

## Section 7

# COORDINATED SALMON PRODUCTION AND HABITAT

An ecosystem approach to species recovery requires close coordination of habitat and production measures. Coordination should ensure that habitat and production measures are driven by the needs of specific populations and by the condition of the watersheds in which those populations live. Effective coordination should provide an opportunity to build on the energy and initiatives of local communities. This helps ensure that ratepayers get maximum return from their investments and makes the best use of the subbasin and system-wide plans prepared by the fish and wildlife agencies and Indian tribes. The process outlined in this section should rely on the analysis and judgment contained in these plans and other resource plans. Implementors should adapt those plans to the needs of weak stocks and watershed conditions.

The starting place for coordination will be a “subregional” process that brings relevant interests together to address the needs of weak fish populations in particular watersheds. A total watershed perspective, in which fish needs, land and water conditions, and local, private and government initiatives are viewed together, will play an essential role in the ultimate success of efforts to rebuild salmon and steelhead runs. To give watershed planning a head start, the Council calls for a “model watersheds” program (Section 7.7B), in which watershed-oriented techniques can be pioneered and evaluated, and promising developments may be incorporated in the subregional process.

Part of the task of coordination is to build on the opportunities and constraints of existing implementation processes, and avoid creating new processes that may diffuse the region’s efforts. The implementation planning process (developed by the fish and wildlife agencies, Indian tribes and the Bonneville Power Administration to help prioritize efforts to

implement the fish and wildlife program) should play a valuable role in bringing land and water managers and other interested parties into a coordinated implementation process.

Because many measures will be implemented by federal agencies, the National Environmental Policy Act may apply. Where it applies, the National Environmental Policy Act can generate important analysis that should inform the region’s decisions.

With the listing of salmon stocks under the Endangered Species Act, the provisions of that law will play an important role. In the process outlined below, we recognize the need to evaluate habitat and production measures in light of these laws and processes, and make the best use of these evaluations in Council decisions. The Council also supports efforts to streamline these processes, both to improve the quality of the public debate and to minimize delay in decision-making.

In Sections 7.0 through 7.5, the Council calls for immediate efforts to gather data on wild and naturally spawning stocks, review impacts of the existing hatchery system and coordinate supplementation activities. In Sections 7.6 through 7.8, the Council calls for changes in land and water management, water diversion screening, habitat priorities and an expedited funding process. In the Council’s view, this work will greatly assist the region’s decision-making processes. In the absence of this work, the Council believes that implementation of habitat and production measures will continue to suffer from inadequate information, disjointed policies, uncertainty and delay. The region should begin this work promptly, to overcome these obstacles and allow recovery efforts to proceed expeditiously.

## **7.0 COORDINATED IMPLEMENTATION OF HABITAT AND PRODUCTION ACTIONS**

### **7.0A Identify and Implement Emergency Production and Habitat Actions in 1995 and 1996**

The subregional approach will be the basis for the program treatment of habitat and production issues, but it is apparent that this approach will take time to develop and implement. In the interim, many salmon and steelhead populations continue a trend of decreasing abundance. Some of these populations, such as chinook produced in the Snake Basin, cannot wait for this approach to be implemented. They require expedited actions. Council evaluation indicates that even with improved salmon and steelhead survival through changes in mainstem operations, many populations will not be maintained, let alone rebuilt, without immediate and significant increases in survival at other stages of their lives.

Habitat improvements and changes in hatchery operations (for example, the use of supplementation) can be implemented to increase natural production and survival significantly. In the short term, options appear to be fairly limited in this area. The Council calls on the fishery managers to immediately identify actions that can be implemented to improve survival of adult spawners in 1995 and 1996. Actions also need to be identified that will increase egg-to-smolt survival of the progeny of these year classes.

It can be anticipated that needed survival increases will require the use of some artificial propagation technology. The Council acknowledges that artificial propagation and the proper use of hatchery fish to supplement wild and naturally spawning populations of salmon and steelhead as a rebuilding measure will continue to be as intensely debated as is the

relationship of increased mainstem flows to fish survival. Regardless, the outlook for Snake Basin chinook, as well as some other populations, requires the immediate implementation of dramatic measures. Without immediate action, these populations will not survive long enough to make the results of these debates meaningful.

#### **Fishery Managers**

7.0A.1 Develop project-specific action plans for production and habitat measures for prompt implementation in Fiscal Years 1995 and 1996. Because of the dire status of Snake River chinook, as well as some other populations in the basin, these implementation action plans should contain measures that will provide immediate increases in natural production and survival for adults returning in 1995 and 1996, and for their progeny. In identifying actions, use Table 1, Table 2 and Appendix A of the Columbia Basin Tribal Restoration Plan submitted to the Council on August 15, 1994, the Integrated System Plan and other appropriate information. Submit action plans to the Council by March 31, 1995.

#### **Council**

7.0A.2 Review the action plans for fiscal years 1995 and 1996 by the end of May 1995.

#### **Bonneville and Other Appropriate Agencies**

7.0A.3 Absent Council disapproval, fund, or share in funding, projects called for in the action plans as a high priority in the fiscal year identified by the fishery managers.

## 7.0B Ten-Year Implementation Plan for Production and Habitat Projects

### Fishery Managers

7.0B.1 Use updated subbasin plans and acknowledged local watershed plans, where available, to develop a project-specific implementation plan that initially addresses the 10 Fiscal Years 1997 through 2006. Submit the 10-year implementation plan to the Council for review by March 1, 1996. Thereafter, annually revise the 10-year implementation plan and submit to the Council by March 1. Once it is operational, use the subregional process to identify projects for specific populations.

### Council

7.0B.2 By June 1 of each year, review the 10-year implementation plan and the proposed Annual Implementation Work Plan for consistency with the program.

### Bonneville and Other Appropriate Entities

7.0B.3 Fund implementation of the Annual Implementation Work Plan.

### Relevant Parties

7.0B.4 Upon implementation of the subregional process, habitat and production measures should be coordinated, evaluated and implemented in a five-step process:

- The subregional process (Section 3.1D) should identify measures to help specific populations. These measures should be included in an

annual work plan submitted to the Council and the fish managers.

- The fish managers should prioritize measures that emerge from the subregional process (or the process described in Section 7.3A) using the six principles discussed in Section 4. This process should include independent peer review on the degree to which proposed measures pose risk to biological diversity. For measures that pose appreciable risk to biological diversity, but address critical uncertainties, the peer review should also provide an opinion on whether potential learning benefits justify the risk. These measures should be incorporated into the annually updated 10-year implementation plan and submitted to the Council for review and approval. A fast-track process should be developed for appropriate, locally based habitat initiatives. Upon approval, Bonneville should incorporate these actions into the Annual Implementation Work Plan.
- Where applicable, the National Environmental Policy Act and the Endangered Species Act processes should be initiated. The “purpose and need” section of any environmental document should reflect the six principles discussed in Section 4. If the National Environmental Policy Act or the Endangered Species Act are not applicable, or these processes do not provide information required in master plans (Section 7.4B), a master plan should be developed. Information available from cumulative impact studies (Section 7.1F), carrying capacity studies (Section 7.1A), and wild and natural production data (Section 7.1C) should be incorporated into these evaluations.

- The resulting analyses should be reported to implementing agencies, interested parties and the Council. The Council will determine whether the projects are consistent with this program and the Northwest Power Act.
- Following approval, implementation, monitoring and evaluation should occur.

## **7.0C Regular Updating and Distribution of Subbasin Plans**

### **Fishery Managers**

- 7.0C.1 Expediently update the subbasin plans. Particular attention should be directed to sections addressing considerations, objectives, alternative strategies and recommended strategies. Use Tables 1 and 2, and Appendix A of the Columbia Basin Tribal Restoration Plan submitted to the Council on August 15, 1994, and other appropriate information in updating the subbasin plans. Submit the updated subbasin plans to the Council by December 31, 1995. Thereafter, update the subbasin plans as needed. Once it is operational, use the subregional process to update subbasin plans. Submit subbasin plans to the Council as updated.
- 7.0C.2 Make subbasin plans readily available through the Coordinated Information System. As much as possible, update sections of the subbasin plans that address background information, data and other appropriate sections annually, as a function of the Coordinated Information System.

### **Bonneville**

- 7.0C.3 Fund updating the subbasin plans.

### **Fishery Managers**

- 7.0C.4 Subbasin plans, as the foundation of the fish and wildlife program, must reflect the provisions of Section 4.1. Implementing an ecosystem approach requires knowledge of the Columbia River ecosystem and its ability to support salmonids (see Section 7.1A Evaluation of Carrying Capacity). The conservation of the existing salmonid genetic resources found in the Columbia Basin is also basic to having sustainable production and fisheries in the future (see Section 7.1B Conserve Genetic Diversity). While many of the states and tribes have adopted wild and natural fish policies, there is need to develop basinwide policies to ensure conservation of genetic resources throughout the basin and to facilitate the updating of individual subbasin plans (see Section 7.1D Wild and Naturally Spawning Population Policy). In some of the original subbasin plans, basic biological information on the fish populations was sparse. It will be important in updating plans not only to identify needed information but also to develop a schedule for obtaining such information (see Section 7.1C Collection of Population Status, Life History and Other Data on Wild and Naturally Spawning Populations). To help in prioritizing restoration efforts among populations, a vulnerability or risk analysis should be developed and performed (see Section 7.1E Population Vulnerability Analyses). In planning for new production, fishery managers must also address the question of the impacts of existing and proposed artificial production activities (see Section 7.1F Systemwide and Cumulative Impacts of Existing and Proposed Artificial

Production Projects; also see Section 7.0D Comprehensive Environmental Analysis). In the interim, fishery managers will need to take precautions not to exceed carrying capacities for juvenile salmonids through operations of the Columbia River hatcheries (see Section 7.1G Adjust Total Number of Hatchery Fish Released to Stay Within Basin Carrying Capacity). The reprogramming of existing hatchery production or space to address restoration priorities, where some form of fish culture is to be used, may be less expensive, more expedient, and avoid bottlenecks in carrying capacity as opposed to new production and facilities (see Section 7.1H Reprogramming Existing Hatchery Stocks and Facilities).”

## **7.0D Comprehensive Environmental Analysis of Federal Production Activities**

A Programmatic Environmental Impact Statement is being designed to assess the impacts on naturally produced salmon of large numbers of anadromous fish being introduced from federally funded hatcheries in the Columbia River Basin. The U.S. Fish and Wildlife Service is examining the options and opportunities for changing how, when, where and why hatchery-produced salmon and steelhead are released into Columbia Basin streams.

The Programmatic Environmental Impact Statement was not designed to specifically meet any Council program objective. However, it is being funded in substantial part by the Bonneville Power Administration. It is evident that overlap exists between some Programmatic Environmental Impact Statement objectives and specific Council measures. The Programmatic Environmental Impact Statement objectives that potentially satisfy Council measures need to be identified and coordinated with the Council program to avoid duplication and expedite resolution of questions surrounding the use of

hatchery-reared salmon and steelhead. The following Council measures have been tentatively identified as being partly or completely addressed by Programmatic Environmental Impact Statement: 7.1C.1, 7.1F.1, 7.1F.2 and 7.2A.2. In helping to fund the Programmatic Environmental Impact Statement, Bonneville may appropriately take credit for funding portions of those measures.

### **Columbia Basin Fish and Wildlife Authority**

7.0D.1 Periodically consult with Council on status of Comprehensive Environmental Analysis, particularly regarding progress on those measures listed above and any reevaluation of planned accomplishments.

Identify areas where additional effort is required to more fully address the Council measures listed above or where Comprehensive Environmental Analysis activities could logically be expanded to address additional Council measures.

Identify measures in the Council’s program where additional or more timely progress would facilitate Comprehensive Environmental Analysis achieving its objectives.

## **7.1 ENSURE BIODIVERSITY**

Scientists and natural resource managers have become increasingly concerned about the need to manage fish and wildlife in a way that recognizes the importance of a diverse and productive ecosystem. Biodiversity is the variety of and variability in living organisms, with respect to genetics, life history, behavior and other fundamental characteristics. Biodiversity is important at the levels of landscapes, ecosystems, species and populations. There is increasing recognition that conserving

biodiversity is key to the sustainability of natural resources, including fish and wildlife. Conserving biodiversity means fostering human development activities that protect the integrity of ecosystems, thereby sustaining natural resources.

## 7.1A Evaluation of Carrying Capacity

Implementing an ecosystem approach requires knowledge of the Columbia River ecosystem. The Council therefore calls on Bonneville and federal agencies to evaluate salmon survival in the Columbia River, its estuary and in the near-shore ocean. This analysis should increase understanding of the ecology, carrying capacity and limiting factors that influence salmon survival under current conditions.

### Bonneville

7.1A.1 Fund an evaluation of tributary, mainstem (including reservoirs), estuary, plume, near-shore ocean and marine salmon survival, ecology, carrying capacity and limiting factors. Include analysis of competition between non-native species and anadromous salmonids and negative competitive interactions resulting from hatchery management practices. As part of the evaluation, estimate the current salmon carrying capacity of the Columbia River mainstem, tributaries, estuary, plume and near-shore ocean for juvenile fish, using primarily existing data. The analysis should include an evaluation of the effects of the alteration and timing of the ocean plume as caused by the construction and operation of the hydroelectric system. The evaluation should identify residency time of juvenile salmonids, and their level of smoltification. Management measures to protect and improve estuary habitat as well as increase the productivity of the

estuary should also be identified. The evaluation should make recommendations for management responses to fluctuating estuary and ocean conditions, such as adjusting total numbers of releases to take such conditions into account. The evaluation should include analysis of existing data, identification of critical uncertainties and research needs, and estimates of incremental gains in survival from improvements in each area. The analysis should also propose a monitoring program to identify optimal timing for residency in the estuary and the near-shore environment (coordinate with measure 7.2D.2. under Improved Propagation at Existing Facilities).

7.1A.2 Fund development of a study plan based on the critical uncertainties and research needs identified in the above evaluation, which should be presented to the Council by December 1995. The study plan should include provisions for federal funding or cost sharing of the study. Upon approval by the Council, Bonneville and/or other parties identified by the Council should fund the proposed study.

### States of Oregon and Washington and Federal Agencies

7.1A.3 Based on existing information, identify management measures that can be implemented immediately to provide better protection and improve estuarine productivity. Include identification of seasonal water volume needs in the estuary for fish and wildlife. Report to the Council by June 30, 1995, on opportunities, needed actions, time frame and funding sources to implement recommendations.

7.1A.4 Explore expanding the scope of the Columbia River Estuary Bi-State Study to include all of the Columbia River Basin. This study could be an effective means of addressing comprehensively all interrelated water quality and quantity aspects of the basin. Also, explore the feasibility of the Columbia Basin participating in the Environmental Protection Agency's national "estuaries of significance" program.

### **Council**

7.1A.5 Begin rulemaking in December 1995 to identify measures aimed at improving estuary conditions and survival for salmon and steelhead. Review results of the Columbia River Estuary Bi-State Study as well as other pertinent information to develop these measures.

## **7.1B Conserve Genetic Diversity**

### **Council Genetics Team**

7.1B.1 Review current efforts for conserving genetic diversity within and among Columbia River Basin salmon and steelhead stocks. Report to the Council by December 31, 1995. The review should provide recommendations for how to achieve sustainable increases in salmon and steelhead populations. Specifically, recommend an approach to identify provisional genetic conservation units for production and harvest, and rules for taking action with regard to those conservation units. Coordinate with measure 7.1C.1. The team also should assist in the development of performance standards for conserving genetic diversity of natural, supplemented and hatchery stocks.

7.1B.2 Participate in the coordinated habitat and production process described in Section

7.0A.1. Develop technical proposals for improved conservation of biodiversity, including identification of genetic conservation refuges, alternative approaches to artificial production and any other appropriate proposals.

### **7.1C Collection of Population Status, Life History and Other Data on Wild and Naturally Spawning Populations**

To meet the program goal, base-line information that will improve management and conservation of wild and naturally spawning populations is needed. High priority populations should be identified immediately so that these can be monitored as soon as possible. An extensive initial data collection effort is needed so that provisional population units in the basin can be identified. And long-term monitoring strategies need to be developed. The following actions should be coordinated with development of rebuilding schedules called for in Section 4. Utilize the Habitat Selection Criteria developed by the coordinated habitat and production process as part of the criteria for collection of biological data.

#### **Bonneville**

- 7.1C.1 Fund a study to: 1) determine what level of differentiation is necessary to identify stock boundaries or genetic differences, and 2) determine what attributes need to be measured. Obtain peer review of the study approach and the results. Report study progress periodically to the Council. The study should begin no later than February 1, 1995, and conclude by June 1995.
- 7.1C.2 Fund the design of an extensive one- or two-year study to identify wild and naturally spawning salmon and steelhead populations in the Columbia River Basin based on genetic, morphological, life history and any other relevant information. Recommend possible indicator populations for monitoring. Consult with appropriate specialists in designing the project. Take into

consideration the findings from measure 7.1C.1 and coordinate with the Genetics Team (see measure 7.1B.1). Bring alternative study designs to the Council by December 31, 1992. Upon Council approval, fund the study.

#### **Fishery Managers in Consultation with National Marine Fisheries Service and Other Technical Experts**

- 7.1C.3 Develop and submit to the Council a proposed program to collect information on wild and naturally spawning populations, including index populations, by June 30, 1996. This should be consistent and coordinated with population monitoring specified as part of the rebuilding schedules in Section 4. The long-term objective of the program is to collect information related to the sustainability of wild and naturally spawning salmon and steelhead populations, including risk-containment monitoring of impacts of management action or inaction. The program should include proposals to accomplish the following elements:

- Refine the identification of wild and naturally spawning populations provided for above and develop necessary data bases.
- Develop a profile on the status of wild and naturally spawning populations.
- Develop a profile on genetic, life history and morphological characteristics of wild and naturally spawning populations. Describe the characteristics to be maintained by management actions.
- Identify limiting factors for wild and naturally spawning populations.
- Identify natural carrying capacity of habitat for the populations.

7.1C.4 Coordinate with the activities described above and fund a project to scope program costs, duration, feasibility and relative benefits for levels of monitoring ranging from complete monitoring of all wild and naturally spawning salmon and steelhead populations, to monitoring of index populations only. Report to the Council with alternative program approaches by September 30, 1996.

## **7.1D Wild and Naturally Spawning Population Policy**

To conserve, manage and rebuild the basin's remaining wild and naturally spawning populations, a policy giving such populations explicit priority is needed.

### **Oregon, Idaho and Washington and Indian Tribes**

7.1D.1 By March 31, 1995, develop and review with the Council a proposed wild and naturally spawning population conservation policy consistent with the Council's overall program goal and intended to protect genetic diversity, population identity, long-term fitness and evolutionary capacity. The policy should address habitat protection, restoration, management and improvement; water use; harvest management; releases of non-native fish; interactions between resident and anadromous fish; use of wild and naturally spawning populations as brood stock for artificial production; risk assessment and containment; and monitoring and evaluation. Consider recovery plans and other products developed under the Endangered Species Act for Columbia River Basin species in development of this policy.

7.1D.2 By June 30, 1995, in consultation with appropriate specialists in genetics and

state, federal and tribal land and water managers, establish a comprehensive wild and naturally spawning salmon population conservation program. Provide for Council and public review. The program should consider for inclusion, but not be limited to, the following:

- Management and funding to address factors that limit populations.
- Habitat management and restoration to maintain and increase the productivity of wild and naturally spawning populations through the maintenance of their biological characteristics.
- Management to maintain the genetic, life history and morphological characteristics of wild and naturally spawning populations, including sustainable long-term spawning escapements and redd counts.
- Maintenance of reproductive isolating mechanisms for wild and naturally spawning populations.
- Determination of current and sustainable effective population sizes for wild and naturally spawning populations, and determination of natural carrying capacity of the habitat that supports these populations.
- Annual evaluation and reporting of the results of fisheries, land and water management actions.
- Recovery plans and other products developed under the Endangered Species Act for Columbia River Basin species.

## **7.1E Population Vulnerability Analyses**

### **Bonneville**

7.1E.1 Fund a review of existing procedures for conducting population vulnerability analyses for depleted salmon and steelhead populations. The procedures should be used to determine the status of populations and facilitate the selection of options for recovering them. Coordinate with appropriate fishery managers, specialists in genetics and the regional analytical methods coordination process (see Section 3). Report findings and recommendations for development and application to the Council by June 30, 1995.

Endangered Species Act. Report to the Council by June 1996.

## **7.1F Systemwide and Cumulative Impacts of Existing and Proposed Artificial Production Projects**

### **Bonneville**

- 7.1F.1 Design a study to evaluate the cumulative and systemwide impacts of existing and proposed artificial production activities on the ecology, genetics and other important characteristics of Columbia River Basin anadromous and resident fish. Coordinate this study with the genetic impact assessment of Columbia River Basin hatcheries called for in Section 7.2A.2. Report to the Council by December 31, 1995. Upon Council approval, fund the study.
- 7.1F.2 Fund a study to develop a method to be used by project proposers and implementors for assessing systemwide and cumulative impacts of proposed new artificial production projects. The method should take into account impacts of ongoing artificial production programs as identified above. The method should help meet requirements of the National Environmental Policy Act and the

### **Fishery Managers**

- 7.1F.3 In addition to existing methods for evaluating proposed artificial production projects (for example, Regional Assessment of Supplementation Project and Chapter III.C of the Integrated System Plan), use the method for assessing systemwide and cumulative impacts when available (see 7.1F.2).

### **7.1G Adjust Total Number of Hatchery Fish Released to Stay Within Basin Carrying Capacity**

The number of hatchery fish released into the Columbia River has steadily increased since hatchery production began in the late 1800s. Between 170 million and 200 million hatchery fish are released into the Columbia River Basin system annually. However, the capacity of the Columbia River Basin to support young fish has decreased during this time. Some scientists have suggested that the number of fish released may exceed the capacity of the present-day river, estuary and ocean to support their growth and survival to adulthood. Exceeding system carrying capacity may be partly responsible for decreasing survival of hatchery and wild and naturally spawning stocks.

### **Fishery Managers**

- 7.1G.1 Until the carrying capacity preliminary evaluation in Section 7.1A.1 is complete (December 1995), take precautions to not exceed carrying capacity for juvenile salmonids through operations of Columbia River Basin hatcheries. Report to the Council by December 31, 1995, on the precautionary measures that will be put in place.

### **7.1H Reprogramming of Existing Hatchery Stocks and Facilities**

The Council acknowledges the commitment of parties to *U.S. v. Oregon* to use the framework of the Columbia River Fish Management Plan to rebuild upriver runs through production planning and the commitment of the parties to make recommendations for actions by June 1995. The Council further recognizes that Congress has instructed the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to prepare plans and implement pilot programs designed to assist in rebuilding fish runs above Bonneville Dam and to report to Congress on such activities within 120 days of enactment of those agencies' appropriations.

### **Fishery Managers**

- 7.1H.1 To coordinate with the foregoing measures, the Council calls on the fishery managers to:
- take the products of the Regional Assessment of Supplementation Project and the Council's genetics team into consideration in production planning;
  - obtain review of production plans by appropriate scientific experts in light of the frameworks provided by the Regional Assessment of Supplementation Project and the Council's genetics team;
  - coordinate with the Integrated Hatchery Operations Team in production planning; and
  - periodically brief the Council on progress.

### **Council**

- 7.1H.2 Review a comprehensive plan developed by the fish and wildlife agencies and

tribes for reprogramming lower river hatcheries. Where current knowledge is sufficient, certain stocks may be moved to particular upriver streams. Initial efforts shall focus on the needs of upriver stocks. The fish and wildlife agencies and the tribes will cooperate in this effort.

### **Bonneville**

- 7.1H.3 After Council review of the reprogramming plan developed by the fish and wildlife agencies and Indian tribes, provide funds to transfer a portion of the fish from existing lower Columbia River hatcheries to release sites in the upper Columbia River system to assist in restoring naturally spawning stocks, as provided in that plan. The Mitchell Act and John Day hatcheries were provided to mitigate fishery losses that result from the federal development of the Columbia River Basin for hydropower and other purposes (such as irrigation and navigation) for which these projects were authorized. Reprogramming hatchery operations by developing new release strategies is intended to help rebuild upriver runs and improve tribal fisheries. The Council strongly supports restoration of naturally spawning upriver stocks, but further consultation with the fish and wildlife agencies and tribes is required to determine a final release plan.

## **7.1I Biodiversity Institute**

### **All Interested Regional Entities**

- 7.1I.1 Cooperatively fund a feasibility study for a Pacific Northwest biodiversity institute. The institute would address native and resident salmonids, their habitat and ecosystems at stream, watershed and landscape levels. The

purpose of the institute would be to assist in developing research and monitoring programs, provide scientific peer review, provide scientific expertise for regional planning and conduct research. Upon Council approval, fund project design, including cost sharing.

## **7.2 IMPROVE EXISTING HATCHERY PRODUCTION**

Because opportunities to achieve significant salmon production increases through improving natural habitats are limited, additional salmon increases may have to be achieved through artificial production by creating artificial spawning and rearing environments such as hatcheries. The dilemma is that artificial production can have negative effects on wild and naturally spawning salmon populations. For example, young hatchery-produced fish may compete with wild and naturally produced juveniles for food and habitat. Or, returning hatchery-bred adults may interbreed with naturally spawning fish, altering gene pools. In the past, artificial production programs have had detrimental effects on wild gene pools and biodiversity.

In developing these production measures, the Council has identified measures that are consistent with the goal of doubling the number of salmon and steelhead in the basin while maintaining existing levels of biodiversity. This means understanding and documenting the life cycle of wild and naturally spawning fish populations at the stream level so that broader management decisions, while not necessarily made at the stream level, are better informed. It means improving the operations of artificial production facilities, so that impacts of hatchery fish on wild and naturally spawning populations are minimized and the quality of hatchery fish is improved. It means making investments and other adjustments to provide harvest opportunities in tributaries or other areas and to facilitate rebuilding of weak populations. It

includes scientifically supported programs to supplement weak wild and naturally spawning fish populations with hatchery fish. It also means proceeding with extreme caution to avoid damaging remaining wild and naturally spawning populations, and fully implementing adaptive management with a systematic monitoring and evaluation strategy.

Populations whose numbers have been greatly depleted as a result of human activities pose a special dilemma. All parties agree that restoring the freshwater habitats and migration corridors of Columbia River Basin salmon is key to recovering depleted populations. There is concern, however, that implementation of passage improvement, habitat protection and restoration measures that have been proposed to date will not be sufficient to recover depleted populations in a timely manner. As a result of this concern, artificial propagation has been identified as an important tool to further aid depleted populations. However, there has been much debate in the region concerning the proper role of artificial propagation.

Some oppose or are skeptical of using artificial propagation to assist depleted populations. This is because of the risk that artificial propagation could change the identity of depleted isolated populations or reduce their ability to recover by altering their ability to survive over the long term in their natural environment.

Others recommend the proper use of some form of artificial propagation (such as supplementation) to aid in recovery of depleted populations. Proponents of this view say that numerous small populations are being lost due to continuing damage and lack of corrective action, with the result that basinwide population diversity is declining. They fear that these populations have already lost the ability to recover on their own because severe reductions in population size have already reduced the genetic diversity important for recovery. In addition, these populations may not be well adapted to survival in the face of dramatic human-caused changes in the basin's environment. Thus, proponents of artificial propagation recommend rapidly

increasing the sizes of these small populations to prevent their extinction and loss of genetic diversity by properly using some form of artificial propagation.

The process of devising the best strategies for restoration of depleted populations of threatened and endangered species will require rigorous integration of genetics, evolutionary biology, demography and ecology in addition to the best cooperative efforts of resource managers. Scientific resolution is unlikely to provide one "generic" answer, but rather two or more different answers appropriate for different existing conditions of populations in the basin.

Because the Council recognizes that there are legitimate biological concerns associated with measures to protect and restore depleted anadromous fish populations, it calls for the undertaking of multiple actions on a site-specific basis.

For salmon, the Council envisions a strategy that considers all available options to develop an effective approach to salmon restoration, and monitors and evaluates the results of these actions in an adaptive management approach. The appropriate combination of actions for a specific population should be determined by the site-specific circumstances of that population. The following options should be considered:

- Take actions to protect and rebuild the freshwater habitat of weak wild and naturally spawning populations. This would include combinations of a variety of techniques: restoring healthy stream/river habitats used for spawning, rearing and overwintering; improving mainstem passage and migration corridor condition; reducing losses of downstream migrants owing to irrigation diversions; restoring water quality; and restoring overall watershed and riparian system condition. Fish harvest rates also should be reduced to support rebuilding.
- Take actions to rebuild populations of weak wild and naturally spawning fish as quickly as possible. This would include

combinations of a variety of techniques such as: the proper use of artificial propagation to prevent extinction and further loss of genetic diversity; prevention or minimization of detrimental genetic and ecological impacts to wild and naturally spawning populations from all human actions affecting the river and its watershed, including hatchery programs; and management of fish harvests to support rebuilding.

- Fully implement adaptive management for the purposes of carrying out restorative actions. Adaptive management is an approach to complex natural resource problems where prompt corrective action is needed despite incomplete knowledge of the resource. Adaptive management relies on a systematic monitoring and evaluation strategy.
- Develop a procedure for conducting a population vulnerability analysis to determine the status of various populations and facilitate the selection of various options for restoring the population.

## **7.2A Hatchery Policies, Coordination and Operations**

Nearly 100 artificial production facilities produce 170 million to 200 million smolts annually in the Columbia River Basin. Approximately 75 percent of Columbia River Basin salmon and steelhead adults are produced in hatcheries. The purpose of these facilities is to mitigate for losses of salmon and steelhead production resulting from dams and other developments. The facilities are operated by different entities, each with its own guidelines for selection, maintenance and spawning of brood stock, mating, rearing and release of juveniles. The Council concluded that regional standards and procedures for hatchery operations should be

developed that are consistent with the goal of rebuilding weak wild and naturally spawning stocks. To help develop tools to reduce the impacts of hatchery production on wild and naturally spawning stocks, the Council convened a group of nationally recognized geneticists. These geneticists have been asked to bring the best current scientific knowledge to salmon and steelhead production issues. A number of products have resulted from this effort and are being reviewed at the technical and policy levels in the region.

### **Bonneville**

7.2A.1 Fund fishery managers and other experts as needed to develop by October 31, 1995, in consultation with appropriate specialists in genetics, basinwide guidelines to minimize genetic and ecological impacts of hatchery fish on wild and naturally spawning stocks. In the development of the guidelines, apply the best available scientific knowledge, and include: 1) approaches to basinwide coordination of hatchery production to reduce impacts of hatchery stocks on wild and naturally spawning fish; and 2) monitoring and evaluation of hatchery and wild and naturally spawning stock interactions. Submit a report to the Council for public review by March 1, 1996.

7.2A.2 Fund the design of an impact assessment to examine the effects of Columbia River Basin hatcheries (individually and collectively) on wild and naturally spawning fish. The impact assessment would use the best available scientific knowledge and state-of-the-art assessment procedures. Coordinate with measure 7.1F.2, complete the design, and report to the Council by December 1995.

7.2A.3 Continue to fund the activities of the Integrated Hatchery Operations Team and the Implementation Plan for Integrating Regional Hatchery Policies.

### **Council**

7.2A.4 Continue to convene and fund a team of scientific experts that will be available to Bonneville, the Council, the fishery managers and the Integrated Hatchery Operations Team to help scope the hatchery impact assessment (see section 7.1F) and review basinwide hatchery operating policies and guidelines. The team will be available to consult with Bonneville, the Council and the fishery managers or the implementation of new artificial production activities. It also will review ongoing artificial production, in light of the basinwide hatchery operating guidelines. The products and activities of the team will be made available for public review.

### **Fishery Managers**

7.2A.5 The Integrated Hatchery Operations Team should consist of representatives from Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Idaho Department of Fish and Game, U.S. Fish and Wildlife Service, Confederated Tribes and Bands of the Yakama Indian Nation, Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation of Oregon, Shoshone-Bannock Tribes of Fort Hall, Confederated Tribes of the Colville Reservation, National Marine Fisheries Service, and associate members. It should coordinate with production planning activities described in this section. Duties of the group are described below.

### **Integrated Hatchery Operations Team**

7.2A.6 Continue to update regionally integrated policies for management and operation of all existing and future hatcheries in the Columbia Basin as required. These policies should be monitored for consistency with the goal of increasing sustained production while maintaining genetic resources in the Columbia River Basin.

The policies should continue to include the following elements:

- **Fish health policy:** Hatchery practices and operations should preclude the introduction and/or spread of any fish disease within the Columbia Basin, and maximize the health of fish released from hatcheries.
- **Genetic policy:** Hatchery facilities and programs should avoid adverse genetic effects on wild, natural and hatchery fish populations and enhance the sustained quality of production from hatcheries.
- **Ecological interactions policy:** Hatchery facilities and programs should avoid adverse interactions between wild, natural and hatchery fish populations, including predation, displacement or competition for habitat. They should maximize post-release survival of hatchery fish by increasing similarity of hatchery fish to wild and naturally spawning fish, and by balancing the numbers of fish released and release strategies with the capacity of the natural environment.

- **Hatchery performance standards policy:** The purpose, goals and objectives of each hatchery should be evaluated in light of the general hatchery policies stated above. Performance standards should be developed for each hatchery, in addition to those provided in this program, including expectations for harvest, maintenance of genetic integrity (including life history, effective population size, morphology and other important traits), fish health and ecological interactions. Criteria and plans for monitoring and evaluating achievement of the performance standards should be developed.
- **Regional hatchery coordination policy:** Columbia River Basin production facilities should operate under a regional coordination program, including hatchery programs and operations, harvest and research. The objectives of the coordination program should be to facilitate implementation of the regional hatchery policies, incorporate harvest and research considerations in hatchery planning, increase information exchange, coordinate operations to minimize impacts on wild and naturally spawning populations, and foster sharing of facilities to increase their effectiveness.

7.2A.7 Submit to the Council a plan for implementing the policies by December 1994. As part of implementing the regional hatchery coordination policy, identify measures for better coordinating basinwide hatchery management that ensure coordinated planning and learning while encouraging creative, site-specific approaches to improving operations.

Upon Council approval of the plan, fishery managers may request Council approval of Bonneville funding for implementing specific parts of the policies.

- 7.2A.8 Review the formal audit report findings. Submit recommended actions to the appropriate operating and funding entities. Annually report findings to the Council.
- 7.2A.9 Continue to review and update audit criteria and obtain independent scientific review for the criteria and revise them as necessary. Report to the Council on this and the following measures annually in January.
- 7.2A.10 Update hatchery operating plans annually for anadromous fish production facilities in the basin.
- 7.2A.11 Report to the Council annually, beginning in January 1995. Describe new hatchery policies and how operations at existing and planned hatcheries are being changed to implement them and any new information leading to revision of policies and operations. New information should include results of the hatchery impact assessment (Section 7.2A.2), the hatchery survival trends analysis (Section 7.2B.2) and the carrying capacity evaluation (Section 7.1A), when available. Finally, describe the extent of achievement of performance standards, and recommend future improvements and needed research. The annual report will be made available for review by all relevant parties.

## 7.2B Hatchery Evaluation

### Bonneville

7.2B.1 Beginning in 1995, fund ongoing independent audits of hatchery performance in consultation with the Integrated Hatchery Operations Team. Such audits should be conducted at least every three years and more frequently, if possible and warranted. Include recommendations for improving performance and for modifying or terminating hatchery programs based on audit criteria. Results of the audits should be presented to the Council beginning in January 1996.

7.2B.2 Fund a comprehensive analysis of existing data on basinwide trends in hatchery fish survival. The analysis should identify trends over time and by hatchery or geographic area, and correlate hatchery fish survival with natural factors, hatchery operations and other fish or river management actions. The results of the analysis should be reported to the Integrated Hatchery Operations Team by January 1996.

## **7.2C Creative Partnerships in Hatchery Production**

### **Bonneville**

7.2C.1 By June 15, 1995, fund an analysis of opportunities for alternative hatchery institutional arrangements and ways to implement them. By December 31, 1995, develop and report to the Council on the potential for artificial production programs in which alternative institutional arrangements between implementors and managers are used.

7.2C.2 The Council does not take a position on funding for the construction of any other hatcheries or the operation and maintenance of existing hatcheries

## **7.2D Improved Propagation at Existing Facilities**

Numerous biological and environmental factors are known to affect the quality of juvenile fish released from hatcheries. The term "husbandry" refers to the proper control of these factors. In the hatchery, the factors affecting juveniles include nutrition, rearing density, water temperature, physiological state of smoltification, dissolved oxygen and nitrogen, ambient sound levels and type of rearing pond or raceway. For returning adults, size, location and time of release are primary factors affecting their migrant patterns.

The traditional spring outmigration period for most wild juvenile salmon and steelhead in the Columbia River Basin is in April and May. Historically, hatchery release strategies emulated wild fish outmigration in terms of the timing and size of juvenile fish released from hatcheries. But environmental conditions in the river and estuary have changed markedly due to hydroelectric development. New rearing strategies are required to match the release time of hatchery salmon and steelhead to the changed conditions of the river and estuary. Downstream migrations must be programmed to coincide with the most favorable conditions of food availability, predator abundance, river and ocean temperatures, flows and other influencing factors.

A number of complex changes occur in salmon and steelhead that allow them to convert from freshwater residents to saltwater residents. Several biochemical, physiological, morphological and behavioral processes are involved. A greater understanding of these processes is required to improve smolt survival after their release from hatchery facilities.

Due to the high density of fish in hatcheries, rearing ponds and transportation systems, infectious diseases and parasites also are a major concern. Sensitive, accurate and rapid diagnosis would help operators detect the presence of a disease and permit timely treatment.

## Bonneville

- 7.2D.1 Fund research, development and demonstration of improved husbandry practices at hatcheries, which will lead to increased production and improved fish survival to adulthood. Also fund tests of new techniques at Columbia River Basin artificial propagation facilities.
- 7.2D.2 Immediately fund an evaluation to determine whether the high levels of sound at hatcheries has an adverse effect on survival of hatchery fish after they are released. Develop cost-share programs to fund necessary improvements at hatcheries if sound is found to adversely affect survival. Submit findings and recommendations to the Council regarding the relationship of sound to survival by December 31, 1996.
- 7.2D.3 Fund research, development and testing of hatchery rearing operations and release strategies aimed at improving the efficiency of hatcheries and increasing the survival of artificially propagated fish to adulthood. This research, development and testing should incorporate effective husbandry practices from Section 7.2D.1.
- 7.2D.4 Fund development of programs and methods to improve fish health protection in hatchery facilities. The development and related research of methods should include:
- prevention of the introduction of diseases into the Columbia River Basin;
  - prevention of the spread of detected fish pathogens;

- improvement of breeding and rearing practices;
- minimization of the impact of fish diseases on wild and cultured stocks; and
- improvement in detection, diagnosis and control of fish diseases and parasites.

- 7.2D.5 Upon approval by the Council, provide funds to develop a sensitive, reliable index for predicting smolt quality and readiness to migrate. The index shall be validated by conducting a test using a selected species and selected hatcheries. Proposals for further action may be submitted to the Council upon completion of the test.

## Bonneville

- 7.2D.6 Consult with the Integrated Hatchery Operations Team regarding needed research projects to improve fish health in both hatchery and naturally reared populations.

## Integrated Hatchery Operations Team

- 7.2D.7 Develop a comprehensive fish health research agenda taking into consideration information provided, for example, by the Pacific Northwest Fish Health Protection Committee, the independent audits authorized in Section 7.2B.1, results from monitoring and evaluation studies, and asking various entities that operate hatcheries and/or use hatchery fish to mitigate for production deficiencies.

## 7.3 DEVELOP, IMPLEMENT AND

## **EVALUATE SUPPLEMENTATION PLANS**

### **7.3A Regional Assessment of Supplementation**

The Regional Assessment of Supplementation Project was created in late 1990 to provide a comprehensive framework for supplementation--the practice of using carefully selected stocks of hatchery fish to "reseed" streams. The project is being carried out by technical representatives from the fishery managers, utilities, Bonneville, the Council and others. One of its products will be a recommended planning process. This process will include setting supplementation objectives in terms of post-release survival, reproductive success, long-term fitness and ecological interactions; analyzing benefits and risks; and developing monitoring strategies to contain risk. This project was completed in December 1992.

#### **Bonneville**

7.3A.1 Continue to fund workshops to assist agencies and tribes in understanding and using the planning concepts and guidelines developed by the Regional Assessment of Supplementation Project, particularly as they can be applied to updating subbasin plans. Continue to support the updating of the guidelines and further development of the ecosystem diagnosis and treatment method.

### **7.3B Final Planning and Implementation of Proposed Additional High Priority Supplementation Projects**

For some time, the Council has urged the National Marine Fisheries Service to develop a clear policy to guide the use of supplementation.

The fishery managers and the Council have developed and extensively reviewed a list of high priority supplementation projects from an original list of 19 proposed projects. The National Marine Fisheries Service has agreed to review these proposals on a case-by-case basis. Final planning is required to complete the necessary elements of the high priority supplementation projects before implementation. These projects will represent the first use and test of the Regional Assessment of Supplementation Project's Planning Guidelines and the Supplementation Guidelines of the 1991 Integrated System Plan.

#### **Fishery Managers**

7.3B.1 Use the supplementation guidelines described in Chapter III.C of the 1991 Integrated System Plan and in Regional Assessment of Supplementation Project to prepare evaluations, biological risk assessments, and final plans for the high priority supplementation projects recommended by the fishery managers. Complete evaluations, biological risk assessments, and final plans by June 30, 1995.

7.3B.2 Absent Council disapproval of the final plans, implement the high priority supplementation projects including design, construction, operation, maintenance, monitoring and evaluation. Provide progress reports on the implementation of the projects.

#### **National Marine Fisheries Service**

7.3B.3 To facilitate appropriate coordination under the Endangered Species Act, the National Marine Fisheries Service should expeditiously review the high priority supplementation projects identified by the fishery managers and provide a clear schedule for completing its review and rendering a decision.

- 7.3B.4 Immediately complete analysis and provide Council with decision regarding policy for supplementation of weak Columbia River Basin salmon and steelhead populations. At the latest, provide policy by January 31, 1995.

### **Bonneville**

- 7.3B.5 Fund the evaluation, biological risk assessment, and final planning of the high priority supplementation projects recommended by the fishery managers.
- 7.3B.6 Absent Council disapproval of the final plans, fund implementation of the supplementation projects including design, construction, operation, maintenance, monitoring and evaluation.

### **Hatchery Operators Not Funded by Bonneville**

- 7.3B.7 Monitor and evaluate future and ongoing major supplementation activities to answer critical uncertainties. Use the Regional Assessment of Supplementation Project planning tools when planning new projects or reevaluating ongoing project objectives. Report to the Council on progress implementing this measure by June 1995.

### **Chelan County Public Utility District**

- 7.3B.8 Upon approval from the Federal Energy Regulatory Commission, Chelan County Public Utility District should fund design, construction, operation and maintenance of a hatchery program, including satellite facilities, for Rock Island Project in accordance with Section E "Hatchery-Based Compensation" of the Settlement Agreement dated April 24, 1987, filed in the relicensing proceeding for Project No. 943 and Docket Nos. E-9569, et al.

## **7.4 PURSUE NEW PRODUCTION INITIATIVES**

### **7.4A Identify, Evaluate and Implement New Production Initiatives**

#### **Fishery Managers**

- 7.4A.1 Use the Coordinated Habitat and Production process identified in Section 7.0 to identify, evaluate and implement new production initiatives. Such initiatives may include measures to address the needs of weak stocks, such as scientifically sound supplementation, restoration of eliminated populations, demonstrations of captive brood stock technology, cryopreservation, portable and low-capital techniques, acclimation, conversion of existing artificial production facilities and other approaches. Initiatives may also include actions to provide harvest opportunities in tributaries or other areas and to facilitate rebuilding of weak stocks.

#### **Bonneville**

- 7.4A.2 Should the Council determine that additional hatchery propagation facilities are required to compensate for fish losses caused by the hydropower system, Bonneville shall provide funds to design, construct, operate and maintain such facilities.

### **7.4B Develop Master Plans**

#### **Fishery Managers**

- 7.4B.1 Because of the need to address potential conflicts among increased production,

mixed-stock harvest, gene conservation, consistency with other plans and other objectives, the Council calls for detailed master plans where there is not a National Environmental Policy Act document that provides enough information to evaluate new artificial production projects. Below, the Council provides a suggested list of master plan elements. This list is intended to offer guidance, not to impose requirements. Not all of these elements may be relevant in all projects, and some unlisted elements may be important. In general, however, the following elements should be considered in the course of master planning:

- project goals;
- measurable and time-limited objectives;
- factors limiting production of the target species;
- expected project benefits (e.g., gene conservation, preservation of biological diversity, fishery enhancement and/or new information);
- alternatives for resolving the resource problem;
- rationale for the proposed project;
- how the proposed production project will maintain or sustain increases in production;
- the historical and current status of anadromous and resident fish in the subbasin;
- the current (and planned) management of anadromous and resident fish in the subbasin;
- consistency of proposed project with Council policies, National Marine Fisheries Service recovery plans, other fishery management plans, watershed plans and activities;
- potential impact of other recovery activities on project outcome;
- production objectives, methods and strategies;
- brood stock selection and acquisition strategies;
- rationale for the number and life-history stage of the fish to be stocked, particularly as they relate to the carrying capacity of the target stream and potential impact on other species;
- production profiles and release strategies;
- production policies and procedures;
- production management structure and process;
- related harvest plans;
- constraints and uncertainties, including genetic and ecological risk assessments and cumulative impacts;
- monitoring and evaluation plans, including a genetics monitoring program;
- conceptual design of the proposed production and monitoring facilities, including an assessment of the availability and utility of existing facilities; and

- cost estimates for various components, such as fish culture, facility design and construction, monitoring and evaluation, and operation and maintenance.

## 7.4C Emergency Cases

### Fishery Managers

7.4C.1 The Council recognizes that more immediate actions may be required for emergency cases, such as badly damaged populations with decreasing escapements. Documentation of the emergency nature of any such case and proposals for immediate production actions should be brought to the Council, which then will work with relevant parties to evaluate and initiate the necessary actions.

### National Marine Fisheries Service

7.4C.2 At an early date, develop guidelines for determining when emergency actions, such as using captive brood stock or other emergency propagation, live trapping and translocation technologies, should be used to aid in recovery of listed or potentially listed salmon and steelhead populations.

## 7.4D Captive Brood Stocks

Captive brood stock programs have the potential to rapidly increase adult fish numbers, while retaining genetic diversity of severely depleted wild or naturally spawning stocks of salmon. The captive brood stock concept differs from that used in conventional hatcheries in that fish of wild origin are maintained for a single generation in captivity. Their offspring are released to supplement wild and naturally spawning populations.

Implementation of captive brood stock programs may be the most effective means of

accelerating recovery of severely depleted stocks. High survival from egg to adult and maintenance in captivity for no more than a single generation should ensure that genetic integrity and adaptability to native habitats are preserved. Even in a situation where barriers to survival were relaxed to the point that the population could double each generation, it is projected to take more than nine generations for a run to rebuild to the same number of spawners as could be provided by a captive brood stock program in one generation. Furthermore, stable egg supplies provided by a captive brood stock program should be a catalyst for habitat restoration and help ensure stock recovery.

Researchers have been developing basic captive brood stock methodologies for a number of years. Nevertheless, considerable technical information is required prior to implementation of large-scale captive brood stock programs.

### National Marine Fisheries Service and Bonneville

7.4D.1 A scoping study identifying captive brood stock research needs is nearing completion. Upon completion of the scoping study, fund development of captive brood stock technology and implementation of captive brood stock programs to aid in recovery of severely depleted stocks of salmonids in the Columbia River Basin. Programs should be consistent with the products and conclusions of the genetics and natural production framework provided elsewhere in this section. Critical investigations that need to be funded concurrently include:

- review of the state of the art of captive brood stock management technology;
- development of genetically sound methods of sourcing and breeding

- brood stock to ensure genetic stability and gamete quality;
- modeling of genetic consequences of captive brood stock programs;
  - development of captive brood stock culture systems that minimize loss of fish;
  - development and testing of a model brood stock program;
  - evaluation and comparison of fish husbandry techniques;
  - evaluation of fish health problems;
  - investigation of reproductive and non-reproductive physiology; and
  - evaluation of fitness of captive brood progeny for supplementation.

7.4D.2 Fund captive brood stock demonstration projects identified under the coordinated habitat and production process.

## 7.4E Cryopreservation

Cryopreservation (preservation of fish gametes by freezing) has the potential of allowing “banking” of genetic stocks for future use, especially when the population is severely depleted and its habitat has been damaged or destroyed.

### Federal and State Agencies

7.4E.1 In June 1995, report to the Council on research needed to improve cryopreservation technology and develop

applications for helping to restore and preserve depleted populations.

7.4E.2 Fund needed research and demonstrations of cryopreservation identified in the coordinated habitat and production process.

## 7.4F Portable Facilities for Adult Salmon Collection and Holding, and for Juvenile Salmon Acclimation

As weak stocks or populations of salmon and steelhead are identified and assessed, supplementation will be one option to consider to help rebuild these stocks. Decentralized facilities to permit the capture and holding of brood stocks and facilities to acclimate the juvenile fish before release could be useful in this effort. The use of local brood stocks is fundamental to maintaining genetic diversity. The use of acclimation and release facilities prior to release is important to increase juvenile fish survival and ability to imprint on the release stream, and thereby reduce to natural levels their straying into other watersheds. The portability of these facilities should allow them to be used flexibly.

The demonstration project should involve only existing hatchery programs or fish populations that are currently being supplemented.

### Bonneville

7.4F.1 Fund the planning, design, construction and operation of a demonstration project for the development of portable adult collection and holding facilities and juvenile acclimation and release facilities. The project should build on the earlier work funded by Bonneville<sup>1</sup> and

<sup>1</sup> Bonneville Power Administration. Compendium of Low-Cost Pacific Salmon and Steelhead Trout Production Facilities and Practices in the Pacific Northwest. October 1984.

other relevant information and experience. The project should be initiated in 1991, with facilities in place in 1992. Report on this measure annually as part of report on measure 7.4O.1.

- 7.4F.2 Fund additional demonstration projects identified in the coordinated habitat and production process.

### **7.4G Ringold Hatchery Site Enhancement and Water Development**

The Washington Department of Fisheries and Wildlife currently has a water right for 100 cubic feet per second from springs located adjacent to the Ringold Hatchery site. Of this amount, the agencies are only able to capture and use about 36 cubic feet per second. The agencies cannot make the full water right permanent unless facilities for capturing, transporting and using the water are improved. This right has been permitted, which means the state has the legal right to take water, but a certificate of appropriation is not issued until the water is actually being used. The temporary permit will be revoked and the water right lost in 1991, if action is not initiated to use the water.

#### **Bonneville**

- 7.4G.1 Insofar as needed to secure a 100 cubic feet per second water right for the Ringold hatchery facility, fund planning, design and construction of the necessary facilities to capture up to 100 cubic feet per second of water and deliver it to the area of the hatchery site.
- 7.4G.2 Fund planning, design and construction of the facilities determined to be necessary to improve existing production. Report to the Council for approval before proceeding with construction.

### **7.4H Reintroduction of Anadromous Fish in the Upper Cowlitz River Basin**

In 1991, Bonneville entered into an agreement with Public Utility District No. 1 of Lewis County to purchase the electricity output from the Cowlitz Falls Project. The project is located above Mayfield and Mossyrock dams on the Cowlitz River, which currently block passage of anadromous fish into the upper Cowlitz Basin. In a settlement agreement for Bonneville's acquisition of the project, Bonneville agreed to fund smolt collection and transportation facilities at Cowlitz Falls to facilitate the reintroduction of anadromous fish above Mossyrock Dam.

Bonneville is coordinating a technical advisory group, composed of state and federal fish agencies, Tacoma and Lewis County utilities and environmental groups, to establish objectives for fish in the upper Cowlitz watershed. One of the objectives includes reintroduction of anadromous fish. The members of the working group are guiding development of project plans and their implementation. The Council notes with approval the cooperative effort to plan reintroduction of anadromous fish in the upper Cowlitz and the agreement on production objectives. The Council expects these agreed-upon objectives to be incorporated in the system planning identified in the coordinated habitat and production process for the Cowlitz Subbasin.

In December 1991, the Washington Department of Fisheries announced its change in policy on the reintroduction of a limited number of adult anadromous fish to the upper watershed. The Fisheries Department felt the risk from disease was minimal for spring chinook. The Department indicated an intent to withhold a decision on fall chinook until more data was in hand and indicated that winter run steelhead were also suitable for reintroduction. As a direct result of this change, reintroduction of salmon and steelhead to the Cowlitz tributaries above Mayfield Dam has already begun.

## Relevant Parties

- 7.4H.1 All precautions should be taken to ensure the sound application of biological principles during reintroduction of anadromous fish in the upper Cowlitz Basin.

## 7.4I Umatilla Production Facilities

The fish and wildlife agencies and tribes have constructed and are operating acclimation ponds on the Umatilla Reservation. Smolts would be transported to these ponds from hatchery facilities for imprinting before release into the upper Umatilla River. Returning adults would provide an improved fishery for the Umatilla tribes and other fishers.

### Bonneville

- 7.4I.1 Fund the Confederated Tribes of the Umatilla Reservation of Oregon to operate and maintain the Bonifer and Minthorn juvenile release and adult collection and holding facilities on the reservation. Also fund the operation and maintenance of the Umatilla Hatchery to demonstrate the use of oxygen supplementation hatchery techniques, and to produce summer steelhead and chinook salmon smolts for release in the Umatilla River.
- 7.4I.2 Fund the construction and operation of planned juvenile release and adult collection and holding facilities for outplanting in the upper Umatilla River to enhance natural and hatchery production.

## 7.4J John Day Acclimation Facilities

In an effort to restore the level of adult bright fall chinook returns that were lost due to construction of John Day Dam, the Bonneville and Spring Creek fish hatcheries were expanded. Smolts from the hatcheries are released above John Day Dam. To achieve maximum smolt survival, it is believed to be necessary to hold the fish to relieve stress caused by transportation and to imprint the smolts. Council approval of permanent facilities will be based on the demonstrated effectiveness of the temporary facilities.

### Fish and Wildlife Agencies and Tribes

- 7.4J.1 Develop a plan for designing, constructing and evaluating temporary acclimation ponds. The primary purpose of the temporary acclimation ponds will be to assess the effectiveness of using acclimation ponds to improve survival of fish released in upriver habitat. If suitable release sites are not identified above McNary Dam, then sites in the John Day Pool should be considered. The plan will provide the following:
- A proposal for temporary acclimation sites;
  - Design elements that are necessary to test the effectiveness of the concept of acclimation ponds. The plan may include different technologies in different locations;
  - Brood stock and release guidelines for the proposed facilities to ensure that releases: 1) do not adversely affect the genetic integrity of stocks potentially affected by the hatchery releases; 2) are compatible with the fish naturally inhabiting the release locations; 3) are disease-free; and 4) are coordinated with other

management and enhancement activities in the basin;

- Monitoring and evaluation studies to assess the effectiveness of the facilities, including a comparison of the survival of juveniles released without benefit of acclimation with those benefiting from acclimation; and,
- Cost estimates and a schedule for design, construction and evaluation.

### **Bonneville**

7.4J.2 Upon approval by the Council of the acclimation pond plan, fund design, construction and evaluation of the temporary facilities.

7.4J.3 Upon approval by the Council, fund the design, construction, operation and maintenance of permanent John Day acclimation ponds. These ponds will be used to imprint fall chinook.

### **U.S. Department of Energy and Yakama Tribe**

7.4J.4 Evaluate options for using K-Basins on the Hanford Nuclear Reservation for the artificial propagation of fall chinook salmon, coho salmon, and sturgeon. Submit evaluation including recommendations to the Council by December 31, 1995.

### **Bonneville**

7.4J.5 Fund evaluation called for in 7.4J.4. Upon Council approval, fund recommendations for use of K-Basins for artificial propagation.

## **7.4K Yakama Production Facilities**

Much is still unknown about the impact of hatchery-produced fish on wild populations. The design and management of this hatchery will allow fish and wildlife agencies and tribes to learn more about these impacts and to identify the best methods for carrying out hatchery production and supplementation of natural production. The Outlet Creek site, because of its water supply and available acreage, was identified by the U.S. Fish and Wildlife Service in a 1979 feasibility study, The Yakama Fish Hatchery, funded by Bonneville as the best location for a hatchery on the Yakama Indian Reservation. The Council believes it is important to proceed with this project as soon as possible because of the importance of the added production to be provided by the facility, the potential learning benefits of the facility, and the long lead time required for planning, design and construction of the facility.

### **Bonneville**

7.4K.1 Fund design, construction, operation and maintenance of a hatchery to enhance the fishery for the Yakama Indian Nation as well as other harvesters. The hatchery will be a central outplanting facility, used to raise juvenile fish for release in the Yakima Basin and elsewhere in the Columbia River Basin. The purpose of the hatchery will be to supplement natural runs. Nothing in this measure is intended to imply that this will be the only outplanting facility for the Yakima Basin or the Columbia River Basin.

- Upon Council approval of the master plan, fund the detailed design, engineering and construction of the hatchery and associated facilities.
- Fund management of operation and maintenance of the hatchery. Before making annual budget requests for

operation and maintenance, the hatchery manager will develop a status report on the previous year's operations. The status report will include a production plan for the coming year and an analysis showing how the plan is consistent with salmon and steelhead management activities throughout the basin.

- Fund biological monitoring and evaluation studies identified in the master plan. The results of the studies will be used to improve management at the Yakama central outplanting facility and at similar facilities elsewhere in the basin.

## 7.4L Northeast Oregon Production Facilities

The primary objective for these facilities is similar to that stated for the Yakama and Nez Perce outplanting facilities. The fish and wildlife agencies and tribes expect these facilities to provide for outplanting of about 2.3 million to 3 million spring chinook juveniles in the five Oregon rivers identified in the measure. The Council maintains that the fish and wildlife agencies and tribes should play the lead role in developing the master plan for the northeastern Oregon hatchery. It also maintains that the facility need not necessarily be limited to spring chinook, as originally proposed, if other stocks would benefit from hatchery supplementation. While the focus may be on spring chinook stocks, the fish agencies and tribes may wish to consider appropriate supplementation of other stocks. Monitoring and evaluation studies should be coordinated with supplementation research and related management and with propagation activities.

The Hood River Production Program component of Northeast Oregon Production Facilities was disaggregated from the other

basins and a master plan was submitted to the Council in 1992.

### Bonneville

7.4L.1 Fund planning, design, construction, operation, maintenance and evaluation of artificial production facilities to raise chinook salmon and steelhead for enhancement in the Hood, Umatilla, Walla Walla, Grande Ronde and Imnaha rivers and elsewhere. The artificial production facilities will be used to supplement natural production in these rivers.

- Prior to design of the facilities, fund development of a master plan for the outplanting facilities, coordinated with the Integrated System Plan. The master plan should address the elements shown in Measure 7.4B.1 or substitute environmental analyses prepared under the National Environmental Policy Act.
- Upon approval by the Council of the master plan, fund the detailed design, engineering and construction of the hatchery and associated facilities.
- Fund operation and maintenance of the hatchery. Before making annual budget requests for operation and maintenance, the facility manager will develop a status report on the previous year's operations. The status report will include a production plan for the coming year and an analysis that shows how the plan is consistent with salmon and steelhead management activities throughout the basin.
- Fund biological monitoring and evaluation studies identified in the master plan. The results of the

- studies will be used to improve supplementation programs elsewhere in the basin.
- 7.4L.2 Fund the Hood River Production Project elements identified in the Council's letter of April 16, 1992, accepting and commenting on the master plan. Final design and additional work elements should begin immediately, and construction should begin contingent on a finding of "no significant impact" by Bonneville in the National Environmental Policy Act environmental analysis.

### **7.4M Nez Perce Tribal Hatchery**

The Nez Perce Reservation in Idaho includes more than 300 miles of rivers and streams with suitable habitat. Upon demonstration that low-cost, small-scale salmon and steelhead propagation facilities are practicable and upon approval of the plans by the Council, construction, operation and maintenance of low-cost, small-scale salmon and steelhead propagation facilities will be funded on the Nez Perce Reservation. The Nez Perce Tribe submitted a master plan to the Council that is consistent with measure 7.4B.1.

#### **Bonneville**

- 7.4M.1 Upon approval by the Council of final design, construction plans, production schedules and biological monitoring and evaluation plans pursuant to measure 7.4M.3, fund the construction, operation and maintenance of those facilities.
- 7.4M.2 Fund project elements identified in the Council's letter of April 15, 1992, accepting and commenting on the master plan. Final design and additional work elements should begin immediately, and construction should begin contingent on a finding of no significant impact by

Bonneville in the National Environmental Policy Act environmental analysis.

- 7.4M.3 Complete the environmental analysis required by the National Environmental Policy Act as quickly as possible so that the Nez Perce Tribe and the Council can come to conclusion on the scope of the supplementation program, facilities needed and the adequacy of the monitoring and evaluation program.

### **7.4N Pelton Dam Fish Ladder**

#### **Bonneville**

- 7.4N.1 Fund propagation of salmon and/or steelhead smolts in the 2.8-mile long fish ladder located at Pelton Dam on the Deschutes River in Oregon. This production will be in addition to the fish propagation activities being conducted there by Portland General Electric to mitigate the effects of Pelton and Round Butte dams and will not affect the mitigation responsibilities of that company. The Oregon Department of Fish and Wildlife and the Confederated Tribes of the Warm Springs Reservation of Oregon developed a master plan which the Council accepted prior to Bonneville funding of design and construction. The master plan was consistent with Section 7.4B.1.
- 7.4N.2 Fund project elements identified in the Council's letter of April 15, 1992. Final design and additional work elements should begin immediately, and construction should begin contingent on a finding of "no significant impact" by Bonneville in the National Environmental Policy Act environmental analysis.

### **7.4O Small-Scale Production Projects**

The major advantages of low-capital propagation are: 1) it requires a smaller water supply, and 2) it is readily adaptable to individual drainages, enabling the conservation of gene pools. The Council encourages community involvement in projects of this nature.

### **Bonneville**

7.4O.1 Immediately, provide funds to develop and test low-cost, small-scale salmon and steelhead propagation facilities adaptable to Columbia River Basin locales. Include investigation of artificial spawning channels, on-site streamside incubators, acclimation ponds and other related technologies. Coordinate this work with portable acclimation facility demonstration projects in measure 7.4F. Report to the Council on this measure annually by June 30. As feasible approaches to low-cost, small-scale facilities are identified, take the steps necessary to use as many of these low-cost, small-scale facilities as required. In implementing this measure, put particular emphasis on implementing aspects of the updated subbasin plans including immediate needs for acclimation facilities.

## **7.5 SPECIFIC ACTIONS TO ASSIST WEAK STOCKS**

### **7.5A Snake River Sockeye Salmon**

In the summer of 1991, the Shoshone-Bannock Tribes, the Idaho Department of Fish and Game, the Bonneville Power Administration, National Marine Fisheries Service and others initiated an emergency program to conserve and rebuild Snake River sockeye. The Council endorses this effort, but regards this program as a highly experimental measure that should be implemented with appropriate safeguards.

### **Bonneville, National Marine Fisheries Service, U.S. Forest Service and Others**

7.5A.1 Fund the program to protect and rebuild Snake River sockeye. Include the following features in the program:

- Continue captive brood stock programs derived from four separate parental stocks.
- Locate and equip hatcheries needed to house projected numbers of captive brood stocks.
- Maintain captive brood stocks through a second generation, where necessary and found to be genetically acceptable, to ensure sufficient releases into target lakes.
- Divide smolts captured for rearing in this program among two or more lots. Each lot should have a separate water supply, alarm system and other protective measures.
- Release brood stock progeny generally into the lake of origin, at density levels within conservative carrying capacity limits consistent with long-term monitoring and evaluation needs.
- Designate Genetic Protocol and Fish Culture/Health work groups to provide continuing advice throughout the recovery effort. These groups address aspects such as rearing and

mating techniques, research and reintroduction protocols and monitoring needs.

- Undertake long-term monitoring and evaluation of the captive brood stock program production as the basis for program improvements, and decisions concerning its continuation.
- Control recreational activities in critical spawning and rearing areas.
- Remove or modify barriers to migration.
- Conduct lake fertilization experiments.
- Provide an annual report on the practices and performance of the program for review by the National Marine Fisheries Service and the Council.

7.5A.2 Regularly update the Governors of the Northwest states, the Northwest Congressional delegation, the Council and other concerned parties on the progress of this program.

### **Bonneville and Fishery Managers**

7.5A.3 Fund and develop for Council review a feasibility study for reintroduction of sockeye salmon into appropriate production areas. These studies should consider reintroduction in all historical production areas such as Wallowa and Warm lakes. It should develop a protocol for fostering natural production in lakes selected for sockeye restoration. This study should also consider creating anadromous populations by managing kokanee, such as those found in Pelton Reservoir, in a manner that allows access to the ocean. This study should

be coordinated with the Regional Assessment of Supplementation Project, appropriate specialists in genetics, and the coordinated implementation, monitoring and evaluation approach. It should also be consistent with the National Marine Fisheries Service's recovery plan for sockeye in the Snake River.

## **7.5B Snake River Fall Chinook Salmon**

### **Fishery Managers**

7.5B.1 As quickly as possible and in consultation with the National Marine Fisheries Service, develop an experimental design for implementing, monitoring and evaluating supplementation of and, if appropriate, a captive brood stock program for, Snake River fall chinook. Submit to Council for approval by February 1, 1995. The proposed work should be coordinated with Sections 7.3B -- Final Planning and Implementation of Proposed Additional High Priority Supplementation Projects and 7.5C: Emergency Cases.

### **Bonneville**

7.5B.2 Upon approval by the Council and in consultation with the National Marine Fisheries Service, implement supplementation and/or captive brood stock programs developed by the fishery managers.

7.5B.3 Continue to fund basic life history studies for Snake River fall chinook. This study should identify the range, limiting factors, effects of flow, temperature, spawning and rearing habitat, and migratory behavior.

### **Fishery Managers**

- 7.5B.4 As rapidly as possible, complete genetic guidelines for using supplementation, captive brood stocks and captive rearing for rebuilding weak populations.

## 7.5C Lower Columbia River Coho Salmon

Natural production of coho salmon in the lower Columbia River has declined to extremely low levels. Fewer than 25,000 spawn naturally in scattered tributaries of the lower river. In 1990, a petition was filed with the National Marine Fisheries Service for protection of the population under the Endangered Species Act of 1973. On June 7, 1991, the National Marine Fisheries Service declined to list the population after its review of available data failed to identify a population segment in the lower Columbia River genetically distinct from coastal populations. However, the service expressed a willingness to evaluate additional data.

Naturally reproducing coho in the lower Columbia River represent an important resource that can be protected and rebuilt. The values of doing so include maintaining genetic diversity, reducing the almost exclusive dependence on hatchery production and preserving recovery opportunities. In implementing the following measures, Bonneville funding should be limited to the extent to which coho populations have been affected by hydropower, or to particular instances in which off-site recovery measures would be appropriate mitigation for hydropower impacts.

### Oregon and Washington

- 7.5C.1 Explore adopting management goals to rebuild naturally reproducing populations of lower river coho to self-sustaining levels.
- 7.5C.2 Continue research to determine genetic distinctions between lower river coho and coastal populations. Submit products

of the research to the National Marine Fisheries Service.

- 7.5C.3 Incorporate recommendations of the Regional Assessment of Supplementation Project and the Council's genetics team in developing management directions.  
**Bonneville and Fishery Managers**

- 7.5C.4 Survey subbasin plans submitted as part of the Integrated System Plan to determine limiting factors for naturally reproducing coho populations.
- 7.5C.5 Fund a survey of land management regulations affecting coho habitat. Include reviews of state forest practices, regulations and federal land management plans affecting coho habitat. Develop recommendations for revisions to support rebuilding objectives.
- 7.5C.6 Fund a review of current production and harvest management practices for impacts on naturally reproducing coho populations, including competition from release of juveniles, disease and predation. Solicit recommendations for revisions of management practices to support rebuilding efforts.

## 7.5D Columbia River Chum Salmon

Chum salmon are listed in the Integrated System Plan as a stock of high concern. Counts from the spawning grounds have dropped from more than 700 per mile in the early 1950s to a low of fewer than 100 per mile in recent times. Catches of this species exceeded 700,000 per year in the 1920s, but catches have exceeded 2,000 fish only twice since 1960.

Chum once spawned in many tributaries of the Columbia Basin, including some above Bonneville Dam. They are now found only in the Grays, Elochoman and Lewis subbasins, and

Hardy and Hamilton creeks. Habitat degradation, passage barriers and harvest have all contributed to reductions in this species. In implementing the following measures, Bonneville funding should be limited to the extent to which chum populations have been affected by hydropower, or to particular instances in which off-site recovery measures would be appropriate mitigation for hydropower impacts.

### **Oregon and Washington**

- 7.5D.1 Identify naturally reproducing populations of chum salmon and adopt management goals to rebuild those populations to self-sustaining levels.
- 7.5D.2 Incorporate recommendations of the Regional Assessment of Supplementation Project and the Council's genetics team in developing management directions.

### **Bonneville and Fishery Managers**

- 7.5D.3 Survey subbasin plans submitted as part of the Integrated System Plan to determine limiting factors for naturally reproducing chum salmon populations.
- 7.5D.4 Fund a survey of land management regulations affecting chum salmon habitat. Include reviews of state forest practices, regulations and federal land management plans affecting chum salmon habitat. Develop recommendations for revisions to support rebuilding objectives.
- 7.5D.5 Fund a review of current production and harvest management practices for impacts on naturally reproducing chum salmon populations. Solicit recommendations for revisions of management practices to support rebuilding efforts.

## **7.5E Columbia River Sea-Run Cutthroat Trout**

Sea-run cutthroat trout are found in all tributaries below and several tributaries above Bonneville Dam. No good measure of run strength exists. Likewise, little is known about early life history survival, ocean survival, catch, or escapement of Columbia Basin sea-run cutthroat trout populations. It is known that these populations have declined over time. Experts believe that habitat degradation and interactions with hatchery salmon and steelhead have caused this decline. Regardless, sport angling for sea-run cutthroat trout is an important fishery, and much support for rebuilding these populations is evident. In implementing the following measures, Bonneville funding should be limited to the extent to which sea-run cutthroat trout populations have been affected by hydropower, or to particular instances in which offsite recovery measures would be appropriate mitigation for hydropower impacts.

### **Oregon and Washington**

- 7.5E.1 Identify naturally reproducing populations of sea-run cutthroat trout and adopt management goals to rebuild those populations to self-sustaining levels.
- 7.5E.2 Incorporate recommendations of the Regional Assessment of Supplementation Project and the Council's genetics team in developing management directions.

### **Bonneville and Fishery Managers**

- 7.5E.3 Survey subbasin plans submitted as part of the Integrated System Plan to determine limiting factors for naturally reproducing sea-run cutthroat trout populations.

- 7.5E.4 Fund a survey of land management regulations affecting sea-run cutthroat trout habitat. Include reviews of state forest practices, regulations and federal land management plans affecting sea-run cutthroat trout habitat. Develop recommendations for revisions to support rebuilding objectives.
- 7.5E.5 Fund a review of current production and harvest management practices for impacts on naturally reproducing sea-run cutthroat trout populations. Solicit recommendations for revisions of management practices to support rebuilding efforts.

### 7.5F Pacific Lamprey

Pacific lamprey are anadromous fish historically present in the Columbia and Snake rivers. Lamprey are a traditional food source for Columbia Basin Indians and remain culturally important. The Council has not previously called for measures to address lamprey populations. The tribes have noted that lamprey populations appear to be declining.

#### **Bonneville, Corps of Engineers, and Bureau of Reclamation**

- 7.5F.1 Fund a unified data collection and analysis project to provide a status report to the Council on Pacific lamprey populations in the Columbia and Snake rivers. As part of the report, identify research needs for passage, habitat, and life history as well as alternative actions for addressing lamprey populations. Submit report to the Council by the end of June 1995. Upon approval by the Council, fund actions recommended in the report.

## 7.6 HABITAT GOAL, POLICIES AND OBJECTIVES<sup>2</sup>

Wild and naturally spawning populations of salmon and steelhead are generally at low levels throughout the Columbia River Basin as a result of impaired mainstem passage, blocked habitat, habitat degradation, fishing, predation and other sources of mortality. Accordingly, habitat is seeded at low levels. Even so, improvements in habitat quality are needed to increase the productivity of many stocks. Reduced habitat quality results in lower survival during critical spawning, incubation, rearing and migration periods, even when population densities are low.

Improved habitat quality would allow greater juvenile and adult survival at each freshwater life stage and can result in more offspring surviving to begin migration to the ocean. The Council is cognizant of the importance of the freshwater period in the life cycle of salmon and steelhead species. These fish spend from one to three years of their life cycle in freshwater as juveniles and several months as adults. It is during these freshwater stages that human activities have the greatest impact on the survival of these populations.

An example of habitat change caused by human activities has been documented by the U.S. Forest Service for spring chinook salmon. In an ongoing project that is comparing 1936-1942 stream survey records to current conditions, the Forest Service has found that large pool habitat in representative subbasins throughout the Columbia system has decreased 50 percent to 75 percent over the past 50 years. Much of this habitat was already degraded to some extent when the surveys were initially

<sup>2</sup> For this section of the program, habitat is defined generally as freshwater tributary areas where salmon and steelhead rear and/or spawn, and tributary migration corridors. It should be noted that salmon and steelhead habitat extends beyond these areas into the mainstem Columbia and Snake rivers, the Columbia River estuary and the ocean. Other sections of the program address these other habitat areas.

completed. Significantly, the sole exception to pool loss has been in wilderness areas, where quantity of pool habitat has remained constant or increased. It is critical for all parties to reduce or eliminate activities known to degrade anadromous fish streams.

Maintaining and improving the productivity of salmon and steelhead habitat is an extremely complex task. It requires coordination of virtually all activities that occur in a subbasin. The Council maintains that the best approach to watershed restoration is for activities to be cooperatively undertaken by federal, state, private and tribal parties. Furthermore, if watershed restoration is to be successful, instream restoration should be accompanied by riparian and upslope restoration. A comprehensive watershed approach can help fisheries resources recover from their depressed state and minimize impacts to local economies.

It is not the intent of the Council to exclude customary land- and water-use activities. Through comprehensive watershed management, innovative approaches that allow fisheries resources and economic activities to co-exist can be developed cooperatively. This approach, which includes both local and regional participation, has an additional benefit of ensuring better results and, therefore, more effective investments by ratepayers and others interested in the subbasin.

Positive actions taken to rehabilitate watersheds in the interest of rescuing and restoring salmon and steelhead stocks will result in long-term benefits to other basin resources dependent on watershed health. However, maintenance and recovery of anadromous fish resources will not be possible unless dramatic steps are taken to protect existing high quality habitat, improve the quality of degraded habitat, and increase the quantity of presently blocked habitat that could be made accessible. Coordinated, cooperative efforts to protect and improve salmon and steelhead habitat in the basin are needed. Habitat has decreased by more than a third, and much of the remaining habitat has been degraded as a result of diverse human activities.

According to the Northwest Power Act, ratepayer funds may be used, in appropriate circumstances, as a means of achieving off-site protection and mitigation for the impacts of the hydropower system. These impacts include salmon and steelhead losses caused in the mainstem and tributaries of the Columbia Basin. Losses and degradation of habitat have been caused by the construction of hydroelectric dams and numerous other human activities.

Funds to maintain and improve habitat have come from the region's ratepayers to provide off-site mitigation for losses caused by the dams, and from federal, state, local and private sources. In this section, the Council has identified additional actions that need to be implemented by Bonneville and others. The Council expects that a significant portion of the funds to accomplish these important tasks will come from sources other than ratepayers.

Bonneville funding for the ratepayer share of fish mitigation should proceed expeditiously, pursuant to short-term agreements. There is no reason for ratepayer fish mitigation in the short term to wait for a determination of the financial responsibility of other project purposes. Other entities with responsibilities for funding non-ratepayer shares of mitigation should also proceed expeditiously. For the longer term, if there is no agreement on funding allocations, federal and state agencies, and tribes should work with the Council and the Congressional delegation to arrive at a solution.

The Council recognizes the loss of stocks of salmon and steelhead has occurred, in part, because of continual degradation of the quality and reduction of the quantity of habitat in the Columbia River Basin. Anadromous fish are among the most sensitive of the native fish inhabiting streams of the region. Management practices known to pose minimal risk to anadromous fish habitat, and habitat objectives considered by fishery professionals to meet the biological requirements are needed. Therefore, the Council advocates implementation of the habitat objectives listed in Section 7.6C.5. The structure and provisions of the Council's habitat section recognize this relationship and also the

urgency of implementing projects addressing the habitat needs of these stocks.

## 7.6A Habitat Goal

Protect and improve habitat conditions to ensure compatibility with the biological needs of salmon, steelhead and other fish and wildlife species. Pursue the following aggressively.

### All Relevant Parties

- 7.6A.1 Ensure human activities affecting production of salmon and steelhead in each subbasin are coordinated on a comprehensive watershed management basis.
- 7.6A.2 At a minimum, maintain the present quantity and productivity of salmon and steelhead habitat. Then, improve the productivity of salmon and steelhead habitat critical to recovery of weak stocks. Next, enhance the productivity of habitat for other stocks of salmon and steelhead. Last, provide access to inaccessible habitat that has been blocked by human development activities.

## 7.6B Habitat Policies

### Federal, State and Local Land and Water Managers, Users and Owners; Fishery Managers; and Others

- 7.6B.1 Improve and maintain coordination of land and water activities to protect and improve the productivity of salmon and steelhead stocks. The Council encourages local cooperation and coordination to address habitat protection and improvement and to resolve problems created by competing missions. The Council encourages private parties

to be proactive and to work cooperatively with resource managers to maintain and improve habitat.

- 7.6B.2 Develop and implement procedures to ensure compatibility and compliance with the Council's habitat goal, policies and objectives. Implement and require compliance with state, federal, local and tribal laws, regulations and policies relating to Columbia River Basin salmon and steelhead habitat regulation and management.
- 7.6B.3 Give highest priority to habitat protection and improvement in areas of the Columbia Basin where low or medium habitat productivity or low pre-spawning survival for identified weak populations are limiting factors. Give priority to habitat projects that have been integrated into broader watershed improvement efforts and that promote cooperative agreements with private landowners.
- 7.6B.4 For actions that increase habitat productivity or quantity, give priority to actions that maximize the desired result per dollar spent. Also, give higher priority to actions that have a high probability of succeeding at a reasonable cost over those that have great cost and highly uncertain success.
- 7.6B.5 Provide elevated or new funding necessary for the successful and timely implementation of the items listed in this section. Funding sources for implementing provisions of the habitat section should include, but not be limited to, the U.S. Forest Service, Bureau of Land Management, Bureau of Reclamation, Soil Conservation Service, National Marine Fisheries Service, U.S. Fish and Wildlife Service, Corps of Engineers, Agricultural Stabilization and Conservation Service, Bonneville Power

Administration, other relevant federal agencies, all relevant state agencies, local governments, private landowners, resource users and tribes. Cost and effort sharing is encouraged.

- 7.6B.6 Encourage the involvement of volunteers and educational institutions in cooperative habitat enhancement projects. Promote public outreach and encourage education in watershed and resource management and protection throughout the basin.

## 7.6C Coordinated Habitat Planning

Federal land management agencies, states and others with ownership and/or management responsibilities for lands and waters that contain or materially affect salmonid habitat must accelerate efforts to restore the health of that habitat. Such restoration activities, to be successful, must be coordinated across many jurisdictional and ownership boundaries. Management entities must be accountable for their own actions, but these actions must be integrated on a ridgetop-to-ridgetop watershed basis. Failure to so integrate will put each action at risk of being undermined by uncoordinated actions downstream, upstream or upslope.

Therefore, the Council adopts the habitat objectives addressing watershed health and land management set forth below. The Council recognizes that habitat conditions differ naturally to some degree around the region, due to differences in soils, topography, vegetation and climate. Consequently, habitat objectives that acknowledge and incorporate these local differences might be appropriate in some instances. Variances in habitat objectives should only recognize natural habitat limitations that occur because of differences in geographic conditions, while fully meeting the biological needs of fisheries resources.

The Council addresses these objectives principally to publicly owned and managed lands.

Nonetheless all parties should recognize that limiting restoration actions to public lands would be biologically futile and wasteful of public funds. Private and public landowners should act in concert. Where listed species are, or could be present, private landowners face considerable uncertainty in any event. On the other hand, private lands managed to achieve and maintain high quality habitat may be eligible for habitat conservation plan status under the Endangered Species Act. This could protect them from further required actions.

Therefore, the Council urges all parties in a watershed to undertake, collectively and voluntarily, the habitat assessment and restoration actions needed to achieve watershed conditions that meet the habitat objectives set forth below, or locally-adopted, subbasin-specific objectives that are functionally equivalent in terms of biological consequences, with these regional objectives.

In setting forth objectives below, the Council wishes to make clear certain expectations as to how progress toward meeting them should be achieved. These expectations derive in part from the experience gained in the Grande Ronde, Upper Salmon and Lemhi Model Watersheds established pursuant to this Program.

**Watershed Assessment:** There is no substitute for current, validated data, and there is no shortcut to acquiring it. Local watershed committees and public land managers should cooperate to assess watershed health on a stream-reach-by-stream-reach basis. Assessment methodologies and results should be peer-reviewed to ensure appropriateness and quality of data. Only with such assessments can recovery plans be designed for the needs of each stream .

**Watershed Management:** People are easily polarized over this concept, some advocate aggressive intervention and others a strict hands-off strategy. The Council anticipates that there will be intervention; otherwise, restoration actions such as removing man-made stream

barriers and controlling road erosion would be precluded. But the Council also cautions moderation in devising intervention measures where complex and still poorly understood natural systems are at work. Our history is replete with well-intentioned, but ill-informed actions compounding problems they were intended to solve: forest fire suppression is one example. Habitat interventions should seek to restore and employ natural healing mechanisms wherever possible, reserving civil and bio-engineering approaches for problems that will not respond otherwise, and where the science is well understood.

**Collaboration:** Another issue that is often polarizing is the false choice between “top down” and “bottom-up” management of watershed restoration. Either approach by itself is doomed to fail. Local residents have a special interest at stake in their watershed and a unique knowledge of it that no other party brings. It is their home and often their livelihood as well.

Parties outside the watershed also have legitimate interests in its health, and they often have the resources and authorities essential to watershed recovery (e.g., federal land managers; state water quality authorities). In such circumstances, the only sound strategy is the kind of collaboration that is evolving in the model watersheds and a few other places. Joint or coordinated assessments, plans and restoration actions will be both more effective and more efficient with the region’s limited resources. They will succeed only when they are based on working relationships that are neither “top-down” nor “bottom-up,” but truly collaborative, respecting the different perspectives and assets each party brings, grounded in science, concerned with problem-solving and focused on results.

**Locally adopted Watershed Plans:** While the Council is promulgating regional habitat objectives and believes these offer a useful reference base for any watershed, the Council expects and encourages development and

refinement of local watershed restoration plans adopted to stream-specific conditions within that watershed. Examples of such local efforts include the Wallowa County/Nez Perce Salmon Recovery Plan and the Grande Ronde Model Watershed Action Plan. Such local plans should be products of the collaborative approach described above, and they should also reflect the history and values of those communities -- both tribal and non-tribal. They should be grounded in thorough, peer-reviewed watershed assessments and restoration plans that will result in watershed health of no lesser quality than what would be achieved by meeting the regional objectives described below. The Council believes such collaborative plans offer the greatest opportunity for accelerated watershed recovery if they incorporate both science-based direction and the commitments by all essential parties to the actions and objectives contained therein.

### **Local Watershed Managers**

7.6C.1 The Council expects that the relevant parties will report to the Council the biological rationale for departures from the approach and objectives provided below. If local watershed managers believe that habitat objectives in this program are not appropriate for local conditions, they may develop alternative objectives and submit them to the Council for review. The Council will approve locally adopted, subbasin-specific objectives upon determining that they are functionally equivalent to the biological benefit intended by the habitat objectives in this program.

### **Federal Land and Water Management Agencies, States, Tribes or the Lead Watershed Review Entity**

7.6C.2 Institute a comprehensive program to monitor progress in achieving compliance with the Council’s habitat

objectives. Such a program will involve coordination of data collection, analysis and reporting, and also adaptive management. As part of the program, by December 31, 1995, and annually thereafter, each entity having watershed management and/or regulatory responsibilities will be asked to provide the Council with a report describing compliance with each habitat objective. Begin wherever appropriate with the subbasin plans already developed pursuant to this program. The report should explain the reason for departures from the Council's objectives and corrective measures being taken, including schedules for achieving compliance.

### **Council**

- 7.6C.3 Review habitat monitoring reports as submitted, for consistency, appropriateness and regional coordination. Report to the President, the Congress and the Governors on success or failure of managers and responsible agencies to restore and maintain the health of salmon and steelhead habitat encompassed in this rule.

### **National Marine Fisheries Service**

- 7.6C.4 Address program and Council-reviewed subbasin specific habitat objectives, and progress in complying with such objectives, as well as other appropriate program measures, in developing biological opinions, performing consultations and adopting habitat conservation plans as required under the Endangered Species Act. Accelerate efforts to review locally developed watershed plans and award Section 10 Habitat Conservation Plan status, where

merited, or provide guidance to local watershed committees and participating agencies on criteria for awarding such status. Provide assistance to local initiatives in complying with these criteria.

### **Federal Land and Water Management Agencies, States, Tribes and Private Landowners**

- 7.6C.5 Because the region places a very high priority on protecting existing habitat, manage activities to restore and maintain the quality and quantity of existing habitat. In so doing, take all steps necessary to comply with the following regionally adopted habitat objectives, or with locally adopted objectives that are consistent, in terms of biological consequences, with these regional objectives in perennial and intermittent streams supporting salmon and steelhead. Provide sufficient funding to support needed watershed restoration activities and schedules. In addition, where possible, manage riparian and floodplain areas to promote the protection and re-establishment of natural ecological functions and, thereby, protect and improve salmon and steelhead habitat.

### **7.6D Habitat Objectives<sup>3</sup>**

These objectives should apply to all watersheds until, for any given subbasin, site-specific, peer-reviewed assessment, objectives and watershed plan based on the geomorphic and climatic characteristics of the watershed are developed collaboratively among local, tribal, state and federal parties of interest, adopted

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<sup>3</sup>Appendix A contains a list of actions recommended by the fish managers that might be taken to achieve these habitat objectives.

locally, and acknowledged by the Council, or by the National Marine Fisheries Service in a Section 10 Habitat Conservation Plan process. However, the Council does not intend for recovery actions under such plans to be delayed or deferred until such acknowledgment is secured.

### **Sediment**

- Take action as needed to limit the percentage of fine sediments (less than 6.4 millimeters) in salmon and steelhead redds to no more than 20 percent. Limit cobble embeddedness to less than 30 percent or documented historic condition.
- In subbasins currently limited by sediment problems, ensure as a first priority no increase in sediment input from human activities.

### **Bank Stability**

- Maintain greater than 90 percent of streambanks in stable condition.

### **Water Quality**

- Water Temperature: Attempt to maintain temperatures in historically usable spawning and rearing habitat at less than 60 degrees Fahrenheit. Under all circumstances, do not exceed 68 degrees Fahrenheit throughout each watershed.
- Water quantity and timing: Determine instream flow needs for salmon and steelhead and establish flows if not yet established, to meet these needs. Flow needs should be based on instream flow evaluation that considers channel morphology, sediment routing, floodplain function, water temperature and salmon

and steelhead passage, rearing and spawning.

- Where the instream flow needs of salmon and steelhead identified above are not being met, the Council recommends actions such as protecting and restoring wetlands and degraded meadow systems, restricting additional surface water or ground water withdrawals that do not consider the effects of stream flow on anadromous fish needs, and acquiring instream flows as needed for fish production.
- Other water quality objectives: Fully comply with the existing federal and state standards. Ensure that species biological requirements will be met if there is not an applicable state or federal water quality standard.

### **Large Woody Debris**

- Retain large woody debris in stream channels (including waters where salmon are not produced) to protect the sediment and nutrient storage and processing function of stream ecosystems supporting salmon and steelhead.
- The Council recommends actions such as addition of large woody debris only after the causes of large woody debris loss and pool loss have been completely addressed.

### **Large Pools**

- Attain the following minimum pool frequency objectives (pools per mile) or documented historic pool frequency if different from these objectives.

Wetted Width: (in feet)	5	10	15	20	25	50	75	100	125	distance from the edge of the 100-year floodplain, whichever is greater.	site-potential trees, or 300 feet slope distance from the edge of the 100-year floodplain, whichever is greater.	
Pools per Mile	184	96	70	56	47	26	23	18	14	12	10	0

- The Council recommends actions such as actively restoring riparian vegetation if there is a declining trend in pool volume as well as monitoring trends in pool frequency and volume.

### Riparian Vegetation

- Retain vegetation in riparian areas to stabilize banks, prevent warming of water, provide fish cover and food, and supply woody debris in the stream.

### Stream Morphology

- Improve stream morphology (the structure and quality) to benefit salmon and steelhead.

### Land Management Generally

- The Council recommends that prior to initiating management activities, land managers complete a watershed analysis to document existing habitat conditions, determine actions needed to meet habitat objectives provided herein and establish a schedule for implementation.

### Riparian Areas

- Managers should take special care to minimize vegetation removal or soil disturbance in the following areas:

**Fish-Bearing Streams:** The area on each side of the stream equal to a distance equal to the height of two

**Permanently Flowing Streams That Don't Produce Fish:** The area on each side of the stream to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the 100-year floodplain, whichever is greater.

**Seasonally Flowing Or Intermittent Streams:** The area on each side of the stream to a distance equal to the height of one site-potential tree or 100 feet slope distance from the edge of the 100-year floodplain, whichever is greater.

**Constructed Ponds And Reservoirs And Wetlands Greater Than One Acre:** The area from the edge of the wetland or the maximum pool elevation to a distance equal to the height of one site-potential tree, or 150 feet slope distance, whichever is greater.

**Lakes And Natural Ponds:** The body of water and the area to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greater.

**Wetlands Less Than One Acre And Unstable And Potentially Unstable Areas:** The extent of unstable and potentially unstable areas, and wetlands less than one acre to the outer edges of the riparian vegetation.

### Roads

- New roads should only be constructed consistent with the sediment objective. Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.

### **Grazing**

- Implement grazing systems that are designed to either recover fish habitat within five years or maintain acceptable habitat conditions.

### **Irrigated Agriculture**

- All activities should be conducted consistent with these objectives. In particular, return flows should meet state water quality criteria or these habitat objectives.

### **Timber Harvest**

- All harvest should be conducted consistent with these habitat objectives.

### **Mining**

- All mining should be conducted consistent with these habitat objectives.

### **Recreation Management**

- The Council recommends that recreational facilities within riparian zone areas be operated in a manner that contributes to the attainment of these habitat objectives.

## **7.6E Expedited Process for Funding Projects**

Many high priority habitat improvement projects involve transactions with private landowners and water rights holders. In working with the private sector, timely access to funding

will be essential once negotiations have concluded and parties are ready to proceed. This ability to move quickly is not current practice, but it is essential to capitalize on agreements to undertake cooperative habitat improvement and protection.

### **Bonneville**

- 7.6E.1 In consultation with the fishery managers, the Council and other relevant parties, explore alternative procedures for funding high priority habitat projects expeditiously. Report to the Council on a proposed procedure by March 31, 1995.

## **7.7 COOPERATIVE HABITAT PROTECTION AND IMPROVEMENT WITH PRIVATE LANDOWNERS**

The Council has adopted the following as a program habitat goal: Ensure human activities affecting production of salmon and steelhead in each subbasin are coordinated on a comprehensive watershed management basis. The Council does not view comprehensive watershed management as a planning process. It is a way of doing business that allows for coordination of the goals and objectives of all interests in order to use available natural, human and fiscal resources in the most beneficial manner. Thereby, investments in development and usage of resources in a subbasin, including production of salmon and steelhead, will benefit.

Comprehensive watershed management should enhance and expedite implementation of actions by clearly identifying gaps in programs and knowledge, by striving over time to resolve conflicts, and by keying on activities that address priorities. A long-term commitment from all local, state and regional entities interested in each subbasin will be necessary. This effort cannot be viewed as something to be accomplished quickly or having an endpoint. It will need to evolve over

time to become truly comprehensive. To succeed, it must become institutionalized in each subbasin.

The Council believes that protection and improvement of habitat on private lands is an essential component of comprehensive watershed management. A key to this approach is the voluntary action of the owners of these lands. Without explicit, direct involvement of private landowners in identification and implementation of habitat actions, protection and improvement of habitat on private lands has little chance of success.

During investigation of habitat issues, the Council was impressed with the number of private initiatives to protect the fisheries habitat in the region. These include activities to prevent erosion, as typified in the Tucannon River Subbasin, as well as other programs conducted by local conservation districts, Oregon Governor's Watershed Enhancement Board, Trout Unlimited, Long Live the Kings, the Adopt-a-Stream Foundation, Wallowa Basin Salmon Recovery Plan, Grande Ronde Model Watershed Action Plan, Asotin Creek Model Watershed Plan, Upper Salmon Model Watershed, Tucannon/Pataha Model Watershed, and others. The Council applauds these worthy efforts to involve different affected interests in development, implementation and funding of coordinated habitat protection and improvement activities. These types of activities need to occur in every subbasin and on a more comprehensive level.

The Council recognizes that some public lands are held under constitutionally imposed trust obligations. For example, the Washington Department of Natural Resources is obligated to manage lands to provide funds for schools as set forth in *Skamania County v. Department of Natural Resources*. Similarly, the Oregon Constitution mandates the state to manage its forest lands primarily to replenish the state's common school fund. In such cases, the Council urges the trustee to develop habitat conservation plans to the full extent of its authority in order to address applicable trust obligations. These plans should be coordinated and consistent with

watershed approaches developed for the subbasin in which it occurs.

In addition, the Council is aware that in urban, suburban and areas of developed small plot ownership, the habitat objectives set forth in this rule may not be fully attainable. An example is riparian areas covered substantially by structures. In such cases, watershed approaches developed under this program should seek to obtain the maximum habitat protection and restoration that is possible under programs such as the Natural Resource Conservation Service's best management practices.

- **Local role:** A locally based, bottom-up, voluntary approach for protection and improvement of habitat on private lands is needed. The coordinated resource management approach is an example of the type of program that might provide the basis for such an approach. This process brings together local landowners and key interests in a facilitated forum to identify goals for improving and managing lands within a geographic area of common interest.
- **State role:** Statewide lead entities, such as the state conservation commissions or other appropriate bodies, should be identified to facilitate coordinated habitat protection and improvement with private landowners. Collaborate with local watershed committees in watershed planning and implementation, and provide funding, technical advice and assistance. In addition, the Council's model watersheds should complement these efforts.
- **Federal role:** Coordination of watershed activities will include an important role for federal agencies, in collaboration with state, local and tribal authorities and local watershed committees. Activities on federal and private lands must be coordinated and

consistent to achieve comprehensive watershed management. In addition, federal funding of activities on private and public lands must continue and at increased levels. The Council is committed to supporting efforts in this regard. Also, it is expected that coordination of activities on private lands will result in approaches that complement and comply with the requirements for habitat recovery plans under Section 10 of the Endangered Species Act. This will require coordination of watershed activities with the National Marine Fisheries Service.

- **Tribal role:** In the last century, individual tribes ceded large tracts of traditional lands in the Columbia River Basin to the federal government. During this process, the tribes retained rights, among others, to harvest fish, wildlife and plants. Management of watersheds in a manner that continues to produce these resources is critical to tribal cultures and to obligations to comply with tribal rights. Therefore, the full involvement of tribes in developing and maintaining local and regional watershed approaches on reservation and ceded lands should occur. The experience of tribes as stewards of watersheds for thousands of years will also be important to the ultimate success of watershed approaches.
- **Council role:** The Council expects that coordination of watershed activities will result in identification of projects to improve and protect habitat on private lands. These projects should be submitted directly to the Council to allow for the necessary subbasin and regional coordination. The Council will review these submissions to identify appropriate funding sources and to help ensure prompt, coordinated implementation of

appropriate projects. The Council, in identifying funding sources for private-landowner projects, will take into consideration, to the extent possible, whether the private land is being managed in accordance with applicable federal and state laws such as the Endangered Species Act and state water quality standards.

## 7.7A Coordination of Watershed Activities

### Idaho, Montana, Oregon and Washington

- 7.7A.1 Each state should select a lead entity, such as the state conservation commission or other appropriate entity, to support local subbasin efforts to coordinate watershed activities. This support should include providing technical or other resources, coordinating state agencies involvement and ensuring consistency with state law and policies. The local subbasin efforts should include all interested parties and work with appropriate model watershed groups. They should develop and implement approaches, such as the coordinated resource management approach, for coordinating watershed activities. These efforts should include consideration of the salmon and steelhead integrated and subbasin plans and other relevant documents. Report on these efforts to the Council, U.S. Fish and Wildlife Service and National Marine Fisheries Service for review.

### Bonneville

- 7.7A.2 Provide initial funding for one or more coordinators in each of the states of Idaho, Montana, Oregon and Washington to initiate efforts to coordinate watershed activities. These coordinators may also coordinate

development of model watersheds (see Section 7.7B, below). Appropriate coordinating entities include tribes, conservation districts, county governments, as well as other entities.

### **Council, U.S. Fish and Wildlife Service and National Marine Fisheries Service**

- 7.7A.3 Coordinate review of local watershed coordination effort reports for consistency with other activities in the appropriate subbasin and the region. Identify funding sources and assist in obtaining funding for appropriate activities. Appendix A contains a listing of potential funding sources.

### **Idaho, Montana, Oregon and Washington**

- 7.7A.4 Each state should identify at least one focus subbasin to apply the approaches developed in the model watersheds (Section 7.7B) for implementation starting in 1995. Submit proposed focus subbasins by the end of March 1995. In addition, each state submit by the end of August 1996 at least one additional focus subbasin for implementation starting in 1997. Upon Council approval, implement watershed approaches in these focus subbasins. Implement watershed approaches applying the requirements of Section 7.7B and in a manner that ensures the sustainability of ongoing model watersheds and other watershed approaches. Focus subbasins will be coordinated by coordinators identified through measure 7.7A.2.

### **National Marine Fisheries Service and U.S. Fish and Wildlife Service**

- 7.7A.5 In consultation with the Environmental Protection Agency, Bonneville, U.S. Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Soil Conservation Service, Council and other appropriate entities, continue to develop an approach to habitat conservation plans that will satisfy the mandate of the Endangered Species Act. Report to the Council regarding this approach by March 31, 1995.

### **Soil Conservation Service**

- 7.7A.6 Compile a report documenting the implementation of all watershed restoration approaches involving private lands in the Columbia River Basin. Include in the report identification of entities involved, approaches used, funding sources and other pertinent information. Submit report to the Council by April 30, 1995, and by January 15 annually thereafter.

## **7.7B Model Watersheds**

### **Bonneville**

- 7.7B.1 Provide initial funding for at least one model watershed coordinator selected by each respective state. These coordinators may also coordinate watershed activities described in Section 7.7A.

### **Idaho, Montana, Oregon and Washington**

- 7.7B.2 Each state should select a coordinating entity for each model watershed project, such as the state conservation commission, a tribe or other appropriate

entity. The Council expects that the experience gained in the model watersheds will result in progress toward implementing a watershed approach for other subbasins. The Council understands that fully attaining a watershed approach will take decades, but incremental progress toward this end should be apparent every year. At the same time, the Council encourages experimenting with these approaches and recognizes that not all experiments will provide positive results. This is the essence of adaptive management, which is a basic premise of the program. The Council believes that accomplishment of certain elements in the first year of implementation of each model is critical to success. It expects the coordinating entity to ensure that each model accomplishes the following critical elements during the first year of implementation:

- Identify *all* parties with an interest in each model watershed. Set up procedures to ensure that *all* these parties have the opportunity to participate fully in the development and implementation of the model watershed. Convene a watershed conference that includes *all* parties with an interest in the model watershed.
- Compile all existing plans, programs, policies, laws and other appropriate authorities that relate to comprehensive watershed management in each model watershed.
- Identify gaps and conflicts in the existing plans, programs, policies, laws and other appropriate authorities that hinder comprehensive watershed

management in each model watershed.

- Set out a path and procedures for filling gaps and addressing conflicts.
- Identify key factors limiting salmon and steelhead productivity.
- Identify priority on-the-ground actions to address key limiting factors.

- Compile a list of *all* human and fiscal resources that are potentially available for protection and improvement of habitat for the model watershed. Include on the list all potential federal, state, local government, and other public sources as well as private sources such as local businesses that rely on natural resources in those watersheds. Coordinate this activity on a regional and state level, as appropriate.
- Provide for the involvement of volunteers and educational institutions in the implementation of projects.

7.7B.3 By the second year, begin implementation of priority on-the-ground actions that address key limiting factors for salmon and steelhead production through the implementation planning process (see Section 3.1B). In addition, initiate procedures for filling gaps and addressing conflicts.

7.7B.4 Each state should report individually to the Council annually by October 15 on progress in each model watershed. Include in the report an overview prepared by the coordinating entity for each model watershed. Detail knowledge gained through experience in the subbasin that could be useful for developing comprehensive watershed management in other subbasins. Specifically address progress and accomplishments for each item bulleted in Section 7.7B.2.

## 7.8 IMPLEMENT STATE, FEDERAL AND TRIBAL HABITAT IMPROVEMENTS

### 7.8A Land Management

#### U.S. Forest Service (Regions 1, 4 and 6) and Bureau of Land Management (Idaho and Oregon/Washington Offices)

- 7.8A.1 Continue implementing the procedures outlined in the Anadromous Fish Habitat Policy and Implementation Guide as outlined in the policy signed January 1991. In addition, incorporate and implement the Guide in the President's forest plan, PACFISH, and other appropriate initiatives. Seek the means to accelerate the Anadromous Fish Habitat Plan. Include quantitative fish habitat objectives in the plan. By September 1, 1992, all land management activities should be designed to at least maintain the quantity and quality of existing salmon and steelhead habitat.
- 7.8A.2 In streams where either water quality objectives or federal land management plan objectives for fish habitat and water quality are not being met, initiate actions needed for recovery. Through the Columbia River Basin assessment and Eastside and Upper Columbia River Environmental Impact Statements, identify fish restoration measures and forest health concerns, and develop strategies to enhance the aquatic habitats for the production of salmon and steelhead. Special attention should be given to insect infestation as it relates to catastrophic fire danger that may threaten salmon and steelhead habitat.

7.8A.3 Review and, as necessary, amend existing land management plans to incorporate the Council's habitat goal, policies and objectives. In the immediate future, evaluate and develop a range of alternatives that display PACFISH riparian management objectives through the Eastside and Upper Columbia River Basin Environmental Impact Statement.

7.8A.4 As a condition for ratepayer funding of habitat protection or improvement projects on federal lands, demonstrate that federal land management activities are consistent with and, therefore, will not undermine the benefits of any project implemented through this program.

7.8A.5 Continue to improve livestock management by developing, updating and implementing livestock management plans. Provide adequate staff and funding to monitor and supervise all livestock permits in salmon and steelhead production areas consistent with the Council's habitat goal, policies and objectives. Revise all livestock management plans, as necessary, to incorporate and implement the Council's habitat goal, policies and objectives and to address enhancement of riparian areas and compliance with state water quality standards and best management practices.<sup>4</sup> Through the Eastside and Upper Columbia River Basin Environmental Impact Statements, incorporate PACFISH riparian management objectives, standards and guides, and riparian habitat conservation

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<sup>4</sup> Best management practices are a practice or combination of practices that are the most effective and practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with state water quality goals. The practicality of these efforts should include technological, economic and institutional considerations. The development and evolution of best management practices requires the input of experts on each resource that may be impacted in order that all values are appropriately considered.

strategies into livestock management plans.

- 7.8A.6 Report annually to the Council by March 15 on the effectiveness of federal land management actions to protect and improve anadromous and resident fish populations and habitat on federal lands in the Columbia River Basin. For each subbasin where federal lands occur, include an assessment of consistency with the Council's habitat goal, policies and objectives, and actions that will be initiated to address any inconsistencies, including a schedule approved by the Council for achieving compliance and actions that will be initiated to remedy problems. In addition, include an assessment of population and habitat status and trends in each subbasin. In particular, provide information on average, high and low water temperatures where major streams leave federal lands and at other key locations. Temperatures should not indicate an increase. Maintain summer temperatures below 60 degrees Fahrenheit or demonstrate that temperatures are declining toward attainment of this objective.

#### **Council**

- 7.8A.7 In consultation with fish managers, review reports for consistency with the program, subbasin plans, and other appropriate plans.

#### **Soil Conservation Service**

- 7.8A.8 Explore alternatives to provide permanent erosion control for lands in the Columbia River Basin that are currently enrolled in the Conservation Reserve Program. Submit alternatives and recommendations to the Council by the end of June 1995.

## **7.8B Best Management Practices**

### **Idaho, Oregon, Washington and Appropriate Indian Tribes in Consultation with Appropriate Water Quality Agencies**

- 7.8B.1 Establish best management practices under the Clean Water Act to maintain and improve salmon and steelhead production. Best management practices should be designed to meet the Council's habitat goal, policies and objectives. Conduct monitoring to ensure that best management practices are implemented and that instream salmon and steelhead habitat and water quality goals are met. Present practices to the Council by December 31, 1995.

## **7.8C Mining**

### **State and Federal Agencies and Tribes**

- 7.8C.1 Review and, if necessary, seek improvements to mining laws and administrative practices to promote salmon and steelhead productivity. Ensure that all mining activities comply with state water quality standards. Report to the Council on progress on this measure by June 30, 1993, and annually thereafter.

## **7.8D Streambanks, Streambeds and Plant Nurseries**

### **Idaho, Montana, Oregon, Washington, Bureau of Land**

### **Management, U.S. Forest Service, Corps of Engineers and Tribes**

- 7.8D.1 Work with model watershed committees and other appropriate groups to identify and protect riparian and underwater lands associated with perennial and intermittent streams that contribute to anadromous and resident fish production, regardless of whether a particular portion of a stream is fish-bearing. Where water quality objectives are being met, retain existing shade, vegetation, standing and down large woody debris and small woody debris. Where water quality objectives are not being met, initiate action to increase shade, vegetation, standing and down large woody debris and small woody debris. Use non-structural methods as the first choice for protecting and improving riparian areas and streambeds. Report to the Council on progress on this measure by June 30, 1993, and annually thereafter.

### **Bonneville**

- 7.8D.2 Evaluate the adequacy and capacity of existing native plant nurseries to supply plant materials for use in protecting and improving riparian and other habitat. Submit the evaluation to the Council by June 30, 1995. If the Council finds existing supplies are inadequate, the entity(ies) identified by the Council should bring existing nurseries up to capacity and, as needed, fund development of additional native plant nurseries.

## **7.8E Land Exchanges, Purchases and Conservation Easements**

### **Idaho, Oregon, Washington, Bureau of Land Management (Idaho and**

### **Oregon/Washington Offices) and U.S. Forest Service (Regions 1, 4, 6)**

- 7.8E.1 Implement land exchanges, purchases or easements of a sufficient width to improve and maintain salmon and steelhead production in privately owned riparian areas and adjacent lands, with full compensation of landowners. Consider factors such as need for fish passage facilities and potential improvements to instream flow conditions when purchasing or exchanging private property. In implementing this measure, acquisition of easements should be the preferred approach for protecting riparian areas and adjacent lands. Exchange or purchase that results in net gains of land in public ownership should be considered the lowest priority method for this purpose. States and federal agencies provide an updated list and report progress to the Council by December 31, 1993. In addition, federal agencies should provide to the Council by December of each year, a list of high quality riparian lands that potentially could be acquired through exchange.

### **Bonneville and Other Implementing Entities**

- 7.8E.2 Provide funding for the acquisition and management of permanent conservation easements for rebuilding and maintaining Columbia Basin salmon and steelhead populations. These acquisitions should be on a willing-seller and willing-buyer basis. Report to the Council on progress on this measure by June 30, 1993, and annually thereafter.

## **7.8F Water Regulation**

### **Idaho, Oregon and Washington**

- 7.8F.1 Review state water quality standards and compliance procedures by June 30, 1995, and report to the Council findings and any limitations in resources to programs that could impact meeting the habitat goal, policies and objectives of the program. If necessary, adjust water quality standards and compliance procedures to meet the program habitat goal, policies and objectives.

**Idaho, Montana, Oregon,  
Washington, and Federal and Tribal  
Agencies**

- 7.8F.2 Improve enforcement of existing water rights and duties for diversions and use from the mainstems of the Columbia and Snake rivers and tributaries. To facilitate these determinations, ensure that existing and new diversions affecting salmon and steelhead streams are equipped with devices to measure instantaneous and seasonal flows. Report progress to the Council by December 31, annually.

**Bureau of Reclamation**

- 7.8F.3 Identify all cases of water spreading on reclamation projects in the Columbia River Basin. Determine quantities and market value of water that has been spread by water users. Propose alternative approaches for addressing this issue, including alternatives that provide incentives for water conservation, that would make water available for instream uses and that recognize whether instream needs are satisfied.

**Corps of Engineers**

- 7.8F.4 By June 30, 1995, propose to the Council a network of water quality monitoring stations in the Snake and lower

Columbia rivers capable of instantaneous telemetry. After Council review, fund the water quality monitoring network.

- 7.8F.5 By January 1996, with consultation and approval of fish managers, fund a comprehensive assessment of all existing and planned dredging activities in the Columbia and Snake River mainstems. Report results of assessment to Council by December 31, 1997.

**7.8G Instream Flows for Salmon  
and Steelhead**

**Idaho, Montana, Oregon and  
Washington**

- 7.8G.1 To protect salmon and steelhead in the Columbia River and its tributaries: establish instream flow protection levels; enforce water right permit conditions; deny new water rights if water is not available consistent with salmon and steelhead needs at all life stages, or if existing water rights or the public interest would be detrimentally affected; and acquire water rights on a voluntary basis by purchase, gift, or through state or federal funding of water conservation or efficiency improvements that produce water savings. Use all available authorities to protect water provided for salmon and steelhead habitat or passage. If existing authorities are inadequate, identify authorities needed and seek legislative approval. In determining whether a proposed diversion or transfer would be consistent with salmon and steelhead needs, consult with fish and wildlife agencies and Indian tribes to determine whether the proposed use would cause any reduction in the quantity or productivity of salmon and steelhead habitat.

### **Bonneville and Other Implementing Entities**

- 7.8G.2 Provide funding for the acquisition and management of critical water rights for rebuilding and maintaining Columbia Basin salmon and steelhead populations. These acquisitions should be on a willing-seller and willing-buyer basis. Report to the Council on progress on this measure by June 30, 1993, and annually thereafter.

### **Idaho, Oregon, Washington and Bureau of Reclamation**

- 7.8G.3 Review the adequacy of existing law and its implementation to protect enhanced instream flows for fish. Complete review and report recommendations to the Council by December 31, 1995. Thereafter, report to Council on progress by December 31, annually..

### **Bonneville and Bureau of Reclamation**

- 7.8G.4 Fund and implement four water leasing demonstration projects; one in the Yakima River Subbasin, along the lines proposed in the Environmental Defense Fund's March 1994 report, and three in the Snake River Basin. Work with the states, the Council and other parties to demonstrate and evaluate the use of water leases and transfers to increase stream flows for salmon and steelhead. Identify goals for each demonstration project in cubic feet per second of additional instream flows measured at specific points at certain times of the year. Report to the Council annually by the end of August regarding progress.

### **Bonneville**

- 7.8G.5 Share funding of the demonstration projects as follows:

- Because Yakima River fish are affected by only four mainstem federal dams, and the purpose of the project is to address both mainstem and tributary water problems, provide one-fourth of the cost of the water leasing demonstration project.
- In areas of the Snake River Basin above eight federal mainstem dams, where the purpose of the project is to address both mainstem and tributary water problems, fund 70 percent of the cost of the project(s).
- In areas of the Snake River Basin above eight federal mainstem dams, where the purpose of the project is to address mainstem water problems, fund 85 percent of the cost of the project(s).

## **7.8H Water Conservation**

Salmon and steelhead need adequate river flows for spawning, rearing and migration. With growing development pressures on streams, there is a need to find innovative ways to leave more water in streams. More efficient out-of-stream water use may be a fruitful strategy. There are many questions about how conserved water actually can be secured for salmon and steelhead, although there is agreement that standing water over time refills aquifers that in turn feed the river system. The Council agrees that there is a pressing need to answer these questions.

### **Council**

- 7.8H.1 Continue to emphasize water conservation and efficiency improvements to help salmon and steelhead.

### **Bureau of Reclamation**

7.8H.2 In 1991, initiate a cooperative effort with the states of Idaho, Oregon and Washington, and with irrigators, to select and design at least four demonstration water conservation projects to provide additional instream flow and enhanced water quality for production of weak stocks. One or more weak stocks should be present in any given subbasin selected for demonstration. There should be at least one demonstration project in Idaho, Oregon and Washington. Consider opportunities to combine one or more of the water conservation demonstration projects with model watershed projects described under Section 7.7B.

7.8H.3 Take initiative to secure the necessary funding to complete watershed selection and planning by the end of 1993, and complete implementation of the demonstration projects by December 31, 1996.

### **Idaho, Montana, Oregon and Washington**

7.8H.4 The Council urges the states to evaluate putting into place statutes or regulations that call for establishing water conservation programs, with a goal of 25 percent more water conservation regionwide by 2005. All or a substantial portion of such conserved water should be dedicated to instream uses.

## **7.8I Water Resource Information Coordination and Development**

### **Environmental Protection Agency and the Council**

7.8I.1 Secure funding through appropriate sources and establish a mechanism to facilitate coordination of water quality activities relating to Columbia River Basin fish and wildlife resources. This should be an integrated basinwide approach that includes coordinated data management and an annual public report and review process. Use a cooperative approach including participation by all relevant entities such as Bonneville, Corps of Engineers, Federal Energy Regulatory Commission, Bureau of Reclamation, fish managers, state water quality agencies, state water resource agencies, tribal agencies, land management agencies, U.S. Geological Survey and others. Report status of this activity to the Council annually by April 15.

7.8I.2 Coordinate development of a study plan to compile and evaluate existing water quality information, identify data gaps and priority problems, and recommend proposals to address gaps and priority problems. Use a cooperative approach including participation by all relevant entities such as Bonneville, Corps of Engineers, Federal Energy Regulatory Commission, Bureau of Reclamation, fish managers, state water quality agencies, state water resource agencies, tribal agencies, land management agencies, U.S. Geological Survey, Council and others. Coordinate with the Columbia River Estuary Bi-State Study as well as other appropriate studies and programs. The project should include analysis of point sources, non-point sources, dioxin pollution, transboundary pollution, sewage in metropolitan areas and cumulative effects. Complete study plan and submit to the Council by April 15, 1993. After Council approval of the study plan, the Environmental Protection Agency, the Council and other relevant

entities should secure funding through appropriate sources to implement study plan. Report status of this activity to the Council by April 15 annually.

## **7.8J Water Availability**

Water is a finite resource. The Council is concerned that continuing diversions of Columbia River and tributary water will degrade stream conditions needed by salmon and steelhead. Competing demands for water must be evaluated, and Idaho, Oregon and Washington must consider the cumulative effects of new diversions on water for salmon and steelhead. Elsewhere in this program, the Council calls for water efficiency, water marketing programs and other means of augmenting flows for fish. Continuing with water diversions that would deprive salmon and steelhead of the benefits of these programs would make little sense.

### **Idaho, Montana, Oregon and Washington Water Agencies**

7.8J.1 In coordination with projects described in 5.2A and 7.11C, and similar efforts, develop coordinated, interstate mechanisms to protect from appropriation additional Columbia and Snake river basin stream flows that come from storage releases, water conservation or other efficiency improvements, where the water is needed to maintain and rebuild salmon and steelhead populations.

### **National Marine Fisheries Service**

7.8J.2 Develop a regional assessment of the availability of water for salmon and steelhead spawning, incubation, emergence and migration in the Columbia River and its tributaries, given current and projected water use and plans to provide secure flows for salmon and steelhead. The assessment should

include a range of 50 percent to 95 percent probability of water availability. In cooperation with the states, tribes, and other federal agencies and interested parties, fund an evaluation of the effects of water withdrawals, depletions and return flows on the natural hydrograph. Compare the magnitude of these effects to the magnitude of effects caused by upstream storage. Develop hydrographs of the mainstem Columbia and Snake rivers and selected tributaries. Analyze the cumulative effects of likely future additional withdrawals on at-risk stocks of anadromous fish. Report results and provide recommended measures to the Council by April 1995.

## **7.9 PURSUE SUBBASIN WATER PROJECTS**

### **7.9A Willamette Subbasin**

#### **Corps of Engineers**

7.9A.1 Complete investigation of the feasibility of installing devices to control the temperature of the water discharged from Detroit Dam on the North Santiam River by March 31, 1996. The Corps should report progress to the Council annually and should make recommendations to the Council at the conclusion of the study.

7.9A.2 Complete investigation of the feasibility of installing devices to control the temperature of water discharged from Cougar and Blue River dams in the McKenzie River Basin by March 31, 1995. The feasibility study should include an evaluation of non-structural alternatives, such as modification of existing project operating rule curves, in combination with various temperature control devices to restore downstream water temperatures to near pre-project

conditions. The Corps should report progress to the Council every six months and should make recommendations to the Council at the conclusion of the study.

### **Corps of Engineers, Bureau of Reclamation and Fishery Managers**

- 7.9A.3 Immediately begin consultations to develop a storage agreement to ensure minimum flows necessary to protect salmon and steelhead below Willamette River projects.
- 7.9A.4 Continue studies to establish flow guidelines for the spawning, incubation and rearing of salmon and steelhead in the Willamette Basin.
- 7.9A.5 Based on the results of the required studies, propose to the Council flow guidelines to be incorporated into the operation of dams in the Willamette Basin.
- 7.9A.6 Upon approval by the Council of flow guidelines for federal hydropower projects in the Willamette Basin, operate federal projects in accordance with those guidelines. In the meantime, meet minimum flows established annually by the state natural resource agencies in consultation with the Corps of Engineers. In setting minimum flows, consider needs for water volume in the estuary for fish and wildlife.
- 7.9A.7 The Corps of Engineers should annually report the results of the studies in 7.9A.4 to the Council.

### **Eugene Water and Electric Board**

- 7.9A.8 Subject to Federal Energy Regulatory Commission and Council approval, fund a study of the lower McKenzie River to determine the flows required for the spawning, incubation and rearing of salmon and steelhead.

## **7.9B Umatilla Subbasin**

### **Bonneville**

- 7.9B.1 Provide power or reimbursement for power costs to Bureau of Reclamation pumping plants designed to exchange Columbia River water for Umatilla River water, so long as the exchange is administered in accordance with federal and state laws, the permit issued pursuant to Application 71293, the transfer order issued pursuant to Application T6621E, and memoranda of agreement resulting from the Contested Case Proceeding on Protested Water Applications 71293 and T6621E.

### **Bureau of Reclamation**

- 7.9B.2 Use the 6,000 acre-feet of storage in McKay Reservoir, which is not contracted on a long-term basis, to enhance Umatilla River flows for anadromous fish, in cooperation with the fish and wildlife agencies and tribes.

### **Federal Project Operators and Regulators**

- 7.9B.3 If new reservoirs are constructed for additional storage, the federal project operators and regulators should propose dedicating a specific portion of storage necessary for the achievement of flows to protect, mitigate and enhance fish and wildlife.

### **Bonneville**

7.9B.4 Provide power or reimbursement for power costs to Bureau of Reclamation pumping plants designed to exchange Columbia River water for Umatilla River water.

### **Bureau of Reclamation**

7.9B.5 Obtain consent from all affected water users and regulators, and provide assurance to the Council that water exchanged to augment streamflows will be used to meet annual flow objectives established by the Oregon Department of Fish and Wildlife and the Confederated Tribes of the Umatilla Indian Reservation of Oregon.

### **Oregon Water Resources Department**

7.9B.6 Report annually to the Council regarding the amount of water provided by pumping, the amount of exchanged water and the disposition of the exchanged water. In describing the disposition of exchanged water, the report should indicate how much exchanged water is: 1) lost to evaporation, ground water, and other natural causes; 2) diverted for out-of-stream uses, and of this diverted water, the extent and timing of return flows; and 3) left instream without loss or diversion. If any of this information cannot be provided because of the problems in monitoring or otherwise, the report should discuss whether and how monitoring problems could be solved. Report to the Council regarding the establishment of a water right for enhanced instream flows resulting from the pumping exchange.

### **Bureau of Reclamation**

7.9B.7 Fund Oregon Department of Fish and Wildlife and Umatilla tribe's quantitative monitoring and evaluation studies to determine the biological effectiveness of this measure.

### **Bonneville**

7.9B.8 Pending installation of Bureau of Reclamation pumping plants, provide power or reimbursement for power costs associated with interim pumping for anadromous fish as proposed by the Columbia Basin Fish and Wildlife Authority.

### **Oregon Water Resources Department**

7.9B.9 Report to the Council annually on interim pumping, as in Section 7.9B.6, the long-term pumping measure.

### **Oregon Department of Fish and Wildlife and the Confederated Tribes of the Umatilla Indian Reservation**

7.9B.10 Monitor and qualitatively evaluate the biological benefits of interim pumping, and file a report with the Council and Bonneville annually.

### **Bureau of Reclamation**

7.9B.11 Beginning in 1989, fund state fish and wildlife agency and tribal quantitative monitoring and evaluation studies to determine the biological effectiveness of interim and long-term pumping.

**Bureau of Reclamation,  
Bonneville, Oregon Department  
of Fish and Wildlife, Confederated  
Tribes of the Umatilla Indian  
Reservation and the Oregon  
Water Resources Department**

- 7.9B.12 Jointly develop a monitoring and evaluation workplan that: 1) coordinates monitoring and evaluation activities; and 2) identifies administrative and funding commitments.

### **7.9C Grande Ronde Subbasin**

Water temperature problems throughout the Columbia Basin signal the need to gain experience in solving this problem in an important area such as the Grande Ronde Subbasin.

**Environmental Protection Agency  
and Other Entities**

- 7.9C.1 Coordinate design of a demonstration project to evaluate and address water temperature problems in the Grande Ronde Subbasin. Work cooperatively with all relevant entities including model watershed project participants. Complete project design and submit it to the Council by April 15, 1993. After Council approval of the project design, the Environmental Protection Agency, the Council and other relevant entities secure funding through appropriate sources to implement study plan.

### **7.9D Lewis Subbasin**

**PacifiCorp**

- 7.9D.1 Subject to Federal Energy Regulatory Commission approval, develop a flow plan in consultation with the fish and wildlife agencies and tribes and the Washington Department of Ecology for

the spawning, incubation and rearing of salmon and steelhead below Merwin Dam on the north fork of the Lewis River. Upon approval by the Council and the Federal Energy Regulatory Commission, the flow plan will become a part of this program.

### **7.10 PROVIDE PASSAGE AND PROTECTIVE SCREENS ON TRIBUTARIES**

During the last 50 years, state and federal entities initiated water diversion screening programs and passage improvements in several parts of the Columbia River Basin. Hundreds of screens have been installed on important fish-producing streams. Unfortunately, salmon and steelhead are still being lost in diversions throughout the basin. A large number of diversions, including many on the Salmon and Grande Ronde rivers and other streams that support weak stocks, remain unscreened. In addition, many of the existing screening facilities are in need of maintenance or other improvements.

Installation of new facilities on unscreened diversions and repair or upgrade of older facilities has accelerated since 1992, but many projects remain to be completed. Unscreened or poorly screened diversions result in the loss of many juvenile salmon and steelhead that have survived the rigors of natural rearing only to be killed at the beginning of their journey to the ocean. This effort has a high probability of reducing salmon and steelhead mortality and will require the use of all available resources for funding, design, construction and installation. Because of the continued need for quick action, it is especially important that the resources of the private sector be used to ensure timely construction and installation of high-priority screens and measuring devices, if such resources are necessary to meet the desired installation time line.

This process is not intended to interfere with the implementation of screening activities that use existing funding mechanisms and programs. Those activities should proceed simultaneously with the process outlined below. As the oversight committee and technical work groups are created, the products developed by these groups should be integrated into the ongoing processes, as well as the implementation planning process (see Section 3.1B).

## **7.10A Update Priorities and Continue to Fund and Implement an Accelerated Screening and Passage Program**

### **Bonneville**

7.10A.1 Fund costs associated with operation of the Fish Screening Oversight Committee and technical work groups. These committees should be incorporated into the implementation planning process (see Section 3.1B). The oversight committee should include state, federal (including Bonneville), Council, tribal and irrigation representatives. The committee should provide overall direction, set priorities and ensure oversight of objectives, funding opportunities, standards, biological criteria and evaluation. The technical work groups should include passage experts and other appropriate technical personnel representing federal, state, tribal and irrigation entities. The Yakima Fish Passage Technical Work Groups are to recommend project priorities within their area of concern to the oversight committee. They also should work with the entity constructing the diversion screens and passage facilities to ensure the facilities are constructed according to

the prescribed criteria and that the necessary project evaluation is designed and implemented. In the case of large projects, this may include the following:

- establish written operating criteria;
- develop preliminary designs;
- see that necessary permit processes are carried out;
- make certain private landowner and public concerns are addressed;
- review detailed designs to ensure that biological and engineering criteria are met;
- monitor construction phases;
- monitor operation and maintenance phases in compliance with criteria and recommend corrective actions if necessary; and
- conduct project evaluations.

### **All Parties**

7.10A.2 Criteria for design, construction, operation and maintenance of facilities should be based on standards and criteria developed by the National Marine Fisheries Service in concert with agencies and tribes with expertise in the areas of screening and fish protective facilities in the region. Use the existing expertise of federal, state and tribal entities and others, including the private sector, to accelerate implementation of screening and passage measures. In addition, conduct statistically valid evaluations

of screening facilities, as necessary, to ensure that fish are adequately protected and the numbers of adult fish returning to the Columbia River, as a result of this program, are assessed. Evaluation should be coordinated through the implementation planning process (see Section 3.1B).

### **Fishery Managers**

- 7.10A.3 Maintain a prioritized list of tributary screening and passage facility improvements for stream diversions in the Columbia River Basin affecting salmon and steelhead. Improvement can include new facilities and the upgrading and maintenance of existing facilities. The list should also include Columbia River and Snake River mainstem pump diversions. Coordinate this list with the assessment of mainstem diversions in Section 7.10A.6. Priority initially should be given weak stocks, with emphasis on stocks petitioned or listed under the Endangered Species Act in the Snake River Basin. This list should be updated annually by January 31 by the Fish Screening Oversight Committee.

### **National Marine Fisheries Service, Working with Oversight Committee, Appropriate Technical Work Groups and Bonneville**

- 7.10A.4 Identify resources that will be needed to accomplish screening and passage work, and prepare a general operation and maintenance plan, including a schedule, budget, proposed cost-sharing incentive programs and monitoring and evaluation plans. To accelerate this effort, immediately identify and allocate a budget of at

least \$15 million per year, from all available sources, to implement the plan. This expenditure will require increased participation from federal, state and private entities. The presumption is that diversion owners will contribute a significant amount of funding for installation and maintenance of screens. Under current federal law, some federal funds may be available to assist in diversion screening. Sources of additional federal funds, as well as state and private funds, need to be investigated and procured. The plan will also address how ongoing screening and passage programs funded by the Mitchell Act and the states will be comprehensively integrated basinwide. The National Marine Fisheries Service, the oversight committee and Bonneville review this plan with the Council annually by the end of January. As part of the review, report on dollars spent individually by federal, state, private and other entities in the past year and overall, according to the plan. Install all needed screens and passage facilities immediately. Complete them no later than the end of 1996. National Marine Fisheries Service should expedite approval of diversion screening in the Endangered Species Act process.

### **Bureau of Land Management (Idaho and Oregon/Washington Offices), U.S. Forest Service (Regions 1, 4, 6) and Bureau of Reclamation (Pacific Northwest Region)**

- 7.10A.5 Require as a condition of both existing and new water use authorizations, that diversion structures have functional fish screens and other passage facilities for manmade barriers to

salmon and steelhead that meet the criteria referenced above. For existing authorizations, wherever practical, and especially on high-priority diversions, the three agencies, in coordination with the state fish screening programs, should proceed to design and install screens on a multiagency or shared-cost basis, with authorization renewals contingent on reimbursement to the agency, or other arrangements satisfactory to the agency. These screens should meet Fish Screening Oversight Committee criteria. By March 1 of each year the three federal agencies should report on their progress, including the number of such permits, estimated screening costs, resources needed to implement and monitor the program, and a time frame for compliance.

### **Corps of Engineers**

- 7.10A.6 Fund periodic inspections of all underwater diversions in the mainstem Columbia and Snake rivers to determine whether screens that prevent losses of juvenile and adult salmon are installed and operating. Repair, update and, where necessary, install screens on all diversions by December 31, 1995. The presumption is that diversion owners will fund installation and maintenance of screens. The Corps of Engineers, National Marine Fisheries Service and other appropriate entities should use their authority to require expeditious repair or installation of screens if violations are found. Work under this measure should be coordinated with all other measures in this section.

### **Idaho, Oregon and Washington**

- 7.10A.7 Idaho, Oregon and Washington have laws that require the installation, operation and maintenance of fish screens on water diversions. Develop legislation to obtain greater compliance with fish screen laws in each state. Develop legislation to require forfeiture of associated water rights after three continuous years of unscreened or substandard screened diversions as determined by the state. Report to the Council on this measure by June 30, 1995, and annually thereafter.

### **7.10B Condit Dam**

Condit Dam once had a fish ladder, but the ladder washed out. Therefore, no passage to the upper White Salmon River exists for adult migrants. If fish passage were provided, 30 to 40 miles of spawning habitat would become available above Condit Dam. The Federal Energy Regulatory Commission ordered PacifiCorp to study the feasibility of providing fish passage past the dam. This study, completed in September 1982, determined that passage is feasible. Under the current relicensing proceeding the Federal Energy Regulatory Commission is conducting an environmental assessment of the project. This environmental impact statement will provide a basis for determining the optimum means for providing anadromous fish access to historic range on the White Salmon River.

#### **PacificCorp**

- 7.10B.1 Subject to Federal Energy Regulatory Commission approval and in consultation with the National Marine Fisheries Service, Yakama Indian Nation, Columbia River Inter-Tribal Fish Commission, Washington Department of Fish and Wildlife, and U.S. Fish and Wildlife Service, implement the alternative that provides

the optimum means for anadromous fish to access their historical range in the White Salmon River.

### 7.10C Enloe Dam

#### Federal Energy Regulatory Commission

- 7.10C.1 Require any holder of a license for an operating hydroelectric facility at Enloe Dam to design and construct the hydroelectric facility improvements to be compatible with future installation and operation of upstream and downstream anadromous fish passage facilities. If the Council determines that anadromous fish should be introduced into the Similkameen River, above Enloe Dam, require the licensee to construct and operate appropriate anadromous downstream passage facilities. Upstream passage potentially could provide the region with the opportunity to establish an anadromous fish run throughout the more than 320 linear miles of spawning and rearing habitat of the Similkameen Basin. This could be considered as off-site enhancement or mitigation for mainstem Columbia River anadromous fish losses and would not be the responsibility of the Enloe hydroelectric licensee. Determination of regional responsibility, if any, for upstream fish passage facilities will be decided at a future date.

### 7.10D Dryden Dam

#### Bonneville

- 7.10D.1 Conclude evaluation of the Dryden Dam juvenile fish screen and make necessary modifications by March 1, 1995. Monitor operation of and

maintain the screen to ensure that it remains effective.

#### Federal Energy Regulatory Commission

- 7.10D.2 If hydropower facilities are later proposed to be added to the Dryden Dam or diversion, require the licensee to reimburse Bonneville for an equitable portion of the cost of these fish screens and bypass facilities.

### 7.10E Green Peter Dam

#### Corps of Engineers

- 7.10E.1 Conduct studies to determine the effect of fluctuating flows at Green Peter Dam on the maintenance of steelhead runs in the South and Middle Santiam rivers. The studies should include:
- evaluation of the effect of maximum and minimum flows or combinations of flows on adult steelhead movement;
  - monitoring of steelhead movement in Green Peter and Foster reservoirs to determine whether delays in migration are occurring in the reservoirs; and
  - assessment of spawning and rearing areas above Green Peter Reservoir to determine if alterations that affect spawning and rearing have occurred.

### 7.10F Willamette Falls

#### Bonneville and Portland General Electric

7.10F.1 Subject to Federal Energy Regulatory Commission approval, jointly install, operate and maintain an adult trapping facility in the Willamette Falls fishway. Funding for the facility should be in the same proportion as the original ratio of federal-to-Portland General Electric funding of the adult fishway.

**Portland General Electric**

7.10F.2 Subject to Federal Energy Regulatory Commission approval, conduct studies to evaluate the juvenile bypass system and screening at the Sullivan Plant at Willamette Falls.

**7.10G Clackamas River Dams**

**Fish and Wildlife Agencies and Portland General Electric**

7.10G.1 Work cooperatively to investigate and resolve adult fish passage problems associated with Portland General Electric’s Clackamas River hydroelectric dams.

**7.10H Leaburg and Walterville Facilities**

**Eugene Water and Electric Board**

7.10H.1 Subject to Federal Energy Regulatory Commission approval, design, construct and operate by August 1, 1995, a new right bank fish ladder at Leaburg Dam and a velocity barrier in the Leaburg powerhouse tailrace, or

equivalent alternative means to prevent injury and migration delay of adult salmon. Assume full responsibility for annual operation and maintenance of these adult passage facilities. If the Leaburg relicense application is delayed, take prompt action to amend the existing license to complete the right bank fish ladder on schedule. In the event Federal Energy Regulatory Commission approval is earlier than anticipated in the Eugene Water and Electric Board's proposed schedule, make a good-faith effort to accelerate completion of the right bank fish ladder.

7.10H.2 Subject to Federal Energy Regulatory Commission approval, make improvements to the existing juvenile fish screen cleaning and bypass facilities at the Leaburg Canal Hydroelectric Project by December 31, 1992, and ensure that the fish bypass and screen cleaning systems continue to operate effectively. Ensure that the juvenile fish passage efficiency of the Leaburg screen and bypass system is not reduced when the Eugene Water and Electric Board’s proposal to raise the elevation of Leaburg Lake is implemented. Assume full responsibility for annual operation and maintenance of these facilities. Substantial populations of juvenile salmon and steelhead migrate through the portions of the McKenzie River affected by the Leaburg project. Studies have shown significant mortalities associated with turbine passage. The Eugene Water and Electric Board has agreed to provide a bypass system.

7.10H.3 Subject to Federal Energy Regulatory Commission approval, design and construct a velocity barrier in the Walterville Hydroelectric Project

tailrace to prevent the migration delay and injury of adult anadromous fish. The velocity barrier should be completed and operational no later than July 1, 1995. Assume full responsibility for annual operation and maintenance of this adult passage facility. If the Walterville relicense application is delayed, take prompt action to amend the existing license to complete the velocity barrier on schedule. In the event Federal Energy Regulatory Commission approval is earlier than anticipated in the Eugene Water and Electric Board's proposed schedule, make a good-faith effort to accelerate completion of the Walterville project tailrace velocity barrier.

- 7.10H.4 Subject to Federal Energy Regulatory Commission approval, design and construct a permanent screening and bypass system for juvenile migrants at the Walterville Canal Hydroelectric Project. The juvenile fish bypass facilities should be completed and operational no later than November 11, 1995. Assume full responsibility for annual operation and maintenance of these facilities. If the Walterville relicense application is delayed, take prompt action to complete the screening and bypass facilities on schedule by either preparing and filing a fish passage facility plan with the Federal Energy Regulatory Commission under Article 34 of the existing license or amending the existing license. In the event the Regulatory Commission's approval is earlier than anticipated in the Eugene Water and Electric Board's proposed schedule, make a good-faith effort to accelerate completion of the Walterville juvenile fish bypass facilities. Walterville Canal is operated by the Eugene Water and Electric

Board in conjunction with Leaburg Canal. The problems encountered by juvenile migrants at this project are essentially the same as those at Leaburg.

### **7.10I Foster Dam**

#### **Corps of Engineers**

- 7.10I.1 Evaluate existing studies and investigate alternative methods of providing adequate downstream fish passage at Foster Dam.

### **7.10J Marmot Dam**

#### **Portland General Electric**

- 7.10J.1 Immediately begin consultation with the fish managers on the design of juvenile fish passage facilities at Marmot Dam. Report progress annually to the Council in December.

### **7.10K Passage into Historic Habitat**

#### **Fishery Managers**

- 7.10K.1 Where appropriate, determine the feasibility of providing passage above blockages to habitat caused by human development activities. Appropriate habitat includes areas where weak stocks are habitat-limited and, therefore, would benefit from additional habitat. These areas might include parts of the Willamette, Yakima, Grande Ronde and Deschutes basins as well as other subbasins. Submit recommendations for providing passage for Council review and identification of funding sources.

## 7.11 YAKIMA RIVER BASIN

The Yakima River Basin is located east of the Cascade Range in Washington, where annual precipitation is very low. Irrigation has changed the Yakima River Valley from a near-desert environment to one of the most productive agricultural regions in the country. Valuable agricultural crops are grown there, thanks to a series of irrigation diversion dams, canals and ditches. Three irrigation diversion dams also divert water for hydroelectric generation. However, in a low water year, the demand for irrigation water for farming and ranching still exceeds the water supply. Available water must be allocated among competing uses, and the provision of streamflows sufficient to support anadromous and resident fish historically has received a lower priority. Yet, because the Yakima's fish habitat remains largely intact, most fish and wildlife experts consider this basin to be one of the areas with the best potential for producing anadromous fish in the Columbia River Basin.

In the past, during certain times of the year, sections of the river below some diversion dams have been dry, making fish migration impossible. Water in the pools that remain and in the river below irrigation returns reaches temperatures that are too high to support cold-water fish species. In addition, irrigation return flows carry sediment and chemicals into the Yakima River. However, water quality problems are secondary to those concerning water quantity. Additional water storage, and changes in existing storage operations and water management functions, are needed in the Yakima River Basin to satisfy fish requirements while meeting other competing demands, particularly irrigation uses.

In addition to water supply problems, many of the fish screens and passage facilities at the various irrigation and hydroelectric structures that control streamflows in the Yakima Basin were outdated, in ill-repair or non-existent when this program was first developed in 1982.

The Council adopted Yakima River Basin measures primarily as off-site enhancement.

Off-site enhancement is a way to compensate for fish and wildlife lost due to development and operation of a hydropower project elsewhere in the Columbia River Basin. Such enhancement is used when it is not desirable or feasible to mitigate the adverse impacts at the hydropower site where the fish were lost. This program's Yakima measures include actions to correct structural problems at irrigation diversion dams, canals and ditches that interfere with the passage of anadromous fish. These are off-site enhancement projects to mitigate the impacts of hydropower elsewhere in the basin.

Measures to provide passage or protection in the lower Yakima River have received priority and are nearly completed. Once the lower-river passage problems are solved, emphasis will be placed on the upper reaches.

Notable progress has been made on the Yakima Basin projects. Screens and ladders have been completed at a number of diversion dams. Other passage projects are well under way or near completion. The increased fish runs recorded in 1986 underscore the Yakima River's potential as one of the most promising areas for off-site enhancement in the Columbia River Basin.

The Council recognizes that the water needs of the Yakima River Basin, including provision of adequate flows for fish, cannot be satisfied without additional storage, changes in existing storage operations and/or modification of water management practices. Although Bumping Lake (on the Naches arm of the Yakima River in central Washington) has a long history of study as a suitable site for added storage, several other sites also have significant potential. These sites are being studied by the Bureau of Reclamation and the Washington Department of Ecology. The results of this study should be considered in identifying the site or sites to be developed for additional storage.

The Council also recognizes the critical importance of the Yakima River's potential for natural propagation and as a system for releasing hatchery fish. An outplanting facility to supplement natural production in the Yakima

Basin will be developed in accordance with Section 7.4K.

Additional water storage in the Yakima River Basin should be used primarily to provide flows to allow the rebuilding of anadromous fish populations and to protect resident fish. Recent studies to estimate the flow requirements for anadromous fish will provide the Council with better information for identifying basinwide flows for anadromous fish protection. Results of these studies also will provide a more detailed basis for determining the amount of water storage necessary for fish flows, a key factor in basin water planning and assessment of storage sites.

When additional water storage is developed in the basin, a major use of this water should be to protect, mitigate and enhance the basin's anadromous and resident fish and wildlife. Flexibility in water management could be increased through construction of reregulating dams. The Council endorses this as a means to allow the additional stored water to be used for both agriculture and fish enhancement.

The Council encourages more efficient use of water in the basin. Irrigation results in the loss of large volumes of water, primarily through transpiration, poorly maintained canals and ditches, and field flooding practices. Water also has been used for frost protection of crops, a practice that appears to be gaining popularity. Other irrigation methods could use less water. For example, irrigation waters can be distributed through closed, pressurized systems. In addition, water management alternatives, such as water banking, have been proposed.

Funding of many program measures in the Yakima River Basin is part of a cooperative effort involving Bonneville, the Bureau of Indian Affairs, the Bureau of Reclamation and others. The Council anticipates that cooperative funding will continue as provided under Section 3.1C.3, which calls on Bonneville to work with the Council and the federal project operators to identify the most expeditious means for funding measures at federal projects.

## 7.11A Additional Water Storage

### Council

- 7.11A.1 Before specifying program measures to resolve the storage problem in the Yakima River Basin, the Council will consult with the fish and wildlife agencies and tribes, especially the Yakama Indian Nation. The Council will evaluate the results of the Bureau of Reclamation and Washington Department of Ecology study of alternative storage sites and other studies of improved flows for anadromous fish. Based on this consultation and evaluation, the Council will develop measures that identify a site, or a combination of sites, and the amount of storage required. The Council maintains that the stored water should be used primarily to protect, mitigate and enhance anadromous and resident fish in the basin. The Council also will evaluate the use of reregulating dams to provide maximum flexibility in managing the additional stored water.

### Council and Relevant Parties

- 7.11A.2 To reduce the amount of additional storage required, the Council will consult with water users regarding more efficient water-use practices in the basin, including alternative irrigation methods and water planning.

### Relevant Parties

- 7.11A.3 The Council encourages all parties to use water as efficiently as possible in order to satisfy the many needs in the Yakima River Basin, to take any interim steps to improve fish flows in the Yakima River, and to support a program of additional storage

incorporating appropriate cost-sharing arrangements.

public participation in water conservation efforts.

7.11A.4 In keeping with the provisions of Section 210, Title II of Public Law 97-293 (the Reclamation Reform Act of 1982), the Council expects that:

- The Secretary of the Interior will encourage the full consideration and incorporation of prudent and responsible water conservation measures in the operations of non-federal recipients of irrigation water from the Yakima Project, where such measures are shown to be economically feasible for those recipients.
- Each Yakima River Basin irrigation district that has entered into a repayment contract or water service contract pursuant to federal reclamation law or to the Water Supply Act of 1958, as amended (43 U.S.C. 390b), will promptly develop a water conservation plan containing definite goals, appropriate water conservation measures and a schedule for meeting the water conservation objectives.
- To ensure coordination of ongoing programs, the Secretary of the Interior will enter into memoranda of agreement with federal agencies that can assist in implementing water conservation measures. Such memoranda will provide for involvement of non-federal entities, including the Council, the Washington Department of Ecology, the Yakama Indian Nation, water users' organizations and other appropriate groups, to ensure full

## 7.11B Passage

### Bonneville

- 7.11B.1 After consultation with the fish and wildlife agencies, the tribes and the Bureau of Reclamation, and upon approval by the Council, implement needed fish passage improvements at irrigation diversion dams, canals and ditches in the basin. Lower river passage improvements will be made first. They will be followed by passage improvements in the upper river.
- 7.11B.2 Upon approval by the Council, fund a study to determine the feasibility of re-establishing runs of anadromous fish above Cle Elum Dam. If results of the study indicate that restoration is feasible, Bonneville shall fund the construction of fish passage facilities at Cle Elum Dam.
- 7.11B.3 Fund the construction of fish passage facility projects included in the two highest-priority groups established by the Yakima Passage Technical Work Group approved by the Council. Construction will begin with the highest priority facilities as established by a predesign memorandum and the Yakima Passage Technical Work Group. The Yakima Passage Technical Work Group may substitute projects from lower-priority groups for projects in groups 1 and 2 based on information developed or circumstances encountered during design. The Yakama Indian Nation and the fishery agencies should continue to make efforts to secure cost-sharing funding for the construction of Yakima Basin fish

passage facilities. Funding for the two unscreened projects on tribal land should be conditioned on the Yakama Indian Nation adopting a requirement that any future water diversions on tribal land are screened at the time the diversion is made.

## 7.11C Flows

The System Operations and Advisory Committee was established as a means for fish and wildlife agencies, tribes, irrigation districts and the Bureau of Reclamation to negotiate flows to protect spawning and incubation in the Cle Elum River and elsewhere in the Yakima Basin.

### **Bureau of Reclamation and PacifiCorp**

- 7.11C.1 Upon approval by the Council and in consultation with the Washington Department of Ecology, the Bureau of Reclamation should provide the minimum flows required for fish passage, spawning, incubation and rearing at Prosser and Roza dams and other locations in the basin. The Council encourages PacifiCorp to work with the Washington Department of Ecology, fish and wildlife agencies and tribes to provide such flows at the Wapatox Project. The Council will specify minimum flow requirements and the location of flow control and monitoring points after evaluating the results of the instream flow studies.

### **Council**

- 7.11C.2 Until the results of instream flow studies are available, the Council will support the establishment of interim flows upon receipt of proposals from the fish and wildlife agencies and

tribes, especially the Yakama Indian Nation. Those proposals will identify specific flow control and monitoring locations and information on the adequacy and safety of the recommended flows.

- 7.11C.3 Before supporting any flows for fish in the Yakima Basin, the Council will consult with the System Operations and Advisory Committee, irrigation districts, Washington Department of Ecology, the Bureau of Reclamation, fish and wildlife agencies and tribes.

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