columbia River Estuary Study Task Force will be initiated in the estuary in 2003 under the Section 536 authority. A funding request for $2 million for the estuary "new start" funding (Section 536) was included in the Corps' FY03 budget request. If funds for Section 536 are not appropriated, the Corps will accomplish those projects that can be completed under Section 1135 or Section 206 authorities.
    - **Skipanon Slough and adjacent sloughs** and intertidal areas near Warrenton, Ore., at river mile 11. This proposed project would restore approximately 30 acres of aquatic, riparian and floodplain habitat along the lower Skipanon River. Two sloughs that were formerly connected to the river would be reconnected to allow tidal exchange and fish passage. Reconnection of tidal influences would allow the river and sloughs to naturally meander and form marsh and tidal channel habitats.
    - **Brownsmead** at river mile 30**.** This project would restore tidal flow to about 9.2 miles of sloughs. It would include installation of a larger intake pipe at Aldrich Point to increase flows in the system, removal of restrictive culverts, reconnecting some channels and installation of tide gates to allow for drainage of the increased flows.
    - **Rooster Rock Wetlands,** approximately 10 miles east of Troutdale**,** Oregon. This project would improve hydrology to enhance and restore habitats on about 200 acres. Improved flows will enhance return of native vegetation and improve habitat values for a variety of species and provide improved access for migratory salmonids**.**
    - **Two miles upstream of Chinook, Wash**., on the Columbia River shoreline. This project would replace nine culverts, and restore passage, spawning and migration between the Columbia River

and the affected streams. It would primarily benefit coho and chum salmon, winter steelhead and coastal cutthroat.

- **West Sand Island** north of the Columbia River Navigation Channel between river miles 3 and 4. This project will expand the existing marsh by 6-10 acres by excavating gorse-covered dune to elevations that mimic the adjacent high intertidal salt marsh habitat. The export of salt marsh vegetation would add detritus to the system

2004-07 Work Plan

In 2004 we will to complete restoration projects initiated in FY 2003 and initiate other projects identified and prioritized from the workshop and through on-going coordination with LCREP and others. In future years, we will continue to seek appropriated funds and cost-share partners, and proceed with selection and implementation of other projects identified by the LCREP, Action Agencies and others. Under the GI Study, the Corps continues to investigate options and will recommend appropriate solutions to accomplish ecosystem restoration in the lower Columbia River and estuary. Recommendations may include projects for:

- wetland/riparian habitat restoration,
- stream and fisheries improvement,
- water quality, and
- water-related infrastructure improvements..

Regional Coordination

LCREP, Federal Habitat Team, and coordination through the Council's Fish and Wildlife Program

Habitat Substrategy 3.4: Subbasin planning and assessment

2003 Work Plan

The subbasin planning and research efforts are addressed in this section.

Subbasin planning and assessment

- Through the Council's Provincial Review processes, research and monitoring related proposals have been recommended for BPA funding in 2003 and beyond. LCREP has proposed a project to "Implement the Habitat Restoration Program for the Columbia River Estuary and Lower Columbia River." This would establish a program to identify on-the-ground habitat restoration projects and plan their monitoring and evaluation. It would also take action on restoration projects already processed and approved through regional and local workgroups (several are listed above under "protect, enhance or restore estuary habitat").
- The Council has also recommended that BPA fund an LCREP proposal to develop an Aquatic Monitoring and Data Management Strategy to address habitat and toxics monitoring needs, and overall data management for the Lower Columbia River (Lower Columbia River and Columbia River Estuary Ecosystem Monitoring and Data Management. This proposal will begin in 2003.

Research

- **Develop criteria for estuarine habitat restoration.** The estuary/ocean RM&E Work Group has been established and will develop and RM&E plan and oversee research efforts to help direct planning and restoration activities. The Action Agencies will continue to fund appropriate research projects in the estuary identified by the work group, NMFS Science Center and others on salmonid

use of the estuary, relevant estuary characteristics, and salmon survival through the estuary and plume. Proposals for estuary research in FY03 are currently in the review process under the Anadromous Fish Evaluation Program (AFEP) of research and under the Council's Provincial Review process. RM&E is discussed in greater detail in Section 5.6 of this plan.

- The Corps and BPA will hold a workshop jointly with LCREP (February 2003) to identify research needs for the estuary. The workshop will include scientists, academics and researchers from NMFS and other appropriate entities.
- BPA will continue working to develop a conceptual model of the relation between estuarine conditions and salmon population structure and resilience through a contract with the NMFS Science Center and subcontract with the Oregon Graduate Institute (OGI) of the Oregon Health and Science University (OHSU). Model simulations have revealed several important features relating river flow and bathymetry to habitat opportunity (RPA 162).
- The NMFS Science Center has a project, with funding from the Corps, to develop a smaller version of the sonic tag allowing for tagging of smaller fish. BPA may fund expanded research on new acoustic tracking technology to track movement of salmon smolts into the ocean and along the continental shelf to areas of ocean residency. A proposal is currently under review in the Council's process. The agencies are working to ensure these efforts are coordinated.
- The Corps is also funding studies, working with NMFS, on tagging and tracking technology for the estuary and near-shore environment. BPA may provide funding for complementary research under the Council process.

2004-07 Work Plan

Estuary research will continue, funded under the Corps' CRFM project and BPA funding. The estuary/ocean RM&E Work Group will continue to work to identify information needs in the estuary and coordinate research activities. The information obtained from these activities will be used to guide future efforts for habitat restoration.

Regional Coordination

BPA and the Corps will continue to rely heavily on LCREP coordination capabilities and membership contacts to coordinate their estuary restoration activities. States, tribes, stakeholders and others are represented in LCREP committees and meetings and benefit from LCREP outreach. The LCREP Science Committee will continue to be an important forum for linking the LCREP program with ESA responsibilities. The Action Agencies and NMFS participate in this forum along with state representatives and others.

The Action Agencies will continue to work with the LCREP and the Council to link LCREP and Subbasin Planning approaches. The Council has agreed to provide funding to LCREP to undertake the Provincial Review for the Lower Columbia Estuary. In the Columbia Estuary subbasin, BPA, the Corps and LCREP are conducting a project to assess and map habitat in the Lower Columbia River.

5.3 Hatchery Priorities

Hatchery actions in 2003-07 may be influenced by pending NMFS hatchery policy and new hatchery BiOps, subbasin plans, and the Council's Artificial Production Review Evaluation (APRE). As these are completed, priorities will be adjusted as needed.

5-Year (2003-07) Outcomes

Hatchery action priorities over the next 5 years include:

- plan and implement safety-net contingency plans as needed for artificial propagation actions to avoid extinction of critically depressed ESA listed salmon and steelhead populations;
- develop and implement new or revised Hatchery Genetic Management Plans (HGMPs) to clarify goals and objectives and guide implementation of hatchery reforms to benefit listed fish;
- develop and implement a comprehensive marking plan through collaboration with the regional fishery managers;
- support other artificial production activities that contribute to tribal and non-tribal fisheries, including ongoing programs and potentially new programs that improve harvest opportunities while not adversely affecting the listed evolutionarily significant units (ESUs);
- support hatchery-related RM&E efforts (see also the RM&E section 5.6) focused on increasing our understanding of the effects of hatchery programs on natural production and harvest, the contribution of hatchery programs in recovery efforts, and the effectiveness of hatchery reform and safety-net actions.

5.3.1 Hatchery Strategy 1: Implement a Safety-Net Program as an Interim Measure to Avoid Extinction

BPA initiated the Safety Net Artificial Production Program (SNAPP) in 2001 by working with NMFS and the USFWS to scope out the program and determine how best to implement the program over the next few years. The scoping effort resulted in BPA funding a Safety Net Coordinator to facilitate the four-step planning process for the Safety Net Program.

The SNAPP Coordinator convened an oversight group comprised of the relevant parties (states, tribes, NMFS, USFWS, and BPA) to provide oversight and help implement the program. That group reviewed the initial list of 10 "at risk" populations identified in NMFS RPA Action 175 and recommended an expanded, more comprehensive list of 38 populations. To integrate SNAPP with the Council project review and selection process, the SNAPP Coordinator prepared a consolidated SNAPP proposal and submitted it to the Mountain Snake Provincial Review in late 2001. Subsequently, the ISRP reviewed the proposal and provided technical comments. The SNAPP Coordinator and other SNAPP participants responded to the ISRP comments and revised the proposal accordingly. NMFS, BPA, and the SNAPP Coordinator presented the revised proposal to the Council in mid-July 2002.

This entire process, from proposal submittal to final recommendations from the Council, required approximately six months. Although SNAPP implementation was postponed during this time, BPA believes the revisions made to the SNAPP proposal as a result of the ISRP review will contribute to the success of the program.

Five-Year (2003-07) Outcomes

The safety-net program is intended to provide artificial propagation contingency plans that, if implemented, would prevent further decline in the status of the most at-risk ESA-listed species, to buy time for other recovery measures to take effect. The program would intervene with artificial production for severely depressed and declining populations when, and only when, such strategy is determined to be necessary, effective, and feasible using a prescribed four-step analytical process. In coordination with NMFS and the Council, we will also continue to support existing safety-net (supplementation, captive rearing, and captive broodstock) projects intended to conserve listed species.

2003 Work Plan

BPA will:

- Continue funding the SNAPP process to develop safety-net contingency plans.
- Continue to implement ongoing safety-net projects to avoid extinction of several populations of Snake River spring/summer Chinook salmon and the Snake River sockeye salmon population.
- Although these projects were initiated through the Council's Fish and Wildlife Program prior to issuance of the NMFS BiOp, they are precisely the type of artificial propagation safety-net project envisioned in the BiOp's safety-net RPAs (175-178). Accordingly, the Action Agencies have associated these ongoing safety-net projects with RPA 177 (implementation of safety-net projects) in the 2003 Hatchery Action Table .
- Develop and adopt an approach to quickly fund implementation of safety net projects when required. This approach will rely upon existing procedures and emphasize those that will expedite the processes (e.g., use of mid-year reallocation, targeted solicitations, etc.)

2004-07 Work Plan

As revised, SNAPP will now rely on delineation of populations and population components of the Interior Columbia TRT. The SNAPP contractor(s) will participate in the population viability subgroup of the TRT to ensure all of the relevant population status and life history information is available for analysis, to assist in extinction risk analyses, and to develop a threshold of "excessive risk of extinction" that would guide moving on to the later steps of SNAPP and to be later incorporated into any contingency plan to trigger the regional consideration of actual implementation. This threshold would be scientifically linked with TRT thresholds for extinction. Should SNAPP recommend that some populations are at "excessive risk of extinction" and a BPA/NMFS decision is made to proceed into the subsequent SNAPP steps, then appropriate co-managers, subbasin planners, and TRT's would be notified of populations' extinction risk and be provided with supporting information. SNAPP would outline conservation options involving artificial production to reduce short-term risk of extinction, conduct a benefit/risk analysis of options using peer-reviewed methods, and develop contingency plans using the established HGMPs template.

A contingency HGMP would include a risk trigger that, if met, would initiate regional consideration and decision on whether to actually implement a contingency plan. Contingency HGMPs would be circulated for scientific and policy review. After review, the final HGMP would be provided to appropriate subbasin planners (for appending to their plans), NMFS, and TRT's. At this point, SNAPP contributions with this particular population would be complete. This process should be completed by late FY03 or early FY04.

If a regional decision is made to implement a safety-net project as an interim measure to avoid extinction of a listed population, we will provide funding to initiate and sustain the project. The NMFS-approved contingency HGMP would be used to guide implementation. The Action Agencies will provide appropriate funding to support such projects, using the Provincial Review process or other appropriate

processes, such as targeted solicitations or direct procurements if necessary (due to scheduling constraints, for example).

BPA will continue to fund the ongoing safety-net programs for Tucannon River and Grande Ronde spring chinook programs, including necessary facility modifications, through the Council's Fish and Wildlife Program. BPA will also continue to fund the safety-net programs for Snake River (Redfish Lake) sockeye salmon and Salmon River spring/summer chinook salmon through the Council's Fish and Wildlife Program, under the guidance of the NMFS ESA Section 10 Permits for the programs.

BPA will use the approach developed through NMFS RPA 178 to quickly make funds available for planning and implementation of any additional artificial production program deemed necessary by the SNAPP process during the term of the 2000 BiOp.

Regional Coordination

TRT, subbasin planning, Council, APRE.

5.3.2 Hatchery Strategy 2: Reduce Potentially Harmful Effects of Artificial Production to Aid Recovery Through Hatchery Reform

The Action Agencies will continue to support the development of new or updated HGMPs to identify methods to reduce harmful hatchery practices and/or aid recovery of listed fishes through hatchery reform. For hatchery programs targeted at ESUs, this HGMP planning process will allow us to determine whether a hatchery program can contribute to recovery of listed species through the modification of existing practices or facilities. We will continue to support these programs as guided by HGMPs, and through the SNAPP process for particularly "at-risk" stocks. For non-ESU hatchery programs the purpose of the HGMP is to assure the programs do little harm to ESUs. We will continue to support the basin-wide development of FCRPS HGMPs until completion. The results of HGMPs, BiOps, the APRE and subbasin plans will be integrated to guide changes in facilities and/or hatchery operations.

Hatchery reform activities identified in NMFS-approved HGMPs and BiOps may take many forms, including but not limited to, changes in broodstock selection, hatchery rearing practices, and release strategies. We expect that these reforms will lead to increased beneficial effects and decreased negative effects on listed species, thereby contributing to recovery.

For facilities owned, operated, or funded by the Action Agencies, we will begin implementing hatchery reforms that may already be specified by existing HGMPs or hatchery BiOps, and additional modifications as they become identified in HGMPs. Changes that consist of significant alterations in facilities will require extensive planning. Changes that may result in significant adjustments to the operation of the program may take far-reaching negotiations among fisheries co-managers. We are supporting processes and funding mechanism to implement these changes as soon as possible.

The HGMP process has been split into three phases. Phase 1 is a compilation of goals, objectives and operations of how the hatchery program is currently functioning. Phase 2 entails a negotiated vision among co-managers of how the hatchery will operate in the future. Phase 3 will be an ESU-wide review and coordination with the Technical Review Team, Subbasin Plans, *US vs. OR*, etc., concluding with revision and review/approval of NMFS and/or USFWS. Because adequate review requires consideration of cumulative effects, all HGMPs relevant to a given ESU will need to complete Phase 2 before they can be reviewed holistically in Phase 3.

Although we expect to make some progress in 2003, most improvement to hatchery practices and facilities will probably be initiated in years four and five of the BiOp because most HGMPs will not be completed until late 2003.

Hatchery Substrategy 2.1: Develop HGMPs

5-Year (2003-07) Implementation Plan

In late 2003, the Action Agencies plan to complete final drafts of HGMPs.

In 2002 the 3-phased approach was identified to address how HGMPs will be developed for the federally funded hatchery facilities in the Columbia Basin, in compliance with the schedule outlined in the RPA. Particularly because the rolling Provincial Review will not recur in time for consideration of proposals to develop HGMPs for facilities in several provinces, the Action Agencies identified this alternative contracting procedure that will ensure the required HGMPs are developed on schedule.

In order to expedite completion of the first phase and reduce overlap in activities with the Council's APRE, the APRE contract was amended to include data collection for Phase 1 of HGMPs. Facility operators were subcontracted by the Council to complete Phase 1. Completion of Phases 2 and 3 involved targeted solicitations, when necessary. Individual federal, state and tribal entities were contracted directly, or through the USFWS (for LSRCP facilities) to participate and contribute in Phases 2 and 3. A private consultant will be hired to lead, facilitate and guide participants through Phase 2 and 3 in a timely manner.

Depending upon the complexity of the programs and negotiations among fisheries co-managers, and the difficulty in TRT and NMFS review of the future direction of the hatchery program, it is still possible to complete final draft HGMPs by the target date.

2003 Work Plan

- Complete Phase 1 HGMPs for all hatchery programs.
- Complete Phase 2 and 3 HGMPs.
- Fund actions identified in completed HGMPs or the BiOp that can be implemented as prioritized in the short planning timeframe allowed. Priority will be given to at-risk populations and actions that are expected to be most critical.
- Any reforms identified will be implemented as expeditiously as possible.

2004-07 Work Plan

All final HGMPs are expected to be completed in late 2003. As HGMPs are completed (or other information that is relevant to changes are available, for example, BiOp recommendations), the Action Agencies will begin implementation of identified reforms consistent with NMFS RPAs 171, 172 and 173. The specifics of implementation will vary by program and type of reform, and will be require prioritization in accordance with HGMPs, all ongoing hatchery recommendations and Subbasin Planning. Funding reforms may involve new authorizations or appropriations, or BPA funding when appropriate, using the Provincial Review process or other applicable processes, such as targeted solicitations or direct procurements (due to scheduling constraints, for example). The Action Agencies are expected to have made significant progress in funding reforms for the most at-risk species by 2004 to 2005.

Regional Coordination

TRT, subbasin planning, Council, *U.S. vs. Oregon,* APRE.

5.3.3 Hatchery Strategy 3: Contribute to the Development and Implementation of a Comprehensive Marking Plan

5-Year (2003-07) Outcomes

By the end of 2002, the Action Agencies will develop a regional marking plan with coordination and input from key parties affected. This plan will be implemented as soon as practical to minimize delay between marking and full cohort representation in catch sampling programs and escapement locations. Revised marking protocols could be applied as early as spring 2003.

For the Upper Columbia River facilities (the Grand Coulee mitigation hatchery programs), all hatchery-produced spring chinook salmon will continue to be marked.

2003 Work Plan

Basic sequential elements needed to develop the marking plan include: 1. finish scoping of marking plan objectives; 2. develop strategies consistent with those objectives; 3. define work statement for contract to write plan; 4. produce plan; 5. review plan and make changes as appropriate via marking strategy oversight group; 6. Conduct cost analysis on marking plan; 7. identify resource base(s) for plan implementation; and 8. implement plan by 2003.

The marking strategy oversight group will redefine focus and expectations to narrow down objectives associated with this effort. Specifically, the oversight group will:

- develop a strategy to address the issue of fewer tag recoveries in existing fisheries sampled.
- provide options to maintain viability of the Coded Wire Tag (CWT) system in light of double index tagging and elimination of visual-based tag recovery systems.
- increase the region's ability to distinguish between hatchery and natural-origin spawners as per the Cumulative Risk Initiative (CRI).
- develop specific marking strategies in light of these objectives and compile them in a plan for application to all of the artificial production facilities in the Basin. Complete plan by fall 2002 targeting early implementation tagging activities in 2003.
- continue marking of spring chinook at the Upper Columbia River facilities (the Grand Coulee mitigation hatchery programs).

2004-07 Work Plan

Periodic review and modification is expected to occur during the 2004-07 timeframe.

Regional Coordination

This strategy defines a regional coordination process as outlined in NMFS RPA 174. It includes regional coordination with the Action Agencies, NMFS, USFWS, ODFW, WDFW, Idaho Department of Fish and Game (IDFG), Pacific States Marine Fisheries Commission (PSMFC), Pacific Salmon Commission, Columbia River Inter-Tribal Fisheries Commission (CRITFC) and individual treaty tribal participation.

5.3.4 Hatchery Strategy 4: Artificial Production in Support of Tribal and Other Harvest, Consistent with the Needs of Listed Fish

5-Year (2003-07) Outcomes

Some of the loss of fishery opportunities due to the FCRPS is now and will continue to be mitigated for through hatchery production. As partial mitigation for the loss of these fishery opportunities, we will continue to support hatchery programs that provide meaningful harvest opportunities. This will be done under guidance of NMFS-approved HGMPs to ensure that artificial production for harvest does not unacceptably impede recovery of ESA-listed species or ESUs.

2003 Work Plan

Subject to any changes recommended in new/revised HGMPs, the Action Agencies will continue to fund hatchery projects operated in conformity with the ESA. These hatcheries include 11 Lower Snake Compensation Plan hatcheries, eight Corps hatcheries, and three Reclamation hatcheries (operated as Grand Coulee mitigation).

2004-07 Work Plan

The Action Agencies plan to continue to operate legally mandated FCRPS mitigation hatchery projects in conformance with the ESA through 2007. BPA plans to continue to fund operation and maintenance of a number of experimental and production hatchery facilities as recommended by the Council's Fish and Wildlife Program. Upon completion of NMFS-approved HGMPs directed at hatchery reform measures (see 5.3.2. Hatchery Strategy 2), the Action Agencies will begin implementation of the high-priority reform measures at FCRPS mitigation hatcheries and Fish and Wildlife Program hatcheries.

Regional Coordination

Council, subbasin planning, TRTs, APRE

5.4 Harvest Priorities

The Action Agencies concur with NMFS about the potential for immediate benefits to listed species from harvest reform measures while enabling continued harvest of stronger stocks by tribal and non-tribal fisheries. The harvest strategies seek to improve adult life-stage survival through measures that will directly or indirectly reduce the take of listed species in the near-term and will advance harvest reforms, for application over the longer term. Efforts will continue to improve the efficacy of harvest management by improving the information upon which harvest management decisions are made. These efforts will contribute to off-site mitigation goals for FCRPS impacts by providing important adult life-stage survival improvements that will contribute to long-term recovery. The Action Agencies will work closely with NMFS and the salmon managers to identify and implement actions that enable reductions in take of listed species consistent with harvest RPA actions of the BiOp.

5.4.1 Harvest Strategy 1: Develop Fishing Techniques to Enable Fisheries to Target Non-listed Fish While Reducing Harvest-Related Mortality on ESA-Listed Species

Overall priorities under this strategy in 2003 include:

- Continuing ongoing projects to develop and evaluate selective fisheries below Bonneville Dam for application in lower river commercial fisheries and potential application above Bonneville Dam.

- Pursuing development and implementation of an additional project above Bonneville Dam to reduce steelhead mortalities in Chinook fisheries, potentially through use of weed-line modifications to conventional gillnets. This may be funded utilizing the within-year process of the Council's Fish and Wildlife Program, or other funding mechanisms.

- Working with tribal, state, and federal representatives through longer-term regional processes to identify and develop other opportunities to improve survival of listed species and other weak stocks through harvest reforms.

Harvest Substrategy 1.1: Gear efficacy testing and fishery integration on the mainstem Columbia/Snake rivers

5-Year (2003-07) Outcomes

Working with the harvest managers, the Action Agencies anticipate by 2005 at least one fully-tested peer reviewed selective fishery project integrated into commercial fisheries, resulting in a decrease in impacts on weak stocks. The Agencies' two areas of initial focus are below Bonneville Dam non-treaty commercial fisheries targeting spring chinook and above Bonneville Dam treaty commercial fall season Chinook fisheries. As new gears are developed, particular emphasis will be placed on the transfer of technology from applied research to fishery integration and evaluation to facilitate effective implementation of additional deployment of selective fisheries by 2007.

2003 Work Plan

- **Continue lower river tooth-tangle net fishery** (BPA 2001-007-00), with modifications based upon 2002 results. Approximately 22,000 steelhead were intercepted during the 2002 chinook fishery, which was not expected. Investigations will continue to enumerate and assess the effect of handling

of steelhead using this gear. Reducing steelhead interceptions and handling will be a priority for 2003 testing. Mesh size is currently one possible factor in the large increase in steelhead interceptions between 2001 to 2002 testing. Regardless, alternative gear strata and/or methods will be developed to implement the tooth-tangle net for the chinook this fishery with less impact to steelhead.

- For fall 2003 fisheries, NMFS in coordination with the Action Agencies will **pursue testing of weed-line modifications on conventional gillnets** fished in Management Zone 6. These types of gear modifications take advantage of the differential water column migration patterns of chinook and steelhead. These modifications hold promise to reduce listed summer steelhead impacts while maintaining a viable treaty fishery targeting fall bright chinook. If an agreement is reached with parties to this fishery, a small controlled study of weed-line modified gill net will be pursued to determine its feasibility, effectiveness, and costs as an alternative gear type in this fishery.

- Continue implementation, within the fall treaty commercial fisheries, of the NMFS **net exchange program** as an ongoing management tool to reduce steelhead interceptions while increasing chinook harvest under current impacts. Catch statistics suggest that the increased use of 9-inch gillnets has allowed Zone 6 fishers to access over 11,000 additional fall chinook within the prescribed steelhead harvest limit. Similar benefits can be expected in future years when chinook surpluses are similarly large. In years where chinook surpluses are smaller, the use of 9-inch nets can be expected to reduce steelhead impacts below prescribed limits and/or provide more scheduling flexibility for Zone 6 fisheries

2004-07 Work Plan

Implementation of actions identified for 2003, described above, will continue during 2004-2007 based on their effectiveness in reducing incidental take of listed species during fisheries targeting stronger stocks. Additional projects may be added to the list of gear efficacy testing projects for 2004-07 based on agreements among salmon managers, NMFS, and the Action Agencies and review and prioritization of proposals considered in the Council's provincial review process. Continuation of applied research on selected gear types will occur, combined with subsequent inter-annual analysis, review and evaluation of results.

All selective fisheries utilizing live-capture techniques are premised on the resolution of the important Coded Wire Tag (CWT) database modeling issues arising from mark-selective fisheries as per Harvest Substrategy 2.2. The schedule and implications are discussed in that section.

As various gear types and methodologies are developed through Action Agency involvement, any biological survival benefit measured or derived from indirect approaches will be credited under NMFS RPA Action 168.

Regional Coordination

New application of gear types in the Columbia Basin must be compliant with Harvest Substrategy 1.2; specifically, the ability to provide both immediate and long-term fishery specific mortality rates for purposes of quantifying gear impacts. Any Action Agency funded gear efficacy studies will be assessed by NMFS, other federal agencies, states and tribes through *U.S. vs. Oregon* and/or the Council's processes before full integration as a management activity.

Currently, impacts resulting from 2002 testing of the tooth-tangle fishery are being reviewed within the Technical Advisory Committee of *US vs. Oregon* management process. Changes and adaptations to that

program will primarily occur within that process, with input from outside reviewers once final reports of annual research are completed.

To the extent practicable, the Action Agencies will use the Provincial Review process of the Council's Fish and Wildlife Program as the basis for solicitation and review of proposals that address the subject harvest-related RPAs. The Action Agencies, in coordination with NMFS, provided criteria for consideration by potential project sponsors submitting proposals to the Mainstem/System-wide Review process. The Action Agencies will review proposals submitted in this process to determine the applicability of proposed projects with Action Agency needs and priorities. Any future opportunities that may be developed will be coordinated through this process.

Harvest Substrategy 1.2: Research to address incidental mortality in selective fisheries

5-Year (2003-07) Outcomes

A major biological issue pertinent to developing and implementing selective fisheries in the Columbia Basin is the ability to determine immediate and delayed (pre-spawning) non-retention mortality rates on non-targeted stocks. The amount of non-retention mortality will determine the efficacy and feasibility of selective fisheries in reducing harvest mortality on specific stocks and thus contribute to rebuilding weak stocks.

As part of our objective under Harvest Substrategy 1.1, the Action Agencies expect to have all relevant incidental mortality assessments already part of current gear testing complete, reviewed and integrated into any decision process associated with full implementation fisheries by 2005. Our current focus is the lower river tooth-tangle study (BPA 2001-007-00).

Additional focus will be placed on the catch-and-release sport fisheries below Bonneville Dam and fall-out mortality in Zone 6 treaty fisheries. Incidental mortality assessments were proposed in the Mainstem/System-wide Provincial Review process targeting non-treaty sport fisheries on spring and fall chinook. Review of those proposals is ongoing with decisions on priority and implementation during the winter or 2002/2003. Short- and long-term mortality assessments will be included in any additional gear types that selected for evaluation. Additionally, future assessments will include studies to determine the impacts of multiple recaptures associated with multiple selective live-capture fisheries implemented in sequence through fisheries that are upstream of one another. Results from these studies will provide information for comprehensive assessment of the true impact of selective fisheries.

2003 Work Plan

For 2003, the Action Agencies will continue to support studies to determine the non-retention mortality using tooth-tangle net gear (BPA 2001-007-00). This will contribute to meeting the three -year check-in requirement established under RPA 167.

Currently, incidental mortality associated with hook and release of non-target fish is assumed to be 10 percent based on literature review of studies primarily conducted outside the Columbia Basin. A proposal was submitted to the mainstem/systemwide province of the Council's Fish and Wildlife Program to evaluate hooking mortality on mainstem Columbia recreational hook and line fisheries. This proposal, along with other harvest proposals, will be evaluated for their potential contribution to obtaining sufficiently accurate and precise estimates of hooking mortality. Regional review of this proposal is ongoing with a decision on potential funding prior to spring 2003.

2004-07 Work Plan

Non-retention mortality studies using tooth-tangle gear will continue. The Action Agencies will consider additional mortality assessments as proposed in the Mainstem/Systemwide Provincial Review process targeting non-treaty sport fisheries targeting spring and fall chinook. As additional gear types are proposed and selected for evaluation in the out years, both short and long-term mortality assessments will be needed.

Regional Coordination

Currently, impacts resulting from 2002 testing of the tooth-tangle fishery are being reviewed within the Technical Advisory Committee of *U.S. vs. Oregon* management process. Changes and adaptations to that program will primarily occur within that process with input from outside reviewers once final reports of annual research are completed.

The Action Agencies will use the Provincial Review process of the Council's Fish and Wildlife Program as the basis for solicitation and review of proposals that address the subject harvest-related RPAs. Specifically, the Action Agencies, in coordination with NMFS, provided criteria for consideration by potential project sponsors submitting proposals to the mainstem/system-wide review process. The Action Agencies will review proposals submitted in this process to determine the applicability of proposed projects with Action Agency needs and priorities. Any future opportunities that may be developed will be coordinated through this process.

5.4.2 Harvest Strategy 2: Improve Harvest Management Assessments, Decisions, and Evaluations

For 2003-07, the Action Agencies will lend coordination assistance and provide appropriate resources through cost-sharing mechanisms to contribute toward efforts by the fishery managers to improve the methods and analytical procedures used to estimate fishery and stock-specific parameters in support of more effective harvest management. Improved estimates of escapement and other critical population data that are critical for effective harvest management will occur through support of projects directed at identifying and addressing important data gaps. In some cases, specific field studies and analytical work may be necessary to address the gaps and ultimately provide the increased resolution required to manage and monitor fisheries in the context of listed populations.

Harvest Substrategy 2.1: Improved escapement assessments and other critical population-specific data to support conservation-based harvest management

5-Year (2003-07) Outcomes

Areas of focus will include improvement in catch sampling programs and escapement estimation, development of improved population discrimination techniques, and the development of new harvest management models to improve the efficacy of preseason and in-season harvest management. Results from the lost fishing net study (BPA 2001-058-00) will be available for review by fishery managers by 2003 for incorporation into in-season management. As other investigations into hooking mortality and other sources of unaccounted loss report results, the Action Agencies will present that information to fishery managers for appropriate integration into harvest assessment models to improve estimates of model parameters.

2003 Work Plan

- Assist NMFS and fishery managers in developing a prioritized list of harvest management information needs that can be addressed through future projects and that hold promise of reducing the impacts of unvalidated assumptions, dated information, or information gaps on listed fish used in developing annual and seasonal harvest management regimes. Areas of focus will include improvement in catch sampling programs and escapement estimation, development of improved population discrimination techniques, and the development of new harvest management models to improve the efficacy of pre-season and in-season harvest management.

- Review and select from among new project proposals submitted under the Provincial Review process of the Council's Fish and Wildlife Program or as may otherwise be identified to address this substrategy.

2004-07 Work Plan

Additional proposals addressing this substrategy are proposed in the Mainstem/Systemwide Provincial Review process. Review of those proposals will occur in summer 2002 with implementation as early as FY03.

This substrategy has relationship to other strategies including: Harvest Substrategy 1.2 and Hatchery Strategy 3. Integration among these strategies is important for consistency in implementing this work plan.

Regional Coordination

Council, U.S. vs. Oregon

Harvest Substrategy 2.2: Alternative modeling systems that work in the context of selective fisheries

5-Year (2003-07) Outcomes

In coordination with fishery managers and guidance from NMFS, the Action Agencies will support the development and implementation of methods and analytical procedures to estimate fishery and stock-specific management parameters within Columbia Basin sport and commercial fisheries targeting spring chinook and steelhead. This will be accomplished for mark-selective fisheries, by 2005. Between now and 2005, the Pacific Salmon Commission – Selective Fishery Evaluation Committee (SFEC) will address measures needed to maintain the viability of the Coded Wire Tag (CWT) program for salmon under mark-selective fisheries.

2003 Work Plan

- Begin incorporating revisions identified by the SFEC or the marking plan prescribed by RPA 174 to maintain viability of current CWT (BPA 1982-013-00) projects. This may include revised double index tagging (DIT) methods and catch sampling programs to maintain level of precision in estimating fishery impacts. Electronic tag detection capabilities must be in place to detect CWTs in both unmarked and marked fish.

- Review new project proposals submitted under the Provincial Review process of the Council's Fish and Wildlife Program or that may emerge from other processes to address this RPA and to the extent necessary, begin a process to address any identified gaps.

2004-07 Work Plan

- Complete incorporation of revisions into current CWT database and recovery programs by 2004.

- Ensure coordination among groups involved in development and implementation of a comprehensive marking plan as per RPA 174.

Regional Coordination

Pacific Salmon Commissions, *US v. Oregon,* Council.

Harvest Substrategy 2.3: Identify sources of unaccounted harvest-related mortality

5-Year (2003-07) Outcomes

By 2003, the Action Agencies will have determined if sufficient numbers of ghost nets are present in the Bonneville and The Dalles reservoirs and whether these are causing sufficient mortalities to warrant a recovery effort. Attempts will be made at the time of gear recovery to collect data on specimens recovered from nets and identify species when possible. All salmonid stocks and other stocks could be affected by lost fishing gear.

The Action Agencies will pursue additional analysis to determine and/or further refine estimates of incidental mortalities from fishing gear and handling. Additional studies will be funded through the Provincial Review process.

This strategy relates to Harvest Substrategy 1.2. All incidental gear-type mortality studies and schedules identified above are referenced here to describe how this work fits together in the general harvest work plan.

2003 Work Plan

- Continue a study to determine the feasibility of locating, marking and removing lost gillnets within the Bonneville and The Dalles reservoirs. If results from 2002 warrant, amend the project to conduct a salvage operation. If the study is extended, attempt to quantify fish loss through data and specimen collection.

- Review and, when appropriate, fund new harvest-related mortality studies proposed within the Mainstem/Systemwide or other Provincial Review processes.

2004-07 Work Plan

- Continue to review project proposals addressing this substrategy submitted in the Council's Provincial Review process.

- Identify any additional high priority fisheries in which unaccounted harvest-related mortality may not be adequately addressed. Fund studies as appropriate.

- Identify high priority fisheries within Columbia Basin where incidental mortality estimates are highly uncertain or not available. Develop research proposals to quantify impact. Conduct field research to estimate loss. Analyze and publish results. Incorporate results into in season management.

Regional Coordination

Provincial Review process, *U.S. vs. Oregon*

5.4.3 Harvest Strategy 3: Support Sustainable Fisheries for the Meaningful Exercise of Tribal Fishing Rights and Non-tribal Fishing Opportunities Consistent with the Recovery Effort

Harvest Substrategy 3.1: Value-added projects

5-Year (2003-07) Outcomes

Selective live capture fisheries can produce catches that are of higher value than conventional fisheries, as shown by results of the 2001 and 2002 lower Columbia River tooth-tangle net study (BPA 2001-007-00). Live capture gear and associated methods result in a better quality caught fish due to increased freshness and less external net marks when compared to a conventional gillnet. Future non-treaty spring Chinook commercial fishery's in 2003 and beyond are also expected to achieve higher value through the continued use of live capture gear and methods.

Other non-gear related measures may also contribute to sustainable fisheries, include price supports, value-added processing or other programs. The Action Agencies will pursue economic development strategies in 2003 with a focus on treaty fisheries. It is possible that value-added fishery benefits in the form of price supports could be a negotiated part of gear testing projects provided they result in the decrease in take of listed species.

2003 Work Plan

- Continue ongoing discussions with interested parties regarding value-added fisheries. Our approach so far has been to link objectives under effort reduction programs with value-added strategies to establish a resource base. This will enable parties to develop tailored marketing strategies to address increasing competition from farmed salmon and varied consumer demand.

- Complete work to develop a principles paper ("white paper") that will assist in shaping policy to guide decision-making.

2004-07 Work Plan

- Work with interested parties on principles to develop economic development strategies.

- Outline alternate strategies identifying opportunities within specific fisheries and/or salmon stocks.

- Coordinate work products with key policy personnel.

- Execute agreements as appropriate within 2004-07 timeframe.

Regional Coordination

Council's Fish and Wildlife prioritization process.

Harvest Substrategy 3.2: Potential alternative/terminal fishing locations

5-Year (2003-07) Outcomes

The Action Agencies will assess and inventory additional terminal locations above Bonneville Dam that provide potential for reducing ESA impacts from mainstem fisheries. Preliminary sites include, but may not be limited to, the Little White Salmon and Klickitat rivers, and Eagle Creek. The Agencies will also review of sites through appropriate processes and develop new sites as appropriate. Existing terminal fishing projects will be continued to provide fishing opportunities in the Lower Columbia River.

2003 Work Plan

- Continue to provide additional hatchery production and terminal fishing opportunities in the Lower Columbia (BPA 1993-060-00) for coho and chinook at Youngs Bay, Deep River, Tongue Point, South Channel, Prairie Channel, Steamboat Slough and Coal Creek Slough sites.

- Work with the states and tribes to develop a prioritized list of potential new terminal fishing locations. Identify land and production issues related to each potential new location.

2004-07 Work Plan

- Continue to work with interested parties to develop a prioritized list of potential terminal fishing locations.

- Determine resource requirements needed to develop sites from list.

- Decide basic course of action using existing regional coordination entities.

Regional Coordination

Council's Fish and Wildlife prioritization process.

5.4.4 Harvest Strategy 4: Fishery Effort Reduction Programs

5-Year (2003-07) Outcomes

By the end of the five-year cycle, the Action Agencies will implement at least one fishery effort reduction program resulting in a decrease in harvest impact to listed fish that is quantifiable and creditable under RPA 168.

2003 Work Plan

- Continue to pursue opportunities for reducing harvest impacts on listed species. These may include agreements that reimburse commercial harvesters for reducing their catch or not fishing, thus creating increased abundance that can be passed through other fisheries to the spawning grounds. As a

starting point, The Action Agencies are developing a principles paper to assist negotiations in this topic area.

2004-07 Work Plan

- Work with interested parties on principles to develop effort reduction programs.
- Outline alternate strategies identifying opportunities within specific fisheries and/or salmon stocks.
- Coordinate work products with key policy personnel.
- Execute agreements as appropriate within 2004-07 timeframe.

Fishery effort reduction programs may be developed as part of value-added fishery strategies identified in Harvest Substrategy 3.1.

Regional Coordination

Informal coordination among interested parties.

5.5 Resident Fish Priorities

5.5.1 Resident Fish Strategy 1: Promote the Reproduction and Recruitment of Kootenai River White Sturgeon (KWS).

The Action Agencies' strategy is to improve the population's ability to produce juveniles and to help ensure that those progeny grow to maturity. This will be accomplished through two complementary substrategies, one that focuses on natural production of KWS, and another that uses artificial production to maintain the population until natural production is self-sustaining. Outcomes, priorities, work plans, and FY03 deliverables are described below for each substrategy.

Regional coordination will occur primarily through the KWS Recovery Team. Additional coordination will occur through NEPA processes (*e.g.,* the Upper Columbia environmental assessment {EA} and environmental impact statement {EIS}), Council/BPA Fish and Wildlife Program processes, subbasin planning, and technical forums (*e.g.*, International Kootenai/Ecosystem Rehabilitation Team).

Resident Fish Substrategy 1.1: Create conditions below Libby Dam that facilitate KWS natural reproduction and juvenile survival

5-Year (2003-07) Outcomes

Under this substrategy, we identify the factors limiting natural production and survival to age 1 of juvenile KWS and, to the extent possible, manage the Kootenai River to overcome those limits. Two primary outcomes are desired during this period:

1. Libby Dam will be able to safely and regularly pass the quantities and temperatures of water needed to induce natural spawning of KWS, or – if significant modifications are required at Libby Dam *(e.g.,* additional turbines and/or spillway modifications) or at downstream flood-sensitive areas *(e.g.*, integrity of levees and wells) – then those modifications will be close to completion by 2007.
2. Studies will have identified the factors that limit recruitment of naturally spawned KWS progeny to age 1. Present preliminary results indicate that something prevents survival of the eggs and/or larval sturgeon in years when natural spawning occurs.

These primary outcomes will depend upon steps and intermediate outcomes described below.

2003 Work Plan

Outcome 1 (Libby flows) will be accomplished through one or more of at least three alternatives that are being explored and evaluated concurrently. One alternative involves providing the quantity of water (see the 2004-07 Work Plan); the others involve passing that quantity at Libby Dam. In 2003, the Action Agencies will continue to work on evaluating and producing reports on these alternatives. Specific 2003 projects include:

- **Libby VARQ –** The Corps and Reclamation will make a decision by December 2002.
- **Determining possible spill at Libby dam –** Spilling water at Libby may be considered for 2003 depending on results of a 2002 spill test evaluation and on interim NEPA analysis. Libby spill that could help provide KWS spawning flows (which exceed the hydraulic capacity of the present powerhouse) could also create gas supersaturation in the Kootenai River that violates state environmental standards. The biological basis for those standards may have to be evaluated by the

state of Montana, the USFWS, and perhaps other agencies if spill were to be used to benefit KWS spawning. A decision to conduct spill is expected by DATE.

- **Evaluating installation of additional Libby turbines –** An additional one or two turbines at Libby Dam could allow KWS spawning flows to be passed with little or no spill. However, inadequate transmission and load for the additional generation, as well as cost and construction time, are factors being weighed in an ongoing study.

As these alternatives are evaluated, primarily under Corps leadership, other viable alternatives may come to light. Results of the evaluations will determine how and how quickly this outcome will be achieved.

For Outcome 2, the Action Agencies will continue research projects in 2003 focusing on the ecosystem of the Kootenai River where KWS spawn and rear, including nutrient and substrate studies. For additional details, see Appendix A.

2004-07 Work Plan

- **Libby VarQ –** The Corps will complete an EIS in 2004 on managing elevations of Lake Koocanusa to increase the probability of providing flows for KWS spawning. System-wide affects on water management, including Canadian interests in their reservoirs, are a significant concern.

- **Libby Spill –** Results of the 2002 spill test, which will determine levels of spill that may be possible without harm to fish or their food organisms, may identify needed modifications to the spillway necessary to pass more water with less gas. Work on these modifications is expected to take place during this period.

- **KWS Studies –** As factors that limit recruitment of naturally spawned KWS progeny to age 1 are identified, the objectives of these studies may have to be modified through the Council/BPA Fish and Wildlife Program to respond to findings and to test new hypotheses.

Resident Fish Substrategy 1.2: Kootenai River white sturgeon conservation hatchery program

5-Year (2003-07) Outcomes

Until the KWS population is able to sustain itself through natural production, we will continue producing families of juveniles in a conservation hatchery program and releasing them to rear naturally and ultimately recruit (in 15 to 25 years) into the spawning population. In the next five year, this program will be continuously monitored, improved, and guided by policies developed by and through the KWS Recovery Team. The naturally spawning population of KWS may decline during this period because of senescence (*i.e.,* the individuals are aging beyond their reproductive years) and lack of recruitment into mature age classes. This anticipated trend would reduce the number of brood fish available for artificial production and may cause production goals to change.

2003 Work Plan

Priorities and deliverables in 2003 will be similar to those of 2002:

- Continuation of the hatchery program.
- Monitoring the survival of previously released year-classes and reporting results to the KWS Recovery Team and in published progress reports. It will also be important to evaluate how newly

discovered errors (underestimates) in KWS age estimation could affect production goals and recovery strategies

2004-07 Work Plan

The Action Agencies will continue to assess the need for this program and to adapt the program to meet objectives of the KWS Recovery Team. The Agencies will determine if year classes are successful by monitoring every year.

5.5.2 Resident Fish Strategy 2: Determine the Impacts of the FCRPS on Bull Trout and Mitigate for Those Impacts.

Although initially we will emphasize the substrategy for monitoring bull trout use of FCRPS areas, we expect that during the next five years there will be considerable evaluation of these monitoring results and potentially – where warranted – an increasing emphasis on the protection substrategy. Along the way we expect a recovery plan, interim monitoring results, and performance standards to begin guiding our efforts.

Regional coordination will occur through bull trout recovery planning, subbasin planning, implementation of the Council's Fish and Wildlife Program, and ad hoc project- and issue-specific processes and forums. Cooperation will be provided, for example, in developing studies relating to bull trout in tributaries of the Bonneville Pool and in developing performance standards appropriate for bull trout.

Resident Fish Substrategy 2.1: Determine the extent to which bull trout use and are affected by FCRPS dams and reservoirs

5-Year (2003-07) Outcomes

During the next five years, the Action Agencies expect to:

- Complete initial studies and make recommendations regarding bull trout passage at Albeni Falls Dam.
- Better quantify how elevations of Lake Pend Oreille affect the abundance of kokanee prey available to bull trout in the lake.
- Obtain estimates of the extent to which bull trout use reaches of the mainstem Columbia and Snake rivers affected by the FCRPS.
- Produce estimates of bull trout use of Dworshak Reservoir.
- Evaluate, along with the USFWS, the significance of these findings and develop appropriate FCRPS responses.

2003 Work Plan

In the next year, the Action Agencies will continue projects begun in 2002, with an increasing emphasis on monitoring bull trout use of the mainstem Columbia and Snake rivers. Specific activities include:

- Monitor passage at mainstem projects.
- Bull trout movement and habitat use at Dworshak and seasonal distribution and abundance
- Annual progress reports.
- Lake Pend Oreille studies.

- Trapping and monitoring operations conducted for anadromous salmonids that might also detect bull trout movement into or out of the mainstem FCRPS areas.
- Radio tagging and telemetry of Tucannon bull trout to monitor their use of the mainstem Snake River.
- Monitoring bull trout in reaches downstream of Libby and Hungry Horse dams.

2004-07 Work Plan

- Continue to include bull trout numbers in mainstem counting facilities.
- Continue studies to identify/quantify adfluvial populations that use the mainstem Columbia and Snake rivers.
- Continue bull trout studies at Dworshak and in the mainstem.
- Continue with initial studies of passage at Albeni Falls Dam.
- Continue studies of predator-prey dynamics in Lake Pend Oreille.
- Implement appropriate management actions (Substrategy 2.2, below) based on the results of these and subsequent studies.

Our plan is to continually evaluate both the quality and implications of the results of the studies. Some studies/projects may be augmented; others may be dropped as ineffective.

Resident Fish Substrategy 2.2: Operate and modify FCRPS dams to protect, provide, and reconnect bull trout habitats

5-Year (2003-07) Outcomes

Where there already is a relatively clear link between the FCRPS and the welfare of bull trout, particularly at Hungry Horse, Libby, and Albeni Falls dams, we will continue to implement protective measures.

2003 Work Plan

- Manage winter elevations in Lake Pend Oreille (regulated by Albeni Falls Dam) to help promote a healthier forage base of kokanee for bull trout in the lake.
- Manage flows from Hungry Horse and Libby dams to minimize downstream effects on bull trout.
- Continue to track and determine use of adult bull trout in the mainstem Columbia and Snake rivers.

2004-07 Work Plan

- Continue managing flows through/over Libby and Hungry Horse dams to protect bull trout in downstream reaches.
- Continue to regulate the winter elevation of Lake Pend Oreille to promote production of kokanee prey.
- Explore and develop other methods to promote feeding and competitive environment favorable to bull trout in Lake Pend Oreille.
- Continue studies that monitor bull trout use of the mainstem Columbia and Snake rivers.
- Determine whether modification of the FCRPS is needed.

Resident Fish Substrategy 2.3: Develop performance standards for bull trout

5-Year (2003-07) Outcomes

By 2007, performance standards appropriate for FCRPS operations and bull trout will be developed and monitoring programs in place to track status and performance.

2003 Work Plan

In cooperation with the USFWS, the Action Agencies will review the bull trout recovery plan and determine ways to measure the affects of FCRPS operations on bull trout and to gauge how well the FCRPS is mitigating those impacts. The USFWS will lead in developing performance standards, and the recovery plan, when released, is expected to provide the foundation for those standards. FY03 should be the first year to begin work under the standards, and the Action Agencies will cooperate in developing those for the FCRPS.

2004-07 Work Plan

At this time we cannot predict how the standards will be applied.

5.6. RM&E PRIORITIES

NMFS and the Action Agencies are working together to develop and implement a comprehensive RM&E plan as called for under the NMFS BiOp and the *All-H Strategy.* The RM&E plan and associated projects are intended to provide information needed to assess the status of ESA-listed anadromous fish populations at the 2005 and 2008 BiOp check-in evaluations, and to identify and prioritize the most effective actions towards stock performance. The Action Agencies are working with NMFS to further develop and identify agreed-upon long-term products, interim steps, and actions needed for development of the RM&E plan, projects, and supporting data systems. This work will include the identification of appropriate funding levels and coordination relative to the RM&E work and the responsibilities of other regional, state and federal entities.

RM&E work groups have been formed through NMFS and the Action Agencies to develop the components for a comprehensive RM&E plan. The RM&E plan currently called for in the NMFS BiOp requires programs and data that are not yet underway or sufficiently available at this time. The continued development and implementation of a comprehensive RM&E plan that addresses the needs of status monitoring, action effectiveness research, and critical uncertainties is a top priority for the years 2003 through 2007. An oversight RM&E Planning Group and several working groups have been formed to address these topics. Formal participants currently include the Action Agencies and NMFS. The following workgroups have been formed: Status Monitoring, Action Effectiveness, Hydro, Hatchery/Harvest, Ocean/Estuary, and Data Management. Each workgroup is chaired by a member agency and includes designated participants. One representative each from NMFS, BPA, the Corps, and Reclamations forms the Oversight and Planning group. The Planning group oversees and coordinates the workgroup's efforts. At present, the Planning Group is participating in and organizing regional forums to identify a mechanism to coordinate proposed and ongoing RM&E plans regionally. The Planning Group has begun contacting regional Federal, State, and Tribal organizations to solicit their participation in the development and implementation of a regional RM&E plan and process to coordinate regional aspects of RM&E. A regionally coordinated RM&E plan will ensure a comprehensive plan as well as meet the broader needs of the region; those beyond listed species.

Workgroups are also developing criteria for determining the effectiveness of ongoing RM&E projects and prioritizing proposed projects. The plan's RM&E projects are continuing steps in a multi-year effort towards plan development and implementation. Specific RM&E projects will be identified and prioritized for 2003. Existing RM&E projects are associated with the Corps' AFEP forum, Reclamation's priority subbasin program, and the Council's Fish and Wildlife Program. A majority of this year's new RM&E projects fall under the Mainstem/Systemwide province. Where possible, some existing projects will evolve project scope and work statement to more accurately address RM&E BiOp requirements. Priority will be given to projects that concentrate on BiOp requirements not currently being addressed. For example, the Action Agencies will work with NMFS to develop a study plan that identifies needed studies of adult use of the estuary and plume. After these 'gaps" in BiOp requirements are met, priority will then be given to projects that address additional BiOp needs. If gaps in BiOp requirements are not currently being funded or proposed for funding in those two programs, a special request for proposals may be developed.

In addition to the continued development and implementation of a comprehensive RM&E plan, top priorities for 2003 through 2007 include:

- Projects that meet the objectives of a structured population status monitoring program.
- Action effectiveness research projects (including ongoing and new pilot studies).
- Research studies addressing critical uncertainties in ESU population assessments.

- An action implementation tracking system.
- An analytical assessment data support system.
- A regional coordination process for collaboratively working with other regional federal, state, and tribal RM&E programs.

The draft of the RM&E Plan and additional information on the Action Agencies and NMFS RM&E workgroups will be posted at http://www.efw.bpa.gov/cgi-bin/FW/welcome.cgi in December 2002.

The RM&E plan and framework document identifies strategies and substrategies to create a comprehensive RM&E program that meets the RM&E requirements outlined in the BiOp. The following five strategies are currently being implemented: (1) Status Monitoring; (2) Action Effectiveness Research; (3) Critical Uncertainties Research; (4) Project Implementation Monitoring, and (5) Data Management. A sixth strategy for Regional Coordination is under development with assistance from regional organizations. In order to properly organize, design, and implement the plan's components, some of the strategies are further delineated by substrategies. Status Monitoring substrategies are outlined according to geographic zones at which the monitoring occurs, such as, tributary habitat, hydropower corridor, estuary/ocean habitat, and the comprehensive, system level. For the Action Effectiveness and Critical Uncertainty strategies, the substrategies are grouped according to whether they apply to management areas of hatchery, habitat, harvest, or hydro. For more project specific details, see the Action Tables.

5.6.1. RM&E Strategy 1: Status Monitoring

Under this strategy, the Action Agencies will assist NMFS, the Council, and other federal, state, and tribal efforts to track the status of fish populations and their environment relative to required performance standards. Projects under this strategy are associated with RPA actions that provide or support status information such as adult and juvenile fish abundance, distribution, and survival, or environmental conditions that have been identified as key measures of fish performance. This work requires identification of appropriate funding levels and coordination relative to the responsibilities of other regional state and federal entities. More detailed information on the structure and planned approach to meeting the Status Monitoring requirements of the FCRPS BiOp will be provided in a draft of the NMFS/Action Agency RM&E Plan at **http://www.efw.bpa.gov/cgi-bin/FW/welcome.cgi** in December 2002.

5-Year (2003-07) Outcomes

The following outcomes have been targeted for the next five years:

- A Status Monitoring Program. The NMFS FCRPS BiOp calls for a comprehensive monitoring program. This program is not fully specified in the BiOp and so requires further development prior to implementation. The BiOp proposes a cooperative framework for a monitoring program that involves NMFS, the Action Agencies, and other federal and state entities with experience in developing large-scale comprehensive monitoring programs.
- An Estuary/Ocean Monitoring Program that is an integrated part of the Status Monitoring Program.
- A regionally coordinated program for aerial and satellite imagery data.
- Biological information necessary to conduct population level, hydro, and off-site mitigation performance tests identified in the BiOp.
- TRT recovery planning products.

RM&E Status Monitoring Substrategy 1.1: System Monitoring

This substrategy includes status monitoring actions that are focused at the entire system or are process oriented.

2003 Work Plan

A general listing of system level status monitoring projects to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project work plans are listed in more detail in the Action Tables.

- Finalize development of a status monitoring program and associated status monitoring project guidelines through the Action Agency/NMFS RM&E workgroup and the regional RM&E coordination workgroup.
- Implement pilot studies for reduced scope versions of the program and test specifically challenging aspects of its design.
- Implement and maintain Columbia River Basin PIT Tag Information System.
- Produce TRT recovery planning products for Columbia Basin ESUs (NMFS cost-share).
- Produce digital maps of the riparian areas, wetland features, and stream channel boundaries for mainstem streams.
- Assess the feasibility of remote monitoring approaches to quantify adult steelhead in select tributaries.
- Conduct long-term monitoring and evaluation of stream, watershed, and aquatic conditions.

2004-07 Work Plan

The Action Agencies will work with other regional entities and provide technical assistance and cost sharing with NMFS for:

- TRT recovery planning for Columbia Basin ESUs.
- Implementation of a regionally coordinated RM&E plan (including data collection protocols).
- Implementation of a regionally coordinated program for aerial and satellite imagery data.
- Continued development and implementation of new fish detection and tagging techniques. Newly funded projects are also developing resource management plans with associated NEPA documentation over the course of five years.

RME Status Monitoring Substrategy 1.2: Tributary Monitoring

This substrategy includes status-monitoring actions within tributary habitats.

2003 Work Plan

A general listing of tributary level status monitoring projects to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A.

- Identify and document current status monitoring efforts in the region relative to the requirements identified in the NMFS/Action Agency RM&E Plan and work with the region to develop additional projects needed to fill gaps.

- Work with the USFWS to further define status monitoring requirements for resident fish and integrate these monitoring requirements with the NMFS/Action Agency RM&E Plan.
- Develop status monitoring sampling designs as one component of a RM&E pilot study in the John Day Basin. Monitor John Day Basin adult steelhead spawning and juvenile migration timing, abundance, and rearing densities.
- Monitor emergence, growth, migration timing, and survival of Snake River fall chinook.
- Prioritize status monitoring work in the Columbia River Basin.
- Monitor native species abundance.

2004-07 Work Plan

The Action Agencies will continue to work with NMFS, USFWS, and other regional entities on the ongoing projects from 2003 and the development of additional monitoring projects. Further development of the Status Monitoring component of the NMFS and Action Agency RM&E program and integration of resident fish monitoring needs will guide the further development and implementation of additional projects at a programmatic level.

RM&E Status Monitoring Substrategy 1.3: Hydrosystem Corridor Monitoring

This substrategy includes status monitoring actions that are focused on the hydrosystem corridor.

2003 Work Plan

A general listing of hydrosystem corridor level status monitoring projects to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A.

- Conduct annual Smolt Monitoring Program (SMP) at seven mainstem Snake and Columbia River dams.
- Monitor wild Snake River spring/summer chinook salmon smolt migrations.
- Monitor smolt condition relative to biological and environmental conditions.

Configuration RM&E plans for 2003 are listed below. Individual work plans for RM&E projects are developed through AFEP and in coordination with the SCT. More detailed plan descriptions are included in the Action Tables.

Bonneville Dam

- **Juvenile fish studies**. Project and route-specific survival estimates; 1st powerhouse sluiceway efficiency.
- **Adult fallback.** Complete telemetry studies.
- **Adult lamprey passage. C**ontinue evaluation of collection channel prototype, spillway entrance, and blood chemistry.

The Dalles Dam

- **Project survival study**. Characterize stilling basin hydraulic conditions, estimate direct plus indirect survival and injury rates, and estimate juvenile fish travel paths through the stilling basin.

John Day Dam

- **Spillway survival (12 vs. 24 hour) and passage efficiency.** Estimate project and route specific survival rates, fish passage efficiency and spill passage efficiency, forebay retention time, tailrace egress and fish presence in tailrace stop log slots.

McNary Dam

- **Juvenile survival**. Estimate project and route specific survival rates.

Lower Granite

- **Juvenile salmon** water temperature studies – temperature impacts biological indicators.

Hydrosystem

- **Adult migration studies**. Continue adult passage telemetry and head burn studies and complete bioenergetic field work.
- **Adult temperature evaluation.** Report on effects between McNary and Lower Granite.
- **Fish ladder temperature evaluation.** Complete summary report.
- **Multiple bypass study.** Data review report for study completion (comparative survival, differential recovery, physiological differences, bypass vs. undetected, guided vs. unguided, and pathogens).
- **Kelt research.** Evaluate passage, returns, and long-term survival of steelhead in the lower Columbia.
- **Unaccounted losses and straying of adult salmonids.** Account for adults undetected in traditional monitoring program through improved technology and effort.

2004-07 Work Plan

The Action Agencies will provide adult and juvenile migration monitoring at dams and install adult pit-tag detectors at Bonneville and McNary dams. Many of the above studies will continue throughout 2004-07. It is anticipated that information and configuration or operational changes needed to improve passage survival rates will be revealed and in most cases implemented. It is expected that PIT tag detection systems for both juveniles and adults will have been developed and installed in the 2003-05 time period to enable passage survival rates to be quantitatively calculated for the 2008 BiOp check-in. Adult return data during 2004-07 should be sufficient to verify/establish the delayed system mortality rate.

RM&E Status Monitoring Substrategy 1.4: Estuary/Ocean Monitoring

Within the ocean/estuary environment NMFS lists six RM&E Actions in the BiOp. Five of the six Actions are associated specifically with status monitoring. In particular, two call for research on fundamental salmon biology and ecology in the estuary and one specifically calls for the establishment and implementation of a RM&E ocean / estuary program. Determining salmon usage of the estuary and freshwater plume and linkages between estuarine conditions and salmon population structure and resilience through modeling is also specified. At present various organizations are conducting studies within the ocean / estuary environment. Many water quality monitoring efforts by various local, state, and federal agencies are being conducted in the estuary. In addition, US Geological Survey is conducting sediment core analysis for the estuary. The LCREP has begun a comprehensive plan for the ocean / estuary environment with respect to restoring habitat and fish populations. Where possible, the RM&E Ocean/Estuary workgroup will coordinate work efforts and ocean /estuary RM&E planning with groups conducting research, monitoring, and evaluation of the ocean/estuary environment. A science member from LCREP is participating in the Ocean/Estuary workgroup. Where appropriate, the Ocean/Estuary workgroup will expand to include other regional members to assist in providing a scientific basis to protect and restore salmon habitats in the estuary and lower Columbia River.

Due to the paucity of current data in this area, baseline conditions will be needed to provide guidance for developing habitat improvement projects and context to evaluate the results of habitat improvement activities. Furthermore, the basic ecology of salmon in the lower Columbia River and estuary is poorly known. There are no current or proposed projects that investigate the adult salmon use of the estuary although some of the tracking technologies being developed may help. A current proposed "action plan" to research and gather information in this area is presently under development.

2003 Work Plan

A general listing of estuary/ocean level status monitoring projects to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A.

- **Surveys.** Conduct mesoscale, predator and forage, and salmon growth surveys.
- **Inventory ocean / estuary habitat**
- **Develop physical habitat metrics**.
- **Modeling.** Conduct coupled and physical-biological modeling of the estuary environment.
- **Develop a model to highlight relationship among hydropower, water management, estuarine conditions, and fish response.**
- **Define and analyze management scenarios and limiting factors to determine which ecosystem functions and habitats are most critical to salmon production in the estuary**.
- **Plume research.** Conduct research to describe spatial and temporal environmental features of the Columbia River Plume and influences of the hydrosystem flows. Develop and calibrate plume circulation model.
- **Develop a study plan that identifies necessary research, establish the scope and determine funding needs.**
- **Avian predation study**. Continue PIT tag recovery on bird colonies; continue study with increased emphasis on inland colonies and development of management alternatives to reduce predation in these locales.
- **Estuary studies**. Evaluate salmonid, including adult, use of the Columbia River estuary and plume.

2004-07 Work Plan

The Action Agencies will continue to evaluate the relationships between estuary, plume, and near-shore ocean conditions and juvenile salmon growth and survival. Activities addressing NMFS RPAs 196 and 197 were started in 1998 and continue under contract between BPA and the NMFS Science Center. The Corps has also closely coordinated estuary research funding with NMFS since 2001. Adult research needs are being addressed through development of acoustic and PIT tag studies and will be further developed in the planning process. Thus, work responsive to RPAs are in progress.

NMFS RPA Action 197 calls for "evaluating juvenile and adult use of the estuarine and near-shore environments," and will require monitoring techniques still in the early phases of development. In particular, the use of acoustic (sonic) tags with fixed, towed, or buoyed detector arrays is recommended, as is continued development of existing technologies such as PIT tag detector flow through trawl surveys. Development of these methods continues to be funded by BPA, the Corps and NMFS. In addition, BPA has provided funding to the Department of Fisheries Oceans Canada, in coordination with NMFS, for joint US-Canada near-shore fish and oceanographic monitoring in Canadian waters. Finally, continued scrutiny of project goals and objectives will occur to eliminate potential project overlaps in order to effectively leverage available monies from all available funding sources.

5.6.2 RM&E Strategy 2: Action Effectiveness Monitoring and Research

The objective of this strategy is to define effects of mitigation actions on fish survival, fish condition, and habitat condition in a quantitatively rigorous approach. This information will be critical to the projections of the expected benefits of hydrosystem and off-site mitigation actions in the 2005 and 2008 check-in evaluations. This research requires well-designed experiments, with treatment areas, controls and adequate replication. Casual monitoring will not meet the objectives of this strategy.

Research conducted under this strategy may require time beyond the NMFS BiOp planning horizons to manifest fish survival effects. Therefore the Action Agencies will initiate other studies to establish cause-and-effect relationships between tributary actions and physical/environmental effects. These relationships will be used as performance measures until survival estimates are obtained from the experiments.

The Status Monitoring/Habitat Action Effectiveness Research (SMHAER) Work Group will continue to refine an effectiveness research plan that addresses abundance and survival data for both adult and juvenile salmonids, as well as habitat indicators. The habitat effectiveness studies will be integrated with status monitoring, other types of action effectiveness research, and critical uncertainties research as part of the broader comprehensive RM&E Program called for in the BiOp, the Federal Caucus Basinwide Strategy, and the Columbia River Basin Fish and Wildlife Program, and outlined in the Action Agencies Implementation Plans. More detailed information on the structure and planned approach to meeting the Action Effectiveness requirements of the FCRPS BiOp will be provided in a draft of the NMFS/AA RM&E Plan at **http://www.efw.bpa.gov/cgi-bin/FW/welcome.cgi** in December 2002.

5-Year (2003-07) Outcomes

Key outcomes targeted for this strategy are:

- Effectiveness research studies that adequately cover off-site habitat mitigation categories of actions and ESUs identified in RPA 183 and are necessary to perform 2005 and 2008 check-in evaluations.
- Effectiveness research for estuary/ocean habitat mitigation actions.
- Effectiveness research to evaluate the effect of hydrosystem mitigation actions on categories of ESUs.
- Effectiveness research to determine the effects of changes in hatchery or harvest management practices on ESUs.

RM&E Action Effectiveness Research Substrategy 2.1: Hydrosystem

2003 Work Plan

A general listing of hydrosystem action effectiveness research projects to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A.

- Provide **information to fishery managers** to maximize the effectiveness of summer flow augmentation.
- Provide **in-season statistical support, real-time running predictions, and annual review of run-timing predictions**.
- Perform **statistical analysis of historical tagging data**.
- Provide **analysis of smolt-to-adult ratios**.
- Conduc**t statistical evaluation of performance standards** to improve decision analysis for assessing RPA compliance.

- Study how **summer flow augmentation** affects water temperature, water velocity, and juvenile fall chinook salmon migratory behavior and survival in Lower Granite Reservoir.
- **Juvenile fish transportation evaluation**. Evaluate: 1. survival and adult return rates of juvenile salmon transported compared to in-river migrating fish; 2. post-release losses and barging strategies that minimize post-release mortality; 3. benefits of trucking juvenile salmon; and 4. effectiveness of late-season transportation at McNary Dam.

McNary Dam
- **Cylindrical dewatering study. P**repare plans and specifications for prototype removal/relocation, preparation of final report, and plan for feasibility recommendations, as warranted.
- **Juvenile fish transportation evaluation. S**pring/summer chinook, fall chinook and steelhead evaluation.

Ice Harbor Dam
- **Separator evaluation**. Evaluate high velocity flume with high fish densities.

Little Goose Dam
- **Trash boom**. Complete high flow sampling.

Lower Granite Dam
- **Surface bypass and collection.** Evaluate RSW with behavioral guidance structure (BGS) installed.
- **Fish ladder transition pool evaluation**. Complete final report and make decision on whether to construct permanent RSWs.

Hydrosystem
- **Turbine passage survival study. C**omplete second Bonneville minimum gap runner (MGR) test, complete phase 1 Turbine Survival Program (gain understanding of turbine environment, optimize turbine operation, identify most promising turbine modifications, and define best strategy for incorporating improvements into rehabilitation programs), and scope and initiate phase 2 (develop implementation plan and test on draft tube effects and tailrace egress).
- **Fish ladder temperature evaluation.** Complete summary report.
- **Marine mammal monitoring.** Evaluate effects of sea lions on adult salmonids immediately below Bonneville Dam.

2004-07 Work Plan

Continue work on statistical evaluation of performance standards to improve decision analysis for assessing RPA compliance. Continue work on understanding how summer flow augmentations affects water temperature, water velocity, juvenile fall chinook salmon migratory behavior, and juvenile fall chinook survival in Lower Granite Reservoir. Continue ongoing AFEP research projects identified under the 2003 plan.

RM&E Action Effectiveness Research Substrategy 2.2: Habitat

2003 Work Plan

A general listing of habitat action effectiveness research actions to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Further projects needed to meet RPA 183 are planned to be developed and implemented in 2003. Individual project work plans for current projects are listed in more detail in the Action Tables.

- Continue implementation and reporting of **nutrient enhancement studies.**
- Initiate a **pilot study on the effects of diversion dam removal** as a part of the John Day pilot study.
- Develop (jointly with NMFS and the Council) and initiate other **tier-3 effectiveness studies as part of the John Day pilot study**. These studies will address the effects of water augmentation, flood irrigation removal, and diversion screen installations.
- Work with other agencies and parties to **prioritize effectiveness monitoring activities** in the Columbia River Basin.
- Implement **channel restoration** and monitor response of fish community to change in habitat condition.
- **Evaluate effectiveness of restoration projects for producing long-term watershed improvements**; use data and trends developed to provide guidance for subbasin planning and future land management decisions.
- **Monitor channel restoration** and update methods.
- **Restore riparian function and channel morphology** to near natural conditions to reduce sediment and temperature inputs of the Little Salmon River Basin.
- **Improve riparian conditions and reduce streambed sedimentation and water temperatures** on non-federal lands to restore critical habitat.

2004-07 Work Plan

Continue to develop and implement habitat effectiveness research projects and modify existing projects based on pilot study results.

RME Action Effectiveness Research Substrategy 2.3: Hatchery

2003 Work Plan

A general listing of hatchery action effectiveness research to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A.

- Evaluate acclimated spring chinook salmon performance.
- Evaluate life history differences between hatchery and wild origin.
- Evaluate environmental factors affecting survival and migration.
- Evaluate weir effects on fish migration and/or behavior.
- Obtain accurate counts of fall chinook salmon redds upriver of Lower Granite Dam.
- Estimate survival of tagged groups.

2004-07 Work Plan

- Develop preliminary catch, escapement and distribution data for all Columbia River hatcheries.
- Determine if program targets for contribution rate of hatchery fish are being achieved.
- Estimate ecological and genetic impacts of hatchery fish on wild populations.
- Determine how harvest opportunities of hatchery fish can be optimized.
- Determine if relationship exists between in river conditions (flow and temperature) and emigration success, residualism rate, and persistence of residual steelhead.

RM&E Action Effectiveness Research Substrategy 2.4: Harvest

2003 Work Plan

- Develop and implement a biologically sound harvest monitoring program.
- Develop, implement, and maintain harvest strategies that are consistent with treaty reserved fishing rights.

2004-07 Work Plan

Develop, implement, and maintain harvest strategies that are consistent with treaty reserved fishing rights.

5.6.3 RM&E Strategy 3: Critical Uncertainties Research

This strategy resolves critical uncertainties and issues related to the assessment methods and data required to evaluate future population performance and needed survival improvements. Projects under this strategy are associated with BiOp actions that address large, systematic research needs and improvements in analytical methods required for more robust and confident assessments of population extinction risks, probabilities of recovery, and needed survival improvements for each ESU. These are critical areas of uncertainty in survival conditions and needed survival improvements identified for fish populations of each ESU. Critical uncertainties include: reproductive success of hatchery fish spawning in the wild; magnitude of delayed differential mortality of transported smolts (D); and extent of extra mortality and its causes. Included under this RM&E category are research projects that may not have been designated as "critical" to BiOp assessments, but are called for under a number of BiOp actions.

5-Year (2003-07) Outcomes

Further development of the critical uncertainties research components and projects for a comprehensive RM&E plan will include participating with NMFS, the Council, and other regional entities to accomplish the following key outcomes:

- Identify key critical uncertainties that need research.
- Develop requests for proposals (RFP) and qualifications (RFQ) for research projects.
- Develop and implement a schedule for peer review of research proposals.
- Complete initial five years of research targeting key critical uncertainties.
- Participate in a regional technical group to successfully resolve critical uncertainties in analytical methods used for assessments of population performance.

2003 Work Plan

A general listing of critical uncertainty projects to occur in 2003 is provided below. Additional projects are currently under development and approval through the Council's Provincial Review. Individual project work plans are listed in more detail in Appendix A. Projects in 2003 will address:

- Uncertainty of in-river juvenile migration survival.
- Relative survival difference of in-river versus transported fish.
- Effect of ocean entry timing.
- Delayed mortality related to hydrosystem passage.
- Uncertainty of different dam passage histories relative to health and delayed mortality.

- Extra mortality and its causes.
- Reproductive success of hatchery fish relative to wild fish.
- Effect of hydrosystem flow modifications on the estuary.
- Salmonid use of the estuary.
- Delayed mortality study. Continue study to determine comparative post-system delayed mortality and isolate areas of loss, evaluate behavioral changes, and evaluate logistical and mechanical barging process.

2004-07 Work Plan

Critical research projects identified under the 2003 work plan will continue in the 2004-to-2007 period.

5.6.4 RM&E Strategy 4: Project Implementation Monitoring

Compliance monitoring, or project implementation monitoring, is necessary to determine how well management actions are implemented and is explicitly called for under NMFS RPA 163. All projects should have explicit deliverables and should be evaluated to determine how well these deliverables were met. From a biological perspective, this monitoring will help to distinguish between actions that did not work and actions that were not implemented successfully. This tracking will also assist in the programmatic crediting of actions. In addition, it is essential for the biological performance assessments of off-site mitigation actions that must be modeled using effectiveness research in combination with an accounting of the number and location of different categories of actions.

5-Year (2003-07) Outcomes

The following key outcomes are expected over the next five years:

- Develop and implement a database with capabilities to track projects under various queries.
- Develop and implement an internal compliance-auditing program that evaluates the success of achieving and maintaining project deliverables.

2003 Work Plan

A general listing of project implementation projects to occur in 2003 is provided below. Additional projects are currently under development and approval processes through the Council's Provincial Review.

- Develop and maintain an interim database system for project tracking and progress reporting.
- Develop a plan for compliance auditing.

2004-07 Work Plan

Continue the refinement and application of a project tracking system. Apply compliance auditing plan to completed projects..

5.6.5 RM&E Strategy 5: Data Management System

The complex of information obtained through the BiOp RM&E program will need to be compiled and organized in a systematic manner. At this time there is no adequate system in place. The region's

information management system is an ad-hoc distributed information system that lacks essential components, and more importantly, coherent organization, standards, protocols, shared responsibility or structure. The objective of this task will be to establish an information system or further develop existing regional information systems to support the RM&E program and related performance assessments. It will involve compiling and archiving monitoring data, derived estimates and all technical reports treating these issues. It may also involve archiving extant information. Whatever system is adopted will need to ensure timely and easy access to the information.

The Council and NMFS entered into a Memorandum of Agreement to proceed with a program for "Cooperative Regional Information System Development in the Columbia Basin." BPA is currently funding Scientific Applications International Corporation (SAIC) to complete a needs assessment and make recommendations on steps necessary to build a Cooperative Regional Information System. SAIC is expected to recommend solutions to information system problems at a number of levels, including improvement of data integrity and organizational arrangements that would be necessary to develop, operate and maintain a cooperative system. However, the report from SAIC will not be available until December 2002. It is anticipated that SAIC will recommend a more systematic approach to data and information management and accessibility. It is not expected that SAIC will solve the data integrity problems that occur in the field collection of the data, although they may recommend approaches to do this.

With the urgency to begin collecting RM&E data to satisfy the BiOp requirements, the federal RM&E Data Work Group is developing its data collection needs and protocols. The draft BiOp RM&E plan lists some key objectives for a region-wide data management system. Those objectives include: 1. meet monitoring and evaluation and scientific research needs; 2. ensure access to biological data; 3. include data pedigree and metadata and clearly distinguish primary data and derived information; 4. develop and use common protocols and techniques for data collection, development, storage and distribution; 5. promote integration and free exchange of data; 6. provide for real time input; 7. provide security; 8. design, develop, test, implement and operate a coordinated system; and 9. develop an ongoing coordination process.

The RM&E work group will coordinate and participate in the regional development of a data support system that meets the needs of the BiOp RM&E plan. Until this system is developed, a near term data support system will need to be developed and applied to meet these requirements.

5-Year (2003-07) Outcomes

- Develop and maintain an interim data management system to support immediate program needs.
- Work with the region to develop a regional data support system that meets long-term RM&E program needs.

2003 Work Plan

Specific products in 2003 include:

- Identify the data and data system requirements of the FCRPS RM&E program.
- Generate guidelines for implementing a data management RM&E program.
- Identify performance requirements for the data management RM&E program.
- Develop one or more pilot data management programs.

2004-07 Work Plan

The Action Agencies will continue to work with the region to develop a system for the efficient and effective collection, management and distribution of information relating to fish and related wildlife restoration and management in the Columbia River Basin. The system must meet information needs in relation to the ESA, Northwest Power Act, treaty trust responsibilities and other relevant requirements. This system should meet the following objectives:

- Meet monitoring and evaluation and scientific research needs and satisfy identified management, environmental and biological objectives of recovery and management efforts.
- Ensure access to biological data relating to fish and wildlife populations in the Columbia Basin; attributes of aquatic, terrestrial and marine habitats; and ecological functions and attributes of species and habitats.
- Include data pedigree and metadata and clearly distinguish primary data and derived information.

5.6.6 RM&E Strategy 6: Regional Coordination

Currently RM&E efforts focus on monitoring the requirements of listed species specified in the FCRPS BiOp. The Action Agencies recognize the broader regional needs for monitoring unlisted natural stocks, hatchery populations, and resident fish species. The need to monitor a broad range of environmental variables in geographic areas beyond those demarcated by the ESUs is identified by many different regional organizations. The FCRPS RM&E program overlaps other regional programs having their own needs and geographic coverage.

NMFS and the Action Agencies need to formulate a comprehensive plan that addresses BiOp requirements for ESA-listed stocks. Where there are opportunities to coordinate with other programs or use their monitoring data, the NMFS and Action Agencies plan to do so. NMFS and the Action Agencies are cooperatively developing this FCRPS RM&E plan with the intent that it will complement and integrate with other regional activities to the greatest extent practicable. Both the Action Agencies and NMFS recognize that the various programs have different goals and that this will limit region-wide reliance on any single monitoring program.

A regional RM&E coordination technical/Policy Group will be formed through the Federal Caucus to provide regional coordination and interface between the BiOp-required RM&E program and 1. *All-H Strategy* (including NMFS and USFWS TRT recovery planning efforts); 2. other regional federal RM&E programs (USFS, BLM, EPA); 3. regional state RM&E programs; and 4. the Council's Fish and Wildlife Program RM&E program (CBFWA, state/tribal fish agencies, subbasin planning).

6.0 COORDINATION FORUMS

The following is a list of several existing forums for Columbia Basin fish restoration activities. The Action Agencies intend to continue coordination with the region through these and other existing processes to the extent possible but will also work with states and tribes and other interested parties to improve upon our coordination efforts with the region in implementing the FCRPS BiOps.

Banks Lake Study and EIS

The Banks Lake Drawdown Study will examine the effects of an additional 5-feet reduction in the surface elevation of the reservoir during the month of August. Banks Lake is already being drafted 5 feet from full through pumping reductions that result in about 130 thousand acre feet becoming available for flow augmentation. The additional draft would leave it 10 feet from full by the end of August. This would reduce the amount of water pumped into Banks Lake by an additional 130 thousand acre feet that becomes available for flow augmentation in August. Reclamation will prepare an EIS that will describe the potential environmental, cultural, and economic impacts of the proposed action. Implementation of this action may proceed following consideration of the EIS. The EIS is scheduled for completion in time for August 2003 operational decisions.

Reclamation NEPA Compliance for 16 Tributary Sub-basin Habitat Improvements

Implementation of Reclamation's tributary sub-basin habitat improvements under NMFS BO Action 149 will require NEPA compliance prior to project implementation. Reclamation is performing programmatic NEPA for two groups of subbasins—the four priority subbasins in Idaho (Lemhi, Upper Salmon, Middle Clearwater, and Little Salmon) and the three priority subbasins in Oregon (Upper John Day, Middle Fork John Day, and North Fork John Day. Programmatic NEPA is addressing the three program components of diversion screening, migration barrier modification, and instream flows. Even after programmatic NEPA is completed, individual projects will be evaluated for site-specific impacts, such as cultural resource evaluations. These site-specific impacts will be addressed and tiered into the programmatic NEPA document. Prior to completion of programmatic NEPA, evaluations and appropriate NEPA documentation will be completed on a case-by-case basis. In addition to NEPA compliance, Reclamation will pursue programmatic ESA consultations with NMFS and the FWS as appropriate. Contact the Bureau of Reclamation for information.

NMFS Regional Forum

Development of the hydro system portion of the Plan will be coordinated through the NMFS Regional Forum. The goal of this Forum is to ensure the broadest possible technical and policy input in planning, funding and implementation decisions regarding the operation and configuration of the Federal Columbia River Power System.

Regional Forum Teams include the **Executive Committee**; the **Implementation Team**; the **Technical Management Team**; the **System Configuration Team**; and the **Water Quality Team**. Membership of the Implementation Team is open to senior program and policy level personnel from the states, Tribes and Federal agencies. The other teams and subgroups operating under the Implementation Team's guidance are open to Federal, State, and Tribal representatives with technical expertise in hydroelectric operations and/or the effects of hydroelectric operations on listed migrating and resident fish. All meetings of the Regional Forum are open to the public. Meeting minutes are distributed available for review on the NOAA Fisheries Northwest Region homepage at: www.nwr.noaa.gov/1hydrop/hydroweb/rif.htm.

Northwest Power Planning Council (Council)

The Council is an interstate agency formed by the states of Idaho, Montana, Oregon, and Washington and operating pursuant to the Northwest Power Act. The Northwest Power Act calls on BPA to use its funds and other authorities in a manner consistent with the Council's Fish and Wildlife Program. In order to ensure that actions BPA takes to fulfill BiOp responsibilities as further defined in the Plan are integrated with actions taken to implement the Council's Fish and Wildlife Program, BPA will coordinate selection and implementation of off-site mitigation actions through the Council's processes. The Council's Web site is at www.nwcouncil.org.

Sub-basin Assessment and Planning — The Action Agencies will be working closely with the Council, and with NMFS and USFWS, on sub-basin assessment and planning. For information go to www.subbasins.org.

Provincial Reviews — BPA will use the Council's Provincial Review process as the primary vehicle for soliciting project proposals to address off-site BiOp actions. The Action Agencies recognize the value inherent in the Provincial Review process that allows all proposals to be evaluated in the context of a comprehensive plan. Provincial project solicitations will identify specific BiOp implementation needs in conjunction with broader non-ESA Northwest Power Act priorities. For more information go to www.nwcouncil.org/fw/province/Default.htm

Targeted Solicitations — The preferred and primary vehicle BPA will use to solicit projects to fulfill plan requirements is the Council's Provincial Review process to ensure the best possible integration of ESA implementation with the broader goals of the Northwest Power Act's fish and wildlife goals. Targeted solicitations will likely be necessary on a limited basis. In the case of targeted solicitations/contracts BPA will coordinate with the Council to ensure integration of Plan actions with the Fish and Wildlife Program.

Artificial Production Review and Evaluation (APRE) — The Council is conducting the APRE to review all artificial production facilities and programs in the Columbia River Basin — more than 300 programs of anadromous and resident fish programs involving about 130 facilities. Hatchery program information and final recommendations from the APRE process will be coordinated with subbasin planning.

The Federal Caucus, the Federal Habitat Team, and All-H Implementation

The Action Agencies continue to have representation on the Federal Caucus pursuant to the December 2000 Memorandum of Understanding among Federal Agencies Concerning the Conservation of Threatened and Endangered Fish Species in the Columbia River Basin. Each agency will also have representation on the Federal Habitat Teamto coordinate off-site mitigation actions. Actions taken under this Plan will be coordinated with the Federal Caucus. The Federal Caucus Web site is at www.salmonrecovery.gov.

Lower Columbia River Estuary Partnership

The Action Agencies will continue to coordinate actions in the estuary with the Lower Columbia River Estuary Partnership. More detail on this coordination is described under Section 5.2.3 Habitat Priorities. The LCREP Web site is at www.lcrep.org.

Technical Recovery Teams

Information on the NMFS Technical Recovery Teams can be found at http://research.nwfsc.noaa.gov/cbd/trt/index.html.

Research, Monitoring and Evaluation

Information on the Action Agencies' RM&E Group is available on the Web at www.efw.bpa.gov/cgi-bin/FW/welcome.cgi. U.S. v. Oregon

The Action Agencies will coordinate implementation of harvest-related actions as appropriate with relevant parties, such as the U.S. v. Oregon process, and ocean management forums, such as the Pacific Fisheries Management Council and Pacific Salmon Treaty. The Action Agencies are not parties to U.S. v. Oregon and will rely on NMFS and USFWS to play an active role in assisting the Action Agencies in the necessary coordination between actions taken under this Plan and the U.S. v. Oregon Process.

7.0 ADAPTIVE MANAGEMENT AND UPDATES TO THE NMFS BIOP RPA ACTIONS

The following table updates the description of RPA actions found in the NMFS 2000 BiOp with information on current implementation. As a result, the RPA actions should now be read in conjunction with these updates.

Table 1 2000 NMFS BiOp Action Update

Action #	Action	Update
1-10		No update.
11	By September 30, 2001, the Action Agencies shall develop procedures for carrying out actions that could not be anticipated in the planning process, but that are necessary or prudent to achieve the performance standards.	The BiOp calls for the Action Agencies to develop an expedited process for implementing new or unplanned activities. The NMFS Findings Letter (July 2002) recommended that the Action Agencies formalize procedures for carrying out unanticipated actions. The informal process used during 2001 and 2002 by the Action Agencies to implement new and unplanned activities (e.g., power emergency Action Plan solicitations in 2001) has been adequate as anticipated by the BiOp. The Action Agencies will continue to informally coordinate any such actions with NMFS and, if applicable, incorporate them into implementation plans. This approach will not diminish the Action Agencies ability to achieve BiOp performance standards.
12-13		No update.
14	The Action Agencies shall operate FCRPS dams and reservoirs with the intent of meeting the flow objectives (Table 9.6-1) on both a seasonal and weekly average basis for the benefit of migrating juvenile salmon.	RPA Action 14 qualitatively recommends occasional drafts to help meet spring flow targets, but does not recommend a reservoir level or time of year from which to measure drafts. The Findings Letter mentions storage management problems and specifically notes that additional draft provided at Grand Coulee was not "significant" (p. 52 of Appendix Table A, RPA Action 18). The Action Agencies cannot determine how much draft would be generally significant, nor can they recommend that it be provided only from Grand Coulee. Therefore, the Action Agencies, in consideration of recommendations of the Technical Management Team, will determine the availability and amount of FCRPS storage draft beyond the flood control rule curve for the purpose of flow augmentation. The issue will also be addressed in the annual Water Management Plan. This clarification does not diminish the Action Agencies ability to achieve BiOp performance standards and is consistent with the adaptive management process inherent to in season flow management.
15-17		No update.

Action #	Action	Update
18	The Action Agencies shall operate the FCRPS during the fall and winter months in a manner that achieves refill to April 10 flood control elevations, while meeting project and system minimum flow and flood control constraints before April 10. During the spring, the Action Agencies shall operate the FCRPS to meet the flow objectives and refill the storage reservoirs (Albeni Falls, Dworshak, Grand Coulee, Hungry Horse, and Libby) by approximately June 30.	As clarified in RPA Action 14, the Action Agencies, in consideration of recommendations of the TMT, will determine the availability and amount of FCRPS storage draft beyond flood control rule curve for the purpose of flow augmentation. The issue will also be addressed in the annual Water Management Plan and is described in the 2003/2003-2007 Implementation Plan (Hydrosystem Strategy: Manage Water to Improve Juvenile and Adult Fish Survival, substrategy: System flow management to improve fish survival).
19-21		No update.
22	The Corps and BOR shall implement VARQ flood control operations, as defined by the Corps (1999d), at Libby by October 1, 2001, and at Hungry Horse by January 1, 2001. By February 1, 2001, the Corps shall develop schedule to complete all disclosures, NEPA compliance, and Canadian coordination necessary to implement VARQ flood control at Libby.	The Corps and BOR shall make a decision by December 2002 regarding interim VARQ flood control operations, as defined by the Corps (1999d), on whether to implement VARQ at Libby as described in the July 2002 NMFS Findings Letter.
23-29		No update.
30	For those BOR projects located in the Columbia River and its tributaries downstream from Chief Joseph Dam (Table 9.6-2), BOR shall, as appropriate, work with NMFS in a timely manner to complete supplemental, project-specific consultations. These supplemental consultations shall address effects on tributary habitat and tributary water quality, as well as direct effects on salmon survival (e.g., impingement, entrainment in diversions, false attraction to return flows, and others). These supplemental consultations shall address effects on mainstem flows only to the extent to which they reveal additional effects on the in-stream flow regime not considered in this biological opinion (e.g., flood control).	Reclamation seeks to clarify the role of its ESA consultations on Reclamation tributary projects with respect to the FCRPS RPA action. Reclamation will provide a detailed status review of the on-going consultations in its FY 2002 Progress Report and will work toward resolution of this issue with NOAA Fisheries during FY 2003.
31	BOR shall assess the likely environmental effects of operating Banks Lake up to 10 feet down from full pool during August. The assessment and NEPA compliance work shall be completed by June 2002 to determine future operations at this project by the summer of 2002.	The NEPA process is on going for this Action and the schedule defined in the BiOp has been slightly delayed due to extensive public involvement and environmental analysis for Banks Lake operations. However, the assessment and NEPA compliance is scheduled to be completed in time to determine project operations for the 2003 fish passage season. This minor delay will not diminish the Action Agencies ability to achieve the BiOp performance standards.
32-35		No update.
36	By October 1, 2002, the Corps shall develop and, if feasible, implement a revised storage reservation diagram for Libby Reservoir that replaces the existing fall draft to a fixed end-of-December elevation. One option is to evaluate variable drafts based on the El Niño Southern Oscillation	By February 2003 the Corps will complete evaluation of El Nino Southern Oscillation Index (SOI) predictions or other forecast methodologies of runoff volume that is a necessary precursor to feasibility of modifying the storage reservation diagram. By October 1, 2003 the Corps will complete

Action #	Action	Update
	Index (SOI) predictions or other forecast methodologies of runoff volume. To implement this change, the Corps shall complete successful coordination with Canada under the Columbia River Treaty.	studies to develop and, if feasible, implement a revised storage reservation diagram for Libby reservoir that replaces the existing fall draft to a fixed end of December elevation. To implement this change, the Corps will seek to reach necessary agreement with Canada under the Columbia River Treaty.
37-71		No update.
72	The Corps shall continue design development of a prototype RSW and extended deflector for testing at John Day in 2002. The Corps should synthesize evaluation results, determine the fish survival benefits of one or more RSWs or a skeleton bay surface bypass, and install the units as warranted.	The NMFS Findings Letter (July 2002) acknowledges that the prototype RSW test at John Day will be delayed from 2002 until at least 2003. The delay is considered beneficial because of unanticipated risks and new information. The Corps will continue design development of a prototype RSW and extended deflector for testing at John Day based on results of testing at Lower Granite Dam and/or other locations.
73-75		No update.
76	The Corps shall investigate, design, and construct, as warranted, a new juvenile bypass outfall at Lower Monumental Dam. Investigations shall be conducted in conjunction with spillway deflector and spill pattern optimization studies.	The Corps plans to use a decision analysis for McNary and Lower Snake projects similar to that used for Bonneville 1 Powerhouse that would include these 3 RPA actions related to Lower Monumental (76, 77, 78). ESBS design and testing has not started due to other high priority work and recent discussions regarding poor performance related to the juvenile facility support. The Corps is delaying any significant improvements to the powerhouse collection system until spill survival results are available. The spill studies are scheduled to start in 2003 pending funding and regional prioritization. The studies will include consideration of spill survival, RSW benefits, transport vs in-river, etc. and call for a decision analysis to be completed by 2005. Corps and NMFS technical staff will work with the region to develop a comprehensive plan. This clarification will not diminish the Action Agencies ability to achieve the BiOp performance standards.
77	The Corps shall investigate surface bypass (e.g., RSW) at Lower Monumental Dam, based on prototype results at other locations, and install in multiple spillway bays, as warranted.	
78	The Corps shall initiate design development and testing of extended submerged intake screens and vertical barrier screens at Lower Monumental Dam and construct units as warranted.	
79-96		No update.
97	By January 2002, the Action Agencies shall develop an analysis that compares the relative passage survival benefits of an extended-length, intake screen bypass system, a surface-collection bypass system, and hybrid alternatives at Bonneville First Powerhouse. Through the annual planning process, the Corps shall determine which of these configurations to implement.	The NMFS Findings Letter (July 2002) acknowledged that the comparative analysis should be delayed. The delay is consistent with the SCTs determination that additional information is needed before a prudent final decision can be made regarding juvenile passage alternatives for the first Powerhouse. The analysis will be indefinitely delayed depending upon corner collector information needs and ISRP review. This delay will not diminish the Action Agencies ability to achieve the BiOp performance standards.

Action #	Action	Update
98	By January 2003, the Action Agencies shall develop an analysis that compares the relative passage survival benefits of replacing existing standard-length intake screens with extended-length screens at the John Day Dam powerhouse to surface collection at one or more skeleton or spillway bays. Through the annual planning process, the Action Agencies shall then determine the need for, and the implementation priority of, these configuration alternatives.	Configuration decisions at John Day will be indefinitely delayed pending RSW testing and funding priorities. This delay will not diminish the Action Agencies ability to achieve the BiOp performance standards.
99	By January 2003, the Action Agencies shall develop an analysis that compares the relative passage survival benefits of replacing existing standard-length intake screens with extended-length screens at the Lower Monumental Dam powerhouse turbines to a removable RSW surface bypass system.	See clarification under Actions 76-78. The indefinite delay of the comparative analysis will not diminish the Action Agencies ability to achieve the BiOp performance standards.
100-119		No update.
120	The Corps shall develop improved operations for adult fishway main entrances at FCRPS dams so that the best possible attraction conditions are provided for adult migrants, both at the four Columbia River hydro projects and the four lower Snake hydro projects (where reservoir elevations are held near MOP). The Corps shall report the findings of fishway entrance flow-balancing investigations in a report to NMFS by the end of 2001 and shall continue to work through FPOM to evaluate and implement, as warranted, structural changes to satisfy fish passage plan fishway entrance criteria.	By the end of calendar year 2003, the Corps will report to NMFS the findings of fishway entrance flow-balancing investigation. This delay is needed to allow the Corps to complete the work informing the report, and will not diminish the Action Agencies ability to achieve the BiOp performance standards.
121-130		No update.
131	The Action Agencies shall monitor the effects of TDG. This annual program shall include physical and biological monitoring and shall be developed and implemented in consultation with the Water Quality Team and the Mid-Columbia PUDs' monitoring programs.	Rather than requiring "redundant and backup monitors at as many locations as the Water Quality Team determines necessary" the program will include a quality assurance/quality control program coordinated with the Water Quality Team. This would be effective and efficient and less costly. The team would provide input on determining the locations of fixed monitoring stations, spot-checking monitoring equipment needs, and the interpretations of environmental influences on monitoring accuracy. The QA/QC program would cover laboratory calibration, field instrumentation post-calibration, field performance checks, and general criteria as described by the Water Quality Team.
132-135		No update.
136	The Corps shall continue to develop and construct spillway deflectors at Chief Joseph Dam by 2004 to minimize TDG levels associated with system spill.	The Corps has attempted to get Congressional funding for detailed design and construction of flow deflectors at Chief Joseph. However, despite strong regional support, funding has not been received. The Corps will continue to aggressively pursue all available funding options for this

Action #	Action	Update
		project and expect that we will complete detailed design and construction no later than 3 years from receipt of funds.
137-142		No update.
143	By June 30, 2001, the Action Agencies shall develop and coordinate with NMFS and EPA on a plan to model the water temperature effects of alternative Snake River operations. The modeling plan shall include a temperature data collection strategy developed in consultation with EPA, NMFS, and state and Tribal water quality agencies. The data collection strategy shall be sufficient to develop and operate the model and to document the effects of project operations.	The Action Agencies will develop and coordinate with NMFS and EPA on a plan to model the Snake River water temperatures and effects of alternative project operations by October 2003. Clarifies that the initial modeling be limited to Snake River water temperatures and allows adequate time for development of a monitoring data base, regional collaboration on the selection of the model(s) to be used and application of models to management challenges. NMFS Findings Letter identifies this as a beneficial change because the final product should be an improvement of the product envisioned in the Opinion because of the additional coordination.
144-148		No update.
149	BOR shall initiate programs in three priority subbasins (identified in the Conceptual Recovery Plan) per year over 5 years, in coordination with NMFS, FWS, the states and others, to address all flow, passage, and screening problems in each subbasin over 10 years. The Corps shall implement demonstration projects to improve habitat in subbasins where water diversion related problems could cause take of listed species. Under the NWPPC program, BPA addresses passage, screening, and flow problems, where they are not the responsibility of others. BPA expects to expand on these measures in coordination with the NWPPC process to complement BOR actions described in the action above.	The Action Agencies agree to work with NMFS to clarify the language in this action and resolve questions related to the appropriateness of priority subbasins during FY 2003.
150	In subbasins with listed salmon and steelhead, BPA shall fund protection of currently productive non-Federal habitat, especially if at risk of being degraded, in accordance with criteria and priorities BPA and NMFS will develop by June 1, 2001.	BPA and NMFS developed criteria and priorities that BPA is using for funding decisions.

Action #	Action	Update
151	BPA shall, in coordination with NMFS, experiment with innovative ways to increase tributary flows by, for example, establishing a water brokerage. BPA will begin these experiments as soon as possible and submit a report evaluating their efficacy at the end of 5 years.	The intent of this action is to test the efficacy of innovative transactional approaches to secure instream flows in a timely and cost-effective manner through competitive processes. BPA, in coordination with NMFS, as well as non-profit, state and local entities experienced in developed or developing transactional approaches, has developed the Columbia Basin Water Transactions Program (CBWTP) for purposes of implementing Action 151. BPA has selected the non-profit National Fish and Wildlife Foundation (NFWF), as the regional entity to implement this program. Action 151 presumes that NFWF will develop and implement transactional strategies to competitively secure water for instream flows by processing water solicitations, and completing transactions including, but not limited to, the lease and purchase of water and water rights in accordance with state laws. It is expected that NFWF will engage the appropriate regional, state, and local entities, including for example water trusts, (existing or developed during the life of this Action), whose involvement would benefit the implementation and testing of transactional strategies. NMFS agrees that Action 151 funding may be applied to securing actual water to increase tributary flow as part of the development of innovative transactional strategies. BPA may use Action 151 as an avenue for purchasing priority time-sensitive flows that become available between the Council's funding cycles. NMFS does not object if BPA wants to make accounting for implementation easier by consolidating all its water acquisitions under RPA 151, but points out that 151 is one of the few RPAs that cites a specific budget recommendation. Therefore, accounting for other measures under Action 151 while limiting expenditures to the same amount would be a defacto reduction in NMFS expectations of implementation under this action. Action 151 directs BPA to demonstrate the capacity of transactional strategies to secure instream flows in a timely and cost effective manner over a 4-year period. BPA has selected NFWF with this task. The Action itself does not restrict NFWF from testing any transactional approach to secure instream flows through competitive processes. The costs associated with water transaction derived from NFWF's transactional approaches to develop competitive processes to secure instream flows will be evaluated at the end of 5 years by an independent third party. NFWF and BPA will develop a design by which Action 151 implementation may be evaluated by an independent third party. Based on this independent evaluation, BPA will submit a report to NMFS at the end of 5 years evaluating the efficacy of these innovative ways to increase tributary flows and a decision will be made whether to continue it. NMFS agrees to provide to BPA a preliminary methodology for ascertaining instream flows that meet ESA requirements by December 1, 2002 or will request that BPA independently fund development of a methodology in consultation with

Action #	Action	Update
		NMFS. If NMFS provides a preliminary methodology by December 1, 2002, then BPA will enter into discussions with NMFS to discuss options for completion of the methodology and funding its implementation. NMFS has also noted that that RPA 149 also addresses flow problems. NMFS agrees that BPA can address its RPA 149 instream flow responsibilities through Action 151 projects that do not go through the Council process but will also be funding Council projects under 149 that address flow as well as passage and screening problems.
152		No update.
153	BPA shall, working with agricultural incentive programs such as the Conservation Reserve Enhancement Program, negotiate and fund long-term protection for 100 miles of riparian buffers per year in accordance with criteria BPA and NMFS will develop by June 1, 2001.	It is expected that a two-tier approach will initially be necessary to leverage agricultural incentive programs to fund long-term protection for riparian buffers. Tier 1 will be a continued effort to develop and implement a program for establishing long-term protection for lands enrolled in these programs. Tier 2 consists of continued support of CREP implementation and other similar federal programs as needed to develop, refine, implement and support the long-term protection program. To this end, BPA, working with NMFS, FSA, NRCS, the States, and others, will collaboratively develop and implement a multi-agency program to strengthen the CREP in areas within the range of listed fish species. The objective of this multi-agency program is to ultimately achieve long-term or permanent protection of 100 miles of riparian habitat per year. NOAA and BPA will annually evaluate the implementation of the multi-agency program and conclude whether and how the program could be adjusted for more effective implementation.
154-168		No update.
169	The Action Agencies shall fund the development of NMFS-approved HGMPs for implementation, including plans for monitoring and revising them as necessary as new information becomes available. HGMPs have to be completed first for the facilities and programs affecting the most at-risk species (Upper Columbia and Snake River ESUs), followed by those affecting mid-Columbia, and then the Lower Columbia ESUs. HGMPs for all the Columbia basin hatchery programs and facilities should be completed (and approved by NMFS) by the 3-year check-in.	NMFS and the Action Agencies have developed a 3-phased process for producing NMFS-approvable HGMPs. Phase I will be integrated with and contracted under APRE. Using this approach has expedited contracting, reduced inefficiencies and accommodated regionally coordinated efforts. Phases II and III will be accomplished by states and tribes through new direct contracts or modification of existing subcontracts (e.e. under LSRCP with USFWS). NMFS acknowledges that although delays have occurred, completion by the deadline is possible.
170	Using new authorizations and appropriations and/or BPA funds as necessary and appropriate, the Corps, working with USFWS, shall oversee the design and construction of capital modifications identified as necessary in the HGMP planning process for Lower Snake River Compensation Plan anadromous fish hatchery programs. These improvements shall begin immediately after the relevant HGMPs are	As the HGMPs are completed and approved, the Corps, USFWS, and NMFS will coordinate implementation schedules and funding mechanisms to expedite recommended construction modifications and operations and maintenance reforms. No new processes are required to secure BPA funding. Prompt review (Council's 3-step Hatchery Review process) and implementation (through mid-year reallocations) can be used. Non-BPA

Action #	Action	Update
	completed and approved by NMFS, and shall be completed as expeditiously as is feasible. BPA shall provide for the operations and maintenance costs of these reforms and shall reimburse the Federal Treasury for an appropriate share of the capital costs. The Corps shall have begun to implement reforms for programs affecting the most at-risk species by the 3-year check-in.	avenues of funding (authorizations and appropriations) will require more agency lead time. NMFS recognizes that the planning and design necessary to make required modifications shall be construed to fulfill the requirement to "…have begun to implement reforms for programs affecting the most at-risk species by the 3-year check-in." NMFS acknowledges that implementation of all reforms will require completion of relevant ESA requirements (e.g. Section 7, Section 10, or 4(d) consultations).
171		No update.
172	The Corps shall implement the reforms identified in the HGMP planning process for the Corp's Columbia River basin mitigation anadromous fish hatchery programs, beginning immediately after the relevant HGMPs are completed and are approved by NMFS. The work shall be completed as expeditiously as feasible. BPA shall fund the operations and maintenance costs of the reforms and shall reimburse the Federal Treasury for an appropriate share of the capital costs. The Corps shall have begun to implement reforms for the programs affecting the most at-risk species by the 3-year check-in.	The Corps will implement the HGMP reforms as the HGMPs are completed. NMFS recognizes that the planning and design necessary to make required modifications shall be construed to fulfill the requirement to "…have begun to implement reforms for programs affecting the most at-risk species by the 3-year check-in." NMFS acknowledges that implementation of all reforms will require completion of relevant ESA requirements (e.g. Section 7, Section 10, or 4(d) consultations).
173	BPA shall implement the reforms identified in the HGMP planning process for Federal and Federally funded hatcheries, beginning immediately after the relevant HGMPs are completed and approved by NMFS. The work shall be completed as expeditiously as possible. BPA shall have begun to implement reforms for the programs affecting the most at-risk species by the 3-year check-in.	BPA will implement the HGMP reforms as the HGMPs are completed. BPA and NMFS will work with hatchery operators to coordinate implementation schedules and funding mechanisms to expedite recommended construction modifications and operations and maintenance reforms. No new processes are required to secure BPA funding. Prompt review (Council 3-step Hatchery Review process) and implementation (through mid-year reallocations) can be used. NMFS recognizes that the planning and design necessary to make required modifications shall be construed to fulfill the requirement to "…have begun to implement reforms for programs affecting the most at-risk species by the 3-year check-in." NMFS acknowledges that implementation of all reforms will require completion of relevant ESA requirements (e.g. Section 7, Section 10, or 4(d) consultations).

Action #	Action	Update
174	Working through regional prioritization processes to the extent feasible and in coordination with NMFS, BPA shall collaborate with the regional, state, Tribal, and Federal fish managers and the Pacific States Marine Fisheries Commission to enable the development and implementation of a comprehensive marking plan. Included in this action are the following four steps: 1. Develop a comprehensive marking strategy for all salmon and steelhead artificial production programs in the Columbia River basin by the end of 2001. 2. Provide funding by March 1, 2001, to begin marking all spring chinook salmon that are currently released unmarked from Federal or Federally funded hatcheries. 3. Provide funding, beginning in FY 2002, to implement the Action Agencies' share of the comprehensive marking plan for production not addressed in (2) above. 4. Obtain funding contributions as appropriate for additional sampling efforts and specific experiments to determine relative distribution and timing of hatchery and natural spawners.	The NMFS Findings Letter (July 2002) acknowledges that development of the comprehensive marking strategy is delayed to allow regional interests to work through policy and technical issues. Consequently, the Action Agencies will develop the strategy for all salmon and steelhead artificial production programs in the Columbia River basin by the end of calendar year 2002. The subsequent steps will follow. Taking into account Step 2, which the Action Agencies have implemented, a delay in development of the overall plan will not diminish the Action Agencies ability to achieve BiOp performance standards.
175	BPA shall, in coordination with NMFS, USFWS, and the relevant state and Tribal comanagers, fund the four-step planning process described above as quickly as possible and, if so determined by that process, implement safety-net projects as quickly as possible at least for the following salmon and steelhead populations: 1) A-run steelhead populations in the Lemhi River, main Salmon River tributaries, East Fork Salmon River, and Lower Salmon River; 2) B-run steelhead populations in the Upper Lochsa River and South Fork Salmon River; and 3) spring/summer chinook populations in the Lemhi, East Fork, and Yankee Fork Salmon rivers, and Valley Creek.This action should be included in a package of early implementation projects. The required planning process should be completed by the end of 2001 so implementation of high-priority, safety-net actions can begin with brood year 2002.	The NMFS Findings Letter (July 2002) acknowledged that the planning process was delayed by up to one year to allow co-managers to better define and coordinate the components of the program. The planning process was expanded to include analysis of 38 populations instead of the original 10 populations specified in Action 175. Planning was delayed for approximately six months while the consolidated Safety-Net Artificial Propagation Program (SNAPP) proposal was undergoing review and approval through the Provincial Review process. As a result of this review, the SNAPP planning process was more closely aligned and coordinated with the efforts of the Interior Columbia Technical Recovery Team, making the SNAPP schedule somewhat dependent on the TRT's completion of it's work products. Because of all of these changes to the SNAPP program , the end of 2003 is now a realistic target date for completion of the initial products from SNAPP, the NMFS-approved HGMPs for contingency safety-net projects.

Action #	Action	Update
176	BPA shall, in coordination with NMFS, USFWS, and the relevant state and Tribal comanagers, fund the development of HGMPs for the Grande Ronde and Tucannon spring/summer chinook safety-net programs. Based on previous risk assessments, conservation hatchery programs consistent with the safety net concept already have begun for three populations of spring/summer chinook on the Grande Ronde River and for the single Tucannon River population. Portions of these programs have been accommodated temporarily, but unsatisfactorily, by crowding into existing facilities, with resultant compromises with other ongoing programs. Each conservation hatchery program would benefit from development of an HGMP that identifies the capital and operational needs for these programs and implementation of the HGMP's findings. The Nez Perce Tribe and Confederated Tribes of the Umatilla Indian Reservation are well along in planning for the North East Oregon Hatchery. Coordination between the existing LSRCP safety-net program and North East Oregon Hatchery planning processes is already occurring to a large degree and should continue among USFWS, NMFS, the states of Oregon and Washington, and the Tribes to provide the best, most efficient and expedient, integration of hatchery programs to meet the resource needs of this region. This safety-net action item should be completed by the end of 2001 to accommodate facility development beginning in 2002.	Completion of these safety-net action items will be delayed until 2003, accommodating plans for facility development in late 2003 or the beginning of 2004. Because the Tucannon spring Chinook salmon has a fixed, 5-brood year lifespan, no additional major capital modifications are anticipated. Delay for the Grand Ronde program is not anticipated to diminish the Action Agencies ability to achieve objectives for this program..
177	In 2002, BPA shall begin to implement and sustain NMFS-approved, safety-net projects.	Existing safety-net projects (Snake River spring/summer chniook and Snake River sockeye captive brood programs) are being sustained when required. (The Tucannon program has a planned phase-out date). Any new safety-net projects that may result from SNAPP will be implemented and sustained in compliance with respective HGMPs. The intent of this RPA has been accomplished and/or will not diminish the Action Agencies ability to achieve the BiOp performance standards.
178	BPA shall commit to a process whereby funds can be made quickly available for funding the planning and implementation of additional safety-net projects for high-risk salmon and steelhead populations NMFS identified during the term of this biological opinion.	BPA and NMFS will work within existing processes (e.g., Council's 3-step Hatchery Review Process, mid-year reallocations, targeted solicitations) to fund planning and implementation of additional safety-net projects as expeditiously as possible.
179		No update.
180	The Action Agencies and NMFS shall work within regional prioritization and congressional appropriation processes to establish and provide the level of FCRPS funding to develop and implement a basinwide hierarchical monitoring program. This program shall be	NMFS and the Action Agencies have developed a detailed plan for this Action item, including pilot scale projects. Ongoing RM&E consistent with the plan continues and is being augmented by the Action Agencies and NMFS. We are working toward implementation of all aspects of the plan.

Action #	Action	Update
	developed collaboratively with appropriate regional agencies and shall determine population and environmental status (including assessment of performance measures and standards) and allow ground-truthing of regional databases. A draft program including protocols for specific data to be collected, frequency of samples, and sampling sites shall be developed by September 2001.	In 2003, this will include a ramp up of RM&E projects, including pilot studies in one subbasin each for the Lower Columbia (John Day); the Upper Columbia (Wenatchee); and the Snake (Grand Ronde or a Snake River site located in Idaho)
181	The Action Agencies and NMFS shall work within regional prioritization and congressional appropriations processes to establish and provide the appropriate level of FCRPS funding for a program to acquire and digitize aerial or satellite imagery of the entire Columbia River basin once every 3 to 5 years.	The Action Agencies and NMFS agree that the anadromous fish portion of the Columbia River Basin is the appropriate area of coverage for this Action. The Action Agencies and NMFS also agree that there is a need to determine the appropriate spatial and temporal level for acquiring aerial or satellite imagery. NMFS and the Action Agencies will conduct, and the Action Agencies will fund, two pilot studies in 2003 to test the use of analytical tools associated with aerial or satellite imagery. NMFS will develop the scope of work for both pilot projects. The pilot studies will be conducted in a manner that searches for efficiencies to reduce the geographic scope as possible. The two studies include: a. Develop John Day River Anadromous Fish Land Use/Land Cover data collection and analysis protocols, extending methods in Ms/Sw 35016 proposal. b. Use SWAM indicators and develop the Land Use/ Land Cover classification in the Upper Salmon River for both medium and high resolution satellite imagery. The Action Agencies will conduct a comprehensive review of existing and proposed aerial and satellite imagery, including the analytical use of the imagery, for the anadromous portion of the CRB. The Action Agencies will contract the review for completion by September 2003. The Action Agencies will use the pilot studies and comprehensive review described above to identify the appropriate level of Action Agency funding to supplement ongoing aerial and satellite imagery programs. The Action Agencies will attempt to develop and/or participate in a collaborative multi-agency program to determine and acquire their appropriate share of imagery.
182	The Action Agencies and NMFS shall work within regional priorities and congressional appropriations processes to establish and provide the appropriate level of FCRPS funding for studies to determine the reproductive success of hatchery fish relative to wild fish. At a	The Action Agencies and NMFS are reviewing Technical Recovery Team products and consulting with the TRTs to identify populations potentially affected by hatchery fish by December 2002. The Action Agencies and NMFS, working with the RM&E Work Group, will establish priorities for

Action #	Action	Update
	minimum, two to four studies shall be conducted in each ESU. The Action Agencies shall work with the Technical Recovery Teams to identify the most appropriate populations or stocks for these studies no later than 2002. Studies will begin no later than 2003.	hatchery effectiveness studies, taking into account information needs across ESUs. The specific number and location of studies are still to be determined. Some studies may apply to more than 1 ESU and some, but not all, studies will begin in 2003. A study will not be required for sockeye.
183	Initiate at least three tier 3 studies (each necessarily comprising several sites) within each ESU (a single action may affect more than one ESU). In addition, at least two studies focusing on each major management action must take place within the Columbia River basin. The Action Agencies shall work with NMFS and the Technical Recovery Teams to identify key studies in the 1-year plan. Those studies will be implemented no later than 2003.	The Action Agencies solicited for these types of projects through the Mainstem Provincial Review process, but did not receive adequate proposals. As a result, BPA will include these types of projects in an upcoming Request for Proposals. The Action Agencies expect to have new representative projects under way in 2003, as well as continuing projects.
184	The Action Agencies and NMFS shall work within regional prioritization and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for a hatchery research, monitoring, and evaluation program consisting of studies to determine whether hatchery reforms reduce the risk of extinction for Columbia River basin salmonids and whether conservation hatcheries contribute to recovery.	The NMFS Findings Letter (July 2002) noted that the Action Agencies lacked a coordinated program and that the issue needed to be addressed promptly if the objectives of the action are to be adequately met. The Action Agencies respond that the TRTs have had a slow start in prioritizing where this research might take place. The Action Agencies expect that the TRT's will have completed their workload enough to make recommendations and prioritize areas in late 2003 or early 2004. The RM&E Plan is being written and will include an evaluation of hatchery reforms. The Action Agencies will contribute an appropriate share of funding to this action, but are not expected to be the sole funder.
185-186		No update.
187	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies and analyses to evaluate relationships between ocean entry timing and SARs for transported and downstream migrants.	Complexity of program warrants extension of timeframe. NMFS staff have been extensively involved in developing the needed studies and associated requirements for additional time. The Action Agencies will contribute an appropriate share of funding to this action, but are not expected to be the sole funder.
188-195		No update.
196	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies to develop an understanding of juvenile and adult salmon use of the Columbia River estuary. These studies support the actions to develop criteria for	Studies of adult use of the Columbia River estuary were given a low priority at the Scientific Review Working Group (SRWG) and no proposals were received. The Action Agencies recognize the requirement for adult studies and are working with NMFS to develop a study plan that identifies the needed studies by December 15, 2002..

Action #	Action	Update
	estuarine restoration (Action 158), restoration planning (Action 159), and implementation (Action 160) in Section 9.6.2.2.	The Action Agencies are working with NMFS to establish the scope, including identifying components and responsibilities for those components for Columbia River estuary research. The appropriate funding levels will be established through this process and the Action Agencies will use their available funding sources, such as CRFM, O&M, GI for the Corps, to meet their requirements..
197	The Action Agencies and NMFS shall work within the annual planning and congressional appropriation processes to establish and provide the appropriate level of FCRPS funding for studies to develop an understanding of juvenile and adult salmon use of the Columbia River plume.	Studies of adult use of the Columbia River plume were given a low priority at the Scientific Review Working Group (SRWG) and no proposals were received. The Action Agencies recognize the requirement for adult studies and are working with NMFS to develop a study plan that identifies the needed studies by December 15, 2002. The Action Agencies are working with NMFS to establish the scope, including identifying components and responsibilities for those components for Columbia River plume research. The appropriate funding levels will be established through this process and the Action Agencies will use their available funding sources, such as CRFM, O&M, GI for the Corps, to meet their requirements..
198	The Action Agencies, in coordination with NMFS, USFWS, and other Federal agencies, NWPPC, states, and Tribes, shall develop a common data management system to track their contributions to the programmatic and biological performance requirements of the BiOp..	The data management system will serve the Action Agency information needs for BiOp implementation and assessment, but may not include all the information requirements for fish populations, water quality, and habitat data.
199		No update.