

**DRAFT**

**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

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# 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.**

<b>Andronomous Fish Populations (12)</b>	
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
<b>Freshwater Fish Populations (2)</b>	
Bull trout, Kootenai River white sturgeon	

Planning for fish conservation measures occurs at two levels: a series of rolling five-year implementation plans, and a corresponding annual series of one-year implementation plans. Five-year implementation plans provide the conceptual foundation and the management framework for coordinating actions to further recovery over the ensuing five years. One-year implementation plans summarize specific measures and provide detail on what is planned for the next fiscal year. 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 first five-year plan, 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.

The first one-year plan, Endangered Species Act 2002 Annual Implementation Plan for the Federal Columbia River Power System (2002 1-Year Plan) was issued in final form in November 2001. The 2002 1-Year Plan provided details about the planned measures; and, summarized expected modifications from the BiOps.

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. (See box on next page.)

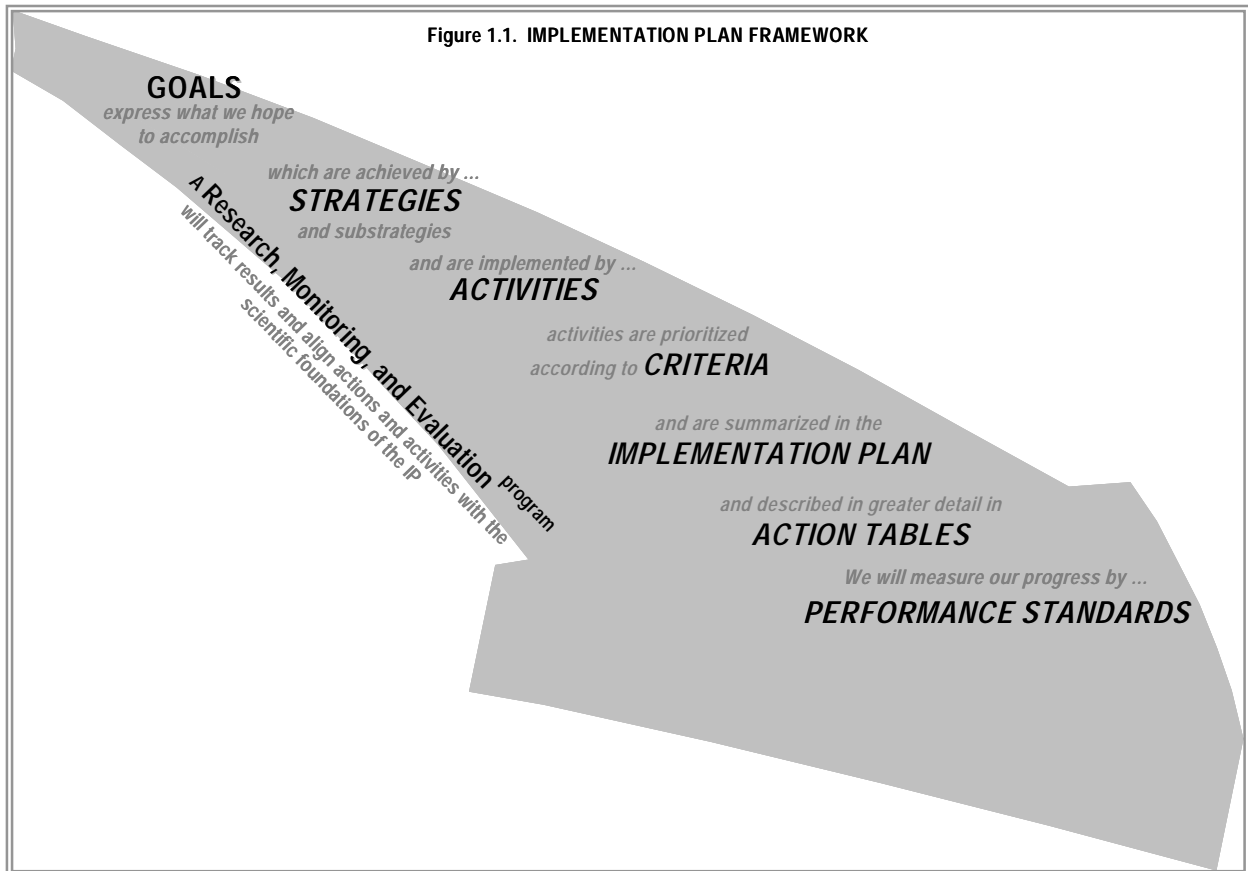
In July 2002, NMFS issued a Findings Letter to the Action Agencies regarding the adequacy of their 2001 implementation efforts and 2002 1-Year Plan. NMFS found that the Action Agencies had made sufficient progress implementing hydrosystem improvements and off-site mitigation measures in 2001 and through the 2002 1-Year Plan. The Findings Letter also emphasized areas where future efforts should be focused.

**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.

**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, effective use of Action Agency resources, 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 several regional plans, and the NMFS and USFWS BiOps.

## 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 hydro system 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 Five-Year Action Tables are met. Performance standards will be adjusted over time.

## 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 — **Hydro System 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 special ESU will be incorporated into the 5-Year Plan. Strategies may also be adjusted as new data are developed.

## Priorities

Within strategies, priorities and outcomes are identified for the next five years. There are more than 200 actions called for in the NMFS and USFWS BiOps. Some are specifically targeted for implementation within the next five 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 or appropriate to fully implement all of the actions identified in the BiOps in the next five years. For these reasons, the Plan identifies priorities and considers available science information based on the ability to achieve the survival requirements of ESA-listed fish. Priorities within each category, and eventually across all the Hs, will be adjusted over time.

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## 1.3 Structure of the 2003/2003-07 Plan

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This Plan is different than previous implementation plans in that the five- and one-year plans have been combined into a single document. This allows a better understanding of the interrelationship of the two plans; particularly, how the five-year plan provides a broader context for the one-year plan. Construction projects and research studies which span several years, for example, may only be discussed piecemeal in

the one-year plan, whereas the five-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' five- and one-year implementation plans, the structure of this year's document, how stakeholders' comments on 2002 Plans were incorporated in this year's Plan, and how readers can comment on this year's Plan.

**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 five- and one-year objectives for fish recovery actions in the FCRPS. The five-year portion serves as a "big picture" blueprint that organizes collective efforts by the three Action Agencies to achieve certain results by 2007. The one-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 – Where to Get Involved**

Lists the regional forums and other entities with which the Action Agencies coordinate fish recovery measures, and contacts so interested parties can get involved.

**Section 7.0 – Adaptive Management and Proposed Modifications of the BiOps**

Discusses changes to BiOp requirements recommended by the Action Agencies, based on experience gained through the process of implementing fish recovery measures in 2001 and 2002.

**Appendix A – Five-Year Action Tables**

Provides lists of specific projects the Action Agencies propose to implement over a five-year period, as well as in Fiscal Year 2003 (FY03), based on the strategies and priorities for Hydro, 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. These timetables and priorities match those presented in the NMFS and USFWS BiOps. Ongoing actions by the Action Agencies are also included.

As expected, the implementation plans are dynamic and continually evolving as information and experience advance. Each year, new 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

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### 1.4.1 Responses to comments received on last year's draft 2002-06 ESA Implementation Plan

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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 discussion, written letters, and other opportunities. Many of those comments are reflected in the actions included in this Plan.

In this section, we summarize and respond to key comments received. Comments from states and tribes, listed first below, primarily addressed BiOp implementation processes. Comments addressing specific projects are then summarized under the appropriate strategy heading (hydro, habitat, hatchery or harvest).

This Plan does not address the numerous comments expressed that were contrary to the recommendations provided by NMFS and USFWS in their BiOps. Those comments are best directed to those regulatory agencies.

#### State Comments

**States want to participate in regional forums, such as the RM&E Technical Oversight and Data Support System committees** — We recognize the importance of regional coordination, especially when implementing an All-H approach to further the recovery of ESA-listed fish. 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 have been formed to develop and coordinate the components of the comprehensive RM&E plan. The work groups include an Action Effectiveness work group, Hydro RM&E work group, Hatchery work group, Estuary/Ocean work group, Data Management work group, and Regional Coordination work group (the technical oversight and data support system committees have been replaced by these work groups). The Regional Coordination work group will invite participation from the Council, NMFS, USFWS, states, tribes, and others in order to encourage increased participation.

**States want to be included 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 off-site 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.

**Implementation should be consistent with state laws and policies** — We agree that state laws and policies should be considered when implementing our programs and projects. The Council's subbasin planning processes 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.

**Implementation plan needs to better identify and acknowledge resident fish priorities** – We concur, and have identified the five-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 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 the 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.

**Need more clarification and understanding of how the Council's Fish and Wildlife Program integrates with the implementation plans** – We understand the need to define how these processes interrelate. The Action Agencies will rely primarily on using the Council Provincial Review process 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.

**Need more clarity about Action Agency responsibilities to implement actions, measures, etc., so the states and tribes can figure out how they need to work with them** – We agree that more clarity is helpful and have tried to do so in this Plan by identifying specific five-year strategic outcomes, specific one and five-year work plans to lead us towards achieving those outcomes, and detailed project tables. The Federal Caucus is also attempting a similar effort. We will be meeting with states, tribes, and others in August or September to discuss and finalize the Plan. Through these individual discussions, we believe that the states, tribes, and others will be able to determine how to get involved in BiOp implementation.

**Want to know how federal/state/tribal priorities will be balanced, especially between upstream and downstream water uses** – Hydrosystem operation priorities are provided in the BiOps and are reflected in the Action Agencies' 1- and 5-Year Implementation Plans and the annual Water Management Plan. Implementation of these priorities, given actual in-season conditions, are coordinated through the NMFS Regional Forum's in-season management process (Technical Management Team and Implementation Team {TMT and IT}).

## **Tribal Comments**

**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 off-site 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 helps to 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 conduct a series of annual workshops to productively engage others in BiOp implementation planning. Furthermore, throughout this Plan the Action Agencies have identified other regional coordination forums involved with BiOp implementation activities so that the states, tribes, and others can determine how to get involved.

**The tribes would like to remind the federal agencies that subbasin restoration must include cultural, socio-economic and tribal trust considerations** - 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-element, 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 to inform their decisions and to achieve an appropriate balance.

## **Hydrosystem responses**

There is general support for many of the ongoing water management activities that have been evolving in the region for the past two decades. These include the use of flow augmentation during juvenile fish migration, the use of project spills and transportation for improved juvenile fish survival, the continued effort to modify fish passage facilities at dams, and the implementation of VARQ flood control for increased resident and anadromous fish benefits. Many also recognized the need for a balanced hydro operation that benefits listed fish species while maintaining a reliable electricity supply.

Comments regarding water quality are being addressed through the regional development of a comprehensive water quality planning effort in order to develop a mainstem Water Quality Plan as described in Appendix B of the NMFS BiOp. The Action Agencies are also installing spillway modifications to reduce total dissolved gas levels and improved juvenile fish survival at mainstem dams. Further information is available under Hydrosystem substrategy 1.3.

The Action Agencies will continue to respond to input on system operation and configuration priorities through the NMFS Regional Forum.

Many comments were received regarding balancing activities to benefit anadromous and resident fish. While our emphasis in this Plan is on ESA-listed anadromous and resident species, the Action Agencies believe that the All-H approach implemented through our strategies will benefit non-listed fish and wildlife species.

## **Habitat responses**

The Action Agencies are in general agreement with many of the comments on habitat actions received on last year's implementation plans. Some of the comments reflected the need to better describe how our ESA implementation activities would integrate with the Council's Fish and Wildlife Program. A related comment involved timing and prioritization of projects given the rolling nature of the Provincial Review process and subbasin planning. Several comments received supported the continuation and initiation of habitat work in several subbasins. Concern was also expressed about ESA priorities precluding actions to benefit non-ESA species or being implemented only in high priority subbasins. We have tried to address these and other comments in this Plan.

Some parts of the Action Agencies habitat program are fairly clear cut, such as Reclamation actions under RPA 149, while others are less well defined, such as the plan for restoration of habitat in the Columbia River estuary. The Action Agencies will continue to work with the region on a localized basis to assure that actions are coordinated with actions of other parties, and that federal funding is leveraged to provide the largest benefits for the money spent.

Reclamation will have personnel in each of the subbasins where it is concentrating efforts to provide maximum liaison opportunity with farmers and irrigators wishing to participate in the program of irrigation screening and barrier removal.

Action Agency participation in subbasin planning will provide a means of coordinating with state, tribal and local efforts on a subbasin or watershed level. The agencies intend to play an active role in the planning process and have committed to coordinate off-site actions including habitat actions through this process.

In the Columbia River estuary, the Corps, NMFS and BPA are working with the Lower Columbia River Estuary Program (LCREP) to link LCREP efforts to subbasin planning and to take advantage of LCREP partnerships with local watershed groups and other parties so that federal dollars can be leveraged to the best use and so that restoration efforts will reflect priorities that all parties can agree on or accept.

Performance standards for off-site actions have not yet been established, but these will guide actions in the habitat effort and will signal when habitat goals have been accomplished. The Action Agencies are working with the NMFS Technical Recovery Teams (TRTs) to zero in on areas needing attention and to establish performance measures and standards that will indicate progress.

The actions called for in the NMFS BiOp for salmon and steelhead habitat are the main focus for this Plan. Actions for listed resident fish in the Columbia River Basin (bull trout and Kootenai River white sturgeon) will also be addressed, particularly through the Council's subbasin planning process. While the Action Agencies are not targeting unlisted species, many of the actions will benefit those species as well, and will contribute to healthier ecosystems. We are proceeding with actions throughout the basin, although we are attempting to focus on priority subbasins.

The Action Agencies will continue to work with states, tribes, watershed councils and other local groups on habitat restoration actions and through the Council's subbasin planning process to optimize benefits and assure the best use of available resources. The NMFS BiOp looks to the Council's subbasin plans as an appropriate vehicle for regional coordination of activities for fish and wildlife enhancement. We do not yet have a perfect habitat plan, and while there are many things we know about habitat needs for salmon and steelhead, there are many unknowns. We are approaching the Plan on several fronts, to do the known actions now, and use subbasin planning and RM&E results to guide future actions.

## **Hatchery Responses**

Comments were received on the Action Agencies implementation of hatchery activities. Some of these comments addressed scheduling and priorities, U.S. vs. Oregon coordination, the safety-net program, and Hatchery Genetic Management Plans (HGMPs).

Some suggested that the Action Agencies coordinate their hatchery activities through the U.S. vs. Oregon established process. The Action Agencies have listed U.S. vs. Oregon as a forum for regional coordination under Hatchery Substrategy 2.1 and Hatchery Strategy 4. The Action Agencies are not parties to U.S. vs. Oregon, but NMFS (the agency approving HGMPs) and USFWS (responsible for Lower Snake River Compensation Plan hatchery management) are parties.

Responding to concerns of the Shoshone-Bannock Tribes about the hatchery safety-net program, BPA is providing funds for their participation in the 2003 Safety-Net Artificial Production Program planning process.

The Council suggested that the implementation plans consider the Artificial Production Advisory Committee (APAC) work plan and specifically use that schedule for BiOp implementation or clearly state where the schedules should be altered. In 2002, the Council's Artificial Production Review Evaluation (APRE) included data collection for Phase 1 of the HGMPs called for in the BiOp.

Comments also called for a central repository for HGMPs. As indicated in Section 5.3 of this Plan, all HGMPs will be submitted to NMFS for approval and NMFS will serve as the central repository.

## **Harvest Responses**

The Action Agencies generally agree with harvest comments submitted on last year's plans. Many of the comments related to either the commitment of resources and/or priority associated with actions under the harvest strategy. One commenter questioned the assumption that listed fish are harvested at the same rate as stronger stocks. Many of the comments/suggestions are addressed in the current Plan, specifically the testing of selective fishing gear to facilitate the development of selective fishing strategies and commencing the development and implementation of a comprehensive marking plan. Our strategies describe a methodical approach to address RPA harvest actions that should be responsive to the comments submitted.

Other priorities not currently associated with a project should be addressed through the Mainstem/Systemwide Provincial Review process with anticipated project activity to begin by FY03.

The Action Agencies question the assertion by one reviewer that even the elimination of fisheries would yield little biological benefit. Harvest rates for some stocks remain high; NMFS analysis shows that recovery would occur on three ESA stocks with the elimination of harvest. The Action Agencies do not support the elimination of harvest; however, opportunities that reduce harvest impacts on some ESA stocks are a priority under the BiOp and this Plan. The Action Agencies' strategies outlined in this Plan emphasize opportunities where impacts to listed stocks might be reduced while maintaining catch of stronger stocks.

### **1.4.2 How to comment on this year's Plan**

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The Action Agencies are accepting comments on this draft for incorporation into the final Plan due for release Sept. 30, 2002. Because we are better able to incorporate comments into five-year or long-term implementation planning, we are most interested in receiving comments that suggest opportunities for longer term beneficial changes. While we do have some ability to modify the 2003 portion of the Plan, some of those activities are either ongoing or already being prepared for immediate or near-term implementation. Contracting and budgeting cycles also require advance planning and could limit our ability to add some activities next year.

To facilitate state, tribal and public comment on this draft Plan, we are scheduling a series of meetings with states, tribes and others. We ask you to submit your comments to us by August 31, 2002.

Comments can be e-mailed to: [federalcaucus@bpa.gov](mailto: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 *Conservation of Columbia Basin Fish: Final Basinwide Salmon Recovery Strategy* (All-H Paper). 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 five to 10 years.
- Establish increasing trends in naturally sustained fish populations in each sub-region 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.

The Action Agencies' short-term goals for anadromous and resident fish between 2003 to 2007 are presented in the Five-Year Action Tables in Appendix A and associated work plans. In accordance with

the NMFS BiOp, progress will be assessed in achieving short- and long-term goals in 2003, 2005, and 2008. The Action Agencies will meet the various timelines prescribed for actions in the USFWS BiOp.



### 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.

In addition, a crediting system tied closely to performance standards and to the RM&E program will keep score on how well mitigation objectives prescribed in the NMFS BiOp are being met. A relatively simple crediting system based primarily on implementing BiOp actions and physical performance measures has been developed in conjunction with NMFS. The crediting system will improve as performance measurement tools are refined through experience and RM&E. In 2005, and 2008, when progress under the NMFS BiOp is more fully assessed, the performance standards will be the tools for measurement.

#### 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 towards or compliance with specified standards. A performance standard should have a performance measure associated with it.

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#### 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 1-4) with examples of performance measures.**

Response Levels	Performance Measure Examples
Tier 4 Management Actions  ↓	<ul style="list-style-type: none"> <li>● Build surface bypasses</li> <li>● Fence riparian zones.</li> <li>● Remove barriers</li> <li>● Complete subbasin plans</li> </ul>
Tier 3 Performance Measures (Physical/Environ. Conditions)  ↓	<ul style="list-style-type: none"> <li>● Enumeration of healthy habitat units secured.</li> <li>● Improved measurement of temperature, stream flows, total dissolved gas (TDG).</li> <li>● Improvement in riverine-riparian habitat condition.</li> </ul>
Tier 3 Performance Measures (Biological)  ↓	<ul style="list-style-type: none"> <li>● Egg-fry survival</li> <li>● Dam survival</li> <li>● Distribution/habitat use</li> </ul>
Tier 2 Performance Measures (Life-Stage Survival)  ↓	<ul style="list-style-type: none"> <li>● Egg-to-smolt survival</li> <li>● Migrant survival</li> </ul>
Tier 1 Performance Measures (Population Responses)	<ul style="list-style-type: none"> <li>● Population growth rate</li> <li>● Abundance estimates</li> </ul>

### 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 *All-H Strategy* 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 three 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 five and eight years. According to the test, each ESU and population may not have more than two consecutive years of adult returns below the five-year geometric mean at the date of the BiOp.

### **3.3 Tier 2 Life-Stage Performance Standards**

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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 hydro system actions (Table 3.2) and another set of relative performance standards reflect additional survival required from actions across all the remaining Hs (Table 3.3).

For the hydro system, 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 hydro system 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: Hydro system survival performance standard (%) for affected life stages.**

ESU	Adult Survival Rate		Juvenile Survival Rate		
	FCRPS System	Per FCRPS Project <sup>1</sup>	FCRPS Inriver Only		FCRPS Combined <sup>2</sup> (Transport + Inriver + Differential Mortality of Transported Fish)
			System	Per Project <sup>1</sup>	
<b>Chinook Salmon</b>					
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
<b>Steelhead</b>					
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.

<sup>1</sup> Per-project inriver survival rate calculated as the xth root of the system inriver 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.

<sup>2</sup> 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 hydro 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
<b>Snake River Spring/Summer</b>		
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
<b>Snake River Fall Chinook</b>		
Aggregate	0	44
<b>Upper Columbia River Spring</b>		
Wenatchee R.	51	178
<b>Snake River Steelhead</b>		
A-run Aggregate	44	214
B-run Aggregate	92	333
<b>Upper Columbia River Steelhead</b>		
Methow R.	0	110
<b>Mid-Columbia River Steelhead</b>		
Deschutes R Sum	102	226
Warm Springs NFH Sum	36	36
Umatilla R Sum	27	31
Yakima R Sum	0	0
<b>Columbia River Chum Salmon</b>		
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.**

	<b>PHYSICAL</b>	<b>BIOLOGICAL</b>
<b>HYDRO</b>	<ul style="list-style-type: none"> <li>- BiOp flow targets (dependent on water conditions)</li> <li>- BiOp TDG standards</li> </ul>	<ul style="list-style-type: none"> <li>- FCRPS juvenile and adult survival Performance Standards (see Table 4.2)</li> <li>- System and project survivals preferred.</li> </ul>
<b>HABITAT tributary mainstem estuary</b>	<ul style="list-style-type: none"> <li>- Progress toward achieving PFCs, using simplified indicators.</li> <li>- This might include enumeration of healthy habitat units secured; improvements in measured temperature, streamflow, sediment; amount of habitat access restored; improvement in riparian/riverine habitat.</li> </ul>	<ul style="list-style-type: none"> <li>- Preliminary biological standards might include habitat use and distribution; fish condition; over-winter survival</li> </ul>
<b>HATCHERY</b>	<p><b><u>Marking</u></b></p> <p>Hatchery populations are properly marked so as not to mask the status of the natural-origin populations or the capacity and proper functioning of critical habitat.</p> <p><b><u>Hatchery Planning</u></b></p> <p>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.</p>	<p><b><u>Broodstock</u></b></p> <ul style="list-style-type: none"> <li>- Local, within-ESU broodstock is used in propagation programs within critical habitat , unless associated with an isolated program.</li> <li>- Hatchery broodstock used in supplementation programs represent the genetic and life-history characteristics of the natural population(s) they are intended to supplement.</li> <li>- Non-isolated hatchery programs regularly infuse natural-origin fish into the broodstock as described in an approved HGMP.</li> </ul> <p><b><u>Hatchery Fish Straying</u></b></p> <p>For naturally-spawning populations in critical habitats, non-ESU hatchery-origin fish do not exceed 5 percent; ESU hatchery-origin fish do not exceed 5-30 percent, unless specified in an HGMP for a conservation propagation program.</p> <p><b><u>Population Thresholds</u></b></p> <p>Hatchery operations do not appreciably slow a listed population from attaining its viable population abundance. Hatchery operations do not reduce listed</p>

	<b>PHYSICAL</b>	<b>BIOLOGICAL</b>
		<p>populations that are at, or below, critical population abundance.</p> <p><b><u>Harvest Effects</u></b></p> <p>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.</p> <p><b><u>Quality and Survival</u></b></p> <p>The quality and survival of hatchery supplementation fish is increasing.</p>
<b>HARVEST</b>	- Selective harvest techniques implemented and evaluated	<ul style="list-style-type: none"> <li>- Increase tributary escapement rate or spawning success for each ESU, as referenced from mouth of the Columbia</li> <li>- No increase in the rate of incidental take of wild fish, above an acceptable base level</li> </ul>

### 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 <sup>1</sup>	6/21 - 8/31	50 - 55 <sup>1</sup>
Columbia River at McNary Dam <sup>2</sup>	4/10 - 6/30	220 - 260 <sup>1</sup>	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 <sup>3</sup>	NA	NA

<sup>1</sup> Objective varies according to water volume forecasts (see below).

<sup>2</sup> 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).

<sup>3</sup> 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 <sup>1</sup>	Estimated Spill Level <sup>2</sup>	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)	24 hours	nighttime - gas cap
	45 kcfs (day)		daytime - adult passage
McNary	120-150 kcfs	6 p.m. - 6 a.m.	gas cap
John Day	85-160 kcfs/60% <sup>3</sup> (night)	6 p.m. - 6 a.m. <sup>4</sup>	gas cap/percentage
The Dalles	40% of instant flow	24 hours	tailrace flow pattern and survival concerns (ongoing studies)
Bonneville	90-150 kcfs (night)	24 hours	nighttime - gas cap
	75 kcfs (day)		daytime - adult fallback

<sup>1</sup> 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.

<sup>2</sup> Estimated spill levels shown in the table will increase for some projects as spillway deflector optimization measures are implemented.

<sup>3</sup> 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).

<sup>4</sup> 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**

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#### **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 one year's time.

### **3.4.3 Tier 3 Hatchery Performance Standards**

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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 overharvest of listed stocks; and quality and survival improvements.

### **3.4.4 Tier 3 Harvest Performance Standards**

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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**

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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**

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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.

<b>Performance Measures</b>	<b>Short-Term (&lt;5 yrs)</b>	<b>Mid-Term (5-10 yrs)</b>	<b>Long-Term (&gt;10 yrs)</b>
Tier 4 (Actions)	<ul style="list-style-type: none"> <li>● Number and distribution of actions implemented</li> </ul>	<ul style="list-style-type: none"> <li>● Number and distribution of actions implemented</li> </ul>	<ul style="list-style-type: none"> <li>● Number and distribution of actions implemented</li> </ul>
Tier 3 Performance Measures (Physical/Environ. Conditions)	<ul style="list-style-type: none"> <li>● Amount of habitat access restored</li> <li>● Number of healthy habitat units secured</li> <li>● Change in TDG</li> <li>● Reduction in surface-water withdrawal</li> <li>● Reduction in road density</li> </ul>	<ul style="list-style-type: none"> <li>● Amount of habitat access restored</li> <li>● Number of healthy habitat units secured</li> <li>● Reductions in TDG</li> <li>● Changes in temperature</li> <li>● Reduction in surface-water withdrawal</li> <li>● Reduction in road density</li> <li>● Reduction in fine sediment recruitment</li> </ul>	<ul style="list-style-type: none"> <li>● Amount of habitat access restored</li> <li>● Number of healthy habitats secured</li> <li>● Reductions in TDG</li> <li>● Changes in temperature</li> <li>● Reduction in surface-water withdrawal</li> <li>● Reduction in road density</li> <li>● Reduction in fine sediment recruitment</li> <li>● Km of streams at or near PFC.</li> </ul>
Tier 3 Performance Measures (Biological)	<ul style="list-style-type: none"> <li>● Habitat use/distribution.</li> <li>● Fish condition</li> <li>● Overwinter survival</li> </ul>	<ul style="list-style-type: none"> <li>● Egg-fry survival</li> <li>● Egg-smolt survival</li> <li>● Prespawn survival</li> </ul>	<ul style="list-style-type: none"> <li>● Egg-fry survival</li> <li>● Egg-smolt survival</li> <li>● Prespawn survival</li> </ul>
Tier 2 Performance Measures (Life-Stage Survival)	<ul style="list-style-type: none"> <li>● Juvenile migration</li> </ul>	<ul style="list-style-type: none"> <li>● Egg-smolt survival</li> <li>● Juvenile migration</li> </ul>	<ul style="list-style-type: none"> <li>● Egg-smolt survival</li> <li>● Juvenile migration</li> <li>● Estuary-ocean survival</li> <li>● Adult migration</li> </ul>
Tier 1 Performance Measures (Population Responses)	<ul style="list-style-type: none"> <li>● Population distribution</li> <li>● Population growth rate and population abundance per BO's 5-year check-in criteria</li> </ul>	<ul style="list-style-type: none"> <li>● Population distribution</li> <li>● Redd counts</li> <li>● Escapements</li> <li>● Population growth rate and population abundance per BO's 8-year check-in criteria</li> </ul>	<ul style="list-style-type: none"> <li>● Population distribution</li> <li>● Redd counts</li> <li>● Escapements</li> <li>● Population structure</li> <li>● Population growth rate</li> <li>● Population abundance</li> </ul>

## 4.0 Strategies to Achieve Performance Standards

### 4.1 All-H Approach

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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 and the Tribal Salmon Recovery Plan. 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 “off-site mitigation” for federal hydrosystem effects – in the form of habitat protections and improvement, hatchery reforms, and support for more selective harvest. These off-site mitigation efforts must be integrated with efforts undertaken through existing mitigation programs such as the Council’s Fish and Wildlife Program.

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. 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 five years – are more fully described in Section 5.0. Further detail is provided in the Action Tables in Appendix A.

**Table 4.1. Action Agencies Strategies and Substrategies (note: RPA #s need correcting. Will be completed for final draft.)**

Strategies & Substrategies	RPA Reference and Totals
<b>HYDROSYSTEM STRATEGIES</b>	
<b>1. Configure Dam Facilities to Improve Juvenile and Adult Fish Passage and Survival.</b> 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.
<b>2. Manage Water to Improve Juvenile and Adult Fish Survival</b>	
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.
<b>3. Operate and Maintain Fish Passage Facilities to Improve Fish Survival</b>	
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.
<b>HABITAT STRATEGIES</b>	
<b>1. Protect and Enhance Tributary Habitat</b>	
Water quantity	NMFS: 149, 150, 151
Water quality	NMFS: 152.
Passage and diversion improvements	NMFS: 149.
Subbasin planning and assessment	NMFS: 154.
Watershed health	NMFS: 150, 153.
<b>2. Protect and Enhance Mainstem Habitat</b>	
Watershed health	NMFS: 155, 157.
Subbasin planning and assessment	NMFS: 156.
<b>3. Protect and Enhance Estuary Habitat</b>	
Water quantity	NMFS: 158-163.
Water quality	NMFS: 160.
Watershed health	NMFS: 158.
Subbasin planning and assessment	NMFS: 159.

Strategies & Substrategies	RPA Reference and Totals
<b>HATCHERY STRATEGIES</b>	
<b>1. Implement a safety-net program as an interim measure to avoid extinction</b>	NMFS: 178.
<b>2. Reduce Potentially Harmful Effects of Artificial Production to Aid Recovery Through Hatchery Reform</b>	
Develop Hatchery & Genetic Management Plans	NMFS: 169-173.
<b>3. Contribute to the Development and Implementation of a Comprehensive Marking Plan</b>	NMFS: 174.
<b>HARVEST STRATEGIES</b>	
<b>1. Develop Fishing Techniques to Enable Fisheries to Target Non-listed Fish While Reducing Harvest-Related Mortality on ESA-Listed Species</b>	
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.
<b>2. Improve Harvest Management Assessments, Decisions, and Evaluations</b>	
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.
<b>3. Support Sustainable Fisheries for the Meaningful Exercise of Tribal Fishing Rights and Non-tribal Fishing Opportunities Consistent with the Recovery Effort</b>	
Value-added projects	NMFS conservation recommendation: 11.13.
Potential alternative/terminal fishing locations	NMFS conservation recommendation: 11.12.
<b>4. Fishery Effort Reduction Programs</b>	NMFS conservation recommendation: 11.13.
<b>RESIDENT FISH STRATEGIES</b>	
<b>1. Promote the Reproduction and Recruitment of Kootenai River White Sturgeon (KWS).</b>	
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.
<b>2. Determine the Impacts of the FCRPS on Bull Trout and Mitigate for Those Impacts.</b>	
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.
<b>RM&amp;E STRATEGIES</b>	
<b>1. Status Monitoring</b>	
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	RPA Reference and Totals
<b>2. Action Effectiveness Monitoring and Research</b>	
Hydrosystem monitoring	NMFS: 82, 83, 100, 107, 183.
Habitat monitoring	NMFS: to come
Hatchery monitoring	NMFS: to come.
Harvest monitoring	NMFS: to come
<b>3. Critical Uncertainties Research</b>	
<b>4. Project Implementation Monitoring</b>	
<b>5. Data Management System</b>	
<b>6. Regional Coordination</b>	

## **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 much of the off-site mitigation actions required by the BiOps through the Council's Fish and Wildlife Program. Under the 1980 Northwest Power Act, the Fish and Wildlife Program is tasked with protecting and rebuilding 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 stock in the NMFS and USFWS BiOps.

### **The Provincial Review Process**

Provincial Reviews occur on a rolling three-year basis within the 11 Council-designated geographical provinces and the System-wide and Mainstem project selection processes.<sup>1</sup> Based on subbasin assessments, as well as review by the Independent Science Review Panel (ISRP), NMFS, BPA and others, habitat, hatchery, and research projects in each province are selected for funding. The first full round of Provincial Reviews should be completed by the end of calendar year 2002 and will enable implementation of two to three years of carefully selected, scientifically based projects.

The second round of Provincial Reviews for the Columbia Gorge, Intermountain, Mountain Columbia, and Columbia Plateau provinces are scheduled to begin and end in 2003. Also beginning in 2003 with scheduled completion in 2004 are the Blue Mountain, Mountain Snake, Columbia Cascade, Middle Snake, Lower Columbia, Columbia River Estuary, and Upper Snake provinces. The System-wide/Mainstem project selection processes will be completed in 2005. The rolling nature of the Provincial Reviews will allow information forthcoming from the more detailed subbasin plans and Recovery Plans to be included in future funding decisions.

In the recent Provincial Review process, 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 federal trust and treaty responsibilities;

<sup>1</sup> The System-wide and Mainstem are not ecological provinces. Projects solicited under those processes may cross provincial boundaries.

- Scientific merit (based largely on Independent Science Review Panel {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. In addition to the general criteria above, specific criteria, including factors for selecting projects focused on targeted ESUs, will be further refined as BPA and the region gain experience with the Provincial Review processes.

The Action Agencies will also rely on the Council's upcoming subbasin plans to further integrate needs identified through recovery planning with those of the Council's Fish and Wildlife Program and FCRPS BiOp implementation. BPA recently entered into a two-year contract with the Council for development of subbasin plans for the entire Columbia River Basin. The plans will be developed in close coordination with the 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.

### **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 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 Implementation Plan will be identified as part of the Council's Provincial Reviews, and, where necessary, through complementary efforts of the Action Agencies for specific substrategies. However, 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. To address these developments, we plan to make periodic updates to our database and tracking system to incorporate new projects into our Action Tables, and the [www.salmonrecovery.gov](http://www.salmonrecovery.gov) Web site. This Plan will evolve over the course of the year as new projects come on-line and move the plan towards broader implementation of the substrategies.

## **4.3 Integrating BiOp Implementation with Other Regional Processes**

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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 that will be forthcoming from other regional processes. The mix of projects identified as necessary in the BiOp Implementation Plan by the Action Agencies will evolve as our decision-making becomes informed by the results of the following two important efforts for region-wide fish recovery.

### **Subbasin Planning**



Subbasin planning efforts are prioritized first by the Council's subbasin planning process. Through this process a higher degree of coordination can be achieved among the on-going habitat actions of other federal agencies, the states, tribes, local entities, and individuals. As the Council's subbasin plans emerge, they will provide a common context for all participants, including the Action Agencies. Once the subbasin plans are complete, project selection will be informed by, and coordinated with, the recommendations and priorities of those plans, consistent with the strategies in the BiOp. Upon completion, recommendations from the Technical Recovery Teams (TRTs) and the Council's subbasin plans will provide guidance to future Action Agency implementation actions and plans. The convergence of these processes will provide the foundation for an integrated region-wide, coordinated approach to habitat improvements. This coordination is essential for comprehensive and effective habitat protection, improvement, and restoration.

Due to limitations resulting from the timing of the various regional planning efforts and the fact that we are still in the early phase implementation of the BiOps, the 2003 portion of this Plan does not contain projects addressing every substrategy in every subbasin. Over the course of 2003, we anticipate that projects implementing the full array of substrategies appropriate to each subbasin will be in the contract-negotiation phase or underway. The selection of these projects will be guided by the subbasin plans and what we learn from experience. If actions are lacking for certain locations or particular types of actions, the Action Agencies will discuss use of targeted solicitations through the Provincial Review process to fill identified gaps.

### **ESA Recovery Planning**

TRTs for the Willamette/Lower Columbia and the Interior Columbia have been formed in response to the BiOps. The TRTs are developing information as the scientific basis for recovery plans and the Council subbasin plans. The products of the TRTs will provide information useful in prioritizing BiOp implementation projects. 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 over the next year.

### **Policy and Information Updates**

Pending hatchery policy and ESU status reviews anticipated for release this calendar year by NMFS may cause this Plan to be adjusted.

## **4.4 Evaluating BiOp Implementation: the Importance of RM&E**

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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 other participating members of the Federal Caucus. 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.

## 5.0 PRIORITIES, WORK PLAN 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 five-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.
- **Least-cost planning.** The Action Agencies will apply least-cost planning principles in an effort to achieve the greatest survival benefits at least cost. A least-cost planning methodology is being development and will be 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:

- **Five 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 actions. (Readers can then refer to Section 6.0 to learn more about where to participate in these activities.)

## **5.1 Hydrosystem Priorities**

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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 hydro 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 strategies below were developed to guide hydrosystem actions and achievement of hydrosystem survival performance rates outlined in the BiOp. 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 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.

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

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Much attention has been given over the last decade to improving juvenile and adult passage survival through the complex hydro system facilities. Fish bypass systems, spillway improvements, and modified system operations today enable 27 to 50 percent of Snake River spring/summer chinook salmon and steelhead smolts to survive in-river migration through the hydro system, 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) Program. 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 Administration's proposed CRFM budget for fiscal year 2003 (FY03) is \$98 million. If funds are provided to that level, between 40 and 50 configuration measures could be funded in FY03.

Physical improvements to hydroelectric facilities at non-Columbia River Fish Mitigation (CRFM) projects are also recommended in the both the NMFS and USFWS BiOps. These 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**

<b>Priority Level:</b>	<b>Criteria Description:</b>	<b>Guidelines:</b>
<b>High</b>	<ul style="list-style-type: none"> <li>* BiOp 2003 Category II Check-In Items as needed to meet check-in requirements.</li> <li>* Construction Items underway from FY01.</li> <li>* Juvenile studies and passage improvements for Bonneville, TDA or Lower Monumental (including incremental gas abatement measures).</li> <li>* Key system and project evaluations to answer uncertainties for future implementation decisions. (includes "D" value &amp; multi-bypass mortality)</li> <li>* Significant adult passage facility and high risk reliability issues (fallback, ladder temperature, holding).</li> </ul>	<ul style="list-style-type: none"> <li>(1) Higher priority for passage alternatives with multi-species, multi-life stage approach.</li> <li>(2) Higher priority for multiple-purpose passage alternatives, (for example: an alternative which improves survival and water quality)</li> <li>(3) Cost-effectiveness should be considered in evaluating priority level.</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>* Juvenile studies and passage improvements with moderate potential survival benefits (including incremental gas abatement and temperature measures).</li> <li>* Less significant adult passage facility issues.</li> <li>* Adult migration, unaccounted loss, spawning success studies.</li> <li>* Studies to determine system and project effects on unlisted species of concern (lamprey).</li> </ul>	
<b>Low</b>	<ul style="list-style-type: none"> <li>* Juvenile and adult evaluations and passage improvements with relatively lower expected survival improvements.</li> <li>* Lower risk adult facility reliability issues.</li> <li>* Other Measures</li> </ul>	

Last Updated 7/20/01

## Hydrosystem Substrategy 1.1: Mainstem juvenile passage improvement

### *Five 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 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.
- 1<sup>st</sup> 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.
- 2<sup>nd</sup> powerhouse surface bypass (corner collector) – continue construction.
- 2<sup>nd</sup> 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**

- ESBS - complete prototype testing.

#### **McNary Dam**

- Forebay debris control – acquire 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.

***2004-07 Work Plan***

Several actions are planned at these dams in 2004-2007, including\_\_\_\_\_.

***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 Corps' Anadromous Fish Evaluation Program (AFEP).

**Hydrosystem Substrategy 1.2: Mainstem adult passage improvement**

***Five 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.
- 2<sup>nd</sup> powerhouse fish unit trash rake - complete construction.
- 2<sup>nd</sup> 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**

### ***Five 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 process for total dissolved gas 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**

#### ***Five 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 Appendix A.

#### **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.
- 2<sup>nd</sup> 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.

### **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 its Anadromous Fish Evaluation Program (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**

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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 .

### **Hydrosystem Substrategy 2.1: Reservoir operations to improve fish survival**

#### ***Five 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 near 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 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.
- 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.

#### **Corps lower Snake River Projects and John Day**

- Maintain forebays within 1 foot of 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**

### ***Five 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.

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' at Libby (20' feet from full), 3540' at Hungry Horse (20' from full), 1280' at Grand Coulee in above average water conditions (10' from full), 1278' at Grand Coulee in below average water conditions (12' from full), and 1520' at Dworshak (80' 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**

### ***Five 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**

### ***Five 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.
- The final EIS and ROD are expected to be issued for BPA's Grand Coulee-Bell 500-kV Transmission Line Project (formerly known as "West of Hatwai"). The transmission line design will be completed, land and material acquisition will continue, and actual construction of the line and terminal facilities will begin in 2003.
- 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***

NEPA

## **Hydrosystem Substrategy 2.5: Other actions to enhance water management**

### ***Five Year (2003-07) Outcomes***

This hydro 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.

### ***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**

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Fish passage facilities, such as fish ladders and bypasses, were provided at the time 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 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 Appendix A.

**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 Appendix A.

***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 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).

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## **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 hydro system. 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 over a hundred projects spread across the Columbia River Basin.

### **Region-wide Coordination Forum**

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. However, there is a need for a forum to coordinate the many on-going habitat efforts at the region-wide scale.

A forum could be as simple as the annual or biannual joint sponsorship of workshops, to creating a new coordinating body. Other options might include expanding the Federal Habitat Team to include state and tribal participation or joint meetings of the Council's Fish and Wildlife Committee, Tribal Fish and Wildlife Committees, and the Federal Habitat Team. The Action Agencies will work with the states and tribes on the development of a region-wide habitat coordination forum during FY03.

In the following sections, the habitat strategies provide a comprehensive approach to achieving the objectives of habitat protection, restoration, and enhancement. The substrategies provide a vehicle for identifying projects that implement the habitat RPAs, and address gaps in RPA coverage of the array of habitat problems. In light of the number and diversity of the habitat projects, the 2003 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.

### **5.2.1 Habitat Strategy 1: Protect and Enhance Tributary Habitat**

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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. For this reason, the Action Agencies's focus in the tributaries is on activities that will result in increased flows and decreased blockages.

#### ***Five 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 Instream 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.
- **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 screen, barrier, and 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. **(RPA 149)**



## **BPA Projects -**

- **Explore innovative types of water transactions** — A regional water entity has been established to facilitate tributary water transactions basinwide. This regional entity will work through qualified local groups to identify and develop opportunities for providing cost-effective in-stream flows. It will submit a report evaluating its efforts annually and at the end of five years. One focus of the entity's efforts is to test the effectiveness of various transactional strategies for increasing tributary flows.
- **Build a regional structure for flow improvements** – The regional water entity described above will also pursue:
  1. coordination of water transactions and associated habitat projects.
  2. development of a competitive process to supply water to increase flows.
  3. development of water solicitations and selection of the most promising transaction proposals.
  4. 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:
  1. emergency flow augmentation for Buck Hollow in the Deschutes;
  2. the Columbia Plateau Water rights acquisition projects in the Deschutes and Umatilla;
  3. 15-mile water rights acquisition in the Fifteenmile;
  4. Oregon Water Trust Early Action project, and the Oxbow and Pine Creek ranch acquisitions in the John Day; and,
  5. 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, and
- Complete a report evaluating the efficacy of the regional water entity, including a decision on whether to continue the program.

### ***Regional Coordination***

Reclamation subbasin liaisons, Reclamation programmatic NEPA processes, and the regional water entity working through local entities and with ISRP review of selection criteria. BPA funded projects will be coordinated with the Council and its staff.

## **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. Examples of the 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 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 UW researchers are coordinating their approach and sharing reports and water quality, habitat, and fish health and toxicity data with WDOE, WDNR, EPA, USFWS and 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 also is directly supporting WDOE's development of Temperature TMDLs in the Yakima subbasin by conducting FLIR flights of the Yakima River in Spring 2002 and furnishing the data to the State and other resource management agencies. In coordination with the Yakama Nation, the State is ground-truthing the FLIR data through temperature logging along the Yakima River.
  - ◆ Project 1988-108-04, StreamNet (CIS/NED). The project created a map and data layers which combine 303(d) listing and fish presence. These maps were used in Province summaries and for future subbasin planning.
- **Improve coordination and documentation of TMDL efforts** — BPA plans to share technical expertise and training to stakeholders to further integration of multi-agency activities into the TMDLs, especially during the two- to three-year subbasin planning process. Specifically, BPA will:
  - ◆ obtain complete schedules and agendas for TMDL and 303(d) meetings,
  - ◆ prepare guidance to BPA staff on the purpose of TMDLs and 303(d) listings,
  - ◆ encourage participation by BPA staff and /or project sponsors in TMDLs in their project areas, and
  - ◆ seek commonalities to benefit subbasin planning such as integration of monitoring and data sharing.

BPA will also document its participation and resulting accomplishments which support the states, tribes, and watershed councils in the TMDL process and in watershed /subbasin planning.

### ***2004-07 Work Plan***

In addition to continued coordination of off-site habitat enhancement measures to improve water quality, the Action Agencies plan to work closely with state and tribal TMDL programs to identify mutual priorities and share technical expertise and training with other entities.

### ***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-identified 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 Lemhi/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 liaisons, subbasin planning. The Federal Habitat Team will address the removal or retrofitting of small blockages.

### **Habitat Substrategy 1.4: Subbasin Planning and Assessment**

#### ***2003 Work Plan***

- **Support development of subbasin assessments and plans** —The Basinwide 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.

- **Coordinate with states, tribes, and local planning initiatives**—Additionally, BPA is supporting another systemwide planning initiative, 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.

#### ***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***

Subbasin planning, Federal Habitat Team.

### **Habitat Substrategy 1.5: Watershed Health**

#### ***2003 Work Plan***

- **Negotiate and fund long-term protection for 100 miles of riparian buffers** — During this time BPA will continue a two-tier approach to leverage agricultural incentive programs in funding long-term protection for riparian buffers. First, we will continue to support implementation of CREP and other similar federal programs. Second, we will develop and implement a program for establishing long-term protection for lands enrolled in these programs.

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.
- **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.
- Wholistic 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 USDA Conservation Reserve Enhancement Program (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**

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#### *Five 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 Basinwide 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. 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 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 – The Action Agencies** will also monitor habitat improvements and 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.
- **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 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.** 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 LCREP and the Council's Provincial Review and subbasin planning processes.

## **Habitat Substrategy 2.2: Subbasin Planning and Assessment**

#### *2003 Work Plan*



In the Columbia Estuary Subbasin, BPA is supporting a Lower Columbia River Estuary Partnership (LCREP) project with the Corps to assess and map habitat in the Lower Columbia River.

- **Monitor chum spawning populations** – BPA is working with several agencies to determine whether chinook and chum spawning populations exist below four mainstem Columbia River dams (Project 1999-00300 includes ODFW, WDFW, PSMFC, USGS, USFWS and Battelle). The Action Agencies, lead by the Corps, has 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. In 2001, baseline information was collected on habitat type, use and riverbed temperatures 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.
- **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.

#### *2004-07 Work Plan*

- Establish new subbasin liaison contacts for the Middle Clearwater, Entiat, and North Fork John Day subbasins.

#### *Regional Coordination*

LCREP, Provincial Review and subbasin planning processes.

### **5.2.3. Habitat Strategy 3: Protect and Enhance Estuary Habitat**

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

The Corps and LCREP plan to develop a long-range plan for protection and restoration of the estuary that is broader in scope than the needs of NMFS BiOP implementation. This will be accomplished through a General Investigation (GI) Study by the Corps that will develop a long-term restoration plan for the estuary, including recommendations for large-scale projects. The GI Study will investigate and recommend appropriate solutions to accomplish ecosystem restoration in the lower Columbia River and estuary, including wetland/riparian habitat restoration, stream and fisheries improvement, water quality and water related infrastructure improvements.

#### *Five Year (2003-2007) Outcomes*

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

- **Planning.** The Corps funds estuary activities through several authorities. 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.

This study is jointly sponsored by the states of Oregon and Washington. The expected outcome of the study is a strategic master plan for the estuary identifying long-range, larger projects.

- **On-the-ground restoration projects.** The Corps will use existing and new authorities to protect and enhance 5,000 acres of estuary habitat. Congress provided a new authority (called Section 536) to the Corps for habitat work in the estuary. Under this authority, the Corps plans to implement ecosystem restoration projects to protect, monitor and restore fish and wildlife habitat based on recommendations made by LCREP. This program is expected to generate a mosaic of restoration projects that will address RPAs 159 and 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 Continuing Authorities Program.

- **Research.** Research will continue in the estuary, guided by the NMFS Science Center and by regional review processes including the Corps Anadromous Fish Evaluation Program (AFEP) and the Council's Provincial Review and subbasin planning processes. The Corps funds its portion of the estuary research through the CRFM. BPA also funds a portion of the estuary research called for in the NMFS BiOp. Estuary research plans are covered under the RM&E section of this document.

#### ***2004-07 Work Plan***

The estuary habitat five-year work plan includes both specific project completion and programmatic activities. The following summarizes major activities that will occur from 2003 through 2007.

**Coordinate planning and on-the-ground restoration activities.** On-the-ground estuary efforts beginning in 2003 will serve as the catalyst to bring together and implement current efforts by a number of governmental and private organizations to identify and cost share restoration projects. These organizations include the National Estuary Program, six state agencies from Oregon and Washington, four federal agencies, recreation, ports, industry, agriculture, labor, commercial fishing, environmental interests, and private citizens. Working with LCREP, the Corps and BPA have identified and prioritized 14 potential projects for construction. Assuming Congress appropriates requested \$2 million funding under the Corps Section 536 authority, several of these projects should begin construction in 2003.

- An expedited reconnaissance study has been completed and the feasibility phase of the Corps ecosystem restoration study for the Columbia River estuary (covering from the river mouth to river mile 145) is expected to continue from 2003 to 2006, but results will inform actions for the estuary along the way. The Corps will move into the feasibility phase of this GI study in 2003, which will be cost-shared with regional partners, possibly assisted by BPA funds. 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. Other studies are being considered by the Action Agencies that could help address the information needed for estuary habitat restoration and identified in the NMFS BiOp.
- The findings from an Estuary Workshop held by the Corps, LCREP, American Rivers and Columbia River Estuary Study Task Force are being used for project identification and prioritization. A funding request for \$2 million for the estuary "new start" funding (Section 536) was included in the Corps' FY03 budget request. Estuary research continues, funded under the Corps' CRFM program and BPA funding.

- Through the Council's Provincial Review processes, research and monitoring related proposals are being considered and 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 six restoration projects already processed and approved through regional and local workgroups.
- BPA and the Corps are considering funding 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). If selected for funding, this proposal would begin in 2003 and directly address NMFS RPA 161 and 193.
- In 2001 BPA funded *A Feasibility Study for Pacific Ocean Salmon Tracking (POST)* to evaluate new acoustic tracking technology to verify its capabilities for use on the West Coast, and design an acoustic monitoring network to track movement of salmon smolts into the ocean and along the continental shelf to areas of ocean residency. The contractor, KinTama Research Inc., has now submitted a promising proposal through the Columbia Estuary Provincial Provincial Review Process for FY03 funding. The project would expand research on the acoustic tag by developing a prototype array that would demonstrate the technology's capabilities to establish both river and ocean movements of chinook salmon. The NMFS Science Center has also funded a project to develop a smaller version of the sonic tag allowing for tagging of smaller fish. Pending ISRP approval, BPA is considering funding these proposals if they are scoped to be complementary and cost-effective. The Corps is also funding studies, working with NMFS, on tagging and tracking technology for the estuary and near-shore environment.
- The Corps and 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 contains a strong research element (modeling) that significantly overlaps with similar and different research elements in RPAs 194, 196, and 197. The Corps and BPA will continue to work with NMFS to design a research program that addresses all of the requisite elements.

### Habitat Substrategy 3.1: Water quantity

#### *2003 Work Plan*

- **Fund an estuary monitoring and research program; and, develop a conceptual model of the relationship between estuarine conditions and salmon population structure and resilience.** This substrategy will be implemented in the Columbia River Estuary Province in the Columbia Estuary, Grays, and Elochoman subbasins. This ongoing effort is part of a coordinated estuary, plume, and near-shore ocean research and monitoring program. These ongoing projects are designed to address the following items:
  - continue funding of the conceptual model development and work to evaluate the role of the plume in supporting juvenile salmon growth and survival during their first year of life in oceanic life; and,
  - characterize and enhance the understanding of tidal, seasonal, and inter-annual variability of the circulation, hydraulic residence times, and physical properties below Bonneville Dam; extent and properties of the plume; and, physical properties of the nearshore ocean environment north and south of the plume.

Participants in this effort include NMFS, OHSU/OGI, Oregon State University (OSU), the University of Washington (UW), ODFW, and Department of Fisheries and Oceans, Canada.

- **Develop a compliance monitoring program.** The Corps and BPA will develop a system to monitor compliance with NMFS BiOp estuary actions.

***2004-07 Work Plan***

*(to be completed)*

***Regional Coordination***

LCREP, Federal Habitat Team, continue to pursue appropriate projects through the Lower Columbia Provincial Reviews.

**Habitat Substrategy 3.2: Water quality**

***2003 Work Plan***

The Corps and BPA, working with LCREP, have identified several potential habitat enhancement projects that improve water quality in the estuary for 2003. They include:

- **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 march 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 and thus provide benefits to the overall ecosystem.

***2004-07 Work Plan***

*(to be completed)*

***Regional Coordination***

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

### **Habitat Substrategy 3.3: Watershed health**

#### ***2003 Work Plan***

- **Protect, enhance, or restore about 1,000 acres of 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, Grays, Elochoman, Cowlitz, Kalama, Lewis, Lower Columbia, Washougal, and Sandy subbasins. As discussed above, the Corps expects to continue in FY03 (subject to funding) with a GI study of the Columbia River from river mile 0 to 145. The Corps and BPA are currently working with LCREP and others to identify and initiate estuary habitat enhancement/protection projects for FY03 and FY04 that will provide clear benefits for listed fish as a comprehensive restoration plan is developed. What we learn from these projects will inform research and actions for estuary restoration. Projects may include acquisition, restoration of wetlands, dike removal, identification of suitable existing habitat that lacks connection for salmon use during migration and rearing, and others.
- **Develop criteria for estuarine habitat restoration** — The Action Agencies will continue to fund research projects in the estuary identified by the NMFS Science Center and others on salmonid use of the estuary, relevant estuary characteristics, and salmon survival through the estuary. The Corps and BPA will continue to work with NMFS and others in a reasonable, planned, and focused approach to identify and fund research needs to ensure effective progress in the estuary. Proposals for estuary research in FY03 are currently in the review process under the AFEP and under the Council's Provincial Review process.

#### ***2004-07 Work Plan***

*(to be completed)*

#### ***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***

- **Develop a plan to meet habitat needs of salmon and steelhead in the estuary.** The Corps and BPA plan to complete funding negotiations for the GI study and will begin initiating the first phase of the study. BPA and the Corps will concurrently support a project by LCREP, CREST, and PNNL to complete the planning requirements of RPA 159. Thus, immediate restoration planning needs will be addressed while long-term needs are initiated.

#### ***2004-07 Work Plan***

*(to be completed)*

### ***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.

## **5.3 Hatchery Priorities**

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Hatchery actions in 2003-07 will be influenced by pending NMFS hatchery policy and new hatchery BiOps. As these directives become known, priorities will be adjusted.

### ***Five Year (2003-07) Outcomes***

Hatchery action priorities over the next five years include:

- planning and potential implementation of safety-net contingency plans for artificial propagation actions to avoid extinction of critically depressed ESA listed salmon and steelhead populations;
- development of new or revised Hatchery Genetic Management Plans (HGMPs) to identify potential hatchery reforms to benefit listed fish;
- development of a comprehensive marking plan through collaboration with the regional fishery managers;
- supporting other artificial production activities that contribute to tribal and state fisheries, including ongoing programs and potentially new programs that improve harvest opportunities while not adversely affecting the listed evolutionarily significant units (ESUs);
- 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, the potential role of hatchery programs in recovery efforts, and measure the effectiveness of hatchery reform and safety-net actions.
- Commencing implementation of finalized HGMPs for the Leavenworth National Fish Hatchery Complex. Because of the multi-year life cycle of spring/summer salmon raised there, the HGMPs will likely require several years to be incorporated into the hatchery complex's routine operation.

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

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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 Columbia River Basin Fish and Wildlife Program prior to issuance of the 2000 FCRPS 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 in Appendix A.

### ***2004-07 Work Plan***

As revised, SNAPP will now rely on delineation of populations and population components of the Interior Columbia TRT. SNAPP contractor(s) will participate in the 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 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 HGMPs template.

The HGMP contingency plan would include a risk trigger that, if met, would initiate regional consideration and decision on whether to actually implement a contingency plan. HGMP contingency plans would be circulated for scientific and policy review. The final HGMP would be provided to appropriate subbasin planners (for appending to their plans), NMFS, and TRT. At this point, SNAPP would be concluded. This process is expected to 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 HGMP contingency plan 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 Council process to make funds available to quickly fund planning and implementation of any additional safety net identified during the term of the 2000 BiOp.

### ***Regional Coordination***

TRT, subbasin planning, Council.

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

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The Action Agencies will continue to support hatchery programs designed to conserve certain populations of salmon for broodstock purposes. Salmon reared in some hatchery programs contain valuable genetic resources and, in some cases, unique strains. Long-term survival of these important broodstocks requires the use of the best genetic management methods. 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.

Hatchery reform activities resulting from 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 protection of listed species, thereby contributing to recovery.

For facilities owned, operated, or funded by the Action Agencies, we plan to begin implementing hatchery reforms that may already be specified by existing HGMPs or hatchery BiOps, and as they become identified through the HGMP process. 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.

The contracting activities for the HGMP process have been broken into three phases. Phase 1 is a description of how the hatchery program is currently operating. Phase 2 entails a negotiated vision among co-managers of how the hatchery will operate in the future. Phase 3 will include basin scope



review: 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. All HGMPs within an ESU will not proceed through Phase 3 until all HGMPs for the ESU have completed Phase 2. Therefore, finalization for individual HGMPs will be contingent upon this timeline.

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**

### ***Five-Year (2003-07) Implementation Plan***

In late 2002 or 2003, the Action Agencies plan to complete final drafts of HGMPs for Lower Snake River Compensation Program (LSRCP) and Upper Columbia facilities (*e.g.*, Grand Coulee mitigation hatchery programs).

In 2002 an approach was identified to address how HGMPs will be developed for the federally funded hatchery facilities in the Columbia Plateau, Columbia Gorge, and any other provinces that affect listed fish, 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 an alternative that will ensure the required HGMPs are developed on schedule.

In 2002, in order to expedite completion of the first phase and reduce overlap in activities with the Council's "Artificial Production Review and Evaluation" (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 direct efforts toward hatchery programs for which they had management responsibilities. A private consultant was hired to lead, facilitate and guide efforts for Phase 2 and 3.

In 2003, the Action Agencies will continue supporting the development, updating and completion of HGMPs to identify opportunities to reduce potentially harmful hatchery practices and/or aid recovery through hatchery reforms.

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, some individual program are not expected to have final draft HGMPs completed until early 2004. For the Upper Columbia River facilities (the Grand Coulee mitigation hatchery programs), NMFS-approved HGMPs will be implemented and genetic protocols will be followed. Implementation will be consistent with any performance standards developed.

### ***2003 Work Plan***

- Complete draft HGMPs for all hatchery programs.
- Complete final HGMPs for most hatchery programs.
- Fund actions identified in completed HGMPs or the BiOp that can be implemented in the short planning timeframe allowed. Priority will be given to at-risk populations.
- For the Upper Columbia River facilities (the Grand Coulee mitigation hatchery programs), HGMPs will be submitted to NMFS for review and approval. 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 or early 2004. As HGMPs are completed (or other information that is relevant to changes are available, for example, BiOp recommendations), the Action Agencies will 1. evaluate recommendations, 2. develop and prioritize lists of actions, 3. identify applicable funding sources, 4. prioritize and pursue funding, 5. provide support for new authorizations or appropriations, or fund for such projects 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 begun funding reforms for the most at-risk species by the 2003 check-in. For the Upper Columbia River facilities (the Grand Coulee mitigation hatchery programs), any hatchery reforms identified in the process of developing HGMPs will be phased in as appropriate according to an agreed-upon schedule.

### ***Regional Coordination***

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

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

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### ***Five 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 RPA 174. It includes regional coordination with NMFS, USFWS, ODFW, WDFW, IDFG, PSMFC, PSC, 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**

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#### ***Five Year (2003-07) Outcomes***

Some of the loss of fishery opportunities due to the FCRPS is now and will continue to be made up through hatchery production. As partial mitigation for the loss of these fishery opportunities, we will focus on providing meaningful harvest opportunities by means of fishery augmentation utilizing hatchery production. This should be done under guidance of NMFS-approved HGMPs to ensure that artificial production does not unacceptably impede recovery of ESA-listed species or ESUs.

#### ***2003 Work Plan***

- Until new/revised HGMPs are completed, 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.
- Reclamation will be to submit completed HGMPs for the Upper Columbia River facilities (the Grand Coulee mitigation hatchery programs) to NMFS for approval.
- The Grand Coulee mitigation hatchery programs will continue to meet tribal harvest obligations and provide for a recreational fishery for unlisted spring chinook salmon in Icicle Creek, contingent upon meeting production goals and environmental conditions that influence survival of year-classes.

#### ***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, TRT, *U.S. vs. Oregon*

## 5.4 Harvest Priorities

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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, such as developing and enabling selective fisheries, 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 goals and harvest opportunities. The Action Agencies will work closely with NMFS and the salmon managers to identify opportunities to undertake actions that address 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

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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 implementation of an additional project above Bonneville Dam to reduce steelhead interceptions using weed-line modifications to conventional gillnets, possibly through the within-year process of the Council's Fish and Wildlife Program or a targeted solicitation.
- Working with tribal, state, and federal representatives through longer-term regional processes to identify and begin developing other opportunities to improve survival of listed species and other weak stocks through harvest actions that are mutually beneficial to the parties.

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

##### *Five Year (2003-07) Outcomes*

Working with the harvest managers, the Action Agencies expect to have in place by 2005 at least one fully-tested peer reviewed selective fishery project integrated into commercial fisheries, resulting in a decrease in ESA impacts on weak stocks. The Agencies' two areas of focus are below Bonneville Dam non-treaty commercial fisheries targeting spring chinook and above Bonneville Dam treaty commercial fisheries targeting summer steelhead and bright chinook. Between now and 2007, an adaptive management approach to gear and fishery testing and evaluation will be necessary, especially as the transfer from applied research to fishery integration occurs.

##### *2003 Work Plan*

- Continue **lower river tooth-tangle net fishery** (BPA 2001-007-00), with modifications based upon 2002 results. Approximately 19,000 steelhead were handled during the 2002 fishery, which was not expected. Investigations will continue to enumerate and assess the effect of handling of steelhead

using this gear. Reducing steelhead interceptions 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 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 impacted by the use and management of this fishery, a small controlled study of weed-line selectivity to increase the information base on the costs and biological benefits of such a management action will be pursued.
- 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. Evaluation of fishery gear profiles and mesh-specific steelhead and chinook catch rates results in the estimate that the increased use of 9-inch gillnets allowed Zone 6 fisheries 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***

As the schedule for review, selection and implementation dictated by the Council occurs, additional projects may be added to the list of gear efficacy testing projects for 2004-07. Continuation of applied research on selected gear types will occur, combined with subsequent inter-annual analysis, review and evaluation of results.

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.

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***

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.

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.

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

### ***Five Year (2003-07) Outcomes***

A major biological constraint in developing and implementing selective fisheries in the Columbia Basin is determining the non-retention mortality rates on non-targeted stocks in both short-term and long-term (spawning) time horizons. Therefore, the levels of non-retention mortality are an important factor in determining the efficacy 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 in the catch-and-release sport fisheries below Bonneville Dam and fall-out mortality in Zone 6 treaty fisheries are needed.

Additional mortality assessments are proposed in the Mainstem/System-wide Provincial Review process targeting non-treaty sport fisheries targeting spring and fall chinook. Review of those proposals will occur in summer 2002 with implementation as early as FY03. As additional gear types are proposed and selected for evaluation, component short and long-term mortality assessments will be a requirement.

As multiple selective live-capture fisheries are implemented in sequence as adults migrate upstream, studies to determine the impacts of multiple recaptures will be needed. Failure to do so may significantly underestimate the true impact of selective fisheries.

### ***2003 Work Plan***

For 2003, the Action Agencies will continue the non-retention mortality estimates in the tooth-tangle study (BPA 2001-007-00). This will meet the three -year check-in requirement established under RPA 167.

Review of project proposals submitted under the Provincial Review process of the Council's Fish and Wildlife Program is ongoing. One submission proposes a hooking mortality study 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. The current estimate of 10 percent non-retention is gleaned from literature on studies primarily outside the Columbia Basin. Review of this proposal will occur in summer 2002 with implementation as early as spring 2003.

### ***2004-07 Work Plan***

Besides continuing the non-retention mortality estimates in the tooth-tangle study, 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, short and long-term mortality assessments will be a requirement.

### ***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.

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

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For 2003-07, the Action Agencies will lend coordination assistance and provide appropriate resources through cost-sharing mechanisms to help 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**

###### *Five Year (2003-07) Outcomes*

Results from the lost fishing net study (BPA 2001-058-00) should be presented to 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*

- Develop a prioritized list of harvest management information needs that can be addressed through future projects and that hold promise of reducing the impacts of harvest management error or information gaps on listed fish. 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 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**

### ***Five Year (2003-07) Outcomes***

Working with the harvest managers, the Action Agencies intend to develop and implement 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, using mark-selective gear and methods, by 2005. Between now and 2005, the Pacific Salmon Commission – Selective Fishery Evaluation Committee (SFEC) will determine the revisions necessary 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 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 to address this RPA. Preliminary review of project proposals indicates one new proposal consistent with RPA 165.

#### ***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. This is a necessary step in developing alternative modeling systems.

#### ***Regional Coordination***

SFEC, *US v. Oregon*, Council.

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

### ***Five Year (2003-07) Outcomes***

By 2003, the Action Agencies will have determined if sufficient numbers of ghost nets are present in the waters of Bonneville and The Dalles reservoirs 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 through the Provincial Review Process. Additional studies will be funded as appropriate.

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 mortality assessments proposed within the Mainstem/Systemwide Provincial Review process.

#### ***2004-07 Work Plan***

- Continue to review project proposals addressing this substrategy submitted in the Council 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 uncertainty and/or loss estimates are 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**

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#### **Harvest Substrategy 3.1: Value-added projects**

##### ***Five Year (2003-07) Outcomes***

Higher valued catch can be the result of selective live capture fisheries, as shown by the 2001 and 2002 lower Columbia River tooth-tangle net study (BPA 2001-007-00). This outcome is realized because the gear and methods deployed result in a better quality caught fish due to increased freshness and less external net marks when compared to a conventional gillnet. If the spring chinook forecast for 2003 and beyond is large enough to support a full-fleet non-treaty commercial fishery, it is expected that these benefits will continue to be a component of live-capture gear and methods.

Other measures undertaken in the next five year may 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 that will define 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 Fish & Wildlife prioritization process; informal discussions with key fishery groups.

**Harvest Substrategy 3.2: Potential alternative/terminal fishing locations**

***Five 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 Estuary.

***2003 Work Plan***

- Continue to provide additional hatchery production and terminal fishing opportunities in the Lower Columbia Estuary (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 prioritization process; informal discussions with key fishery groups.

**5.4.4 Harvest Strategy 4: Fishery Effort Reduction Programs**

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***Five Year (2003-07) Outcomes***

By the end of the five-year cycle, the Action Agencies will implement 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 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**

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

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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**

##### ***Five 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 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:

- **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 Kooconusa 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**

### ***Five 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.**

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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 is likely to occur through bull trout recovery planning, subbasin planning, implementation of the Council/BPA 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**

#### ***Five 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:

- (List continuing projects from 2002).
- Annual progress reports.

### ***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.
- Initiate study 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**

### ***Five 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**

### ***Five 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**

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NMFS and the Action Agencies are working together to develop and implement a comprehensive RM&E plan as called for under the 2000 BiOp and the *All-H Strategy*. This RM&E plan and associated projects are intended to provide information needed to assess the performance of ESA-listed anadromous fish populations at the 2005 and 2008 BiOp check-in evaluations, and to identify and prioritize the most biologically effective actions.

The RM&E projects in this Plan are continuing steps in a multi-year effort to develop and implement the RM&E plan. Top priorities for 2003 through 2007 include:

- Continued development and implementation of a RM&E program framework.
- Projects that meet the objectives of a structured population status monitoring program.
- Action effectiveness research projects (including ongoing and new pilot studies).
- 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 Action Agencies are working with NMFS to further develop and identify agreed-upon longer-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 to develop and coordinate the components of the comprehensive RM&E plan. Participants currently include primarily the Action Agencies and NMFS, but may be broadened to include other agencies as needed to ensure a comprehensive RM&E plan. In addition to a Planning Group, the following work groups have been formed:

- Status Monitoring/Habitat Action Effectiveness Work Group
- Hydro/Estuary/Ocean Work Group

- Hatchery/Harvest Work Group
- Data Management Work Group

A regional RM&E coordination technical/policy group is also planned to provide regional coordination and interface between the BiOp-required RM&E program and other regional federal, state, and tribal RM&E programs.

Specific RM&E projects will be identified and prioritized for 2003 through the comprehensive RM&E plan currently under development. Those projects fall under the Corps' AFEP forum, the Bureau's priority subbasin program, and proposals submitted through the Provincial Review process, particularly for the Mainstem/System-wide province. Special requests for proposals (RFPs) may be developed to fill gaps not covered under those two regional research and monitoring forums.

The current draft RM&E Plan and additional information on the Action Agencies and NMFS RM&E workgroups can be found at <http://www.efw.bpa.gov/cgi-bin/FW/welcome.cgi>.

The following six RM&E strategies are currently being implemented to comprehensively meet RM&E requirements outlined in the BiOp: 1. Status Monitoring; 2. Action Effectiveness Research; 3. Critical Uncertainties Research; 4. Project Implementation Monitoring, 5. Data Management, and 6. Regional Coordination. In order to properly organize, design, and implement the Plan's components, some of the strategies are further delineated by a substrategy. For example, the substrategies for Status Monitoring are 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 sub-strategies are grouped according to whether they apply to management areas of hatchery, habitat, harvest, or hydro. For more details, see Appendix A.

### **5.6.1. RM&E Strategy 1: Status Monitoring**

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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.

#### ***Five 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 Appendix A.

- 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.

- 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.
- Develop status monitoring sampling designs as one component of a RM&E pilot study in the John Day.

- Monitor emergence, growth, migration timing, and survival of Snake River fall chinook.
- Prioritize status monitoring work in the Columbia River Basin.
- Characterize existing conditions and trends within the watershed and identify data gaps
- Minimize salmonid losses and migratory delays or blockages associated with irrigation diversion structures and water withdrawals along streams on non-federal lands.
- Monitor native species abundance.

### ***2004-07 Work Plan***

The Action Agencies will continue to work with NMFS and other regional entities on the ongoing projects from 2003 and the development of additional pilot monitoring studies. Further development of a regional RM&E program will help implement additional projects at a programmatic level and refine status monitoring sampling designs.

### **RM&E Status Monitoring Substrategy 1.3: Hydro Corridor Monitoring**

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

### ***2003 Work Plan***

A general listing of hydro 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 Appendix A.

#### **Bonneville Dam**

- **Juvenile fish studies.** Project and route-specific survival estimates; 1st powerhouse sluiceway efficiency.
- **Adult fallback.** Complete telemetry studies.
- **Adult lamprey passage.** Continue 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**

### ***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.
- **Develop physical habitat metrics.**
- **Modeling.** Conduct coupled and physical-biological modeling.
- **Define and analyze management scenarios.**
- **Plume research.** Conduct spatial and temporal features of the Columbia River Plume. Develop and calibrate plume circulation model.
- **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.

### ***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 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.

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

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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 hydro 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. For more detailed information on habitat action effectiveness research please see the document "Guidelines for Action Effectiveness Research Proposals for FCRPS Offsite Mitigation Habitat Measures," by the SMHAER Work Group (posted at <http://www.efw.bpa.gov/cgi-bin/FW/welcome.cgi>).

### ***Five 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 hydro 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: Hydro

### 2003 Work Plan

A general listing of hydro 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.**
- Conduct **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.** Prepare plans and specifications for prototype removal/relocation, preparation of final report, and plan for feasibility recommendations, as warranted.
- **Juvenile fish transportation evaluation.** Spring/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.** 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).
- **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: 1. statistical evaluation of performance standards to improve decision analysis for assessing RPA compliance, and 2. 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

## **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. Individual project work plans are listed in more detail in Appendix A.

- 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***

Develop pilot effectiveness monitoring programs in other subbasins and continue 2003 projects.

## **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**

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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 RPA 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 RPA actions.

*Five 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**

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Compliance monitoring, or project implementation monitoring, is necessary to determine how well management actions are implemented and is explicitly called for under 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.

#### ***Five 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. Individual project work plans are listed in more detail in Appendix A.

- Develop and maintain an **interim data tracking system** for project tracking and progress reporting.



- Develop a **plan for compliance auditing**.

#### ***2004-07 Work Plan***

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

### **5.6.5 RM&E Strategy 5: Data Management System**

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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 legal requirements in the BiOps, 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.

#### ***Five 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**

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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). This group will be formed through a regional workgroup session with key RM&E participants in the region.

## 6.0 WHERE TO GET INVOLVED

Coordination forums discussed in each H area are listed below.

*(To be reorganized and completed in final Plan.)*

This section will describe the various forums mentioned for Regional Coordination and identify relevant information for those wanting to get involved)

Hydrosystem:

1. System Configuration Team (SCT)
2. Water Quality Team (WQT)
3. Implementation Team (IT)
4. RM&E Work Group
5. Technical Recovery Teams (TRT)
6. Anadromous Fisheries Evaluation Program (AFEP)
7. NMFS Regional Forum
8. Technical Management Team (TMT)
9. Upper Columbia EIS
10. Banks Lake Drawdown EIS
11. Snake River Basin Adjudication settlement discussion
12. Fish Passage Operation and Maintenance Coordination Team (FPOM)
13. Subbasin Planning
14. Provincial Reviews
15. Columbia River Fish Mitigation program (CRFM)
16. Regional water entity. The regional water entity will address the variety of state and tribal regulations and policies affecting the dedication of water for in-stream use. A system of regional and local water entities will be established to explore and evaluate viable methods of increasing tributary flows. Each local transaction approved by the regional entity will have an associated requirement that the local entity be able to establish that the transferred quantity of water is both measurable and protected within the relevant stream reach. Establishing a public forum to inform, facilitate and solicit promising water transactions is a primary role of the entity.

Habitat:

1. Independent Science Review Panel (ISRP)
2. Technical Recovery Teams
  - a. Willamette/Lower Columbia
  - b. Interior Columbia
3. Subbasin Planning
4. Provincial Reviews
5. Federal Caucus
6. Federal Habitat Team
7. Lower Columbia River Estuary Partnership (LCREP)
8. Proposed Regionwide Forum (Federal Habitat Team, tribes, states, & others)
9. State and tribal TMDL processes
10. Reclamation funded high priority subbasin liaisons
11. Regional Water Entity (to be established)
12. Columbia Basin Coordinated Information System

13. Conservation Reserve Enhancement Program
14. Oregon Watershed Enhancement Board
15. Washington State Conservation Commission
16. Reclamations ESA Manager (give names & numbers??)
17. Anadromous Fish Evaluation Program
18. Columbia River Fish Mitigation program

Hatcheries:

1. Safety Net Program
2. Safety Net Artificial Production Program (SNAPP)
3. Provincial Review
4. Technical Recovery Teams
5. Subbasin Planning

Harvest:

1. US v. Oregon Technical Advisory Committee
2. Provincial Reviews
3. Pacific Salmon Commission – Selective Fishery Evaluation Committee
4. Informal discussions with key fishery groups
5. COUNCIL prioritization process
6. Informal coordination among interested parties

Resident Fish:

1. Kootenai White Sturgeon Technical Recovery Team
2. NEPA process (Upper Columbia EA & EIS)
3. Council Fish & Wildlife Program processes
4. Subbasin Planning
5. Technical Forums
6. Kootenai Ecosystem Rehabilitation Team
7. Bull Trout recovery planning
8. Ad Hoc project and issue specific processes and forums

RM&E:

1. RM&E Regional Coordination Work Group
2. Council processes
3. Lower Columbia River Estuary Partnership
4. RM&E Data Management Work Group

## **7.0 ADAPTIVE MANAGEMENT AND PROPOSED MODIFICATIONS OF THE BIOPS**

As requested by NMFS, the Action Agencies have included recommended RPA modifications and rationale in our 2001 Progress Report and this Implementation Plan. NMFS will consider our recommendations and make changes to the RPA as appropriate. The Action Agencies will be working with NMFS throughout the summer of 2002 to identify those portions of the RPA that warrant modifications.

To date, (ADDITIONS and MORE DETAIL to come for final draft) the Action Agencies suggestions of actions for modification and clarification include, but are not necessarily limited to the following: 1) further clarification of responsibilities of NMFS, the Action Agencies, and the Federal Caucus agencies for RM&E and other activities; 2) clarification of which high-priority subbasins should be the focus of our off-site actions; 3) resolution of ESA consultations on Reclamation Projects and programmatic consultations on tributary screens and barriers; 4) clarification of NEPA issues in VARQ; 5) clarification of elements of a comprehensive marking plan; and 6) modification of scope and/or clarification of requirements in several off-site habitat actions. The final 2003-07 Implementation Plan will include a detailed description of our suggestions for NMFS' consideration.