



# Strategy for Salmon

Response  
to  
Comments

Northwest  
Power Planning  
Council

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November 23, 1992

To: Interested Parties

On November 19, 1992, the Council adopted its Response to Comments received in its Phase Three rulemaking, which considered measures to protect, mitigate, and enhance salmon and steelhead in the Columbia River Basin. The final amendments as adopted in Phase Three were published last month under the title "Strategy for Salmon," Volumes I and II.

The adoption of the Response to Comments concludes the Phase Three rulemaking. Notice of final action has been submitted to the Federal Register and will appear shortly. The Council expects to enter rulemaking in early 1993 on the Phase Four measures, which will deal with resident fish and wildlife in the Columbia River Basin.

The Response to Comments lists significant comments received by the Council in the course of the Phase Three rulemaking and describes the Council's response to these comments. The Response to Comments also lists each of the recommendations received in August 1991, when the Council called for such recommendations pursuant to section 4(h) of the Northwest Power Act, and describes how the Council has responded to these recommendations.

A copy of the Response to Comments is enclosed. If you need additional copies, please call our central office and request document 92-27.

Sincerely



Steve Crow, Director  
Public Affairs Division

enclosure

# **Strategy for Salmon**

**Response to Comments**

**November 19, 1992**

**Northwest Power Planning Council  
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**NORTHWEST POWER PLANNING COUNCIL**  
**COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM**  
**SALMON AND STEELHEAD AMENDMENTS, PHASE 3**

November 19, 1992

In May, 1991, the Northwest Power Planning Council began a process to amend the *Columbia River Basin Fish and Wildlife Program*. The first phase of the amendment process, initiated on the Council's own motion, addressed high-priority habitat and production measures for salmon and steelhead. As it began phase one, the Council also issued an invitation to the region's fish and wildlife agencies, Indian tribes, and others, to submit their own recommendations for salmon and steelhead amendments in August, 1991. The Council concluded phase one in August, 1991, and issued a response to comments. During the fall of 1991, the Council considered mainstem passage, harvest and other measures raised in the August recommendations. The Council concluded this second phase in December, 1991, and issued a response to comments. In 1992, the Council entered a third phase, in which it considered long-term issues related to production, habitat, and the program's goals, objectives, monitoring and evaluation, many of which originated in the August, 1991 recommendations. In September, 1992, the Council concluded this final phase of the salmon and steelhead amendment process. In the third phase, the Council integrated all three phases of the salmon and steelhead amendment process. The Council considers its September, 1992 decision to be a final decision with respect to all three phases of the salmon and steelhead amendment process.

The measures adopted in phase 1 and phase 2 were incorporated in the phase 3 rule and were reopened for additional comment as part of this rulemaking. Although most of the phase 1 and phase 2 measures were not greatly changed in the phase 3 rulemaking, the phase 3 rule presents them in their final form. The phase 3 rule therefore supercedes the phase 1 and phase 2 rules in their entirety.

In this document, the Council addresses comments submitted during phase 3. Responses to comments submitted in phases 1 and 2 are incorporated by reference, and in some cases supplemented by this document.

As a matter of format, each subject heading is followed by a summary of major comments. After the summary, the Council provides a response describing how the comment was addressed in the amendments. In many cases, the same point was made by numerous commenters. To avoid making the document longer than absolutely necessary, the Council did not identify commenters except where

the commenter's identity was needed to understand the significance of the comment. All citations to the fish and wildlife program are to volume 2 of the program.

We have used the following acronyms or abbreviations:

**BLM:** U.S. Bureau of Land Management  
**BPA:** Bonneville Power Administration  
**CBFWA:** Columbia Basin Fish and Wildlife Authority  
**cfs:** Cubic feet per second, a measure of water velocity; "kcfs" means thousands of cubic feet per second.  
**CIS:** Coordinated information system  
**CRISP.O:** A computer model used to analyze fish passage issues.  
**CRITFC:** Columbia River Intertribal Fish Commission  
**CRM:** Coordinated resource management  
**EIS:** Environmental impact statement  
**EPA:** Environmental Protection Agency  
**ESA:** Endangered Species Act  
**EWEB:** Eugene Water & Electric Board  
**FELCC:** Firm energy load carrying capability, a measure of firm energy in the hydropower system.  
**FERC:** Federal Energy Regulatory Commission  
**FGE:** Fish guidance efficiency  
**FISHPASS:** A computer model used to analyze fish passage issues.  
**FOEC:** Fish Operations Executive Committee  
**FPDEP:** Fish Passage Design and Evaluation Program  
**GAO:** U.S. General Accounting Office  
**IHOT:** Integrated Hatchery Operations Team  
**ISP:** Integrated System Plan  
**MAF:** Million acre-feet, a measure of water volume.  
**MPAC:** Mainstem Passage Advisory Committee  
**NEPA:** National Environmental Policy Act  
**NIU:** Northwest Irrigation Utilities  
**NMFS:** National Marine Fisheries Service  
**ODFW:** Oregon Department of Fish and Wildlife  
**PNUCC:** Pacific Northwest Utilities Conference Committee  
**PUD:** Public utility district  
**RASP:** Regional Assessment of Supplementation Project  
**SAM:** System Analysis Model  
**SCLDF:** Sierra Club Legal Defense Fund  
**SOR:** System Operation Review  
**USFS:** U.S. Forest Service

## **INTRODUCTORY MATTERS**

### **Northwest Power Act requirements.**

**Ensuring an adequate and economical energy supply.** *Comments.* Fish and wildlife protection is an important purpose of the Act, but not the primary purpose; power purposes comprise the bulk of the Act. The Council vitiates these purposes when it proposes measures that would strip the hydroelectric system of its flexibility and cause power deficits, as would reservoir drawdowns and flow augmentation. If it were not for the program's flow augmentation measures, the power system would not be facing deficits.

*Response:* Our program recognizes the relationship between hydropower production and fish and wildlife restoration at Page 8:

While the fish and wildlife program must 'protect, mitigate and enhance fish and wildlife affected by the development, operation and management' of Columbia River Basin hydropower facilities, it must do so in a way that ensures the region 'an adequate, efficient, economical and reliable power supply.' The Council has called for aggressive exploration of structural changes to the hydropower system ... such as reservoir drawdown strategies. These non-structural innovations in particular will require careful integration when planning for the power system, fish and wildlife and water use to ensure that the needs of salmon, power and other users are addressed.

The Council has called for expedited evaluation of reservoir drawdowns and implementation unless they are shown to be structurally, economically, or otherwise infeasible, biologically imprudent, or *inconsistent with the Act*.

The measures adopted by the Council affect the adequacy and economy of the hydro system in four primary ways.

First, the measures dealing with flows change the times at which certain quantities of water will flow through the turbines at dams in the Columbia River Basin. This, in turn, reduces the amount of power which can be generated at certain times of year, and increases the amount of power which can be generated at other times of year. The Council and others studied these flow impacts extensively using existing computer-based power system planning models such as the System Analysis Model (SAM).

Using these models, the Council examined not only the impact on available electrical generation, but also the financial impact, including the prices at which region was likely to be able to sell surplus power to out-of-region utilities, and the prices at which the region would be able to purchase replacement power or build

new resources. While any forecast of future prices contains uncertainty, the Council examined the flow impacts over a wide range of possible future prices.

Second, measures affecting reservoir levels (other than the drawdown of Snake River reservoirs) or imposing other operational constraints can reduce the output or efficiency of generating turbines, or otherwise restrict the hydro system's flexibility in meeting load peaks. In analysing these measures, the Council obtained the best estimates available of the electrical impacts and incorporated them in the models and consulted with the system operators.

Third, the Snake River drawdown measures will change the times at which stored water is used to produce electricity, and the loss of hydraulic head will affect the efficiency of the turbines. Under some of the alternatives now under study, electrical generation at one or more of the Lower Snake dams may cease altogether during the drawdown. In order to have some idea of the potential impacts, the Council requested its staff to model the effects of a two-month drawdown of all four dams with no generation while the drawdown is in effect.

These impacts were studied using spreadsheet analysis with the System Analysis Model as a baseline. Like other flow-related impacts, the range of impacts on the electricity produced by the affected hydroelectric projects is relatively clear, but there is considerable uncertainty about the overall cost of these impacts. The Council's studies therefore looked at costs over a wide range of futures.

In weighing the electrical impacts on the region's power system from flows, other operating constraints, and Snake River drawdown, the Council relied extensively on information received during the three years of studies, briefings, and public comment leading to the adoption of the Council's 1991 power plan. The plan recognizes the region's growing energy demand and the possibility that new measures undertaken for salmon and steelhead could require the region's utilities to acquire additional resources.

In anticipation of these contingencies, the power plan calls for aggressive development of conservation and for immediate acquisition of certain other low-cost resources. The region is presently carrying out these actions on a schedule which, if continued, will achieve the goals of the 1991 plan. Thus, to the extent that the salmon and steelhead measures will adversely impact the electrical energy available to the region's power system, the Council believes that timely implementation of the actions called for in its 1991 power plan will result in a power system which continues to meet the region's electrical load in an adequate, efficient, and reliable manner.

Fourth, many of the costs of the salmon and steelhead measures in the program will be paid by Bonneville and reflected in the rates charged to the

region's electrical consumers. Although it was not possible to compute exact costs for each of the measures, the Council considered estimated costs where available, and was mindful of the overall impact on ratepayers. The Council anticipates a 4% increase in wholesale power rates and a 2% increase in retail rates, as a result of the program amendments. The Council also considered the potential costs to the region and its ratepayers which could arise from Endangered Species Act proceedings involving Snake River stocks as well as other stocks in the basin.

In this rulemaking, the Council began by examining the measures which needed to be implemented for salmon and steelhead, not by making a determination of how much money the region could afford to spend. The measures were examined for their biological merit. No major measures were rejected solely on grounds of their cost.

When a measure was identified as likely to benefit salmon or steelhead, the Council then considered how it could be implemented in the most efficient and least-cost way. Although there was no way to fix a precise cost for many of the measures, the Council put considerable effort into identifying potential costs for proposed measures. The Council will continue to collect and evaluate cost information.

Ultimately, the decision on what constitutes an "adequate, efficient, economical, and reliable power supply," the decision on what measures are necessary to "protect, mitigate, and enhance" fish and wildlife, and the decision on what balance to strike between the two involve large measures of judgment. The Northwest Power Act contains no calculus for determining, for example, what is an "economical" power supply or for determining when a fish or wildlife measure renders the power supply uneconomical. Nonetheless, the Council, based on its experience in power planning and fish and wildlife mitigation, and the extensive body of information presented to it in this rulemaking, has given close consideration to these factors.

The Council believes this fish and wildlife program is carefully designed to protect fish and wildlife without putting the hydroelectric system at risk, and finds that the program assures the region an adequate, efficient, reliable, and economical power supply.

**Complementing the fish and wildlife agencies and Indian tribes.**

*Comments.* The amendments do not complement the activities of the fish and wildlife agencies and Indian tribes because they do not adopt the Integrated System Plan, and conflict with the Columbia River Fisheries Management Plan.

*Response:* See pp. 17-18, below.



**Best available scientific knowledge. Comments.** The amendments are not based on the best available scientific knowledge because the Council did not develop an inventory of reliable information and identifying research that needs to be done; determine the biological benefits of proposed measures; and reject those that are not demonstrated by research to be effective. The best available scientific knowledge shows that further reductions in mainstem mortality are needed. Do not overemphasize the need to use "available" data. Bad data are an inadequate basis for making irreversible decisions even if they are the best available.

**Response:** In considering each program measures, the Council reviews information in its amendment record, including the initial recommendations, comments, and other material, and acts on information the Council deems to be the best available.

In understanding the requirement that measures be based on the "best available scientific knowledge", the Council is guided by the discussion of this provision which appears in the legislative history of the Northwest Power Act.

The Act requires the Council to develop its program on the basis of recommendations accompanied by supporting data as submitted by fish and wildlife agencies, Indian tribes, and other interested parties. The Commerce Committee Report (House Report 96-976, Part I, at page 56) explains:

The recommendations must be accompanied by data to support them. The better the data the more likely it is that the recommendations will receive wide support. While the Committee believes that it is reasonable to expect organizations with fish and wildlife expertise to be able easily to provide needed support data, the Committee also recognizes, and the Council should also, that 90 days will not afford opportunity for extensive studies, the acquisition of new data, or the development of the best scientific knowledge. The data requirement is to enable the Council and others to understand the recommendations. The quantity or quality of the data should not serve as a basis for turning down any recommendation.

This explanation, which was repeated by Congressman Dingell during the floor debate in House of Representatives, emphasizes that the "best available" provision gives the Council discretion to take action on recommendations even when the information before it is incomplete or of poor quality.

The Council did extensive analysis of the possible effects of the measures with system implications, such as mainstem flow or velocity improvements. These measures were reviewed through the use of a Council-developed computer model known as the System Planning Model, which incorporates a good deal of what is

known about the life cycle of Columbia River salmon. The System Planning Model is a computer program that models the life cycle of Columbia River salmon, taking them from the time of birth, down the river as juvenile fish, into the ocean, and back to their natal spawning grounds. At each life stage, the model exacts a mortality factor that approximates, as best we can, natural and human-caused mortalities.

The System Planning Model has been in development since 1986, with broad involvement by interested parties, including extensive public and peer review. The model's documentation is included in the Administrative Record. The model was used extensively in the system planning process called for in the 1987 fish and wildlife program, and carried out by the Columbia Basin Fish and Wildlife Authority.

A second model of this type, the Empirical Life Cycle Model, has been under development by fishery agencies and tribes. Some preliminary results from this model were submitted to the Council in August 1992. However, the assumptions underlying this model were not fully documented in the Council's process.

The System Planning Model was useful to the Council in providing information on the possible interactions among various measures and on the significance of certain measures. Unfortunately, the knowledge we have at hand is not sufficient to predict all of the biological effects of a particular measure with certainty. Therefore the model is designed to examine the effects of those uncertainties on the decisions which the Council must make rather than predict certain outcomes.

During the course of this rulemaking, some parties have interpreted particular projections from the modeling as vindicating their preferred options while others have been disappointed because the projections for their options were not as favorable. Both interpretations are inappropriate: it is not the intent of the analysis to predict what outcome will result from a particular set of measures, but rather to review the implications of existing knowledge and examine the effects of scientific uncertainty on the decisions the Council must make.

The model contains the best available data. However, in those cases where solid research data are not available, the model includes assumptions about the interrelationship between various elements of the system. These assumptions were based on consultations with fish and wildlife agencies, tribes, Bonneville and others. The model considered a range of assumptions (see technical appendix E).

While the Council did not examine all uncertainties, it evaluated the sensitivity of each alternative to different sets of assumptions. This analysis helped to highlight those assumptions which had the greatest impact on the

actions under consideration. This allowed the Council to identify and prioritize research questions to focus on areas that are critical to important decisions.

In addition, the relative sensitivity of different actions to uncertainties is itself important information for decision making. For example, options that have strong potential but depend on optimistic outcomes of key uncertainties might be less attractive in the short run than options that are less sensitive pending resolution of the uncertainties.

The Council recognizes that neither the information in its administrative record nor the assumptions in the System Planning Model represent perfect knowledge, but salmon stocks cannot wait for complete resolution of the debate over data. When the best available information needs refinement, the Council attempts to structure program measures as experiments, to improve the region's knowledge over time, and to minimize risk. As the program says:

The Council recognizes the need to employ a systemwide approach to address the needs of Columbia River Basin fish and wildlife. To accomplish this, a coordinated implementation, monitoring and evaluation process is essential. This process should be flexible enough to evolve over time ..." (section 7, p. 79) "The purpose of these monitoring and evaluation activities is to ensure that the region systematically improves its knowledge of what measures work, what measures do not, and why. (Page 81).

The program calls for an independent scientific review to help implement this learning process. In addition, and the Council calls for traditional research in a variety of areas.

To add to existing understanding of the relationship between water flows, velocity and fish survival, the Council has called for an intensive analysis of existing data, and accelerated efforts to develop new information. The Council agrees that further reductions in mainstem mortality are needed, and has called for a number of exploratory efforts to determine how best to do so while assuring an adequate, efficient, reliable and economical power supply.

**Council consideration of economic factors.** *Comments.* The Council misstates its obligation to consider economic factors (May 28 draft, page 5); economics and power system reliability must play an important role in every program determination. The Council should include only least-cost fish and wildlife measures, yet no least-cost analysis had been done. For example, the Council should compare the cost of eliminating in-river and ocean harvest versus the cost of augmenting flow or velocities. The amendments do not adopt the least costly way to achieve sound biological objectives, because such objectives are not identified and resources are proposed to be diffused in lengthy planning exercises.

**Response:** The Council believes the amendments correctly state the Act's requirements. The Council considers economic factors in two ways: (1) the program must assure an "economical" power supply; and (2) where alternative measures would achieve the same sound biological objective, the Council chooses the alternative with the least economic cost.

The Council considers the cost of particular measures on a case-by-case basis on the record before it, and does not interpret the Act to require a comprehensive "least-cost" study before measures can be adopted. However, the Council agrees that increased attention should be devoted to cost-effectiveness, and is calling for the Council, the subregional process, and an independent scientific group to develop appropriate tools for such analysis.

The Council does not believe that harvest reductions can supplant program measures to reduce mortalities at mainstem dams, based on economic considerations. The Council's central fish and wildlife charge is to find measures to help fish affected by the development, operation and management of hydropower facilities, including flows to improve production, migration and survival. The Council has no explicit authority over harvest.

The Council's careful pace toward rebuilding, which some commenters believe is needlessly expensive, is intended to evaluate measures to avoid irreparable losses to weak stocks, and to help ensure coordinated implementation. To be sure, this approach imposes a burden on interested parties, whose resources are already stretched. However, the risk to weak, naturally-spawning stocks, the requirements of the ESA and the National Environmental Policy Act, the need to protect biodiversity, and mean that care must be taken.

The Council recognized the importance of economics in devising the program. Section 8 is devoted to mitigation of adverse impacts. On Page 87, the program says:

All river users will have to share in making sacrifices if significant progress is to be made in rebuilding salmon and steelhead runs. At the same time, maintaining the economic health of the basin also is vital to the Northwest.

**Consistency with Indian legal rights.** *Comments.* The amendments are not consistent with the legal rights of the tribes because they allocate too much of the conservation burden to the tribes. The Council should call for river users to make a contribution to salmon survival that is equivalent to the contribution made by harvest controls, and monitor the contributions of all the parties accordingly. If the Council intends to call for an evaluation of impacts on resident fish and Brownlee refill from providing anadromous fish flows, it should also call for an evaluation of effects on treaty Indian fishing.

*Response:* The Council's primary focus under the Northwest Power Act is on ways to address the effects of hydropower facilities on salmon. The problems salmon face cannot be attacked piecemeal, however, and the Council has therefore addressed other sources of salmon mortality. In approaching the problem comprehensively, the Council did not increase or reduce the impact on one sector, e.g., the hydropower system, in view of burdens imposed on other sectors, e.g., harvesters. The harvest measures the Council adopted represent cuts that cannot be avoided in view of the stocks' status, in the Council's view. The Council did not attempt to allocate the burden of harvest cuts among harvesters, Indian or non-Indian, or seek to impose any part of the burden on the tribes. As for the evaluation of resident fish impacts, the Council believes it is important to be informed about the impacts of salmon measures on other species. This does not mean that it intends to take any action inconsistent with the tribes' rights. Indeed, many of those urging evaluation of resident fish impacts are upriver Indian tribes.

**Adequacy of flows.** *Comments.* The amendments do not provide for adequate flows, which are represented by a flow plan developed by the Columbia Basin Fish and Wildlife Authority.

*Response:* See pp. 21-23, below.

**Equitable treatment.** *Comments.* Providing "equitable treatment" for fish is a lesser requirement than the requirement that power needs, which are more certain than fish needs, be assured. Fish needs must be balanced against power supply needs. Equitable treatment is a standard for federal implementing agencies to interpret and apply, not the Council. Other commenters said that they agreed with the Council's discussion of equitable treatment, but that the program does not provide this level of assurance.

*Response:* The discussion of equitable treatment at page 9 of the program is intended to provide assurance that the Council will design the program consistent with the equitable treatment requirement imposed on the Administrator and other federal agencies by the Act, even while the Council continues to be guided by its own mandate to protect, mitigate and enhance fish and wildlife affected by hydropower facilities while assuring the region an adequate, efficient, reliable and economical power supply. The needs of fish and power are both uncertain--fish because their survival involves a complex of interrelated factors, and power because future power needs are unpredictable--the Council understands the Northwest Power Act to reflect the assumption that the needs of both can be met with a comparable level of certainty.

### **The Council and the Endangered Species Act.**

*Comments:* Coordinate closely with NMFS and the Endangered Species Act (ESA) process, to ensure that fish mitigation measures funded under the Northwest Power Act will not increase liabilities under the ESA, and that federal activities under the fish and wildlife program mesh with ESA requirements. Forego program amendments and work with the NMFS recovery team, while others supported development of a plan through the Council, notwithstanding reservations about particular issues. NMFS said it was hopeful that the Council's program will provide building blocks for a NMFS recovery plan, but urged the Council also to address non-ESA stocks.

*Response:* The Council has adopted a variety of provisions intended to coordinate Council processes with ESA processes. The Council has its own obligations under the Northwest Power Act, of course, and cannot simply defer to the NMFS recovery process. As NMFS points out, the Council's program must extend beyond ESA stocks. See also Phase 2 Response to Comments, p. 7. The Council sees the fish and wildlife program as working in conjunction with, not in opposition to, existing laws and regulations. It is noteworthy that the National Marine Fisheries Service intends to use the Council's amended program as the foundation of recovery plans it is developing for Snake River sockeye and chinook salmon.

### **Salmon and steelhead losses.**

*Comments.* You overestimate historic run sizes. Some studies support a range of 7 million to 10 million fish. (The Council estimates 10 million to 16 million.) Consider other causes for declines in the runs; discuss the role of natural factors such as weather, natural variation; consider harvest, habitat and production in addition to losses from hydropower.

*Response:* The Council stands by the run size estimates established in the 1987 Columbia River Basin Fish and Wildlife Program. See also Appendix D, Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin, for a discussion of losses and data on other contributing factors to salmon and steelhead losses.

### **Costs**

**Generally.** *Comments.* Note that the Northwest has the least expensive electric power in the country. This section should be balanced with a discussion of foregone fish production resulting from the hydropower system. The hydropower system does not own the river, and it is inappropriate to consider foregone power generation revenues.

*Response:* The Northwest enjoys low-cost electricity from the federal dams. See, for example, the hydropower discussion that begins on Page 128 of Appendix

D to the 1987 fish and wildlife program, the losses statement. The program's discussion of cost (p. 14) was aimed primarily at the Northwest Power Act's requirement that the fish and wildlife program assure the region an "economical" power supply, and for that reason the discussion is limited to possible rate implications. Foregone power revenues are relevant to that subject. The adopted amendments are expected to result in a 4% increase in wholesale power rates and a 2% increase in retail power rates.

**Cost-sharing. Comments.** It is critical that electric power ratepayers not be asked to fund salmon recovery alone; there are many causes of the salmon's decline, and many should share the cost of recovery, including taxpayers. The Endangered Species Act is a national law, and federal funding should pay some of the recovery cost. As a practical matter, the states cannot staff or fund all the activities the program calls for. The power system's damage to salmon and steelhead has not been fully mitigated, and Bonneville should be the major and primary funding source. What criteria were used to determine what costs Bonneville should pay? The Council should work with the states and Bonneville to clarify what which activities undertaken by the states will be funded by Bonneville.

**Response:** The Council agrees that cost-sharing is important. On Page 88, the program says:

Regionalizing costs should not, however, mean simply turning to Bonneville as the region's 'deep pocket' for meeting mitigation needs. Such an approach would be neither sufficient to the region's needs nor equitable to Bonneville's customers. The states have the means of absorbing some costs, and other mechanisms must be found or devised. ... In devising mitigation strategies, federal agencies should be assigned an appropriate share of the responsibilities and costs.

The Council recognizes that all parties face severe funding constraints, and has committed to work with Bonneville and other regional interests to address cost-sharing issues in greater detail. Throughout the amendment process, the Council has worked with Bonneville and other agencies to formulate a comprehensive recovery effort. Generally, the Council calls on Bonneville to pay for measures directed to the effects of federal hydropower facilities. In some cases these costs will be borne by the Corps or other federal agencies. Bonneville has in some cases expressed an interest in funding particular activities. In other cases, Bonneville-funded measures do not address *all* the effects of the federal hydropower facilities, and the Council believes it appropriate for Bonneville to fund other mitigation measures as off-site enhancement (16 USC 839b(h)(8)(A)). The Council's preliminary review shows that in 1992, Bonneville will fund a little more than half the out-of-pocket expenses of phases 1, 2 and 3.

## **FRAMEWORK**

### **Generally.**

*Comments.* In general, commenters endorsed the framework concept, but maintained that there was not enough time in the amendment process to scrutinize the Council's analysis, to incorporate analysis that is still being developed, or to agree on the potential impacts of particular measures. Because of this, many commenters urged the Council to defer adoption of several framework elements. Commenters also raised questions about the meaning of terms, such as the Council's proposed "biological objectives," and their implications for cost-effectiveness analysis.

*Response:* The Council proposed a program framework, with goals, objectives, rebuilding schedules and performance standards. The framework proposed to provide direction for the salmon rebuilding effort and to enable a surer system for monitoring and evaluation. Program goals provide the broadest sense of direction. As proposed, biological objectives would have identified the biological changes needed at each stage of the salmon life cycle; rebuilding schedules would provide time expectations for rebuilding; and performance standards would be measureable, providing concrete indications whether an intended effect is occurring.

The framework is based on policy judgments checked by analysis using computer models. While modelling analysis must be interpreted cautiously, such analysis can give decision-makers a sense of the feasibility of achieving given policy objectives. The process of developing the framework is thus intended to be an iterative process of judgment and analysis, followed later by monitoring and evaluation of actual results.

In deference to commenters' concerns, the Council deferred action on several of the framework elements, to allow further analysis and consultation. The significance of this deferral should not be misunderstood, however. The framework is a critical element in the Council's program, providing long-term guideposts for the rebuilding effort, and structure to the Council's implementation of "adaptive management" monitoring and evaluation. The framework concept should continue to guide the parties' efforts to develop rebuilding plans. Notwithstanding the deferral of framework elements, all of the steps that should be taken to begin the rebuilding process remain in the program. Some of these concrete steps, especially regional initiatives such as drawdown demonstration and evaluation, may affect the Council's judgments on long-term framework elements. However, the reverse is not true: apart from the framework itself, *none* of the measures in the program are delayed pending further development of the deferral of framework elements.



The Council proposes to use the "survival target" label instead of "biological objective" to avoid the implication that this concept will rigidly drive cost-effectiveness analysis. Further definitional issues can be addressed in the course of developing the remaining framework elements.

### **Goals.**

**Generally. Comments.** Commenters offered a wide and sometimes divergent range of possible goals and objectives: The ultimate goal should be full mitigation and compensation for the hydro system's impacts, and restoration of productive fisheries. Two biological objectives should be recognized within the goal: increasing numbers of fish and protecting biological diversity, with stock-specific targets for each objective. Two "implementation objectives" should be included: 1) address the general lack of resource information; and 2) system-level cost-effectiveness. Two further sub-goals should be recognized: 1) to improve survival at and between dams, and 2) to provide flows for successful spawning, rearing and migration. The program should set general goals and leave implementers flexibility to identify appropriate measures.

The goal, rebuilding schedules and biological objectives should recognize the need to change management practices to ensure ecologically balanced management of activities affecting the salmon life cycle. Otherwise, losses of biological diversity due to imbalances in production are compounded by imbalances in harvest. Discussion of the proposed goal should recognize the problems created by loss of riparian and wetland habitat and use of hatcheries to enhance production without regard to consequences for mixed-stock fisheries.

If the Council's goals are to be achieved, it needs to undertake a comprehensive review of the long-term impacts of hydropower development on the river and the estuary, and the complex ecological response to these impacts.

*Response:* The goal is intended to provide the broadest statement of the program's direction. Many of the concerns expressed by commenters (reflected in the goals, objectives, and subobjectives suggested by commenters) are addressed in specific elements of the program framework that remain to be fleshed out.

The Council agrees that ecologically balanced river management is needed. The framework development process is intended to lead to better understandings of how such management may be achieved. The Council also agrees that better understandings of the ecological impacts of hydropower and other development are needed, and has called for an evaluation of the carrying capacity of the Columbia River ecosystem, which should reach many of the broader questions commenters have mentioned. In addition, the Council seeks to focus research on the most pressing questions that face the rebuilding effort: the relationship between flow, travel-time and fish survival (section 3.6F.1-6), effects of salmon

and steelhead measures on resident fish and wildlife (section 3.6F.11-12), stock identification for harvest (section 5.4), baseline information on wild and natural populations (6.2A.3-5), and systemwide impacts of production activities (section 6.2E). Finally, the Council has asked an independent scientific group to develop a list of key uncertainties that the region must address both through evaluation and monitoring of program measures, and research (section 7.2C).

**Doubling and biological diversity.** *Comments.* The doubling goal is appropriate, although we (fishery managers) recognize the importance of maintaining biological diversity and that some additional definition of the doubling goal may be required. Goals should include a level of escapement and harvest desired by fishery managers, restoration of an historic productivity level, and a timeline for rebuilding.

The doubling goal is arbitrary and provides no meaningful way to measure progress, particularly in light of concerns over weak stocks. We need steady and sustained increases of each species. The goal should not be to double, but to restore viable populations; some populations may require much more or much less than doubling.

The doubling goal is objectionable because it appears to give priority to numbers over biology, is conditioned on an undefined notion of practicability, and addresses only diversity *among* populations, not *within* populations, contrary to the advice of the Council's genetics team. Pursuing the doubling goal is the opposite of what is needed. Doubling would require substantial production increases through massive artificial production or supplementation, weakening wild stocks and putting unsustainable harvest pressures on them.

There is potential for conflict between the doubling goal and the requirements of the Endangered Species Act. The ESA conservation goal is the primary goal, and the Northwest Power Act is narrower: to address hydrosystem impacts. Doubling must not be at the expense of biological diversity, which is needed to sustain any increases and is required by the ESA. Maintaining genetic resources with no avoidable or irreversible losses of genetic diversity resulting from management must take precedence over increases in run sizes. Remove the "practicability" qualification to the mandate to protect biological diversity. In a literal sense, "no loss of biological diversity" is impossible; clarify that this goal calls for minimization of such loss, and applies to genetically distinct stocks, consistent with the Endangered Species Act. Concern should not be limited to stocks listed under the Endangered Species Act. The program should lead to the recovery of listed stocks, but also obviate the need for additional listings.

Doubling should be a long-term goal without a target date, so that appropriate emphasis can be focused on weak stocks. A target date for reaching

the doubling goal is appropriate as long as the Council recognizes technological, economic and legal constraints. Clarify that doubling is an interim goal.

A biological diversity goal is helpful if it calls for restoring and preserving diverse ecosystems for diverse species and populations; otherwise it is too abstract. Biological diversity is an appropriate concern, but weak-stock harvest management should not be the sole tool for achieving it. The focus should also be on habitat protection and supplementation. The definition of biological diversity should not be confined to anadromous fish.

The specific information contained in the "biological diversity baseline" and the difference between it and the "population monitoring" indicator lists are unclear. The biological diversity baseline needs clarification; biological diversity should mean more than just preserving a baseline.

*Response:* The Council adopted six principles intended specifically to address these comments, and to reflect the Council's sense of priority between weak-stock conservation concerns and doubling concerns. Consistent with these principles, the Council deleted the target date for doubling. Concerns over the content of the biological diversity baseline and indicator stocks may be addressed both in implementation and in developing the program framework. The Council agrees that we must more than double some stocks; doubling provides an overall sense of the magnitude of the program's interim goal, not a stock-specific objective. The Council adopted management objectives and interim rebuilding targets for Snake River chinook salmon that go well beyond doubling.

**Role of the integrated system plan.** *Comments.* Amend the CBFWA's Integrated System Plan into the Council's fish and wildlife program, and tie goals, rebuilding schedules, and biological objectives to it. The Integrated System Plan represents the "existing and future activities" of the fish and wildlife agencies and Indian tribes, which the Council is bound to complement. We support implementation of the integrated system plan, but there are National Environmental Policy Act, Endangered Species Act and other hoops to jump through before individual projects can be implemented (NMFS).

The integrated system plan also has not been subject to notice and comment under the Administrative Procedures Act. Many of our prior comments on the integrated system plan have not been accounted for. It is inappropriate to consider adopting the integrated system plan in this process. The system plan is seriously flawed; it probably conflicts with the ESA, and there are less costly and more effective alternatives.

Before adopting the integrated system plan, consider areas in which it is inconsistent with the genetic diversity goal and the Endangered Species Act. The system plan was focused on doubling to meet U.S. v. Oregon harvest objectives,

and is insensitive to impacts to wild stocks. Of 45 potential wild stocks in the Snake Basin, the system plan proposes to convert 19 to hatchery-based production. The proposed program's focus on biological diversity requires more information on the genetic risk of proposed measures and puts more importance on system-level integration. Use the integrated system plan as a resource document; it and the subbasin plans are a useful compilation of information and list of alternatives. Winnow the Integrated System Plan to measures that provide immediate benefits to weak wild stocks that are consistent with genetic conservation and a "no harm to wild stocks" standard.

*Response:* The Council calls for the Integrated System Plan and the subbasin plans to be used as resource documents in identifying production and habitat measures. The Council did not propose to adopt the System Plan *per se* for several reasons. The System Plan was developed in significant part to accomplish the objectives of the Columbia River Fisheries Management Plan. Endangered Species Act listings have significantly changed the context of salmon rebuilding since the Columbia River Fisheries Management Plan was developed. With the ESA listings, it is clear that rebuilding must put much greater emphasis on weak, naturally-spawning populations, and conserving biological diversity. We do not see this new emphasis as wholly inconsistent with meeting harvest objectives. The Council aims to rebuild runs to levels that can sustain harvest. However, this rebuilding must begin with weak, naturally-spawning stocks, and with fish production projects that pose no appreciable risk to these stocks. In developing framework elements, and in the subregional process, the fish and wildlife agencies, Indian tribes and others can examine the system and subbasin plans in light of these priorities and adapt them to the framework format shown in Appendix A. The Council's intention is that this process should build on the subbasin and system plans, and not duplicate or ignore that work. The Council believes this is a productive way to complement the activities of the agencies and tribes and continually update the system plan.

### **Management objectives for Snake River populations.**

*Comments.* These targets are too modest and too slow; they will not reverse the decline of Snake River populations. Indeed, changed intertie or non-treaty storage operations could erase the benefits of the phase 2 flow augmentation measures.

The rebuilding targets for spring and summer chinook represent model outputs, not management intent. The management goal for spring and summer chinook should be to rebuild as rapidly as possible to productive, fishable levels. If a specific level is necessary, 70,000 and 35,000 fish, respectively, are appropriate targets. Clarify that these are not upper limits.

We (Oregon Fish and Wildlife) support interim rebuilding targets of 40,000 spring and 14,700 summer natural chinook spawners, which is consistent with the Columbia River Management Plan and the integrated system plan.

Adopt a .8% smolt-to-adult return ratio, sufficient to sustain productive commercial and sport fisheries.

We are extremely concerned that a rebuilding target of 40,000 adults will damage listed stocks. This would require a four to five-fold increase in production, which implies supplementation. In addition, we are unclear how such a target can be reached consistent with U.S. v. Oregon, whose escapement objective is 25,000. Idaho's 70,000 target would require significantly higher production, and compound these concerns. Both 40,000 and 70,000 appear too high.

The Endangered Species Act process does not distinguish between spring and summer chinook as species; it is not clear why the Council does.

Reconsider the rebuilding schedules and biological objectives for fall chinook. The rebuilding target of 1,000 adults is probably not sufficient to constitute recovery under the Endangered Species Act. Set the rebuilding target based on carrying capacity of the habitat.

Avoid implying that mixed-stock fisheries will be permitted below Idaho, but that Idaho will be limited to tributary fishing. Instead, call for "carefully regulated" fisheries above and below Lower Granite.

*Response:* The Council adopted interim management objectives of 50,000 adult spring chinook, 20,000 summer chinook, and 1,000 fall chinook, until further decisions are made on intermediate-term measures. Based on the Council's modelling analysis, these numbers appear to be ambitious but achievable if immediate and intermediate-term measures are successfully implemented. In the case of spring and fall chinook, these numbers approximate run sizes (in adult equivalents) that existed before the sharp decline of 1979. In the Council's judgment, this is an appropriate interim objective.

The Council's analysis of the effect of phase 2 measures (see "How Survival Will Be Affected," Phase 2 Amendments, pp. 8-9 (December 11, 1991) shows that the immediate phase 2 measures will stabilize some stocks and not others. More recent analysis of the effect of immediate and intermediate-term measures shows that weak populations should rebuild if these measures are successfully implemented. The Council is concerned that changed system operations (such as intertie or non-treaty storage operations) could undermine the program's measures to reduce mainstem juvenile mortalities, and has called for continuing

evaluation of alternative system operations (sections 3.2 and 3.6D) to help ensure that this does not occur.

The Council made an explicit judgment to distinguish between spring and summer chinook, notwithstanding the Endangered Species Act process. The ESA process is concerned only with species and subpopulations that are recognized by that law. The Council is concerned with maintaining biological diversity in a broader sense.

The fall chinook objective may be adjusted if experience teaches that bigger increases are feasible and advisable; at this point, 1,000 adults is about as much as can reasonably be expected. Whether 1,000 fall chinook is sufficient for delisting is for NMFS to judge.

The proposed .8 smolt-to-adult-return ratio (SAR) was based on modelling of supposed conditions that once produced 70,000 adults. The Council did not adopt this proposal for several reasons. In the analysis supporting the .8 SAR, it was not clear that .8 accurately estimated the SAR that produced 70,000 adults, or what SAR was associated with the conditions that produced 70,000. Moreover, the analysis was premised on 300,000 cubic-feet-per-second flows in the lower Columbia River. While flows of that scale are achievable in better-than-average water years, achieving them in the lowest water years is highly problematic.

The six principles the Council added to the goal section address concerns that this level of rebuilding would damage weak stocks. The Council is concerned that there may be important subpopulations within the spring and summer chinook populations that require special attention, and has called for monitoring to ensure that these populations are not deteriorating. The Council recognizes that the potential conflict between the Council's rebuilding target and U.S. v. Oregon escapement goals must be addressed by the U.S. v. Oregon parties.

The Council changed the characterization of Idaho fisheries.

### **Development of performance standards.**

*Comments.* Performance standards should, as much as possible, refer to biological survival.

*Response:* The Council agrees, and modified the program to call for performance standards to relate to actual biological results whenever feasible. In doing so, the Council intends to encourage all parties to explicitly explain the link between performance standards and biological outcomes. The Council recognizes that survival is difficult to measure, however, and does not intend to foreclose performance standards that can be reasonably linked to survival, based on knowledge that is sometimes imperfect or unsatisfactory.

## **MAINSTEM FLOW, VELOCITY AND TEMPERATURE IMPROVEMENTS**

### **Generally**

*Comments.* The phase 2 measures are not enough. Any gains from these measures are likely to be nullified by other changes in system operations, such as Intertie and Non-Treaty storage operations. Moreover, model analyses may underestimate the severity of the declines. Adopt the CBFWA flow proposal as a goal, and implement drawdowns of all Snake and Columbia River pools. Bonneville's 1992 Biological Assessment shows that a sliding-scale flow regime can be implemented immediately; for the longer term, pursue reservoir drawdowns aggressively. Adopt a firm travel-time objective and phase out transportation. Drawdown the lower Snake and John Day pools, and provide more flow augmentation in the Columbia. Include all measures in firm planning.

We have reexamined our earlier statement that CBFWA flow objectives can be met in all 50 years by operating the four lower Snake projects at spillway crest and the lower Columbia projects at minimum operating pool. In fact, CBFWA objectives would be achieved in 48 or 50 years (96%) at Lower Granite and 29 of 50 years at The Dalles (58%) (Corps).

The Council has not called for an adequate contribution to flows from the Bureau of Reclamation projects and the Idaho Power Company in the Snake River, or in the Mid-Columbia area. Many Mid-Columbia stocks are in trouble, and you have an obligation to try to rebuild them before Endangered Species Act petitions are necessary.

Reexamine the cost-effectiveness of phase two mainstem passage measures. The only available data show that these measures are not cost-effective.

Describe how measures in this section contribute to the biological objectives in the framework section.

We do not support the long-term measures because they go beyond what is biologically needed. Significant changes have been made in river operations to help salmon. Experience in 1992 showed that phase 2 measures provide excellent passage even in drought conditions (PNUCC).

Do not wait for the SOR. The program should be the preferred alternative in NEPA analysis.

*Response:* The Northwest Power Act requires flows of sufficient quantity to improve production, migration and survival of salmon and steelhead. The Council found that the immediate mainstem flow measures in the program would improve

migration and survival (see Phase 2 Response to Comments p. 33). The Council adopted a sliding-scale flow program that reflects the Council's evaluation of constraints on flow augmentation in the Columbia system. See Phase 2 Response to Comments, p. 51. However, the Council agrees that the phase 2 immediate measures are not enough, and has called for expedited exploration of intermediate-term measures, including reservoir drawdowns, additional water from Bureau of Reclamation projects and the Idaho Power Company in the Snake River, more efficient water use, new storage projects, and alternative power system operations that could increase flows for salmon (including Mid-Columbia populations). See Phase 2 Response to Comments, pp. 32-34.

The Council did not adopt a travel-time objective for several reasons. The biological objectives the Council proposed were expressed in terms of survival improvements, because improving fish survival is the most important biological objective. However, survival objectives are difficult to measure; in the short-term, they can be impossible to measure. Because of this, the Council proposed various performance standards--factors that are measureable in the short-term and can be reasonably linked to survival. Performance standards are, in this sense, short-term indicators of survival improvements. Travel-time may be an appropriate performance standard but not, in this frame of reference, as a biological objective or survival target. Travel-time is not important *per se*, but only insofar as it improves fish survival.

The relation between travel time and survival remains a subject of heated debate (see pp. 22-23, below). The Council decided not to adopt performance standards in a number of areas, where it appeared that there was a need for further analysis and comment. As the Council said in the Phase 2 Response to Comments:

The value of objectives such as shorter travel times depends very much on the means that are chosen to achieve the objective. Means that increase nitrogen supersaturation may constitute a step backward, unless the problem can readily be corrected. The Council seeks to reduce travel time, and has called for an ambitious set of actions to accomplish this goal. The Council also calls for evaluations to determine how to do so in ways that increase fish survival rather than decrease it. Phase 2 Response to Comments, p. 36.

In the course of the coming year, the Council will review the flow-travel time-survival relationship, further work will be done to develop framework elements, and the feasibility, cost and biological effectiveness of a range of measures to reduce travel time will be explored. With this information, the Council expects to come to more definitive judgments about the role travel-time reductions may play, and to tie mainstem measures more closely to the program framework.



The Council cannot adopt the CBFWA proposal *per se*, for reasons outlined in the Phase 2 Response to Comments, pp. 34-35 and Appendix V, p. 3. Whether it is feasible to achieve velocities comparable to those that would be provided by the CBFWA flow plan, and do so in a biologically sound manner, will be evaluated in connection with the intermediate term measures. Since phase 2, the Corps submitted information indicating that drawing down the Lower Snake reservoirs significantly could achieve CBFWA flow objectives in most water years, but that drawing down the Columbia River reservoirs would not achieve CBFWA flow objectives in below average and low water years, when the need is greatest.

The Council finds that the flow measures adopted in phase two are cost-effective. These measures are not supplanting other, less costly ways to improve mainstem survival. The Council's analysis shows that mainstem mortalities are too high, even combining flow measures with other less costly measures. See Phase 2 Response to Comments, pp. 33-34 and *supra*, p. 3.

The Council did not require the phase 2 flow measures to be introduced into firm planning, but allowed the power system flexibility to use operational flexibilities to satisfy fish needs. This does not imply, however, that the Council expects that the amounts of water the program calls for are discretionary. See Phase 2 Response to Comments, pp. 53, 56.

The Council has called for an evaluation of the biological impacts of drawdowns, and expects to review that information carefully before making decisions on reservoir drawdowns.

The SOR process is evaluating certain system-level issues in connection with a National Environmental Policy Act analysis. Rather than duplicating that work, the Council sees value in relying on it to the extent the SOR's schedule and resources permit.

### **Relationship between flow, travel time and fish survival.**

*Comments.* Little progress has been made in evaluating relationships between flow or travel time and fish survival. Evaluation is needed. However, in conducting tests, care should be taken not to use test fish from a weak fish population. Your view of flow/travel-time relationships ignores the bulk of the empirical evidence, while you base your view of transportation on a single, poor data point. The effects of mainstem hydro operations go beyond velocity and temperature, and affect mainstem and estuary habitat in complex ways. Evaluate these matters comprehensively. Failure to do so will continue to present substantial genetic risks to salmon.

*Response:* The Council acknowledges that the region needs a much better understanding of the relationship between flow, travel time and salmon survival,

as well as the merits of smolt transportation, and an evaluation of mainstem, estuary and near-ocean carrying capacity. The program's provisions for evaluating these relationships were significantly strengthened. The Council agrees that care should be taken not to use test fish from a weak fish population. The Council remains open to suggestions for a more comprehensive evaluation of mainstem mortality. See also discussion in connection with Appendix E, below.

### **Spill and summer flow.**

*Comments.* Increased spill and summer flow called for in the NMFS biological opinion should be a base from which future operations should build. Our review of the research leads us to conclude that flows help summer migrants. We would hope not to have to choose between summer flows and temperature control for adult fall chinook, but if a choice is necessary, we would opt for summer flows. We believe there is a more significant relationship between flow and travel time and are less certain that temperature control will help adults (NMFS).

The phase 2 measures represent a regional consensus that the Council should respect. There is no scientific justification for summer flows. Measures required to avoid jeopardy may change through ESA consultations, but if the Council adopts those measures, it limits the on-going flexibility of the consultation process. The Council should not expect to amend the program every time NMFS issues or changes a biological opinion. The spill memorandum of agreement has provision for changes. There are several reasons not to incorporate NMFS measures into the program: the spill measure is based on fish passage efficiency rather than survival, we do not support the efficiency criteria, and spill benefits and side effects (gas supersaturation) require more evaluation.

*Response:* While the Council does not take issue with NMFS's spill and summer flow provisions, the Council concluded that no purpose would be served by amending the program with each biological opinion. In the Council's opinion, the benefits of summer flow for juvenile migrants are less clear than the benefits of spring flow. The Council called for water to be provided both for the summer juvenile migration and for summer temperature control for adults. However, recognizing that the Snake is a water-constrained system, it may be necessary to make choices between using water for all these purposes. The Council called for the Fish Operations Executive Committee to address trade-offs between summer flows and temperature control water, in consultation with NMFS.

### **River Operations**

*Comments.* The Fish Oversight Executive Committee is useful in facilitating discussion and resolving disputes, but it is only advisory.

We are concerned that the FOEC cannot respond to real-time salmon needs. We strongly oppose the FOEC: 1) operational flexibility has failed in the past; 2) the Council should not limit the committee's membership to hydro system operations; 3) the FOEC undercuts the role of the Fish Passage Center; and 4) the committee excludes public participation.

Expand the FOEC to cover Willamette River operations, coordinated with the State Water Resources Department.

Consider expanding the FOEC to include Washington Water Power.

*Response:* The FOEC is advisory in the sense that it cannot bind its members or the Council. Whether the committee can respond to the real-time needs of salmon remains to be seen. Part of the rationale for not expanding the committee more broadly, or including more public involvement mechanisms, is that the real-time needs of salmon often cannot wait for public comment. Nonetheless, the Council believes the committee can supply a needed forum for policy-level discussion of issues that concern both fishery and power system interests. The committee, which includes members from fish and wildlife agencies and tribes, is intended to supplement the management actions of the Fish Passage Center, whose flow and spill requests in the past were sometimes plagued by disputes for which there was no established dispute-resolution mechanism.

The Council considered expanding the FOEC to cover Willamette River operations, but believes that further discussion of this idea is needed before any conclusion is drawn. Phase 4 of the amendment process could provide the opportunity for further consideration.

The Council did not specify the FOEC membership in the program amendments.

### **Snake River spring operations**

**Alternative regimes.** *Comments.* We recommend operating Snake and Columbia projects at minimum operating pool for spring migrants, at spillway crest (with spill) for summer migrants, and with phase 2 reservoir volumes (CRITFC). Do not refill Snake reservoirs until the end of October, to avoid creating problems for adult fall chinook.

An interim flow regime should be based on a sliding scale, e.g., when less than 15 MAF is forecast, achieve at least 85 kcfs; 15-23 MAF, achieve at least 100 kcfs; >23 MAF, provide at least 120 kcfs.

Aiming for 85,000 cfs is a barging strategy. Make clear that this approach is opposed by all tribes, fish and wildlife agencies, and citizen salmon advocacy organizations.

*Response:* The Council's Snake River Drawdown Committee is evaluating a variety of drawdown scenarios. Interim reports are expected by the end of 1992. At this point, the Council does not have enough information about how the suggested scenario compares to other scenarios to make an intelligent judgment. Regarding proposals for a sliding-scale flow program, see Phase 2 Response to Comments, p. 51. The argument over the merits of an 85,000 cfs target is at this point academic. As the Council has pointed out, few would disagree that a natural river would be better for salmon. See Phase 2 Response to Comments, p. 15. Until we identify much-improved ways to manage the river, however, the Snake River system cannot even come close to the 85,000 cfs flow level in poor water years. For the Council's view of the 85,000 cfs standard, see Phase 2 Response to Comments, p. 34. It bears repeating that the standard is *at least* 85,000 cfs.

**Dworshak operations. Comments.** These operations would result in less than desirable water releases in some years (those having greater than 16 million acre feet forecast). For 1992 operations, we adopted a modified fish flow plan that reflected both Council and Corps studies (Corps).

*Response:* Although the Council chose not to amend the program at this time, it recognizes the modifications the Corps proposes as logical. These modifications may be discussed further in the Fish Operations Executive Committee, and before the Council.

**Brownlee operations. Comments.** It is inconsistent to limit operations to protect resident fish in Brownlee, but not in Dworshak. Our experience with phase two is that Council measures lead to requests for expedited action on our part. We will make every effort to do so. However, because of our obligations under the National Environmental Policy Act and the Endangered Species Act, we may not be able to act as quickly as the schedule calls for (FERC).

*Response:* The Council has called for evaluations of resident fish impacts at both projects. The Council recognizes that the program amendments impose extraordinary burdens on the federal agencies and others, but believes that extraordinary efforts are justified.

**Snake River fall chinook. Comments.** Water temperature work should continue and Bonneville funding should be provided if needed to integrate research efforts in a program that includes physical and biological monitoring, and is coordinated with adult research. NMFS's priority on summer flows should not preclude enhancement efforts in August and September. Brownlee water did

appear to increase the efficiency of cool water releases from Dworshak, and could be an integral part of late summer temperature control (BPA).

*Response:* The Council calls for conflicts between temperature control operations and releases for summer flows to be resolved by the Fish Operations Executive Committee annually in consultation with the National Marine Fisheries Service. The Council did not change the provision calling for water from Brownlee to assist with temperature control.

### **Columbia River spring operations**

*Comments.* Operate lower Columbia projects at minimum operating pool as follows: Bonneville (March 15-Nov. 30); The Dalles (April 1-Nov. 15); John Day (April 15-Nov. 30); McNary (April 1-Nov. 30). During spring and summer migrations, weekend flows should not drop below 90% of the preceding 5-day average. Use a sliding scale approach: provide at least 200 kcfs when less than 80 MAF runoff is forecast, at least 220 kcfs when runoff 80-100 MAF is forecast, and at least 250 kcfs when more than 100 MAF run-off is forecast.

Clarify whether the John Day reservoir drawdown section means 1) most or 2) all irrigation pumps should be operative.

*Response:* The Council adopted a sliding-scale flow program that reflects the Council's evaluation of constraints on flow augmentation in the Columbia system. See Phase 2 Response to Comments, p. 51. The short-term program for drawing down John Day pool calls for the reservoir to be drawn down to its minimum irrigation pool, such that all irrigation pumps will be operative. For the longer term, the Council anticipates developing an alternative that permits continued irrigation.

### **Snake River reservoir drawdown**

**Further evaluation.** *Comments.* The Council should be commended for its aggressive approach to drawdowns. Concerns over gas supersaturation should be measured in light of the fact that spill generally is considered to be better for fish than other methods of in-river passage. These concerns and concerns over adult ladders can be managed.

This is a study plan; the only way to find answers to the questions posed by drawdowns is to implement drawdown with prototype modifications at one dam. Additional tests to provide biological information are important. Analyze the effects of drawdown options on all life history stages for all anadromous stocks. Evaluation must be based on field experience, not just models.

We support evaluation of drawdown as one of a variety of techniques, but it is premature to consider it a viable option absent biological information, well-defined operating parameters, and a cost assessment (BPA).

Take drawdowns out of the program and put them back in only if they are shown to deliver the promised benefits. What little is known about drawdowns suggests that they are biologically unsound--due to loss of transportation capability, impacts to resident fish, loss of wetlands, etc.

Reinitiate rulemaking if decision makers conclude that drawdown or an additional million acre-feet of water from the Snake River Basin are infeasible.

*Response:* The Council left the phase 2 drawdown measures unchanged, in the belief that the region needs to take aggressive steps to improve juvenile fish survival in the mainstem. The drawdown evaluations are identifying potential drawdown scenarios and ways to test biological, physical and economic effects. It may be that prototype or other evaluation at one project will prove the best way to evaluate these questions, and the program allows for such judgments. Until evaluation clarifies these questions, the Council makes no judgment on the biological merits of drawdowns. If drawdown or other intermediate-term measures are judged infeasible, it is likely that further amendment proceedings would be initiated.

**Decision rule. Comments.** Calling for drawdowns unless they are shown to be structurally or economically infeasible, biologically imprudent, or inconsistent with the Northwest Power Act is an attempt to reverse the burden of proof contained in the Act. In addition to demonstrated biological value, of which there has been no showing, drawdown must be shown to be the least costly way to improve survival.

*Response:* The program provides that any drawdown decision must be consistent with the Northwest Power Act, including the requirement that program measures be the least costly way to achieve a sound biological objective.

**Costs and impacts. Comments.** Recent evaluations of drawdown costs have understated costs, overstated benefits, and made various analytical errors. The Corps noted that costs are at this point highly uncertain.

A report of the NMFS economics committee shows that a two-month drawdown of the Lower Snake project reservoirs would be economically feasible and less expensive than the Council's phase 2 flow measures (SCLDF, Reading). Our consultant (Olsen) demonstrates that reservoir drawdowns and flow augmentation are the least cost-effective ways to help juvenile migrants (NIU, et al.).

It is important to explore options that insure the economic vitality of the Lewiston-Clarkston area. Reducing river transportation for grain will cause train transportation rates to rise. We are concerned about impacts to international trade, and deep-draft, ocean-going vessels in the lower river. Explore alternatives to drawdown, such as transportation.

Losses of energy and capacity can be compensated for through purchases or acquisitions, but it is much harder to compensate for lost system flexibility (i.e., the ability to respond to instantaneous changes in demand).

*Response:* The Council believes that feasibility, cost-effectiveness and economic impacts of reservoir drawdowns will be best evaluated when it is known how long a drawdown should be, what facilities must be reconfigured, what the operational implications might be, etc.. The evaluation process in the program should facilitate such evaluations. See also Response to Comments on System Analysis Model Study.

Notwithstanding the cost-effectiveness claims of both sides, no party has offered measures that accomplish the region's rebuilding goals and obviate the need for flow augmentation or reservoir drawdowns. Even if drawdowns would be less costly and more effective than phase 2 flow augmentation measures, drawdowns still cannot be implemented for some years. In the interim, flow augmentation, transportation, predator control and less drastic drawdowns are the only tools the region has to address reservoir mortality problems. On the other hand, even assuming that transportation and predator control are more effective and less costly than reservoir drawdowns and flow augmentation, there is no evidence that transportation and predator control can provide enough protection for juvenile salmon to accomplish the region's rebuilding goals.

**Schedule. Comments.** Implementation in 1995 is not a realistic possibility. Drawdown is extremely complex. Based on the alternatives that are being reviewed, implementation almost certainly will not be possible in 1995. Replace the 1995 date with "as soon as practicable."

*Response:* The evaluation process in the program should enable the Council, with help from the drawdown committee, to establish an alternative implementation schedule, if one is needed.

#### **Additional measures to increase survival.**

**Generally. Comments.** This section should either document the expected biological benefits of these measures (lowering the John Day pool), developing additional storage, and augmenting flow, or establish time frames that allow research, monitoring and evaluation before implementation. Planning,

engineering, hydrologic and economic analysis could proceed as biological analysis does.

*Response:* In all cases, the Council has called for further evaluation of the biological merits of these measures before final implementation decisions are made. The Council reinforced the requirement for a biological evaluation of John Day drawdown, and expanded program measures calling for evaluation of flow-travel time and survival relationships.

**John Day drawdown.** *Comments.* There is no credible evidence that the John Day drawdown will help fish, given current flow augmentation, and there is evidence of dewatering of wetlands, wildlife refuges and wells. Moreover, this would eliminate important system flexibility and load-following capability, contrary to the Northwest Power Act.

*Response:* On the efficacy of John Day drawdown, see Phase 2 Response to Comments, p. 53. In the phase 3 amendments, the Council reinforced the requirement of a biological evaluation of this measure, including an evaluation of impacts to wildlife refuges, wetlands, and other environmental values.

**Energy exchanges.** *Comments.* Additional energy exchanges and operational changes could impose significant costs on non-federal parties to the coordinated system who cannot easily offset them.

*Response:* This concern may be addressed in the course of evaluating alternative power system operations, including exchanges.

**Flood control.** *Comments.* Consider calling for an evaluation of separate system and local flood control requirements in upper basin projects.

*Response:* The Council amended the program consistent with this comment.

**Research.** *Comments.* Clarify that studies of resident fish effects "around" projects includes areas downstream of reservoirs, and call for particular attention to measures that may help both resident fish and salmon and steelhead (e.g., spring flows that help sturgeon and salmon).

*Response:* The program measure is intended to call for a sufficiently broad evaluation to enable the Council and others to evaluate the impacts of salmon and steelhead flow programs on resident fish and wildlife species. Although the Council anticipates that most of these effects will occur in proximity to reservoirs, the measure is drafted broadly enough to go beyond this proximity if there is a reasonable basis for anticipating broader impacts.



## **MAINSTEM SCREENS, PREDATION, AND TRANSPORTATION**

### **Bypass facilities at federal projects**

**Generally. Comments.** Screens must not only be operational, they must assure survival rates adequate to promote rebuilding. Provide a date by which the 98% bypass survival rate standard should be achieved.

**Response:** The Council agrees that screens must not only be installed, they must be effective. Improvements in bypass effectiveness cannot be guaranteed by any formula, however, and depend on the unique characteristics of each project. At this time, the Council has insufficient information to estimate a date by which adequate improvements and evaluations to achieve the specified survival rate can be attained.

**Passage efficiency standard. Comments.** Adopt an 80/70% passage efficiency standard. Adopt a fish survival objective, which is more realistic and consistent with the proposed biological objectives than fish passage efficiency. Fish passage efficiency does not equate to fish survival, which requires a more thorough review of passage routes. Fish passage efficiency standards would be satisfied by "efficient" bypass systems that kill more fish than they save, as has occurred with screens at Bonneville Dam's second powerhouse. Requiring 70/50% passage efficiency is ambiguous and may be contrary to the fish spill memorandum of agreement.

**Response:** See Phase 2 Response to Comments, p. 24.

**Bypass screen schedule. Comments.** We are testing prototype extended-length screens. It is hard to put a date on final completion, but it will likely be several years after 1998 (Corps). Until prototypes are tested, there is no point in adopting a schedule. The schedule is too slow; put more emphasis on this critical program.

The March 1994 date for Ice Harbor screens is very optimistic; the current plan is 1996. Change these dates to show screened turbine intakes and bypass through ice and trash sluiceway beginning March 1993, and physical completion of a low-velocity flume in March 1996.

Screens will help only if they are effective; adopt the bypass planning provisions of the spill memorandum of agreement to ensure adequate testing.

**Response:** The Council believes strongly that the extended-length screen program should proceed as quickly as prudently possible, and accordingly did not relax this schedule. The Council modified the Ice Harbor schedule in view of these comments. The Council agrees that screens must be effective. The fish spill

memorandum of agreement appears to provide an adequate way to evaluate this, and the Council anticipates continued implementation of the agreement. However, incorporating the relevant portions of the agreement into this program could make the agreement harder to change in light of experience, and so the Council sees no need at this time to incorporate the terms of the agreement.

**Corps passage facilities design.** *Comments.* Clarify that this measure applies to federal projects only.

*Response:* The Council agrees.

**Bonneville Dam passage.** *Comments.* Also rehabilitate turbine runners. At the first powerhouse, improve fish guidance efficiency and evaluate the survival of bypassed fish.

*Response:* The Council has modified the program accordingly.

**Spill agreement.** *Comments.* The spill agreement should be revised to reflect Endangered Species Act concerns. Adopt higher spill levels.

*Response:* See Phase 2 Response to Comments, p. 26.

**New bypass technologies.** *Comments.* Such a review has been completed; existing technologies should be evaluated, rather than pursuing new technologies (Corps).

*Response:* The Council appreciates that existing technologies appear most effective, based on what we know now. However, it is important to remain open to new ideas, and the Council has adopted a measure intended to ensure that promising new ideas and bypass technologies are not overlooked.

**Operating turbines within one percent of peak turbine efficiency.** *Comments:* Investigate ways to reduce fish mortality through alternative turbine operations, recognizing that bypass screens, transportation, spill and other passage measures have drawbacks. We recommend operating turbines within 1% of peak efficiency. Power demands are the only reason for not doing so. Also call for Bonneville to fund a Corps retrofit of aged Bonneville I turbine units.

The Corps of Engineers commented that it aims to operate within 1% of peak efficiency at all its projects in salmon and steelhead areas. The Corps also says that it is in the process of making modifications to each mainstem Snake and Columbia River project generator's automatic control system. These systems, which are expected to be completed by April 1993, will automatically ensure that operation of turbine units is within 1% of peak efficiency or, if not, Bonneville will provide justification why critical power system requirements could not be satisfied

any other way. The Corps reports that it has consulted with the fish and wildlife agencies and Indian tribes on these systems, and will incorporate these operational limits in the Corps' juvenile fish passage plan submitted annually to the Fish Operations Executive Committee.

The Mid-Columbia PUDs commented that they already strive to operate at the most efficient operating levels attainable within the constraints of river flow conditions. Operating at the most efficient level minimizes cavitation and rough operation, which results in the best passage conditions for fish and reduces maintenance costs for the turbines. There are other incentives as well: efficient operation is required by their FERC licenses and it increases the projects' output to the benefit of their ratepayers.

Although the Mid-Columbia PUDs recognize the value of operating at within 1% of peak efficiency, a major factor affecting turbine efficiencies is the operating head available for generation. During high flow periods, tailwater levels rise, which reduces the operating head available at the projects. As a consequence of the reduced operating head, the turbine efficiencies decline slightly. Although many of the turbine blades are adjustable so that they will have good efficiencies and minimal cavitation over a wide range of heads and flows, it is not possible to optimize generation and operate within 1% of peak efficiency during all periods, especially during periods of high flow.

It is possible to achieve efficiency within 1% of peak by limiting the amount of flow through the turbines during period of high flow. However, the reductions in generation would be large. For example, at the Wells Project, turbine flow would need to be restricted to about 120,000 cfs during periods where river flows approach 200,000 cfs. The remainder of the flow could not be used for generation. This would be equivalent to losing a resource in excess of 300 megawatts. Similar dramatic losses of capacity and generation would occur at the other Mid-Columbia projects. In addition, restricting the Mid-Columbia projects to operation at their peak turbine efficiencies would prevent these projects from participating in system load changes.

*Response:* The Council is satisfied that, as a general matter, hydropower operators operate turbines within 1% of peak efficiency, and that calling for such operations at all times, regardless of effects on the hydropower system, would do little for fish survival. The Council urged the Corps to expedite rehabilitation of old generating units at Bonneville Dam, first powerhouse (section 3.7B.5).

### **Nonfederal projects**

**Generally.** *Comments.* The Council has no authority to call on nonfederal project operators or their licensing agency to act. Timetables for some of these measures appear very optimistic.

**Response:** The Federal Energy Regulatory Commission makes final decisions on license conditions for nonfederal facilities. Each of the Mid-Columbia projects (Wells, Rocky Reach, Rock Island, Wanapum and Priest Rapids, operated by Douglas, Chelan and Grant County PUDs) is addressed either by FERC rulings or FERC-approved settlement agreements that regulate the installation of bypass facilities. Like other federal agencies that manage, regulate or operate hydropower facilities in the Columbia system, the Commission has obligations with respect to the Council's program. By addressing measures to project operators and to FERC, the Council intends to communicate clearly not just to FERC, but to affected parties. Timetables reflect the Council's sense that progress on these measures is urgent, given the number of weak stocks in the Columbia River system, but recognizing that regulatory decisions are FERC's to make.

**Rocky Reach. Comments.** Provide for a sluiceway at Rocky Reach.

**Response:** The Council calls for continued testing of a prototype screening and bypass system for the project. However, if the tested system is ineffective, the Council supports evaluation and design of an alternative bypass system, such as a sluiceway bypass system similar to those at The Dalles and Ice Harbor Dams.

**Priest Rapids. Comments.** The FERC administrative law judge's initial decision in the Priest Rapids proceeding calls for installation of bypass facilities and spill. It is inappropriate to try to set schedules at this time.

All existing data show that installation of bypass systems at Grant PUD's dams would increase fish mortality. Grant's transportation proposal would reduce mortality.

The FERC administrative law judge found transportation lacking in the recent Priest Rapids-Wanapum proceeding, and ordered bypass installation.

**Response:** The Council believes it is appropriate to state its own findings on an appropriate installation schedule, and has done so. The Council modified the measure to account for further discussion of the feasibility of these schedules. The Council saw no reason to second-guess the administrative law judge's preliminary decision.

**Leaburg project. Comments.** More work at Leaburg juvenile passage is needed. Existing bypass and cleaning systems need to be improved, and evaluation must determine whether acceptable juvenile survival can be achieved over the full range of project operating conditions. Bypass modifications should proceed regardless of the pool raise. The timetable for this measure appears very optimistic.

*Response:* The Council agrees and has modified the program accordingly.

**Walterville project.** *Comments.* EWEB should proceed now with a FERC license amendment process to enable rapid implementation of improvements, rather than waiting until late 1993. The timetable for this measure appears very optimistic. Accelerate schedule for the juvenile fish screen and the adult barrier, and actively seek FERC approval for completion by July, 1995.

*Response:* Based on consultations with affected parties, the Council calls on EWEB to design and install a screening and bypass system at Walterville project by November 1995. Moreover, if the project's relicense application is delayed, EWEB has assured the Council that prompt action will be taken to complete juvenile fish facilities on schedule.

### **Predation**

**Introduction.** *Comments.* Do not confine predation control to sport reward fisheries, commercial Indian harvest, and dam angling.

*Response:* The Council modified the program in view of this comment.

**Performance standard.** *Comments.* We wonder about the validity of a 25% standard. The standard should be *about* a 20% reduction *annually*.

*Response:* Because this is an experimental program, any performance standard is to some extent speculative. The 20/25% standards should be understood as hypotheses subject to proof or disproof through monitoring and evaluation. The standard is a sustained reduction of 20/25% from the existing population level.

**Predation associated with bypass.** *Comments.* Also evaluate release strategies to reduce predation on transported smolts. Evaluate the extent of predation throughout the system.

*Response:* In section 3.9.9, the Council called for improved release and dispersal strategies to minimize predation of transported fish. The program calls for an expanded Bonneville predation control program, an evaluation of predation in the Mid-Columbia area, and an evaluation of salmon interactions with marine mammals. The Council believes that this constitutes a relatively comprehensive approach to predation. Rather than calling for a broader evaluation, evaluation of the results of these programs should give the region a sense of how much can be accomplished with such programs.

### **Transportation**

**Generally. Comments.** The proposed amendments do not give sufficient consideration to the benefits of transportation. Transportation holds great promise. Remember that transportation improvements can be implemented relatively quickly, and benefit salmon in the short term. Call for full transportation in all water years, and accelerate transportation enhancements. We especially support evaluation of net-pen transportation, and urge a faster pace than is proposed in the amendments.

Transportation is appealing in theory, but in fact is an inadequate substitute for mainstem flow and velocity improvements. The FERC administrative law judge found transportation lacking in the recent Priest Rapids-Wanapum proceeding. Transportation should be used only where in-river measures fail. Transportation has not worked. However, if it is to continue, make improvements--sort by size and species, unload fish well below Bonneville Dam. Transportation helps only certain stocks, and is not successful in returning adults. Include a comprehensive review of the scientific record of transportation.

*Response:* See Phase 2 Response to Comments, p. 26. Transportation is an important tool, as evidenced by the fact that the fish and wildlife agencies, tribes and the Corps have called for maximum transportation in low water years. Improvements to transportation can be tried relatively soon, with the possibility of quick improvements in fish survival. For this reason, the Council puts a high priority on short-term transportation improvements. At the same time, the Council does not see an either/or choice between transportation and in-river measures. Even combining transportation with available in-river measures, mainstem survival rates are too low. The region needs more ways to reduce mortalities, not fewer.

**Transportation criterion. Comments.** This criterion cannot be implemented unless each bypass system is equipped with two branches for juvenile passage. The standard also should include species separation to lessen stress. Clarify that the standard applies to all projects with transportation facilities. Anticipate greater separation efficiencies.

*Response:* The Council agrees, and due to conflicting and insufficient information, has deferred action on this performance standard. However, the Council recognizes the need for, and importance of, such performance standards and calls for interested parties to submit recommendations by March 1, 1993 for specific, measureable performance standards in this and other areas of the program.

**Transportation guidelines. Comments.** The guidelines referred to are developed by the Fish Transportation Oversight Team, not just the fish managers.

*Response:* The Council changed the measure in response to this comment, with the burden of preparing guidelines falling on the fishery managers.

**Transportation evaluations.** *Comments.* More evaluation is not needed. Instead, call for a scientific, comprehensive review of studies conducted so far.

*Response:* Lack of data in this area is reflected in the continuing controversy over the merits of transportation for various species. Accordingly, the Council has called for additional transportation evaluations.

**Transportation improvements.** *Comments.* Control temperatures at raceways and other holding facilities; call for fish chillers and adequate holding and backup facilities in emergencies. Refrigeration is a low priority because of transportation's timing in relation to high river temperatures, and the practicality of refrigerating large volumes of water. Stress and disease evaluations are underway, but transport from John Day will require additional regional support if it is to be carried out. Evaluate transportation in dilute seawater. Monitor smolt condition on release. Consider calling for acclimation facilities below Bonneville Dam.

*Response:* Several innovative ideas for improvements in transportation collection systems, techniques and management were suggested during the amendment process. The Council believes that many of these should be evaluated for feasibility. In particular, the Council calls on the Corps to evaluate the use of refrigeration or other sources of cool water, reduced densities, and other stress reduction techniques to improve transportation effectiveness, particularly for fall chinook. The Council believes the fishery managers, through the Fish Transportation Oversight Team, are best able to decide when and where to employ smolt transportation. The Council also changed the program to call for an evaluation of the feasibility of using acclimation facilities below Bonneville Dam.

**Alternative transportation techniques.** *Comments.* The schedule for evaluating these alternatives is unrealistic, and does not recognize the need to prioritize implementation. More collection and transportation in the Snake is infeasible and will not help fish. Evaluation of a fish flume makes no sense biologically or otherwise. Net pen transportation is doubtful, as was demonstrated in the FERC hearing on Priest Rapids bypass.

*Response:* Full-scale evaluation of each of these alternatives may be unwarranted. However, preliminary feasibility evaluations currently underway by the Corps should give the region a sense of which alternatives merit full-scale evaluation. A report on these evaluations should be presented to the Council in December, 1992.

## **ADULT PASSAGE**

### Generally

#### **Gas supersaturation, connection with other mainstem measures.**

*Comments.* Recognize that the problem is one of *air* supersaturation, or total dissolved gas, not nitrogen, and it affects fish food organisms as well as fish. Explain how the improvements called for in the goals and framework section will be addressed in this section. What are adult mortalities currently?

*Response:* The Council has modified the language in the introduction to this section to recognize that high spill conditions at mainstem dams may increase the level of total dissolved gas in the water to levels lethal to both fish and fish food organisms. In addition, inadequacies in certain mainstem adult fish passage facilities create passage delays or reduce the success of fish passage. Losses and delays of returning adults at each dam due to upstream migration problems can be significant and have a cumulative effect. Accordingly, the Council fully expects that implementation of the adult fish passage improvements and evaluations called for in this section will help reduce passage mortalities and assist in attaining both the program goal and Snake River chinook rebuilding targets specified in Section 2.

**Performance standard.** *Comments.* There is no adult passage performance standard in this section.

*Response:* The Council postponed adoption of a performance standard in the adult fish passage section because there were sharp disagreements over the proposed standard, and the Council felt that the matter requires further discussion. However, the Council recognizes the need for, and importance of, performance standards and calls for interested parties in the region to submit recommendations for specific, measureable performance standards in this and other areas in the program by March 1, 1993. The Council will review and act on recommendations for performance standards, including those addressing adult fish passage after that time.

**Lower Snake and Mid-Columbia projects.** *Comments.* You have not proposed to adopt our recommendations for: 1) A feasibility study of new fish ladders on the shore side of navigation locks at Snake projects for use during drawdown periods; and 2) requiring the Corps and the Mid-Columbia PUDs to improve adult facilities basinwide (CRITFC).

*Response:* The Corps of Engineers' System Configuration Study is presently evaluating the need for additional adult fish passage facilities, improvements or modifications to those facilities as part of its ongoing feasibility studies for the Council's Columbia/Snake River Drawdown Committee. These



feasibility studies are in response to Snake River drawdown measures adopted in Phase 2. Moreover, Ice Harbor and Lower Monumental dams on the Snake River already have two fish ladders installed, one on each shore. The Council adopted a number of measures to improve adult migrant survival. For example, the Council calls on the Corps to implement all spill and operating criteria for mainstem adult fish passage facilities and to make needed improvements in such facilities. The Council also calls on the Corps, Bonneville and fishery managers to continue to evaluate and identify the causes of interdam adult losses and to take action to address the causes. In addition, the Council calls on the mid-Columbia public utility districts to evaluate adult fish passage at each mid-Columbia hydroelectric project to determine if losses are occurring in this reach of the Columbia River and to compile the results of such studies into a comprehensive report.

**Leaving screens in place.** *Comments.* Although you recommended that screens be left in place, you did not specify that this should be done throughout the adult migration period.

*Response:* The Council concurs and calls on the Corps to keep fish screens installed at each mainstem dam beyond the juvenile fish migration, at those dams where adult fallback is a documented problem. The length of time the screens are left in place should be determined by: a) fishway operating criteria developed jointly by the fishery managers and the Corps; and b) the need to remove screens for annual maintenance.

**Video counting.** *Comments.* We will report to the Council our ongoing work on this subject (BPA).

*Response:* The Council supports research to improve the accuracy of present adult fish counting procedures. Accordingly, the Council calls on the Corps and/or Bonneville to evaluate the feasibility and benefits of using video-based or other automatic counting and species recognition systems to better monitor adult fish passage at mainstem Columbia and Snake river dams. The Council is calling for a report on this subject by December 1993.

**Shad evaluation.** *Comments.* We plan such an evaluation, but CBFWA has not given it a high priority (Corps). Although you call for a shad evaluation, you should include the effects of other non-indigenous species such as carp.

*Response:* Over the five-year period 1987-91, an average of nearly 1.8 million shad have been counted passing Boneville Dam, with the peak of the shad run occurring during the months of May through July. Accordingly, the Council believes that such large numbers of shad in the ladders may be affecting chinook, sockeye and steelhead fish passage and calls on the Corps to evaluate the effects of shad population increases on adult fish passage at mainstem dams. Any effects of other species will likely be noted during the shad evaluation, plus the Council

believes that the millions of shad present more of a potential salmon passage problem than other species such as carp.

**PIT-tag detectors.** *Comments.* We do not expect to install detectors at *all* mainstem project, and anticipate removing *selected* fish for transportation, not just weak stocks (BPA).

*Response:* The Council concurs and has modified the program language accordingly.

**Water temperature control.** *Comments.* Add to the list of study areas: data base management; temperature model development; water management scenario development; coordination with adult migration studies; and data analysis, interpretation and reporting. Ladder temperatures should also be considered.

*Response:* The Council concurs and has modified the program language accordingly.

### **Fish Passage at Non-Federal Dams**

**Generally.** *Comments.* Delete these measures, because the Council has no authority to call on nonfederal project operators or their licensing agency to act (PNUCC).

*Response:* As noted earlier, the Federal Energy Regulatory Commission makes final decisions on license conditions for nonfederal fish passage facilities. Like other federal agencies that manage, regulate or operate hydropower facilities in the Columbia Basin, the Commission has obligations with respect to the Council's program. By addressing measures to nonfederal project operators and to the Federal Energy Regulatory Commission, the Council intends to communicate clearly to affected parties, and to account for these legal requirements.

**Leaburg Dam adult passage.** *Comments.* Require a right-bank ladder at Leaburg Dam. Include a structural solution, such as a tailrace barrier, to prevent adult salmon migration delay and injury at the Leaburg tailrace; an operational alternative is not feasible or prudent (NMFS). Do not preclude an evaluation of the effectiveness of operational alternatives to keep adults out of the Leaburg tailrace (EWEB).

*Response:* The Council agrees and calls for EWEB to construct a new right-bank fish ladder and a velocity barrier, or equivalent alternative means to prevent adult salmon migration delay and injury, such as a floating weir device, by August 1995.

**Miscellaneous. Comments.** The proposed measures are generally appropriate, with some language suggestions for A500(i).

We are not optimistic about receiving enough funding to add project biologists to inspect fish passage facilities (Corps).

**Response:** The Council has modified A500(i) accordingly. The Council believes it is important to provide at least two project biologists to inspect both adult and juvenile fish facilities at each of the eight mainstem dams on a regular basis during the fish passage season to ensure all fish facilities are being operated according to cooperatively developed criteria. The Council will assist the Corps obtain funding to add the necessary number of project biologists.

## **HARVEST**

### **Generally**

**Sharing the burden of recovery.** *Comments.* Harvest should not bear the conservation burden alone. The Tribes have borne an unfair share of the conservation burden. The 1992 fishing season will equal the poorest tribal fishing season on record. The Council is obligated to impose the burden for recovery of upriver salmon runs most heavily on those responsible for destroying the runs--non-Indian development.

A number of sources of mortality have not been adequately addressed in the current version of the plan such as high seas driftnetting; Alaskan and Canadian fisheries; Washington and Oregon coastal fisheries, in-river fisheries and poaching (Washington State Legislature).

The harvest proposals developed in the Council's Phase 2 amendments have basically been ignored by the fishery management agencies. The Council should mandate reductions in harvest. The greatest loss on a sustained basis is over-harvest and losses in the ocean. The restoration plan must insure harvest levels allow adequate brood stock return to properly utilize the spawning areas. Curtail gill netting and sport fishing for salmon in the ocean and the Columbia River Basin for four to five years. "Placing a moratorium on salmon fishing is a low cost low risk program with an immediate guarantee of more wild salmon in the Snake and Columbia Rivers." (Umatilla Elec. Coop.)

The last sentence in this section ("Failure to establish and manage for spawning escapement objectives could jeopardize Council support for future funding of production and habitat measures in the Council's program") is unnecessarily provocative. To hold production and habitat measures hostage to the Council's version of prudent harvest management is clumsy and offensive. It is time for other consumers of the salmon resource to similarly constrain their taking of the fish.

*Response:* See discussion at pages 9-10, above. The Council also recognizes the sacrifices that Indian fishers have made in an attempt to compensate for increased mortality at other life stages.

The Council has no fishery management authority and can not mandate fishery regulations. The effectiveness of the program depends, in part, on how aggressively the measures are pursued by those having legal authority to effect change. The available analyses show that some Snake River stocks would continue to decline in the absence of any adult harvest. Snake River wild salmon populations can not be restored by only reducing fishing mortality. Mortality at all life stages must be reduced to increase the productivity of the stocks. The

Council's program addresses reductions in all sources of mortality through out the life cycle to increase both abundance and productivity of weak stocks. The effectiveness of these measures will be monitored and adjustments made to ensure that rebuilding occurs.

The fishery agencies' 1992 ocean and Columbia River harvest regime met or exceeded the Council's recommendations for reductions. Progress has been slower on the implementation of other measures, but the crucial reductions in harvest called for in the plan were implemented by the fishery managers in a timely manner. In its biological opinion on 1992 harvest, NMFS concluded that the actions planned or taken by the fishery managers, represented progress toward reversing the decline in abundance and thus met the interim goal for 1992. NMFS listed a number of conservation recommendations that the fishery managers need to address in the future to improve harvest management.

The Council did not intend the language linking escapement objectives with production and habitat measures as a threat, but as an indication of the seriousness with which the Council takes program implementation. Efforts are needed in all stages of the salmon life cycle, including mainstem, harvest, and production. The Council intends to use what ever means are appropriate to ensure that all parts of the program are implemented.

**Harvest and stock productivity.** *Comments.* Trends in stock strength are determined by productivity, while abundance only describes the trend. Harvest restrictions have little effect on rebuilding, because harvest doesn't affect productivity so much as it is affected by productivity. Habitat and passage improvements and production measures that increase productivity should be the focus of the Council's recovery actions.

*Response:* The Council has adopted a broad based program to increase the productivity of weak stocks. Reductions in harvest are needed to facilitate rebuilding and perhaps maintenance of chronically weak stocks, particularly for Snake River fall chinook and sockeye salmon. Harvest restrictions are of particular importance initially until improvements in productivity occur as the result of the fish populations responding to other measures in the program. The Council understands that harvest rate reductions alone will not rebuild Snake River salmon runs and that survival rates must be improved at other life stages.

**Mixed stock fisheries.** *Comments.* Some commenters said that mixed stock fisheries are a major factor accelerating the decline in runs of weak stocks. Others disagreed with the assertion that mixed stock fisheries are a central cause of stock declines.

*Response:* Mixed stock fisheries are widely recognized as a problem where harvest rates are not set to protect the weakest stock subject to the fishery.

Harvest rates have been too high for Snake River fall chinook and sockeye salmon. The Council's program calls for additional protection of weak stocks and encourages the development and evaluation of terminal fisheries and selective harvest methods.

**Spawning escapement goals.** *Comments.* It would be unproductive to have a policy to improve freshwater spawning and rearing habitat while not having a policy to provide for adequate spawning escapement of depressed stocks. The escapement goal for Snake River spring chinook in the Council's program could never be achieved under the harvest rate permitted under the Columbia River Fish Management Plan.

*Response:* The Council's program calls for the development and implementation of spawning escapement goals as part of the effort to establish rebuilding schedules for weak stocks. The Council expects that the escapement goals established in the Columbia River Fish Management Plan will be reevaluated and modified as required to achieve the agreed to schedules for Snake River salmon stocks.

#### **Management Goals and Escapement Objectives.**

**Columbia River Fish Management Plan.** *Comments.* Current goals and objectives in the Columbia River Fish Management Plan are inadequate or non-existent. Develop management goals and escapement objectives in FY 93 with co-managers.

*Response:* The Council's program calls for the development of escapement objectives. Program goals are to be reevaluated to assess progress, adequacy and feasibility.

**Passing-through survival benefits.** *Comments.* Harvest should be managed to 'pass through' the benefits of improved survival in the form of increased spawning escapement. Harvest rates and regimes should be calculated annually based on objectives for indicator weak stocks and expected run size. Fish identification efforts should be developed in coordination with development of harvest alternatives. Hatchery production should be coordinated with management of harvest alternatives.

*Response:* The Council added language for fishery managers to strive to pass through population gains associated with other elements of this program until rebuilding schedules are met. Fishery managers will decide how best to manage the fisheries to meet the objectives of the Council's program. The Council has included measures to improve the identification of fish for purposes of developing selective or known stock fisheries.

## **Consultation**

*Comments.* The harvest consultation schedule for fishery managers does not fit with the Pacific Fishery Management Council's management schedule. The earliest that they are able to publish data is the end of February, and even then some data are not available.

*Response:* The Council changed the date for the consultation from "by the end of February" to "during April." It is important that the consultation occur prior to the Secretary of Commerce's action on ocean salmon seasons and preferably before the Pacific Fishery Management Council makes its recommendation to the Secretary.

## **Harvest Rates and Regimes**

**Generally.** *Comments.* Harvest managers are making necessary reductions to ensure that stocks of concern are given increased protection.

*Response:* The Council acknowledges the steps that the fishery managers took last year and this year in both ocean and inriver fisheries to reduce the harvest impacts of mixed stock fisheries on Snake River salmon stocks. The Council would like to see the fishery managers develop and adopt management criteria that specifically account for the needs of weak stocks as part of existing management plans and annual management planning processes.

**Sockeye.** *Comments.* There should be no harvest of sockeye below the confluence of the Columbia and Snake rivers, and this should be incorporated into the Columbia River Fish Management Plan.

*Response:* The Council expects that the parties to US v Oregon will manage the fisheries so that harvest constraints are consistent with the escapement objectives and rebuilding schedules.

**Fall chinook.** *Comments.* Harvest rates of 50% are not appropriate for listed stocks. The 55% rate is inadequately defined, and so we cannot support it (NMFS). We provided information on the genesis of the 55 percent harvest rate for fall chinook in phase two of the Council's amendment process. Two different projections were provided of the harvest rate that will be incurred by Snake River fall chinook as a result of the 1992 ocean and Columbia River fisheries. One analysis provides a point estimate of 45 percent and the other method an estimate of 55 percent for total harvest (ODFW). We are concerned over the objective of reducing harvest below the 55 percent goal. Evaluation is needed before additional reductions are implemented.

**Response:** Preliminary modeling indicates that a reduction from the historical average harvest rate of 74 percent (1984-90) to 55 percent, in conjunction with other measures, should rebuild the Snake River fall chinook. The Council has included other harvest management measures to further reduce the harvest rate on weak stocks.

The Council modified the program to call on the fishery managers to better define the 55 percent harvest rate, document how it was calculated and develop a standard to which future harvest rates can be compared.

Reductions below the 55 percent rate are voluntary and/or will be achieved by improved harvest management. For example, the development of terminal and selective fisheries will focus harvest on stronger stocks and away from weak stocks. The Council did not prescribe how or where the harvest reductions should occur.

### **Harvest alternatives**

**Comments.** Restoring terminal fisheries in tributaries is the only reasonable way to fish for known stocks. Allow only sport catch and release in the mainstem and tributary mouths. Move the Indian commercial fishery from the Columbia mainstem to terminal fisheries using selective harvest gear in the middle and upper reaches of the tributaries. Constrain non-selective harvest practices. Feasibility studies for harvest alternatives should be initiated immediately, coordinated with reprogramming of Mitchell Act hatcheries, Indian fishery needs and terminal fisheries.

**Response:** The Council has included measures for the development and evaluation of terminal fisheries and selective gear and the marking of hatchery fish. These measures should lead to a reduction in mixed stocks fishing problems while increasing the opportunities to harvest stronger stocks.

### **Enforcement**

**Comments.** Funding is needed for a comprehensive evaluation of law enforcement statistics, fishery statistics and inter-dam losses relative to the increased law enforcement program.

**Response:** The Council believes that Bonneville should and can implement the needed evaluations under the existing program measure.

### **Voluntary buy-back**

**Generally.** **Comments.** Displaced commercial fishers should be compensated, but not using BPA funds. Bonneville should acquire licenses from



individuals engaged in gillnet fishing. We are concerned about the buy-back measure, particularly with respect to who was being bought out. We do not believe that such a program should be funded, particularly at the expense of the rate payers. As time and circumstances change, many businesses disappear and the involved individuals find other ways to make a living.

This measure suggests that fish runs will not be rebuilt to viable level. Most fisheries are already much reduced and savings of spawners by eliminating the non-treaty gillnet are small.

*Response:* Buy-back and lease-back are measures for reducing salmon harvest below the program's numerical levels. The buy-back concept was urged by electric utility and related industries in Phase 2, who argued that the least costly and quickest way to increase spawning escapement was to buy out the commercial fishery. These parties volunteered to pay the cost, and the Council accepted the idea. Support for the programs from these parties has waned, however. Funding is now sought from the Bonneville Power Administration. The Council continues to believe that the buy-back and lease-back ideas have promise, and should be implemented and evaluated.

As to concerns about who was being bought out, the proposed buy-back program for 1992 was to be based on fair market value of a permit. Compensation in the lease-back program was based on the number of fish landed, irrespective of the number of permits.

It is the Council's intent that salmon populations recover to support viable fisheries. Because of the perilous condition of some of the stocks, it is important that adult fishing mortalities be reduced to increase spawner abundance while measures to increase stock productivity are implemented and evaluated.

### **Including Idaho and Indian Tribes in Columbia River Compact**

*Comments.* Modification of the Columbia River Compact is unwarranted (CRITFC). No conceivable purpose can be served by Idaho's representation on the Compact that cannot be adequately addressed in existing US v Oregon forums (Yakima Tribe).

*Response:* Membership in the Columbia River Compact, of course, is a matter for these parties to evaluate. The Council believes that there is value in the idea of a single harvest-management forum, to help integrate salmon management. Because the Compact makes decisions on fisheries that harvest stocks that pass through tribal fishing areas on their way to Idaho spawning grounds, Idaho and the tribes would clearly be important parties.

### **Unified reporting**

*Comments.* A unified data report is a good idea, but the date is unrealistic. Dam harvest of adults and juveniles should also be reported. Management agencies will need to be financed to do work. A reporting system might be developed through the Coordinated Information System.

*Response:* The Council changed the reporting date from mid-January to June, to allow the fishery managers more time to complete the data bases upon which the report will be based. The Council also expects that information on other sources of adult and juvenile mortality will be available from other sources. The Coordinated Information System may be a source of information and a depository for the report.

## **PRODUCTION**

### **Generally**

**Role of artificial production. Comments.** Production of salmon and steelhead in the Snake River system is well below the potential of existing habitat. Opportunities exist to increase natural production by ten times on average for salmon and four times on average for steelhead. To regain population levels closer to historic levels will require artificial production. The introduction should be modified to reflect this. It should also reflect the fact that not all hatcheries and hatchery practices are bad. The introduction assumes the worst about artificial production, ignoring the fact that we do not yet know whether artificial production is destructive. The Council apparently continues to underestimate the detrimental effect of hatcheries and the lethal impacts on natural populations of high hatchery production and mixed stock fisheries. Reduce and/or eliminate the proliferation of artificial production measures.

*Response:* The introduction was substantially revised to reflect these comments.

**Genetics and natural production. Comments.** Genetic diversity must not be sacrificed. Hatcheries must be redirected to support weakened stocks. Product quality compatible with and, if possible, equivalent to the natural process should be targeted. Hatchery releases, including supplementation, must not jeopardize wild and weakened stock. With the genetic conservation goal developed by its own geneticists and the supporting policies proposed by PNUCC, no further policy development is needed. Delete this section and replace it with language that would require obtaining wild salmon population baseline data before funding any hatchery or supplementation projects. Otherwise, the program will put the Council at cross-purposes with the requirements of the National Environmental Policy Act (NEPA) (by failing to "factor in reasonable timelines for NEPA compliance," including completion of a cumulative impacts analysis which will require such studies), the Endangered Species Act (ESA) (which can be expected to require a demonstration that any supplementation projects not "jeopardize the continued existence" of listed species), and the Northwest Power Act (because Bonneville could not be expected to implement these measures absent these studies, and the Council's decisions could not be based on the "best available scientific knowledge" until needed baseline and carrying capacity studies are completed.) The studies, data collection projects and assessments contained in sections A802-804 are commendable. Due to the long period of time required to complete these necessary studies, it is unrealistic for the Council to be evaluating new supplementation proposals at this time.

*Response:* In response to these comments, the amendments were revised to include a "Coordinated Production and Habitat" section that recognizes the role

that information on the status of wild and naturally-spawning stocks, and the cumulative impacts of production activities will play in evaluating proposed production projects in NEPA, ESA and Council processes. In combination with the six principles adopted in connection with the program's goals, these changes respond forcefully to concerns over weak stocks, artificial production and biological diversity.

**Proportion of naturally-spawning to artificially-produced fish.**

*Comments.* Increase the ratio of natural/wild fish to artificially produced fish over the short- and long-term. The current ratio of one natural/wild fish to three artificially produced fish threatens the long-term survival of the runs. Shrinking government resources should be used on passage improvements, habitat restoration, and improving carrying capacity. The ultimate objective should be to minimize the need for human intervention in production. The role of artificial production in contrast to habitat management techniques over the long term should be thoroughly evaluated and incorporated into the Council's plan.

*Response:* The measures adopted by the Council should lead toward increased wild fish production and improved habitat. The role of hatcheries and culture techniques will be evaluated over time, not just in the Council's process, but in all the processes referred to in the "Coordinated Production and Habitat" section of the amendments.

**Delay in new production.** *Comments.* The Council's current preoccupation with genetic risk will forestall or preclude rebuilding wild stocks threatened with extinction, and restoring eliminated stocks. Virtually all of the amendments call for policies, plans, evaluations, or studies, unfairly requiring compliance with extensive procedures before tribal production proposals can proceed, while requiring little or no process in connection with other production proposals, such as captive broodstocks or the Upper Cowlitz. This is inconsistent with the tribes' treaty rights and incompatible with the Columbia River Fish Management Plan. Take aggressive action to move beyond the study-and-report mode.

*Response:* The amendments were revised to encourage a range of approaches in production and habitat. Under the final amendments, all new production actions (including habitat measures but not including projects such as Yakima or Nez Perce, which were approved by the Council before the phase three amendments) will be reviewed through a common screening process, required to meet specific criteria, and results monitored and evaluated. Where possible, the Council has modified the amendments to streamline implementation processes, while giving appropriate attention to important biological questions and accounting for NEPA and the Endangered Species Act. The Council believes that the tribes' treaty rights and the Columbia River Fish Management Plan are consistent with a serious concern for biological and genetic diversity.

**Coordination of processes and genetics team.** *Comments.* The different roles for the genetics team, RASP, the biodiversity institute, and other processes are not clear. We are concerned that multiplying processes will diffuse authority and inhibit progress, when the basin should be focusing its attention on high-priority problems. The genetics team should be advisory only.

*Response:* The new "Coordinated Production and Habitat" section of the amendments is intended to clarify how RASP and other groups will fit into the implementation of production measures. The amendments have been changed to eliminate references to the genetics team except where that group is assigned a specific task. The Council will call on the genetics team to participate in implementation processes to advise the Council where appropriate. The amendments no longer call for Bonneville funding of the biodiversity institute. The Council sees the genetics team as advisory.

**Genetics conservation plan and hatchery policies.** *Comments.* Coordinate preparation of genetics conservation plan with the hatchery policies developed by the Integrated Hatchery Operations Team.

*Response:* The Council agrees that genetics policies should be coordinated with hatchery policy development.

### **Collecting wild and natural production information.**

**Coordination.** *Comments.* Coordinate closely with habitat measures. Ability to use the phase two technical criteria to prioritize habitat projects depends on this information. Add a reference to the Habitat Selection Criteria. Formulation of a monitoring plan for wild and naturally spawning stocks requires coordination with a comprehensive monitoring and evaluation plan to assist in determining cost-effectiveness.

*Response:* The draft amendments were modified to reflect these comments, particularly in the "Coordinated Production and Habitat" section.

**Prioritization.** *Comments.* These studies should be prioritized and implemented as needed to meet specific needs; the proposed study would be a massive task, with effort on populations with the greatest need diluted.

*Response:* Any needed prioritization may occur in the implementation process. There is some logic in focusing on an area like the Snake Basin, where listed stocks are, but the region needs a full picture of biological variability in the Basin so that we understand the diversity we have and need to protect.

**Use of existing information.** *Comments.* Even if a new study can be justified, existing information should provide its foundation. Before developing the proposed long-term monitoring program, the Council should determine whether ongoing and proposed programs can be linked. Much of the information proposed here is already being collected or has already been proposed. The Council should draw upon the skills and knowledge of the fishery managers, specifically in identifying population units.

*Response:* The Council envisions that all relevant information should be brought to bear in this effort, including the expertise of the fishery managers.

### **Wild and natural production policy.**

**Generally.** *Comments.* These studies and policy implementation activities are redundant or unnecessary, considering ongoing efforts in the region. Idaho already has a policy that meets the conditions the Council calls for. Any single policy that specifically addressed all of the issues would be so generic as to be useless. Rather than imposing global implementation of Council policies, the Council should set biologically prudent policy and expect proposals for funding to be consistent with that policy. The fisheries agencies and tribes do not have the resources to develop the proposed policies; it would be reasonable for the Council to ask the agencies and tribes to illustrate where and how we are addressing the Council's issues in our existing policies. This would serve as a foundation for further discussion of limiting factors, data gaps, and management proficiencies or deficiencies.

*Response:* The Council believes that policies need to be developed to address the principles stated in the goal section, in the kind of detail that is anticipated from the Integrated Hatchery Operations Team's policies. However, the Council is not attempting to impose Council policies "globally." Instead, the Council has asked that policies be developed by the fishery managers, whose activities the Council must complement. The Council understands that any new activities strain agency and tribal budgets.

**Coordination.** *Comments.* Wild and natural production policy should be coordinated with model watersheds, complement hatchery policy development, and build on existing processes to create a natural production team. In b.5, call for a determination of the carrying capacity of the habitat that supports these populations. Habitat preservation, not just restoration, should be included.

*Response:* The Council agrees that wild and natural production policy should be coordinated with model watersheds and hatchery policy development. The "Coordinated Production and Habitat" section is intended to build on existing processes to coordinate activities in this area. The program calls for a

determination of the carrying capacity (section 6.2A.7.e) and calls for habitat preservation (section 6.2A.6).

**Isolating mechanisms.** *Comments.* Delete A801(a)(4)b.4 (calling for consideration of maintenance of reproductive isolation mechanisms when a wild and naturally spawning conservation program is developed). Natural recolonization should be allowed, and gene flow should be restored between fragmented populations.

*Response:* This provision was not intended to prevent natural recolonization or natural rates of gene flow. The commentors' concerns should be considered when the wild and naturally spawning conservation program is developed.

### **Biodiversity institute.**

*Comments.* The function of the institute is unclear. The combination of the genetics team, the Scientific Review Group, peer reviewers and the proposed institute seems an unnecessary multiplication of process. A biodiversity institute limited to salmon and steelhead is a contradiction in terms; focus on the health of ecosystems. It would be better to use these funds on the resource, instead of a new institute. The proposed biodiversity institute should be cooperatively funded. The biodiversity institute is a duplication of functions well served by universities and other institutions. The Council should focus on better dissemination of information from these institutions. The Council could better meet the goal of this measure by sponsoring a workshop to consolidate knowledge from these and other sources and identify areas where more information is needed.

*Response:* The provision calling for Bonneville funding was removed, and cooperative funding by interested parties was suggested. The Council continues to believe that such an institute would serve a compelling need, but agrees that Bonneville should not be asked to single-handedly fund such an institute.

### **Supplementation coordination.**

**Generally.** *Comments.* Supplementation may be an appropriate tool for recovery of wild runs that have been, or may soon be, eliminated. Another BPA-funded supplementation planning process is not needed. New supplementation should be evaluated as outlined in the Integrated System Plan (ISP). The supplementation guidelines in Section C of the ISP are being used to identify appropriate supplementation proposals. Supplementation projects identified in the Integrated System Plan should proceed, but only with further analysis. The Council should delete this section and rely on the existing RASP process. The agencies and tribes have worked to categorize currently proposed supplementation projects; the proposals could not be prioritized until RASP is completed, now

scheduled for October 1992. This delay creates a need to delay the action in Section A801(b).

We see value in your focus on genetic concerns, and are skeptical about the use of supplementation in the Snake River system. We see no evidence that artificial and natural production are coordinated basinwide, or that production policy and harvest policy are coordinated. An experimental approach makes sense if adequate experimental designs are developed and high-quality monitoring is pursued (NMFS Recovery Team). Supplementation is unproven and projects should not be conducted on the scale proposed in Phase Three. In areas with wild/natural populations of concern, supplementation should be initiated on a small scale, with safeguards.

We support a coordinated, basin wide approach to production planning and supplementation research. Recognize that any federally-funded supplementation will have to comply with the Endangered Species Act. A programmatic EIS should be prepared for all supplementation projects.

*Response:* The Council concluded that supplementation should proceed experimentally. With the principles adopted in connection with the program goal, experimentation should be possible without posing undue risk to weak stocks. The Integrated System Plan's section C, the Regional Assessment of Supplementation Projects (RASP) and other evaluation tools should be used to evaluate proposed supplementation projects. Dates were adjusted as suggested. The Council agrees that a coordinated approach to production and supplementation is needed, and this part of the program is intended to bring about such an approach. Whether a programmatic EIS is advisable is for implementing agencies to decide.

**Supplementation projects proposed by CRITFC. Comments.** These proposals may not be entirely consistent with the Endangered Species Act. They will have to be developed within the framework of recovery plans. An ad hoc group of fishery managers has met to rank supplementation projects; any Council list should be similarly coordinated (NMFS).

We need more information before committing to a capital intensive effort where biological signposts have yet to be identified with sufficient clarity. Development of supplementation programs should include risk/benefit analysis, clear documentation of decisions based on the risk/benefit analysis, a comprehensive risk containment program, and monitoring and evaluation. We oppose the gross outplanting effort to augment harvest under the guise of supplementation to increase natural runs.



We oppose formation of a new process or group to address this issue. Preliminary evaluation of CRITFC proposals can come from the genetics team, the RASP group, and Council staff.

*Response:* The "Coordinated Production and Habitat" section of the amendments provides a procedure that relies on existing processes to evaluate these projects to ensure that they are consistent with the goal principles and relevant NEPA and ESA requirements.

**Supplementation of eliminated or badly damaged populations.**

*Comments.* Add three months to the dates here and in section (b)(8). New supplementation activities should not be undertaken without adequate information on the wild/natural population being supplemented. Caution is needed before proceeding with more supplementation. The Council should rely on the RASP process to determine the needs for supplementation research and evaluation of existing projects. The fisheries agencies and tribes have already provided consensus documents, the ISP and subbasin plans. We believe there are enough comprehensive and well-designed supplementation studies in the basin to provide many of the near-term answers needed. An ecosystem, stock, or subbasin approach would be more manageable and realistic. The focus should be on bringing available tools forward to assist managers with implementation of specific projects, not on another study.

*Response:* This section was replaced with a new section, "New Production Initiatives," which, combined with the "Coordinated Production and Habitat" section of the amendments, responds to these concerns.

**Hatchery conversion.**

*Comments.* Because supplementation is an unproved technique, it is premature to plan for conversions. Adapt projects that are already in the works-- Yakima, Nez Perce and Northeast Oregon. Changing existing facilities into supplementation facilities will require major changes, which must address hatchery management roles and responsibilities, authorizing legislation on mitigation programs, and integration into harvest management and allocation requirements that have not been solved by the operational entities and fishery co-managers. Rename this section "Modifications to existing hatcheries to improve smolt quality and to more easily allow their use in supplementation experiments." Acknowledge the need for pathogen-free water, isolation facilities, etc. Delete this section until a clear role for artificial production in rebuilding is developed. Identifying additional candidates for conversion should be delayed until the ongoing supplementation review is farther along. Our highest priority should be to complete ongoing projects. Extreme caution is needed before converting existing hatcheries to supplementation programs. The benefits of supplementation are sufficiently in doubt even when the facilities were specifically designed for that

purpose. Because of limitations of existing hatcheries regarding their suitability for supplementation, conversion could be detrimental to the wild/natural stocks brought into them. Where existing hatcheries are not meeting objectives, the limiting factors should be corrected rather than starting over. Funding already-proposed projects to improve effectiveness of hatcheries would be a better expenditure of ratepayer dollars.

*Response:* As with the foregoing provision, this section was replaced with a new section, "New Production Initiatives," which, combined with the "Coordinated Production and Habitat" section of the amendments, responds to these concerns. Hatchery conversion projects may be appropriate, and deleting this provision should not be interpreted to imply otherwise. However, these projects should be evaluated with the same considerations as other production and habitat ideas.

### **Hatcheries.**

**Generally. Comments.** Hatchery production methods need to be audited immediately. Improvement in the hatchery program is a must. There are uncertain biological effects on wild stocks associated with increased reliance upon hatchery production. Identifying current hatchery problems and concerns is the only viable way to protect weak wild stocks. A data base on weak wild stocks and the effects of supplementation on wild stocks is critical prior to continued supplementation in areas with wild stocks. Management of hatcheries should preserve wild stock genetic diversity.

*Response:* Most of these concerns are addressed in sections 6.2B, 7.6 and the program goals.

**Evaluations. Comments.** The Council has added four BPA-funded studies to this section. These should be deleted. If BPA needs any of the information proposed to be collected to implement the program, it can fund the studies under its own authority. Otherwise BPA should not fund these studies.

*Response:* The studies are critical to managing hatchery programs and minimizing impacts on weak stocks.

**Hatchery policies, coordination, operations. Comments.** Coordination between Bonneville and the Council should include coordination with National Environmental Policy Act processes. How will performance of non-supplementation hatcheries be monitored? The date in A802(a)(1)a is unrealistic; change it to June 31, 1993. Set a new date in consultation with the Integrated Hatchery Operations Team. Further date changes are suggested.

*Response:* The "Coordinated Production and Habitat" section should ensure coordination with NEPA processes. Date changes were made in the final

amendments. Non-supplementation hatcheries should be included in these policies.

**Hatchery evaluation and assessment.** *Comments.* We share your desire for early screening of potential projects. Rather than suggesting a new process, the Council should support the call for complete project proposals that respond to both program and NEPA information needs. Master planning and environmental analysis of proposed projects should be integrated as much as possible. Bonneville is not necessarily the right agency to develop a screening process for NEPA analysis. CBFWA is analyzing the need for a basin-wide EIS for fish production. The systemwide and cumulative impact study (A802(b)(4)) must precede development of screening criteria (A802(b)(3)). To reflect this, reverse the order of these provisions. It is up to the fishery agencies and tribes to develop and fund a methodology for fishery management decision making (A802(b)(4)b). The reason for having different coverage in subsections a (proposed projects) and b (existing and proposed) of sections A802(b)(3) and A802(b)(4) is unclear.

The hatchery evaluations and assessments should be deleted, because complex biological parameters would have to be evaluated, and results may be unreliable. Studies of existing hatcheries and their cumulative and systemwide impacts is critical; this study should examine the alternative of no hatcheries, with available resources shifted to habitat restoration and improved management.

*Response:* Section A802(b)(3) was replaced by the "New Production Initiatives" measure, and a "Coordinated Production and Habitat" section, which responds to the concerns expressed in these comments.

The hatchery evaluations and assessments are critical to managing hatchery programs and minimizing impacts on weak stocks. Investigating the alternative of no hatcheries would require a study of different scope, which was not noticed or commented on in the amendment process.

**Creative partnerships.** *Comments.* The import of this section is unclear; delete it.

*Response:* The Council believes the region should be open to new approaches to production, and should consider whether different arrangements would be productive.

### **Carrying capacity studies.**

*Comments.* Delete section "a" in view of the complexity of the subject, and the unlikelihood that we can develop this information into a useful decision-making tool. A one-year study will not be sufficient to adequately estimate carrying capacity. A 3-5 year study is needed. The study should first review and

synthesize available information. Other important aspects are the effect of water contaminants on the river's rearing capacity, the plume and near shore ocean environment.

The concern about impacts of large scale hatchery releases on wild stocks is legitimate; however, strategies such as release ceilings must be substantiated to be credible. The present data base is inadequate to estimate the carrying capacity of the mainstem, tributaries and estuary for juvenile fish. IHOT members have the means to estimate the basin's carrying capacity for hatchery fish, and can evaluate whether poor hatchery returns reflect a need to alter hatchery practices.

Adjusting releases from existing hatcheries to take account of releases from new hatcheries appears counterintuitive and counterproductive. Phased production levels dependent upon broodstock collection is a sounder approach. The number of hatchery juveniles released should be restricted so that the sum of hatchery and naturally produced salmonids does not exceed historic production and the food supply of the system.

The Council should not demand that the fish management agencies and tribes take specific actions in response to the information. The Council can use its leverage to ensure that study results are evaluated and considered when fish management decisions are made. It doesn't make sense to require an upriver hatchery with low return rates to cut back so that a lower river hatchery can continue to pump out hatchery fish. This measure would foreclose many of the production reforms being sought by the tribes above Bonneville Dam, on the basis of some foggy notion of carrying capacity.

Habitat carrying capacity research should be coordinated with development of escapement objectives.

*Response:* The scope and schedule for the study were modified to call for a longer preliminary study that should provide a basis for further debate about carrying capacity considerations. The "release ceiling" was modified to call more generally for precautions to be taken.

### **Marking hatchery fish.**

*Comments.* This should be coordinated with research described in section A603(d) to identify methods for mass-marking fish. Define "straying," conditions under which it is "significant," and when such straying involves "wild" populations. Evaluate straying among wild populations and call for identification of marks that cause least mortality.

**Response:** With regard to straying, the Council did not propose to attempt this level of detail in the program. These comments may be considered in implementation.

### **Other production measures**

**Generally. Comments.** The sections on lamprey, coho, shum and searun cutthroat trout will help the region get ahead of the curve on weak stocks (NMFS). To preserve genetic integrity from a basinwide perspective, the Cowlitz, lower Columbia coho, chum, sea-run cutthroat trout and sockeye measures should be adopted. Enhancing lamprey would be counter-productive to anadromous fish measures, however. Enhancement measures for sturgeon should be developed. Lower Columbia coho genetic identification should be cooperatively funded by NMFS, which is already preparing a proposal.

Measures for captive broodstocks, protecting endemic spring chinook in Minam and Wenaha rivers, portable adult collection/holding and juvenile acclimation/release systems, cryopreservation, and evaluation of survival, ecology, carrying capacity and limiting factors represent potential tools or information useful in recovery of weak stocks. This section needs clear goals and objectives. Without them, these ideas are difficult to assess relative to other proposals in terms of their contribution to meeting program objectives. The Council should wait until the recovery team and NMFS have indicated what will be needed.

**Response:** See specific responses below. The Council agrees that work on these measures should begin now, to avoid the need for further Endangered Species Act petitions. These measures should be part of the framework development.

**Captive broodstocks. Comments.** Claims for maintaining genetic diversity are not unique to captive broodstock programs; hatchery programs may, in effect, do something similar. Items 1-8 of the proposed measure should be funded beginning in October 1992. Item 9 should be funded no later than October 1994. Captive broodstock programs should be reviewed by RASP and the genetics team before funding.

**Response:** Dates were added to expedite implementation. Captive broodstock demonstration projects should be developed under the provisions of "New Production Initiatives," which includes technical review, and requires the same analysis of captive broodstock initiatives as other production initiatives. In addition, the Council has provided a process to consider emergency cases (section 6.2D.3-4).

**Ringold hatchery.** *Comments.* The Ringold hatchery site enhancement and water development activities should await identification of the need and purpose for additional hatchery capacity.

*Response:* This measure was approved in phase one as a limited opportunity to improve hatchery water supply. See the phase one response to comments.

**Snake River fall chinook.** *Comments.* Supplementation of Snake River fall chinook must await development of a recovery plan. More work needs to be done to identify the best population to use in a fall chinook supplementation program. Supplementation for fall chinook should be contingent on genetic and stock structure data now being collected. Snake River fall chinook and sockeye measures will require NMFS approval; the Council should not prejudge NMFS recovery plans for these species.

*Response:* The measure was modified to call for consistency with the NMFS recovery plan.

**Cowlitz.** *Comments.* This measure incorrectly states that a technical advisory group is establishing objectives for reintroduction. In fact, the group is developing a fish mitigation plan for the Cowlitz project, which is not limited to reintroduction. A Council commitment to reintroduction would be premature, because of concerns over disease in reintroduced stocks. Agreement has not been reached on production objectives. Reintroduction of anadromous fish to the upper Cowlitz requires addressing issues that are not part of these amendments, such as how to get fish past Mayfield and Mossyrock dams. Delete this proposal. Supplementation programs should not be begun without essential information and environmental analysis. With that caveat, we support reintroduction of anadromous fish in the Upper Cowlitz.

*Response:* The measure was revised to respond to these comments.

**Lamprey.** *Comments.* Lamprey populations probably have declined as a result of deterioration in river spawning habit, and recent increases in marine mammal populations. Lampreys are not eels. Funding Pacific lamprey enhancement is not appropriate at this time because it would be counterproductive to benefits for anadromous salmonids. Enhancement of lamprey is likely to adversely affect Council efforts to recover Columbia Basin salmon stocks, because lamprey are known to prey on salmon.

*Response:* The Council believes it is appropriate to evaluate lamprey, a native fish species that is important to the region's Indian tribes. With adequate data, the possible conflict with salmon can be evaluated.

**Lower river coho, chum and cutthroat trout.** *Comments.* Funding reviews of land management affecting Lower Columbia coho and chum salmon and sea-run cutthroat trout is more appropriately provided by the responsible federal and state land management agencies (BPA). Bonneville should fund lower Columbia River coho work only if that is the only means available to ensure that appropriate steps are taken to recover this important stock, which has been affected primarily by harvest (PNUCC).

We support rebuilding of coho, chum and sea-run cutthroat, according to the management goals recommended by the Council's genetics team. We especially support efforts to reduce dependence on hatchery production, and improved habitat and harvest management for coho, chum and sea-run cutthroat.

*Response:* Language was added limiting Bonneville's funding responsibility for these species, to the extent impacted by hydropower, or to particular instances in which off-site recovery measures would be appropriate.

**Snake River sockeye rebuilding.** *Comments.* Reintroduction of Snake sockeye will need to be consistent with recovery plans. There are many questions about Columbia River sockeye salmon; this issue should be addressed on a stock basis, not with regional planning. Amend this measure to say "This plan should consider re-introduction in all historical production areas not permanently blocked by Grand Coulee Dam."

*Response:* The Council modified the language to call for a feasibility study, and language was added calling for consistency with the recovery plan. The plan would be limited to reintroduction in "appropriate" areas. Reintroduction above Grand Coulee is unlikely to be appropriate, given passage problems.

**Cryopreservation.** *Comments.* We question the use of cryopreservation of genetic material for the preservation of populations. Before further work is done to improve technology, the appropriateness of the technology must be agreed upon (BPA). We agree with the need to study cryopreservation, and have submitted a proposal to CBFWA (Idaho).

*Response:* In some circumstances, cryopreservation may be useful as a tool in preserving highly endangered populations. Cryopreservation proposals will go through the process outlined in the "Coordinated production and habitat" section, where the commenters' concerns can be addressed.

### **Carrying capacity evaluation.**

**Generally.** *Comments.* Hatchery fall chinook compete with Snake River fall chinook in the Columbia River estuary. A salmonid recovery plan that does not attempt to improve and increase estuary habitat will not be completely

successful. Without institution of a marine mammal management policy, seal and sea lion predation and competition will continue to deplete salmonid resources. A management plan should be implemented for American shad.

*Response:* Carrying capacity studies should help give direction for addressing these issues.

**Timing and coordination.** *Comments.* The time frame for the survival evaluation should be at least 3-5 years, divided into several parts. The date for submittal of the study plan should be changed to December 31, 1993. The study plan then would be available at the same time as the results of the one-year carrying capacity study called for in A802(b)(6)b.

*Response:* Dates in the carrying capacity study were changed to allow more time. This study was integrated with the similar study in section 6.2E.

### **Willamette River**

*Comments:* A measure should be added calling for reintroduction of anadromous fish above Corps dams in the Willamette River.

*Response:* This proposal can be introduced as part of "New Production Initiatives."



## **HABITAT**

### **Generally**

**Condition of habitat. Comments:** Dramatic steps must be taken to protect and improve fish habitat. Habitat improvement is an important recovery tool and should be aggressively implemented. Habitat projects should get under way as soon as possible. Council should spearhead and support regionwide steps to protect our remaining fisheries habitat and restore degraded habitat. The GAO should study the effects of clearcutting in Washington, Oregon and Idaho and impacts on the water resources.

If habitat quality isn't improved, Snake River stocks such as spring chinook cannot be rebuilt. The proposed actions make sense for revitalizing runs in Idaho, and they should be incorporated into existing programs rather than creating new ones. Protection of habitat is important in Idaho because most of the habitat is in good condition. Habitat should be protected in Idaho even if it is underutilized now, so that there's good habitat when the runs are rebuilt. We should move forward rapidly on numeric, measurable criteria. There is poor water quality and degraded fish habitat in Idaho, especially sediment in streams. The State should identify total maximum daily loads and water quality of limited stream segments under the Clean Water Act for the southfork Salmon River.

The introduction is filled with contentious, unsupported statements attributing riparian problems to grazing. Land management practices for mining, logging and grazing have improved a lot since early times. Landowners need encouragement to continue the trend, through research, education and monitoring.

Even though there are some problems with habitat in Idaho, the agricultural, mining and timber industries are working with us to enhance stream quality where problems exist. Habitat in Idaho is severely underseeded and doesn't need to be improved. Idaho's system of stream management assures responsible stewardship. It is not clear that current livestock management practices are causing further degradation today. Salmon River habitat is in better condition than it was 25 years ago. In fact, significant improvements seem to be occurring from today's management in riparian areas. Don't make long-term decisions on the short-term effects of the current drought in Idaho.

**Response:** Many factors, including habitat loss and degradation, have worked together to cause a decline of salmon and steelhead populations. At the same time, improvements in some areas of land and water management over the last few decades have improved some degraded areas, and slowed the degradation of habitat in other areas. Maintenance and/or improvement of habitat will

increase the numbers of naturally spawning salmon and steelhead in the many areas where there is still room for improvement.

The Council recognizes that wild and naturally spawning populations of salmon and steelhead are at low levels in some areas of the Columbia River Basin, and throughout the Snake River Basin, and that habitat is seeded at low levels in these areas. Even so, improvements in habitat quality are needed to increase the productivity of many stocks. This increased productivity will result in more of the off spring from these returning adults surviving to migrate to the ocean.

Accordingly, the Council has called for aggressive implementation of measures to maintain good salmon and steelhead habitat, and improve habitat where it is limiting salmon and steelhead productivity.

**Coordinate habitat and production.** *Comments:* Recognize that production and habitat need to be coordinated. If a stream is logged and important spawning and rearing habitat is destroyed, it frustrates efforts to outplant and rebuild the runs.

*Response:* The Council agrees, and adopted a "Coordinated Production and Habitat" process (see section 6.1). Habitat measures should, as much as possible, be coordinated with the subregional and model watersheds processes, to ensure that the most important projects proceed first, and habitat measures are not pursued in isolation.

**Instream structures.** *Comments:* Instream structures cannot compensate for poor watershed management; protection of habitat is by far the more effective stream rehabilitation enhancement technique. Artificial restoration methods of providing spawning and rearing habitat, particularly structures, is proving to be less effective than hoped, and in many instances, even counter-productive. Emphasize, instead, habitat protection, restoration of riparian vegetation and reduction in sediment from roads and other sources.

*Response:* The Council is aware that past activities to improve salmon and steelhead habitat have focused on "structural solutions" with varying degrees of success. In the habitat section, the Council calls for a comprehensive watershed approach that should be effective in promoting natural recovery of salmon and steelhead habitat. At the same time, in some instances site-specific riparian and instream projects are needed to address habitat problems adversely affecting the survival of specific populations of salmon and steelhead. The Council will rely on the experts in habitat rehabilitation to identify the best course to achieving the habitat objectives regarding maintaining and improving salmon and steelhead habitat.

**Public lands.** *Comments:* There is a growing body of evidence that land management practices on the federal lands, particularly logging, grazing, mining, road building, have a profound negative impact upon the salmon and steelhead habitats throughout the Columbia Basin. Recent studies done by scientists on both side of the Cascades indicate that continuation of current forest service and land management is likely to result in elimination of habitats in individual stocks. Many of these practices violate current laws, policies and regulations. The priority should be to encourage compliance with existing laws, regulations, and policies with respect to managing public lands.

The focus of habitat effort should be two-fold. By 1995: (1) Forest Service and BLM develop and implement grazing allotment management plans in cooperation with livestock operators and other interested parties using outside consultants; and (2) Forest Service implement all aspects of its anadromous fish policy implementation guide on all national forests in the Columbia Basin. All other process-related measures should be deferred or deleted.

*Response:* Existing laws, regulations and policies must be complied with, if the basin's salmon and steelhead runs are to recover. The Council calls for review to see if this is occurring, and improved enforcement if needed.

The Council calls for the Forest Service and BLM to take the two steps suggested. In addition, the Council adopted measures to address other important habitat problems for Columbia Basin salmon and steelhead stocks. These include development of performance standards, coordination of watershed activities, as well as specific activities such as screening water diversions. These activities are also vital to the efforts to rebuild salmon and steelhead.

**Funding.** *Comments:* Ratepayers should not pay the cost of habitat measures. Funding should come from all parties affected. Fencing streams and rivers would take land off the tax roles and decrease taxes for education.

*Response:* The Council agrees that ratepayers should not pay the full cost of habitat measures, and has looked to the Forest Service, the Bureau of Land Management, and others to pay significant parts of the expense. Ratepayer funding is appropriate by way of offsite enhancement, however, for certain activities such as coordination (sections 6.5A.2, 6.5B.1), acquisition of critical water rights and conservation easements (sections 6.6A.10, 6.6B4), and water diversion screening (section 6.6C).

**Economic impacts.** *Comments:* People who are going broke do a poor job of conservation; maintaining profit in land use will allow development of programs that consider amenities such as fish and wildlife. The system needs to be managed recognizing that other uses are going to occur beside just salmon and

steelhead. Recognize that cattle ranching is major economic activity to many isolated areas. Any reduction in grazing allotments will affect this industry.

If the logging and mining industries are required to operate zero sediment discharge, and cattle grazing allotments are required to be reduced 50 percent, the economy in the upper Salmon Basin will die.

A forest restoration program to repair and restock streams and to replant clearcuts would create much needed jobs to replace losses of timber industry positions.

*Response:* The measures called for in the habitat section will have economic effects. The Council believes that these effects should be spread to all those that have benefited from development of the Basin and therefore contributed to the decline of salmon and steelhead stocks. At the same time, it is not the intent of the Council to exclude customary uses of land and water. Through comprehensive watershed management, innovative approaches can be developed by affected parties that will allow fishery resources and economic activities to co-exist.

**Monitoring and evaluation.** *Comment:* Monitoring and evaluation are an essential part of any habitat program.

*Response:* Monitoring and evaluation are essential parts of the program (see generally section 7.2). Program implementation is based on the concept of adaptive management which requires intensive monitoring and evaluation in order to determine the success of and need for changes in program activities.

**Definition of habitat.** *Comment:* Expand the program's habitat measures to include the lower river estuary and the ocean. Habitat should be divided into three segments: freshwater, river system, ocean. Recognize the mainstem Columbia and Snake Rivers as habitat. Define habitat as an organism's environment that form the immediate area in which it can dwell and properly interact with other organisms.

*Response:* Program language has been added clarifying that the habitat section addresses fresh water tributary areas where salmon and steelhead rear and/or spawn, and tributary migration corridors. It also notes that habitat extends beyond these areas and that other sections of the program address these other habitat areas.

**Survey of habitat conditions.** *Comment:* Survey the condition of the habitat of all wild stocks in the Columbia River basin. Adopt a policy and program to conserve the habitat of wild populations.

*Response:* The program calls for maintaining the current quantity and productivity of salmon and steelhead habitat, as a minimum (section 6.4A.2). This objective applies to all wild stocks in the Columbia River Basin. In addition, the program calls for collection of information on the population status, life history and other data on wild and naturally spawning populations (section 6.2A.3-5), and information to permit evaluation of the status of salmon and steelhead habitat in the basin (section 7.2A, 7.6).

**Role of volunteerism.** *Comments:* The Council's proposal relies heavily on voluntary participation by local land owners, farmers, ranchers, timber companies, and others, which has been the rule for years and has not worked. Immediate and unequivocal action is needed to simply prevent these problems from getting worse.

Habitat measures must be realistic and recognize private property rights and the state local economies which will be affected. Cooperation of private parties is important. Concern for the localities and individuals affected should be paramount. Integrating livestock owners into the salmon recovery planning will help retain the benefits to wildlife, range management, community stability and economics, and our nation's food supply that we strive to provide. Any ultimate solution will use a multifaceted approach with private citizens on both private and public land managing commercial uses to enhance resources. Leadership for habitat protection must come from those who own and directly manage the resources, not from a one-size-fits-all prescriptive path approach.

*Response:* 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. For this reason, the Council has called for a locally based, bottom-up, voluntary approach to protection and improvement of habitat on private lands. At the same time, the Council expects that all entities with an interest in each subbasin will participate in protection and improvement of habitat on private lands. The program identifies significant roles in this regard for the states, federal agencies and the Council.

**Need for legislation.** *Comments:* The Council should work for habitat legislation that supports fish and wildlife program goals and expenditures.

*Response:* Several measures in the habitat section call for review of state and federal laws to determine the need for legislation. Council members will continue to work with state and federal agencies and legislators to ensure that statutory law and funding is available to support the program's implementation.

**Fire considerations.** *Comment:* Fire is a real danger in northeastern Oregon, and fencing streams will increase it. Nearly 50 percent of the trees in the Blue Mountain region are dead or dying. This could cause catastrophic fires that would destroy all aquatic life in small streams, especially in the riparian areas.

*Response:* Language has been added to the program calling for special attention to be given to insect infestation as it relates to fire danger.

**Condit and Enloe Dams.** *Comment:* Remove Condit and Enloe Dams.

*Response:* The Council calls for passage above these projects to be considered in the process outlined in section 6.1 (coordinated production and habitat and subregional planning). For Enloe Dam, rather than dam removal, the program calls for any holder of a license for an operating hydroelectric facility to design and construct 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, then FERC should require the licensee to build and operate appropriate downstream passage facilities. Upstream passage could provide the region with the opportunity to establish an anadromous fish run in more than 320 miles of habitat in the Similkameen Basin. This could be considered as off-site enhancement or mitigation for mainstem Columbia River anadromous fish losses that would not be the responsibility of the Enloe project licensee. Determination of regional responsibility, if any, for upstream passage facilities will be decided at a later time.

### **Habitat Objectives, Policies and Performance Standards**

**Generally.** *Comments:* There is no overall lead for developing habitat goals, policies, and performance standards other than "all relevant parties." Habitat goals, policies and performance standards are extremely weak in their treatment of logging and grazing. The Council should establish expectations of fish benefits from habitat projects funded with ratepayer funds. Goals, policies and standards will help ensure that benefits occur. We fully support actions recommended for BLM (BLM).

*Response:* The Council has itself adopted goals and policies. The Council's state offices will assume the lead for facilitating development of habitat performance standards.

The Council received comments and testimony that virtually all areas of land and water management, as well as fisheries resource management, have had a detrimental effect on salmon and steelhead populations. In order to address these effects, the Council has called for a watershed approach to habitat management. Reductions in specific activities are expected to occur to differing

extents based on local circumstances. For this reason, the Council did not call for broad brush reductions in any specific land and water management activities.

The Council appreciates the Bureau of Land Management's support of actions recommended for that agency.

### **Habitat objectives.**

**Generally.** *Comment:* Focus on productivity of fish, not habitat. Focus on fish production capability of habitat. It is essential not to lose productive capacity of existing habitat. One commenter suggested that goals should be: (1) no net loss of watershed and riparian habitat used by depressed natural stocks and (2) by 2002, rehabilitate 50% of existing degraded habitat used by these stocks. Another suggested: (1) first priority to maintaining good quality habitat; (2) second priority to improving habitat critical to recovery of depressed stocks; (3) third priority to actions that improve productivity; and (4) fourth priority to measures that yield maximum effect per habitat improvement dollar spent. Still others suggest goals of prevention of further degradation; priority on enhancement of degraded habitat for depressed stocks through good watershed management such as reducing sediment inputs, increasing shading, and increasing the supply of potential large, woody debris.

*Response:* The Council agrees that it is essential not to lose productive capacity of existing habitat, and the habitat objectives supports this concept. The objectives also incorporate many of the other suggestions made by commenters.

The Council's objective is broader than no net loss of habitat used by depressed natural stocks. The objective is to, as a minimum, maintain the present quantity and productivity of all salmon and steelhead habitat. This will support rebuilding depressed natural stocks, as well as maintaining and improving all stocks of salmon and steelhead in the Columbia River Basin. The Council's objectives do not include reaching certain habitat rehabilitation acreages by certain dates. It is expected that the action called for throughout the habitat section will be pursued aggressively, to improve and maintain salmon and steelhead habitat as soon as possible.

**Maximizing return.** *Comment:* Rather than calling for priority actions that "maximize productivity per dollar spent," emphasize actions that "best meet the specific objectives in a cost effective manner." This allows for the possibility that with some stocks (e.g., those listed under the ESA) there may not be time to wait for long term measures that would maximize productivity. Habitat objectives should not only call for maximizing dollar input only in terms of fish productivity, it should include consideration of resource impacts as well. One way of changing habitat from good to excellent would be to remove resource activities from a basin, but this would have great negative impact.

*Response:* This objective has been modified to address economic concerns has been adopted: "For actions that increase habitat productivity or quantity, give priority to actions that maximize the desired result per dollar spent. . . . [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."

Most of the concerns expressed by commentators may be addressed through comprehensive watershed management of private lands, as are outlined in section 6.5.

**Numerical targets.** *Comment:* Goals need objectives, such as natural production targets, to provide clear direction. The habitat section lacks a sense of direction because it has no explicit objectives that tie goals to principles, standards and actions.

*Response:* Although the Council did not adopt numerical objectives, it called for the development of performance standards (based on specific criteria and illustrative examples). As these are developed, they may be linked to other elements of the program framework. For naturally reproducing stocks of salmon and steelhead, numerical objectives have been delineated by the fisheries managers in the Integrated System Plan and the subbasin plans. These objectives may be refined over time through processes called for by the coordinated production and habitat section.

**Coordination.** *Comment:* Coordination of activities should not be viewed as a habitat goal, but as a process or methodology to meet the habitat goal.

*Response:* Coordination of all human activities affecting production of salmon and steelhead on a watershed basis is an objective that will benefit the users of each subbasin. Comprehensive watershed management is not a process or a methodology. It is an approach that over time can be implemented using appropriate processes and/or methodologies as are needed for each specific subbasin. The program delineates generally, and in some instances specifically, what processes and/or methodologies should be used to initiate and refine comprehensive watershed management.

### **Habitat policies.**

**Generally.** *Comment:* Call for all federal agencies to fully comply with state water quality standards. Completing the necessary watershed inventory and evaluation work will take time, but it is vital that the program habitat section make it absolutely clear that forest management and other activities continue to be regulated by existing state and federal laws, regulations and rules until such time as new information may warrant changes. The policies are consistent with



the Idaho Anadromous Fish Management Plan. Recognize that state forest practices acts in Washington and Oregon are dynamic; give them time to see if they can be effective. Current statutes and regulations for forestry and mining, if properly administered, complement the proposed measures.

*Response:* The Council policy requires, at a minimum, that state, federal, local and tribal laws, regulations and policies relating to habitat regulation and management be implemented and compliance required.

**Coordination.** *Comment:* Private parties should be proactive. Comprehensive watershed management is important, but it could hold up projects.

*Response:* To avoid holding up projects, the Council called for Bonneville and other implementors to make special provision for expedited implementation of appropriate, locally-based initiatives (section 6.1), and for high priority habitat projects (section 6.6D). The Council also calls for elevated or new funding, from all relevant sources, for implementation of habitat measures.

**Natural-stock emphasis.** *Comment:* Highest priority for protection should be given to those streams that currently have the greatest production of natural stocks, especially ESA-listed stocks.

*Response:* The Council expects priority to be given to weak stocks, including Endangered Species Act stocks (see sections 2.1A, 6.1 and 6.4A). At the same time, the Council expects that habitat maintenance and improvement activities will occur throughout the Columbia River Basin, where consistent with the program's goals and habitat objectives. Information received by the Council indicates that habitat improvements would be beneficial in most areas of the Columbia River Basin except potentially some wilderness areas.

### **Habitat performance standards.**

**Generally.** *Comment:* Use a scientific, function-based, objectively measurable, widely understood set of descriptive terms for habitat quality. Performance standards alone are not enough to protect and restore fish habitat needed to rebuild runs. Prescriptive measures, including reductions of grazing and land disturbing activities, and temperature requirements should be used.

Enforcement is critical and has not been apparent in the past. This issue should be addressed concurrently with the development of standards.

Incorporate: (1) No-timber-harvest, riparian-zone buffers for perennial and intermittent streams; (2) extended timber harvest locations in key fish-varying watersheds; (3) standards for construction, rehabilitation, and removal of new and

existing roads; (4) prohibition on entries into existing roadless areas; (5) exclusion of livestock from badly damaged and critical riparian areas; (6) additional necessary restrictions on logging, grazing, and other extractive uses; and (7) an emphasis on riparian revegetation in areas where habitat loss is due to grazing, logging, mining and other activities.

In setting standards consider: (1) The standards must address the most important factor(s) of concern; (2) the standard should be based on aquatic habitat perimeters; (3) make sure the standard is technically defensible; (4) don't make a standard that cannot be met in natural, undisturbed systems; (5) recognize the natural variability in aquatic systems, as well as variability involved in techniques used to monitor whether or not the standards have been met; and (6) recognize that the linkages between land management activities in downstream aquatic responses are complex, at best.

Use a site-by-site approach as opposed to a broad prescriptive approach that may have literally nothing to do with the specific needs of a particular watershed.

Habitat managers, not Council, should set habitat standards. Use existing land management programs to develop criteria and guidelines as foundation for habitat performance standards, with funding from Council. Performance standards should consider desired future conditions which will be developed through the U.S. Forest Service policy implementation guide. Habitat performance standards should be coordinated through a regional process.

Delete the performance standards and call for immediate completion and implementation of Allotment Management Plans and Anadromous Fish Habitat Policy and Implementation guides. Reject any habitat performance standards.

*Response:* The Council believes that habitat performance standards are essential to maintaining and improving salmon and steelhead habitat, and has called upon local watershed managers in consultation with fishery, land and water managers to develop watershed-specific performance standards. Draft standards will be reviewed by the Council for consistency, appropriateness and regional coordination.

In the interim, the Council calls on states, tribes, federal agencies, land and water managers, and private landowners to manage activities to maintain the quality and quantity of existing habitat. In so doing, the Council has identified five areas where compliance is important in perennial and intermittent streams to support salmon and steelhead stocks. The Council expects that in development of draft performance standards, the concerns expressed by commentators will be considered.

**Choice between options A, B and the “watershed option”.** *Comments:* Many commenters supported Option A, because it contained specific objectives and told what changes have to be made in land management practices instead of asking. Option A would spur agencies to move forward aggressively. Some supporters contended that the schedule was too long; two years should be sufficient. Option A could be implemented immediately and fine tuned over time. Other comments included: the standard for riparian vegetation and large woody debris should call for retaining all vegetation and large woody debris; the performance standard on sediment should address juvenile rearing habitat, not spawning habitat; water temperature should be described as targets because the relatively low level temperatures may not be achievable; the performance standard should be water quality itself; fine sediments should be limited at all times, not just prior to spawning; a specific standard for riparian areas would be helpful; incorporate a riparian buffer strip standard; specify a lead agency or agencies; and all standards should include a procedural guide by which standards are measured and monitored.

Others contended that option A would cause hardships to users of the land, and failed to address site-specific conditions; failing to recognize that there are site-specific considerations--geological or other nonbiological reasons--that would make the standards inappropriate. If option A is selected, flexibility would have to be built into the standards to reflect natural background conditions such as sediment loading.

Supporters of Option B said it would allow for best management practices to continue in Idaho; provide land and fish managers flexibility needed to address variety of stocks and ecosystems; and allow habitat performance standards to be coordinated in a regional process involving all management entities. Other comments: Option B's first sentence is unnecessarily restrictive and unfair because it is a general approach that doesn't recognize that these factors may not be limiting production and therefore, shouldn't be regulated. Timelines for Option B are unrealistic. Focus first on critical habitat areas where there is sufficient knowledge to develop standards.

Opponents of Option B said it would give too much leeway to subjective criteria; it lacks the accountability of Option A; and would permit significant delay in implementation of actions needed to protect and improve fish habitat.

Others suggested that the two options be combined: Performance standards should rely on best available information and technology, which would blend elements of both options. Adopt Option A and ask for additional information and recommendations with the intent of providing additional standards within the next two years.

A large number of commenters supported incorporation of the watershed option features found in the report titled "Alternatives for Management of Late-Successional Forests of the Pacific Northwest," as giving more specific definition to what habitat management activities should happen. Others opposed it, for reasons similar to those opposing option A.

*Response:* The Council combined what it believes are the best features of options A and B, providing detailed guidance for the development of area-specific standards by affected parties. The Council recognizes that the watershed option identified in the report entitled, "Alternatives for Management Late-Successional Forests of the Pacific Northwest" may include ideas or standards that could be incorporated in identification of site-specific watershed habitat performance standards. To this end, the Council calls for review and consideration of this and other reports and performance standards described in Appendix B.

### **Land management**

**Best Management Practices.** *Comment:* Use of the term "best management practices" is not consistent with present use in state legislation. Best management practices are developed to protect beneficial uses, not to support a broad agency policy or goal. It is unrealistic to expect to develop best management practices for all human activities. Best management practices should be developed for non-consumptive uses such as recreation. Provide seed money for technical assistance to develop best management practices.

Best management practices should be developed to meet the Clean Water Act, not the Council's goals. State agencies should take the lead based upon state water quality criteria. The benefits of following best management practices must be verified, through monitoring and evaluation. But where states will obtain funding for monitoring and enforcement?

Individual Tribes and the Council should consult regarding establishment and implementation of best management practices on Indian lands (CRITFC).

*Response:* The Council believes that establishment of best management practices will support the maintenance and improvement of salmon and steelhead habitat. Draft practices are expected to be consistent with the Clean Water Act as well as the Council's habitat objectives, policies and performance standards. The drafts also should include recommendations for monitoring and for ensuring compliance with best management practices. Recognizing the tribes' sovereignty, the Council will seek consultations to discuss best management practices on Indian lands. Finally, funding of this activity, as with other areas of the habitat section, should derive from a broad range of interested and effective parties.

**Livestock Management Plans.** *Comment:* Allotment management plans and anadromous fish habitat policy implementation guidelines should be completed and implemented immediately. Can the state agencies that have livestock management plans also be asked to revise them? Private landowners? Revision should start with areas where livestock management is causing most negative effect. Amend this section to require reduction or elimination of cattle grazing within riparian zones of degraded streams.

Recognize that the Council's goals, objectives and standards are only one factor in the revision of plans. Federal, state and local governments and affected parties, will continue to have input into the development of all plans. Use the criteria delineated as state water qualities best management practices; if these are being followed, there is no need for another set of policies and management plans.

The schedule for revising livestock management plans is unrealistic. The current program to revise allotment management plans is continuing; we have requested additional funds to accelerate this process. We suggest that completion date be extended to at least December 31, 1997 (BLM). Planning and budgeting for completion of allotment management plans in salmon and steelhead drainages is now scheduled for the end of 1996 (USFS).

*Response:* Grazing on state and private lands may be addressed in the process outlined in section 6.5. Data and information considered in revisions, the role of best management practices, the need for or scope of revisions, and the amount of grazing in riparian zones should be considered in the revision process.

The Council believes that livestock management plans need to be revised on an ambitious schedule. Recognizing that the proposed schedule may be unrealistic, the Council has extended the call for this revision to the end of 1997. The Council will work with implementing agencies to secure federal funds.

**Exchange, purchase, and easements for protecting riparian areas.**

*Comments:* Be careful about calling for riparian land exchanges; private management can be environmentally superior to public management. Land exchange or purchase of privately owned riparian areas is a shortsighted and ineffective approach to the management of riparian lands.

*Response:* The Council recognizes that land exchanges, purchases or easements involving riparian lands may not be the best alternative in all cases, and has modified this measure language to provide that riparian exchanges or purchases that result in net gains of land and public ownership should be considered the lowest priority method. However, such transactions can be valuable tools in maintaining and rebuilding salmon and steelhead populations. The Council believe that these tools should be considered in appropriate areas, together with potential economic impacts.

**Federal Forest Land Management.** *Comment:* Putting the Forest Service in charge of determining consistency of National Forest Plans with rebuilding goals is like putting the fox being in charge of the chicken house. The Council should take charge of this issue in consultation with state and federal fishery agencies and tribes. Call on federal land managers to submit annual reports documenting fish population and habitat status and trends on all federal lands in the Columbia Basin. Support implementation of the U.S. Forest Service policy implementation guide.

All uses of the forest lands should be addressed in this process, not just the Council's goals and standards. This section serves no useful purpose.

*Response:* Management of federal lands to support maintenance and improvement of salmon and steelhead runs in the Columbia River Basin is critical. The U.S. Forest Service and Bureau of Land Management manage lands that comprise over 50 percent of the spawning and rearing areas currently available to salmon and steelhead in the Columbia River Basin. These agencies have committed to implementing the measures called for in the habitat section of the Council's program. Frequent coordination between the federal land management agencies and the Council should address the commentors' concerns. In addition, an annual report has been added to the program calling on these agencies to review their actions effect on salmon and steelhead populations and habitat.

**Coordinated Resource Management.** *Comment:* Coordinated Resource Management is a process, not a "practice." The Coordinated Resource Management section should be an introduction to the rest of section A702(a). Support the coordinated resource management process to involve local landowners, managers and interest groups in watershed resource protection goal setting and planning efforts. This program is underway in several parts of the region and has displayed initial success. This process is an effective way to achieve long-term, lasting improvements in watersheds.

*Response:* A coordinated resource management approach has been incorporated into the cooperative habitat, protection and improvement section of the program.

**Riparian Management.** *Comment:* This is perhaps the most important proposal in the habitat portion of the amendment package. It is essential that this amendment be adopted and implemented as soon as possible. Maintaining all existing shade, vegetation, and large woody debris within riparian areas along streams and restoring degraded riparian areas is critical to the protection and restoration of the runs. Where water quality standards not met in riparian areas, that all management activities, including timber harvest and livestock grazing be

excluded until these standards are met. BLM strongly supports a riparian management goal, regardless of the presence or absence of fish.

Riparian management section is good in concept, but creating properly functioning riparian areas depends on local hydrology and soils, and requires local expertise. Management of riparian areas and watersheds has to be flexible to address site-specific needs. Riparian habitat knowledge is in an embryonic state and this makes it difficult to assess the effectiveness of riparian management actions. Adequate monitoring must occur in riparian areas to determine if problems exist. Identification of what are riparian areas is important; every agency has its own interpretation and idea.

Removal of livestock is not the answer. Hoofed wildlife use riparian areas extensively and their effects need to be considered. Livestock can use a riparian area and the area will flourish. Recent papers and studies have shown that the key is proper management. Management alternatives include developing watering sources for livestock, cross fencing into riparian pastures and additional herding of livestock from these areas.

Research showed that season-long grazing, a traditional form of livestock grazing, is generally detrimental to riparian values. Depending on the type of vegetation you want to promote along the riparian area, early or late season grazing can work to improve the riparian area instead of degrading it.

Look at management in holistic manner. Address limiting factors using weak link analysis. Focus on areas that are essential for populations listed under the Endangered Species Act. Manage riparian areas to avoid building up fuel loads, causing fire danger. Planting trees that are of value in riparian areas, not willows and cottonwoods. Expending scarce federal funds to disrupt current economic activity along riparian areas is ridiculous when excess spawning habitat exists.

*Response:* The Council recognizes the important role that riparian areas play in providing high quality habitat for salmon and steelhead and other aquatic species (see sections 6.6A.4, 6.6A.4, 6.6A.8). In the habitat performance standards, the Council calls for retention of existing vegetation in riparian areas; and development of standards for shading, overhanging vegetation, stream bank stability, stream bank height, stream bank undercutting, water temperature, woody debris, sedimentation, and other factors. The Council also calls for identification and maintenance of riparian areas associated with perennial and intermittent streams that contribute to production of salmon and steelhead, regardless of whether a particular portion of a stream is fish-bearing. The habitat section uses water quality as an index in managing riparian areas for several factors including shade, vegetation and woody debris. The quality and substance of a riparian area is a site-specific consideration, and the Council expects that

site-specific factors will be considered in developing performance standards, protecting and improving habitat on private and public lands, and in developing comprehensive watershed management approaches. The Council will review progress in this regard through an annual report that will be submitted on June 30 of each year.

**Mining.** *Comment:* Support pending federal mining law legislation, and assist state and federal agencies in reviewing and proposing legislative language to improve mining laws.

*Response:* The Council intends to work with implementing agencies to review the effect of mining practices on salmon and steelhead in the Columbia River Basin. This review may identify improvements that could be made to mining laws to promote salmon and steelhead production. As with other measures in this program, the Council will work with the relevant parties to address needed improvements in federal and state law.

**Conservation easements.** *Comment:* Exchange, purchase, or easements of land or water rights is unnecessary; CRM actions can bring about improved riparian conditions. The measure would result in a haphazard, patchwork of acquisitions that might prove of little benefit and would be an administrative nightmare. Acquisition erodes rural communities' economic health; they cannot afford to lose the tax base and increase economic pressures on lands remaining in private hands, thus increasing the possibility of resource damage.

Other commenters supported this measure as a valuable tool in protecting critical land and water resources for salmon and steelhead. Easements may be the most cost-effective alternative in some instances. Cost sharing should also be considered when procuring easements.

*Response:* The Council believes that in some cases exchange, purchase or easements of land or water provide useful options for maintaining and improving salmon and steelhead habitat. Acquisition of easements is the preferred approach for protecting riparian lands. These transactions would be on a willing seller and willing buyer basis, and should be coordinated with other features of the habitat section calling for comprehensive watershed management. As with other measures in the habitat section, the Council has called for annual reports that review progress made on measures addressing this topic.

### **Water Quality and Quantity.**

**Generally.** *Comment:* The Council should call for off-stream storage projects as an alternative to increasing regulation. A Columbia River commission or water compact should evaluate water quality and quantity. States have instream flow statutes that are working well; no further legislation or policy



development is necessary in this area. Existing authorities are inadequate. Irrigated agriculture has proposed a regional water and energy efficiency program to Bonneville.

*Response:* The program calls for evaluation of new storage options as well as potential water savings from regulatory programs. One need not be pursued to the exclusion of the other. The water managers of the four states are scoping a water availability evaluation. The subbasin plans developed by the Columbia Basin Fish and Wildlife Authority do show a number of tributary water problems, and the Council does not believe there is no room for improvement in state water laws. The Council welcomes the involvement of irrigated agriculture in helping to find water for salmon and steelhead.

**Water Quality Study.** *Comment:* The Council should pursue funding for water quality studies and demonstration projects. EPA can not take the entire responsibility for funding this work. Call for: (1) Comprehensive water quality study; (2) basinwide coordination of water quality efforts; (3) water temperature demonstration project in the Grande Ronde subbasin; and (4) a reservoir sediment contamination survey. Request that all discussions of proposed water quality efforts in the Columbia basin emphasize EPA's desire for interagency cooperation in defining needs and carrying out actions.

*Response:* The Council has added several measures to address these comments: A comprehensive water quality study (including a reservoir sediment contamination survey); a basinwide coordination mechanism for water quality efforts; and a water temperature demonstration project in the Grande Ronde subbasin. The Council will work with the EPA to secure funding for necessary actions. Interagency cooperation to define needs and carry out actions has been embodied in the measures.

**Columbia River Estuary Bi-State Study.** *Comment:* Columbia River estuary bi-state studies should be expanded upstream, and states of Oregon and Washington are currently investigating this. It is doubtful that study can be expanded without substantial non-state funding.

Do not expand the bi-state study to include the whole basin because it could increase EPA jurisdiction over headwater areas; and because estuaries are just a small component of the river and to extrapolate decisions or recommendations to the entire Columbia from a study of this area is not logical or practical.

*Response:* The Council calls for an evaluation whether an expanded Columbia River Estuary Bi-State Study study may be more effective in comprehensively addressing inter-related water quality and quantity issues in the Basin, and merits exploration.

**State Water Quality Standards and Compliance Procedures.** *Comment:* Compliance is critical element of an effective water quality program. Date for review of standards and procedures should be delayed until 1993 or 1994. Financial support will be needed.

*Response:* The Council modified the program measure to respond to these comments.

**Protection of Appropriation of Enhanced Instream Flows.** *Comment:* This is a critical element in the protection and restoration of fish in the Basin. Without flow protection, many habitat protection measures will be wasted effort. Encourage states to continue discussions in the interstate agreement work group. Water conservation is needed in the Methow Subbasin to contribute to instream flows.

*Response:* Several measures in the Phase 3 rule address protection of enhanced instream flows. The Council very much appreciates the interstate agreement work group's work on issues related to protecting from appropriation additional water for Columbia and Snake River Basin streamflows. Implementation of these and other water measures is critical to the protection and restoration of salmon and steelhead in the Columbia River Basin. These measures address water flows in the mainstem of the Columbia and Snake rivers, as well as in tributary areas.

**Enhancing Instream Flows for Salmon and Steelhead.** *Comment:* Establish instream water rights on the mainstem Columbia and Snake rivers and all tributary streams that contribute to salmon and steelhead production. Enforcement of all the provisions on existing water rights including elimination of wastes, and the regulation of rate and duty. Call for a moratorium on the issuance of any new water rights in streams that contribute to salmon and steelhead production, and undertake an aggressive program for the purchase, lease and gift of existing water rights. The Council should work with state and federal agencies and Congressional and state legislative contacts to ensure that legislation affecting water allocation and usage is consistent with the program.

*Response:* The Council recognizes the critical importance of instream flows to protecting and rebuilding the Columbia Basin's salmon and steelhead runs.

**Enforcing Water Rights.** *Comment:* This is critical issue. Need to eliminate illegal water use and revisit old water rights to assure efficiency and protection of public trust resources. Illegal use is occurring on a massive scale in Oregon. States will need significantly increased field staffs to effectively enforce existing water rights. Measuring devices need to be put on all diversions. The

federal government should pay for the purchase and installment of new measuring devices.

*Response:* The program measure calls for improved enforcement and installation of measurement devices in new and existing diversions. The cost associated with this measure, as with other measures in the habitat section, is expected to be spread among all affected entities in an equitable manner. The Council agrees that more discussion of funding arrangements is needed (see program p. 14).

**Water Availability.** *Comment:* Before additional water rights from the mainstem Columbia and Snake rivers and their tributaries are issued, a water availability assessment needs to be completed. Good resource management requires timely and accurate budgeting of resource use and, therefore, a significant effort should be made to project water availability on an annual basis, to show the amount of water needed by the salmon and steelhead and the amount of water available for other needs on a month-by-month basis. Water efficiency and water conservation measures should not result just in cutting irrigation.

*Response:* The state water managers are scoping a regional water availability assessment. Rather than a blanket moratorium, the Council called for a multi-faceted approach to the problem. See also Phase 2 Response to Comments, pp. 64-65. In response, the states have adopted significant new restrictions on water diversions, and are in the process of considering further protections.

**Water Conservation Demonstration Projects.** *Comment:* Water conservation is fine, as long as conserved water is protected from downstream appropriation. Water conservation projects should consider substantial benefits of changes in delivery systems from continuity between ground and surface waters allow, such as with the Methow Valley Irrigation District system. Benefits include removal of diversion dams, increased efficiencies, and elimination of the need for screens. Bureau planning will not be completed until end of 1993.

*Response:* This measure is currently being implemented by the Bureau of Reclamation. The planning deadline has been extended to the end of 1993. Other comments may be incorporated into the planning process.

**Water Diversion Screening.** *Comment:* This is an important step in reducing fish mortality and all agencies and parties must coordinate efforts in funding to assure this measure is implemented. Passage is not adequate at all diversion facilities. Irrigation diversions are being screened to protect migrating smolts. Work with state agencies and water user groups in cooperative efforts to improve monitoring of diversions to assure compliance with relevant water rights. Diverters should be required to participate in funding.

*Response:* Since this measure was adopted in August 1991, progress has been made to increase funding and expand the program. It is expected that this program will continue to expand so that all Columbia River Basin water diversions in the tributaries and mainstem areas that affect salmon and steelhead are screened as expeditiously as possible.

**Underwater diversion inspection program.** *Comment:* The Corps is carrying out the program.

*Response:* The Council appreciates the Corps of Engineers efforts. It appears reasonable to expect that repair, updating and, where necessary, installation of screens on all mainstem diversions can be completed by the end of 1995.

**Habitat project selection criteria.**

*Comment:* We oppose the draft habitat project selection criteria because state and federal governments might force the livestock industry to comply with the criteria as a condition of technical help or money for habitat improvement. Habitat criteria should not include (1) State water rights reserved for instream flows; (2) potential for private groups to maintain water rights for instream flows; and (3) future water withdrawals eliminate jeopardy for salmon projects. Do not adopt habitat project criteria until they have been evaluated and tested by the fisheries agencies and tribal fishery managers.

The habitat criteria listed in the program are appropriate and should not be simplified. They complement the Council's habitat goals, and can be clarified. The criteria can be applied flexibly to accommodate different types of projects. Add an additional criterion that project should not conflict with federal wild and scenic designated streams.

Limiting factor analyses are expensive and burdensome, and should not be required in project proposals. Moreover, a true limiting factor analysis is likely to focus on mainstem passage. It is legitimate to require proponents to state the purpose and rationale for projects, but not in this way.

*Response:* The Council did not adopt the habitat project selection criteria. Habitat project selection criteria can be developed and refined through the implementation planning process (see section 6.1). The annual implementation work plan should include a listing of criteria that have been used for selection of projects for any particular year. The comments received on this proposed measure will be forwarded to the Bonneville Power Administration and Columbia Basin Fish and Wildlife Authority for review and consideration in developing habitat project selection criteria.

**Identification of annual habitat project priorities.** *Comment:* The deadline for completing action item 4.2 of section 1403 of the 1987 program should be extended indefinitely, if these project address the program's goals.

*Response:* The habitat projects listed in Action Item 4.2 of Section 1403 of the 1987 program may be considered in subregional planning, and in developing the annual implementation work plan. The Council's expectations for this process are delineated in section 6.1.

### **Streamlined Process for Funding Projects.**

*Comment:* The streamlined process for funding projects should include an oversight framework. Purchasing land to preserve it for fish and wildlife is a good idea, but the current process needs to be faster to avoid delay.

*Response:* The Council will consider these comments in working with Bonneville and the fishery managers to implement this measure.

### **Comprehensive Watershed Management.**

**Generally.** *Comment:* An integrated planning approach that includes participation by diverse parties is critical to successful habitat protection and restoration. Coordinated watershed approach will have greatest long-term benefit for the salmon and steelhead resource. We are not in favor of comprehensive watershed management when watershed is in private ownership. Voluntary best management practices will do more to help salmon than comprehensive watershed management.

Bonneville should not fund this kind of planning, especially when it would repeat system planning and tell us no more than we already know.

Replace section A703 (comprehensive watershed management) with Coordinated Resource Management Planning.

Watershed planning should be shown to be effective and efficient before this type of planning is expected to supersede other planning efforts.

*Response:* The Council is convinced by the large body of evidence demonstrating the advantages of managing watersheds comprehensively. This approach requires the coordination of planning and implementation activities in a watershed to ensure the consistency of goals and actions. The end result is all users of the watershed, including salmon and steelhead, 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 focusing activities on 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 and institutionalized in each subbasin.

The Council has called for the development of best management practices for human activities that affect salmon and steelhead elsewhere in the phase three rule. These practices could be implemented as part of a local watershed management approach under section 6.5A (Coordination of Watershed Activities).

The watershed approach called for by the Council is intended to be action-oriented. Rather than repeating earlier planning, it should refer to existing plans and identify appropriate, on-the-ground activities to maintain and improve salmon and steelhead habitat. The Council believes that a primary source for identifying habitat actions for salmon and steelhead should be the subbasin and integrated system plans. These plans are the result of analysis that identified priority problems for salmon and steelhead stocks and the various alternative approaches that might be used to address these problems. The problems have not disappeared since the plans were initially compiled, although some of the recommendations for preferred approaches may have. In all events, these plans comprise a rich source of information to help the region successfully manage and improve habitat.

In the final amendments, the coordinated resource management approach is given as an example of an approach that the Council expects to be implemented in subbasins to coordinate watershed activities. At the same time, the Council does not view comprehensive watershed management as the only approach that could be used.

**Conservation districts as lead.** *Comment:* Rely on state or local conservation districts as lead entity to coordinate within subbasins. Secure adequate long-term federal funding for the Soil Conservation Service to provide technical assistance to watersheds.

*Response:* The Council agrees that the Soil Conservation Service, state conservation commissions, and local conservation districts need to be involved, perhaps as leaders, in comprehensive watershed management. Other entities also may be appropriate leaders, and appropriate states and localities need to participate in this determination. For this reason, the Council left this question to the states.

**Subbasin coordinators.** *Comment:* The function of the state level coordinators should be clearly defined before such positions are established.

Funding for the position should be transferred after one year to the appropriate participating federal or state agency.

Implement an urban area streams restoration program. Local utilities would sponsor the effort and provide funding and coordination. Bonneville would provide matching funding, technical support and design.

*Response:* Bonneville funding should be viewed as seed money, although funding for specific activities in the future is not precluded. The Council expects that continued funding will be provided from available sources through in-kind or direct funding to maintain efforts to coordinate activities on a watershed-level. Products of these efforts will be submitted to the Council and National Marine Fisheries Service for review for consistency with other efforts and activities, as well as to identify funding sources and assist in obtaining funding for appropriate activities. The Council encourages efforts to develop coordinated watershed management approaches in urban as well as all other areas in the Columbia River Basin.

### **Model watersheds.**

**Generally.** *Comment:* Model watershed projects developed by local people are a good idea. Broad-based participation, including local government representatives and private land owners is essential. Private landowners are critical since they own 50 percent of riparian areas in most watersheds.

Citizen groups do not have the same rights and obligations as state, tribal, and federal governments and elevating them to "quasi-agency" status will bring development and implementation of coordinated watershed plans to a grinding halt. We are concerned that model watershed on Lemhi will cause more regulation of local interests.

Phase 1 model watershed program should be implemented and evaluated before we start on new project.

Implementation of model watersheds should not delay any of the other measures in the program such as the obligation of the Forest Service and BLM to implement coordinated watershed management.

*Response:* The Council agrees that all parties, including local governments and landowners, with an interest in each model watershed need to be involved in development of the comprehensive watershed management approach for these subbasins. This does not mean that citizen groups or any other groups take on governmental status. Rather, all those who have a stake in the watershed and knowledge about alternative approaches to management of the watershed, should be involved. In fact, the Council believes that a locally based, bottom up,

approach to protection and improvement of habitat is the best way to bring private land into a process to maintain and rebuild salmon and steelhead.

Changes to the model watershed measure in phase 3 only clarify the Council's expectations for the phase 1 measure.

The federal land managers should be participants in comprehensive watershed management in subbasins where they own land. The Council does not expect that these activities should cause delays in implementing agency programs.

**Contents of model watershed plans.** *Comment:* Elements of a model watershed plan should be articulated in greater detail.

*Response:* The Council does not encourage the development of new plans for each model watershed. If possible, model watershed teams can identify plans in their area, identify gaps, conflicts and priority actions. These actions should include on-the-ground projects, resolution of conflicts between plans and other activities in the subbasin, filling gaps in plans, or acquiring more information about the watershed.

**Selection of model watersheds.** *Comment:* We would like more specificity on the selection of additional watersheds. Look at Oregon's strategic water management group's criteria for prioritizing subbasins. Work with the first group of model watersheds should be completed before additional watersheds are selected.

*Response:* The program does not say how additional model watersheds might be selected. Because the model watersheds program is a pilot, the Council does not know whether additional model watersheds will be chosen.

**Schedule for model watersheds.** *Comment:* The Council is overly optimistic in what can be accomplished in the first year of implementation.

*Response:* The Council's intention is to jump-start comprehensive watershed management, and have on-the-ground projects in the second year of each model watershed project. Comprehensive watershed management developed in this process should improve and evolve over time. It is expected that it will take years to approach fully comprehensive watershed management. The list of tasks is a guide to work in each watershed that will be repeated and refined over time, to achieve a long-term, comprehensive watershed management approach.



## **COORDINATED MONITORING, EVALUATION, AND IMPLEMENTATION.**

### **Monitoring and evaluation.**

**Generally. Comments:** Monitoring and evaluation are essential and should be beefed up. We prefer independent monitoring to "consensus science" (NMFS Recovery Team). The Scientific Review Group that is currently part of Bonneville's implementation planning process is well suited to the proposed monitoring work. The group probably would have to be augmented by a small, full-time staff (BPA).

Evaluation criteria should developed by an unbiased review group, and keyed to fish and wildlife program goals and objectives. A basinwide evaluation report would be prepared using the evaluation criteria. Monitoring and evaluation should include cost-effectiveness. The program should say how an adaptive management approach to achieving goals, rebuilding schedules and biological objectives will be achieved. A monitoring and evaluation mechanism should address biological objectives through performance standards, and a trigger mechanism for program amendments (however, monitoring may underestimate variability because it does not segregate estimation error and natural variation). The Council's System Monitoring and Evaluation Program would be a good foundation for a monitoring and evaluation program.

Models should be used in combination with actual observations to track trends. Any monitoring system should encompass juvenile fish survival below Bonneville Dam; otherwise you will not be unable to evaluate what is happening.

**Response:** In response to these comments, the Council expanded and reordered the program's monitoring and evaluation provisions in several ways.

The Council put an independent scientific group in a pivotal role in the monitoring process (7.2B). The System Monitoring and Evaluation Program will provide a starting point for this group's work. Bonneville's scientific review group may well be the core of the independent scientific group. The Council understands that the group may require contractors or a small staff to perform effectively.

In developing the program framework, the idea of tying survival targets (biological objectives) to performance standards can be explored. The independent scientific group should be part of those discussions. When the Council considers additional framework elements, it can consider the idea of a trigger mechanism for program amendments.

The Council agrees that models must be combined with actual observations.

Recognizing the importance of understanding juvenile fish survival below Bonneville Dam, the Council called for studies of ocean survival and its relationship to freshwater survival.

### **Implementation.**

**Council role.** *Comments:* The Council's only role is to develop a program; it should not tell Bonneville how to implement the program. Provide general direction and give the parties a broad charge to come up with an expanded implementation process and report to the Council.

The Northwest Power Act directs the Council to define Bonneville's participation. Responsibility for fish management lies with the fish and wildlife agencies and Indian tribes. Bonneville should have no role in fish and wildlife decisions.

*Response:* The Council concluded that the expanded scope and complexity of the recovery effort requires a different approach to implementation: The Council added a section to the program (pp. 80-81) clarifying the Council's role vis-a-vis implementing agencies. The fish and wildlife agencies, Indian tribes and Bonneville must play key roles in coordinating, accelerating and streamlining program implementation. This section is aimed at speeding the full implementation of the fish and wildlife program. Implementation requires a large number of agencies, and a strong system of coordination is needed. But this does not mean that implementing agencies are being given a license to treat the fish and wildlife program as a menu from which they can pick and choose things they want to implement. The program is in place and should not be slowed down by second-guessing. In addition, by calling for a strong executive function, the Council does not challenge the authorities of implementing agencies. The roles of the fish and wildlife agencies, Indian tribes and the Bonneville Power Administration, for example, are vital. It bears repeating the the fish and wildlife program must complement the activities of the fish and wildlife agencies and Indian tribes. Finally, the Council is not abdicating any of its own responsibilities in this section. It is true that the Council is not an implementor. However, the fish and wildlife program will continue to set the priorities for implementation, and the Council will operate in the oversight role that the Northwest Power Act intended.

**Role of the implementation planning process.** *Comments:* The Implementation Planning Process can be expanded (BPA). Expanding the Implementation Planning Process poses problems. The Implementation Planning Process is a consensus process, and cannot be easily modified. Instead of expanding the implementation planning process, ask the fish and wildlife agencies, Indian tribes and Bonneville to establish subregional forums to compile "annual implementation registers." Alternatively, project proponents should

submit detailed recommendations (“fleshed out detailed proposals’ as opposed to the ‘ideas’ or ‘bones’ it now receives (with the flesh added in the IPP process”) to the Council, followed by Council consultation and public review and comment leading to program amendments, implemented by Bonneville.

*Response:* The Council believes that an expanded implementation planning process is the logical place to coordinate, accelerate and streamline program implementation. The Council has specified the elements of the annual workplan for this process, but leaves to the implementing agencies the design of an efficient and effective structure.

**Prioritization and cost-effectiveness.** *Comments:* Do not view this amendment process as the end of system integration. Cost-effectiveness, interactions between measures, and program prioritization have not been adequately addressed. There is an overriding need to address priorities in program implementation, given human and financial limits. The Council should establish criteria to facilitate priority-setting.

*Response:* The Council devoted considerable energy to prioritization during phase 3 of the amendment process. The Council evaluated the potential cost and effectiveness of alternative measures before adopted the final amendments. In addition, the six principles the Council adopted in connection with the program goal should aid priority-setting in future program implementation. The Council also adopted several measures calling for cost-effectiveness evaluation and prioritization in the implementation process. Efforts to integrate program measures conceptually also will be aided by further development of the program framework.

### **Analytical Methods Coordination**

**Generally.** *Comments:* Delete this entire section, which does nothing for fish. Given the fishery managers’ unwillingness to share information, there is no point in pursuing this initiative. The program lacks any accountability requirements.

*Response:* One of the key purposes of this section is to ensure that information needed to determine the success or failure of program measures, and to improve future decisions, is organized efficiently and accessibly. It would be illogical to seek better accountability without taking steps to coordinate the information needed to determine accountability.

**Regional analytical methods coordination.** *Comments:* The goals or scope of the process are unclear, and so would be difficult to implement. The objective should not be to achieve a single modeling approach; this is neither achievable nor desirable. Bonneville should not be expected to fund all model

development in the region, but to develop documentation standards, review and coordination of well-documented models, and initial compilation and distribution of data through CIS.

*Response:* The Council made a number of changes to the analytical methods section to clarify the goals and scope of the process. The Council agrees that the objective should not be to develop a single model, but to coordinate and understand the differences among models. Bonneville has agreed to fund the expenses of the fish and wildlife agencies and Indian tribes to participate in this process. This process is being coordinated by NMFS.

**Research and monitoring information dissemination.** *Comments:* This is a worthwhile provision, but some wording changes are advisable (BPA). Bonneville is doing this, and this section is unneeded.

*Response:* Bonneville has made some good efforts to disseminate research results. The thrust of this provision, however, is to make sure that research results are accessible through the coordinated information system, to ensure even wider dissemination.

**Coordinated Information System.** *Comments:* Policy and management questions surrounding CIS need to be resolved. Bonneville has already wasted too much money on this enterprise, which has foundered on the issue of who decides what information can be put in the data base. If CIS proceeds, participation and funding should include fish agencies, tribes, and others. State agencies with the data should fund data publication and dissemination. Include harvest data.

*Response:* The Council agrees that the CIS needs to be streamlined, and is working with interested parties to that end. The Council does not see much disagreement about what information should be put into the data base. The state agencies are funding a portion of this work.

**Project accounting data base.** *Comments:* Bonneville already has a project accounting system.

*Response:* There have been a number of problems with the existing system, which Bonneville and the Council have agreed need to be remedied.

**Evaluation of new technologies.** *Comments:* It is unrealistic to expect owners of valuable new ideas to volunteer title to them. There is no need to create a new committee to do this. Council and Bonneville processes are adequate. Coordinate this with FPDEP, to avoid duplication.

*Response:* The program does not assume that owners of valuable ideas will volunteer title to them. Rather, the Council wishes to make sure that such ideas

are not overlooked in the rush to pursue existing strategies. The Council does not propose to create a committee to do this, necessarily. Where possible, consideration of such ideas should rely on existing processes, such as FPDEP.

## **MITIGATION OF ADVERSE EFFECTS**

### **Authority.**

*Comments:* Ratepayers are responsible only for mitigating the impacts of the hydropower system on fish, not for mitigating the impacts of fish mitigation on other parties. Bonneville's obligation is limited to measures that protect, mitigate and enhance fish and wildlife under the Northwest Power Act, and measures required under the Endangered Species Act. The Northwest Power Act provides no authority for the Council even to conduct a mitigation study, which should be left to impacted parties.

*Response:* The Council salmon strategy responds in part to direction from the region's Governors and congressional delegation to develop a comprehensive regional approach to weak stock recovery. Understanding, planning, and implementing strategies to ease the impacts to the region's economy are essential to this regional effort. While the Council responded to the need for a comprehensive approach, the Council cannot assert authority beyond the provisions of the Northwest Power Act. Ratepayer-funded mitigation would be appropriate only for measures to address the effects of hydropower facilities, including appropriate off-site mitigation measures. The mitigation effort may include costs for which ratepayer funding would be appropriate, and other costs for which ratepayer fund would be inappropriate. In view of this, the Council deemed it advisable for ratepayer funds to finance only a share of the mitigation planning; the Council did not single out Bonneville as the funding source for economic impact mitigation measures. The introduction to Section 8 discusses the need to distribute the burden of the funding regionally and nationally.

### **Nature of impacts.**

*Comments:* Before asking for mitigation funding, the Council must refine the definition of "disproportionate impacts." Analysis must focus on one level of the economy -- the consumer -- to avoid double counting. Businesses can transfer capital assets; these should not be treated as total losses, and the focus should be on transition costs. Avoid the term "mitigation," because that term is so often used to refer to fish and wildlife mitigation.

*Response:* The Council recognizes the need to clarify what impacts are "disproportionate." This should be discussed as the parties identify mitigation needs and proposals.

The Council agrees that analysis of increased cost to the consumer is appropriate - particularly in evaluating the regional and national contribution to salmon rebuilding measures. However, the amendment language recognizes that individual businesses are affected to varying degrees by specific changes in river

operations. The Council remains committed to identifying those impacts. The introductory language in Section 8 specifically focuses the discussion of mitigation needs on transition costs.

The Council used the term "mitigation" instead of "compensation" intentionally. Mitigation means softening the impact of actions. Compensation implies a payment to negate the financial impact of an action.

**Schedule.**

*Comments:* It is not realistic to expect a mitigation plan by July, 1992.

*Response:* The Council adopted an ambitious schedule to develop information in time for congressional action. In 1992, Congress provided some assistance for impacts from the Snake River drawdown test. The Council will continue to work towards recommending an approach to economic mitigation that focuses on easing transition to new river operations. The Council expects further development of mitigation recommendations as part of the drawdown planning process and through other, specific, measures (e.g., changed operations at Dworshak reservoir, and development of harvest alternatives).

## **TECHNICAL APPENDIX E**

Technical appendix E is not part of the fish and wildlife program. However, a number of comments were submitted on the appendix, and the Council believes that clarifying the strengths and limitations of the analysis is important. For more information on the models that were used in the analysis, see pp. 6-8, above.

### **Assumptions generally.**

*Comments:* We appreciate the appendix as a starting point for discussing alternative rebuilding schedules. However, many of the assumptions and approaches are not supportable or accepted. Continue to improve understanding and, where possible, strive for consensus. The analysis is the best analysis that could be done with data that are severely limited and uncertain, to the point of invalidating the production curves. The analysis should spell out these limitations more clearly. Evolving models, including the Snake River fall chinook model, are insufficiently documented and understood. The analyses for spring and summer chinook appear to be slanted in assumptions and sensitivity analysis: much is made of uncertainty of transportation benefits, but not of reservoir drawdown and flow augmentation, which are modelled with favorable assumptions. Assumptions for the benefits of habitat and adult passage improvements are overly optimistic. The values used for adult survival, predator reduction, fish guidance efficiency during drawdown, habitat benefits, prespawning survival are questionable. Ranges should be used. The analysis also should reflect the uncertainties and difficulties of finding more water for fish in the Snake River Basin. The assumption that there will be 1.427 million acre-feet in dry years is risky. The starting point for the analysis was a stable 1979-91 average, while we have seen declining stocks. This difference in starting point gives an unrealistically optimistic value.

*Response:* Whenever possible, staff based its assumptions on published figures. Where there was no such support for a given variable, the analysis relied on staff's best judgment of plausible assumptions. To determine the significance of key assumptions, sensitivity tests were done to ascertain the extent to which the results of the analysis would change with different assumptions. Indeed, the analysis of the sensitivity of the options to uncertainty in these assumptions was a major purpose of the analysis. In the process of developing framework elements in the coming months, these assumptions and their sensitivity can be evaluated further. Regarding assumptions for transportation and drawdowns, see discussion below.

### **Analysis of lower Snake reservoir drawdown.**

**Benefits of drawdown.** *Comments:* We strongly disagree with the analysis results that indicate the four pool drawdown option will provide the greatest



benefits for the Snake River Spring Chinook. We have conducted prior reviews of the Council Passage Analysis Model (report for the Northwest Irrigation Utilities by Darryl Olsen, John Stevenson, and Don Weitkamp). A close examination of the graph that describes the sensitivity analysis of the four pool drawdown shows the modeling analysis probably contains some inherent errors in the fish transportation logic. The Council staff only reduced the fish guidance efficiency (FGE) variable to 50 percent of the current level.

**Response:** The analysis did not indicate that the four pool drawdown option can be expected to provide the greatest benefit for Snake River spring chinook. It did indicate that the four pool drawdown option holds potential for increasing survival in the average or better flow years if a number of uncertainties turn out favorably. It also indicates that drawdown would actually lower survival relative to the baseline in the lower flow years, based on what we know about transportation. The decrease in survival in low flow years is the result of losing the ability to transport fish from Lower Granite and Little Goose dams. The analysis also showed that drawdown is extremely vulnerable to uncertainty in a number of key factors such as predator control and fish guidance efficiency. The Olsen report reiterates the conclusions of our analysis regarding drawdown, only stating them much more strongly. They agreed that drawdown would decrease survival under low water conditions given our present understanding of transportation. They agreed that the success of predator control was essential to drawdown while high FGE was also critical.

Sensitivity analyses were intended to identify the key uncertainties that affect passage options before the Council. We do not know what effect drawdown will have on fish guidance efficiency (FGE). The analysis used a mid-range value to test the sensitivity of drawdown to FGE. The analysis showed that the four-pool drawdown option is very sensitive to reduced FGE while the Lower Granite drawdown option is less sensitive. Our mid-range FGE value was chosen to illustrate this effect, not to support a specific drawdown hypothesis. If we assumed an FGE of zero at the drawn down projects, the results would differ only in degree.

**Scope of analysis. Comments:** The analysis limited its evaluation of variables that may be impacted by the Four Pool Drawdown to only transportation and FGE. Other factors such as impacts of gas supersaturation, elimination of the food chain in the Snake River reservoirs, and changes in predation were not addressed. The powerhouse capacities used by Council staff in their analyses exceed the projected powerhouse capacities under a drawdown scenario by about 50 kcfs.

**Response:** The analysis did not purport to examine all the factors that might affect drawdown, but only to perform an initial analysis of drawdown, looking at the most obvious benefits and drawbacks. Future analysis of

drawdown by the drawdown committee will include some of the features that concern commenters. The Council is open to information showing a potential reduction in powerhouse capacity as a result of drawdown, which would increase spill and could increase gas supersaturation mortality. Future analysis of drawdown will incorporate a relation between reservoir elevation and powerhouse capacity as this information on specific reductions in powerhouse capacity becomes available.

### **Transportation assumptions.**

*Comments:* The results of the analysis are extremely sensitive to assumptions about transportation benefits. The assumptions are based on one study of modern transportation conditions, which is too narrow a basis for judgment. Transportation benefits are not independent of in-river conditions. If you must use a transport-benefit ratio, use the most conservative one, and the results should not be deemed significant for stocks that have not been studied, such as Snake fall chinook. Test the sensitivity of transportation assumptions. If collection and transportation are feasible in the Lower Granite drawdown, why not in the four-pool drawdown?

*Response:* The analysis did consider the sensitivity of transportation assumptions. The graph showing the sensitivity of these assumptions indicated that if transportation benefits are assumed to be high, drawdown would result in 50% fewer fish; if transportation benefits are assumed to be low, drawdown would result in 80% more fish. Thus, if transportation has a high benefit, then drawdown, which eliminates transportation, has to have an extremely high benefit to outweigh the loss of transportation. Contrariwise, if transportation has a relatively low benefit, then drawdown does not have as much to overcome. At the extreme, for example, if transportation did not exist, then drawdown would be a clear winner. On the other hand, if transportation had a very high benefit at all flows, then drawdown would be a clear loser.

The analysis assumed that transportation facilities at Lower Granite would be modified to allow continued transportation, but that with a four-pool drawdown, transportation facilities at dams below Lower Granite would not be modified. Modifying transportation facilities at a drawn down Lower Granite project would allow a demonstration of the drawdown strategy without losing the benefits of transportation. Indeed, a Lower Granite drawdown should improve transportation because higher velocities should improve survival to Lower Granite Dam. However, in order to maintain the ability to transport fish in a four pool draw down, all of the navigation locks would have to be reconfigured. The idea of a four-pool drawdown has been proposed as a replacement for transportation. It would make little sense to incur the expense of modifying navigation locks and transportation facilities simply to test the drawdown concept.

## **Flow-survival relationship**

*Comments:* We question why the sensitivity for all of the options fails to address the assumption concerning the appropriate flow/survival relationship. Moreover, we object to the use of the Sims and Ossiander data as the basis for the flow/survival relationship in the System Planning Model because of the statistical weaknesses inherent in this information.

*Response:* The analysis used the exponential model of the flow-survival relationship, which is used by the fishery agencies and tribes. The Council felt that using other models would vary the results of the analysis only in degree, and therefore a sensitivity analysis was not as important as other sensitivity analyses we ran. However, such an analysis could be run in connection with future consideration of drawdown questions. The Council has committed to a rulemaking process in 1993 to further consider the relationship between flow, velocity and fish survival.

While the Sims and Ossiander data are certainly vulnerable to criticism, it is difficult to find an alternative data set. Indeed, even those who criticize these data use the same data to support their arguments (e.g., arguments that flows above 85 kcfs offer no biological benefit; PNUCC flow proposal August 28, 1991). The Sims and Ossiander data were also the basis for the model work done by the Army Corps of Engineers using FISHPASS, and BPA's analysis using CRISP.0, including BPA's biological assessment for 1992 operations. The only alternative to using the Sims and Ossiander data at this time is to assume that all mortality in the reservoirs is the result of predation and then predict mortality on the basis of residence time and predator activity. This is the approach taken by BPA in their CRISP.1 model. We are working on a flow model of this sort as an alternative to the Sims/Ossiander data. This work could not be completed in time to use in this amendment process.

## **Turbine and bypass mortality.**

*Comments:* The analysis fails to consider recent data that indicate turbine mortality and bypass mortality may be substantially different than previously reported.

*Response:* The assumptions that we are using for turbine and bypass mortality are the same ones used by practically all analysts that have looked at the problem. This includes the MPAC analysis and all analysis reported by BPA and the Corps to date. Recently these same assumptions were reviewed and approved by NMFS for the analysis of 1993 operations on Snake River spring, summer, and fall chinook. See Phase 2 Response to Comments, p. 23, regarding recent evaluation of bypass mortality at Bonneville Dam.

**Iterative analysis.**

*Comments:* The Council staff revised the analysis in the course of the amendment process.

*Response:* The analysis was changed once during the course of the public discussion of the results, due to a refinement of the passage survival model. The change modified the results of the analysis only in degree. The Council took care to make the results of this analysis available to interested parties. Refinements in analysis as better information and methods emerge is a positive aspect of the use of models in public policy development.

## **SYSTEM ANALYSIS MODEL STUDY**

The Council completed a preliminary analysis of the mainstem flow amendments to the Fish and Wildlife program adopted in phase 2 of the amendment process (unchanged in phase 3), using the System Analysis Model. The System Analysis Model was developed collaboratively in the early 1980s, and is the standard tool in the Northwest for evaluating the implications of proposals for changed hydro system operations. Results of that analysis were sent to hydropower system modelers in the region for comment. This section summarizes those comments and the Council's response to them.

### **Flow augmentation.**

*Comment:* The Pacific Northwest Utility Conference Committee (PNUCC) commented that they continue to support the immediate actions called for in the Phase 2 amendments although they believe that those actions "do more than is necessary with respect to flow augmentation."

*Response:* This section deals with technical adjustments required to correctly model the Phase 2 amendments, not biological opinions or policy judgments concerning the effectiveness of those actions.

### **Impact on hydropower system.**

*Comment:* PNUCC comments that the Phase 2 amendments will undermine the hydro system's reliability to electric consumers. They say that the hydro system cannot simultaneously provide 12,500 average megawatts of firm energy and 3 million acre-feet of water for flow augmentation on the Columbia River during critical water conditions.

*Response:* The Council agrees that the hydro system cannot provide both during critical water conditions. It was never intended, however, for the hydro system to provide replacement energy for the 3 maf during poor water years. In those years, when no secondary hydro energy is available to curtail, the region would rely on out-of-region energy to replace the energy being withheld in reservoirs for later flow augmentation. In no case will the reliability to the electric consumer be degraded. If purchases cannot be made then the flow augmentation water is not stored and flows suffer. Under such a scenario the region must then build a new resource(s) to provide the replacement energy to store flow augmentation volumes in future years.

In further analysis, the Council will examine a scenario in which the region builds a replacement resource.

### **Cost.**

*Comment:* PNUCC comments that the estimated cost of the Phase 2 actions are too low. They contend that using real-levelized costs will miscommunicate the total cost to the region's rate payers. They suggest that total "out-of-pocket" cost over a 10-year horizon is a better indicator of cost to rate payers.

*Response:* The Council agrees that there is more than one way to express cost. This issue has been debated before the Council on numerous occasions. In this case, the costs incurred to the power system represent Phase 2 short-term action costs only. (In the long term, Phase 2 actions call for a greater drawdown of the four lower Snake projects and the feasibility of those actions has not yet been completely analyzed). In order to best estimate the short-term costs, the Council believes that real-levelized costs better represent the real costs borne by the region over the next several years. It is unlikely that the region would build a resource over that time period to replace lost FELCC. Instead, the Council believes that the region would more likely purchase energy, if needed, to replace lost firm generation. The Council believes that the real-levelized cost for a combustion turbine closely reflects the actual cost (in mills/kilowatt-hour) of purchased energy over a one or two year interval.

In the long term, a greater loss of FELCC is expected due to the drawdown of the four lower Snake projects. At some time in the future the region must replace that lost firm energy. At that time, the cost of building a replacement resource(s) can be expressed in either real-levelized or nominal-levelized dollars. The Council has adopted the use of nominal dollars to express long-term resource costs (staff issue paper # 89-21, Financial and Economic Assumptions, May 9, 1989). Using nominal dollars to express the cost of the Phase 2 amendments would about double the value.

If using nominal costs is still not conveying the proper message to consumers, then those costs can be translated into increases in Bonneville's wholesale electricity rate. The Council's analysis showed about a 4% increase in wholesale power rates, and a 2% retail rate increase.

The Council does not agree with PNUCC's assertion that "out-of-pocket" 10-year costs better convey the true cost of the Phase 2 actions.

### **FELCC loss.**

*Comment:* PNUCC comments that the estimated loss of firm energy (FELCC) is too low. They believe that the estimate for the Snake River actions is too low and also that the Council is not reflecting potential FELCC losses due to the Columbia actions.

**Response:** The Council recognizes that the 30 average megawatt FELCC loss estimate for the Snake River actions is lower than other estimates in the region. The Council agrees that further modeling will be necessary to more accurately describe the proposed changes to system operations.

The Council is working closely with Bonneville staff, NMFS, and others to examine the critical period operation in the System Analysis Model (the critical period operation is what determines the hydro FELCC value). Some changes to the critical period operation have been suggested which could potentially increase the FELCC loss. This issue is still under review.

Under the assumed operation in the Columbia River, by definition, the region will experience no loss of firm energy. If actions on the Columbia call for purchase of out-of-region energy and that energy is not available, then the required volume of water for flow augmentation will not be stored. Under that scenario, the region must then build a resource(s) to provide the replacement energy to store flow augmentation volumes even under the worst water conditions.

PNUCC contends that this scenario is likely to happen at some point in the future and that the region should not wait to plan for a replacement resource. In this "firm planning" approach, the hydro system would provide the required storage volume whenever called for and the subsequent loss of FELCC would be made up with a firm resource(s). PNUCC has estimated the firm energy loss to be about 330 average megawatts. This approach is more costly to the region but it does provide a higher probability of meeting the required storage volume target.

The Council analyzed a similar "firm planning" strategy during the Salmon Summit proceedings and found that not only would this firm planning strategy be more costly but also that it would have indirect effects on other reservoirs--Libby and Hungry Horse, for example, are drafted a little deeper to make up some of the FELCC that is lost. Because of these reasons, the Council decided against a "firm planning" approach. Although the final amendment language does not specify precisely what methods are to be used to store the water for flow augmentation, it was the Council's intention that the specified amount of water be provided at least cost, and least impact to other reservoirs.

#### **FELCC loss due to Snake River actions.**

**Comment:** The Bonneville Power Administration (Bonneville) comments that the estimated FELCC loss due to the Snake River actions is too low. In SAM, the hydro regulator splits the month of April but the energy dispatch is done for the whole month. Bonneville suggests that because of this, secondary energy from the second half of April may be used to meet loads in the first half, thereby reducing the FELCC loss.

*Response:* The Council also recognizes this problem and agrees that the FELCC loss would be higher if this operation is changed. SAM has been modified to address this problem.

**Minimum operation pool at Lower Monumental.**

*Comment:* Bonneville commented that the Minimum Operating Pool (MOP) elevation for Lower Monumental is incorrect. They suggest using 537.5 feet as the MOP elevation.

*Response:* The appropriate SAM data files have been changed to correct this. The elevations at the four lower Snake projects and John Day reservoir have been adjusted to reflect more realistic elevations.

**Priest Lake elevations.**

*Comment:* Bonneville suggested that the elevations for Priest Lake are too low.

*Response:* The elevation for Priest Lake is measured with respect to its minimum operating pool level. All other projects' elevations are measured with respect to sea level. Leaving the elevation of Priest Lake at its present value will not bias any analysis performed with SAM.

**Dworshak and Lower Granite outflows.**

*Comment:* Bonneville commented that the outflows at Dworshak and at Lower Granite are lower in May under the Phase 2 operation. They suggest that this contributes to a smaller FELCC impact.

*Response:* The Council is aware of the lower flows in May. Part of the Phase 2 actions call for the volume of water budget in the Snake River to be used in the second half of April and also in June. By "spreading out" the water budget, some May outflows will be lower than under the pre-Phase 2 operation. In general, the Phase 2 actions provide more water for flow augmentation than the original water budget.

**Priest Rapids flows.**

*Comment:* Bonneville comments that the flows at Priest Rapids in the second half of April and in June are lower in the Phase 2 case. This occurs because Columbia River reservoirs will store as much as they can to compensate for the extra generation produced in the Snake River. Bonneville suggests that keeping the Columbia River reservoirs constant would provide a more accurate



indication of the FELCC loss due to Snake River actions and would not interfere with potential Columbia River storage activities.

*Response:* The Council agrees that the Phase 2 actions called for in the Snake River would reduce flows at Priest Rapids in the second half of April. During that time period, Columbia River reservoirs will attempt to withhold as much of the extra generation produced from Snake River projects as possible. Also, during the second half of April, Columbia River actions to store water for flow augmentation in May and June may still be in operation. These actions will also reduce the flows at Priest Rapids.

It is not clear that Priest Rapids flows in June are lower in the Phase 2 case. The Council's analysis shows that during low water conditions, the average June flow at Priest Rapids is greater than that in the pre-Phase 2 case. For some wet years, however, the flows are lower in the Phase 2 case. This occurs because SAM will attempt to even out the flows between May and June. For these years, some of the high May runoff is held back (to the extent possible) for release in June.

#### **Combustion turbines and DSI top quartile.**

*Comment:* Bonneville observed that combustion turbines were not included in the Council's studies and that the Direct Service Industry's (DSI) top quartile interruptible loads were curtailed beginning in September of the critical period. Under a normal critical period operation, those loads would be served through December of the first year.

*Response:* Combustion turbines were used in the Council's analysis. They were only removed for that part of the analysis that determined the hydropower system's firm energy generating capability (critical period analysis). For that analysis, combustion turbines were removed to simplify the analysis. However, their absence in no way biased the results. For a critical period analysis, it is only important that the Northwest hydropower system be isolated (i.e., has no out-of-region transactions) and that no thermal resources are displaced by hydropower.

The DSI interruptible load should be served through the first December of the critical period because the hydropower system will shift energy into the fall to do so. In the spring, if the shifted energy cannot be repaid (i.e. during the critical period), then other DSI loads are curtailed to pay back the borrowed water in the fall. For the critical period analysis only, the shift limits were set so that the DSI top quartile would not be served with borrowed hydropower in the fall. This was done to simplify the analysis and should not bias the results. Once the hydropower FELCC was established, the shift limits were replaced and shifted hydropower was allowed to be used to serve DSI top quartile loads in the fall.

#### **Identifying representative loads.**

*Comment:* Bonneville comments that the loads in the first half of April in 1931 are significantly higher than the loads in the second half. 1930 shows exactly the opposite effect and in 1929 the loads are about equal. Bonneville suggests that these loads are not representative.

*Response:* The derivation of monthly load shapes in SAM has been reviewed. SAM has been modified to address this issue. The net effect of this imbalance is small.

#### **Elevation for dummy Snake River reservoir.**

*Comment:* Bonneville suggests that the "dummy" upper Snake reservoir should start at some elevation less than full to represent the temperature control operation in the previous August.

*Response:* The Council's preliminary analysis assumed that the "dummy" upper Snake reservoir would be full at the beginning of September. The Council agrees that it should be at some lower point to reflect previous spring and summer actions. This will be corrected for any future analysis.

#### **Front-loading stored volume.**

*Comment:* For the Columbia storage operation, Bonneville suggests that more of the stored volume should be "front loaded," that is, more than 50 percent of the total required volume should be in storage by the end of February.

*Response:* The Phase 2 amendments do not specify how the flow augmentation volume for the Columbia River is to be stored, just that it must be in storage by the end of April. For this analysis, it was assumed that 25 percent of the required volume would be stored in each of the four months between January and April. The Council agrees with Bonneville that this approach is only one potential storage strategy and may not necessarily be the most efficient. In some years, it may be wiser to store more in January and February due to conditions in the hydro system. In other years, water stored early may be forced out due to changes in flood control requirements and therefore a "back loading" strategy might be best.

For further analysis, an algorithm should be developed which will determine the appropriate amount of storage for each month based on forecasted runoff volume. In some years this would mean front loading the volume and in others it could mean back loading. Council staff is working with Bonneville staff to develop a methodology to address this issue.

#### **Storage in Grand Coulee and Arrow.**

*Comment:* Bonneville questioned why in February of 1929, the required 750 kaf of water was not stored in Grand Coulee and Arrow.

*Response:* For the 1929 water condition, actions under the Phase 2 amendments call for the storage of 3 maf in Columbia River reservoirs by the end of April. In the staff's analysis, one quarter of the required amount (750 kaf) was to be stored in each month between January and April, unless a Vernita Bar flow limit (at Priest Rapids) would be violated or unless no room is available to store or unless local project constraints prevent such actions.

In February of the 1929 water year, although Grand Coulee was already at its flood control level, Arrow had plenty of room to store and the outflow at Priest Rapids was high enough to not constrain any storage actions. Also, no local project constraints were limiting the amount of storage. After reviewing the logic, it was discovered that the accounting methods were not correct in this month. The full amount should have been stored.

The logic that calculates the amount of water to be stored has been corrected.

### **Storing spilled energy.**

*Comment:* Bonneville observed that in March of water year 1934, the U.S. system spilled 1,500 megawatt-months of energy while at the same time room was available in Canadian non-Treaty storage space. Bonneville questions why the U.S. did not take advantage of that space and store the spilled energy.

*Response:* This operation has been reviewed. Currently SAM does not allow the U.S. to take advantage Canadian non-Treaty storage space. If policies change, SAM can be adjusted to take advantage of this operation.

### **Dispatching resources.**

*Comment:* Bonneville observed a potential problem in the way that SAM dispatches resources. In the pre-Phase 2 case, in April of the 1930 water condition, energy from B.C. Hydro was purchased at 37.8 mills/kilowatt-hour while combustion turbines were available to be dispatched at 33.7 mills/kilowatt-hour.

*Response:* This could be related to the modeling of service to the DSI interruptible load. Under certain conditions, SAM determines that the interruptible load should not be served. In that case, combustion turbines are never dispatched to satisfy that load but are used only if required to meet firm

loads. B.C. Hydro, however, sees a potential market and will dispatch any resource to meet that load as long as it is economical to do so.

The dispatch algorithm was reviewed to insure that SAM does in fact produce the most economic and consistent operation in all cases. The apparent discrepancy occurs because the studies were done on a 50-year continuous basis. In other words, the starting elevations for all reservoirs at the beginning of the second year is the same as it was for the end of the previous year. After one year, the base case and Phase 2 case begin to diverge and different starting contents may call for different policy actions to occur. After further examination, it was determined that the SAM operation in this case was acceptable.

### **Disparity in firm loads.**

*Comment:* Bonneville observed that firm loads in the Phase 2 case for September through June are about 30 average megawatts lower than the pre-Phase 2 case. Yet the loads are about the same for July and August. They do not understand why this should be.

*Response:* In the Council's analysis, the load/resource balance of each case (pre-Phase 2 and Phase 2) was identical. The Phase 2 case had a 30 average megawatt lower hydro FELCC due to the new operation on the Snake River. To compensate for the lower hydro FELCC, a 30 average megawatt resource was acquired. To simplify the analysis, staff assumed that a conservation (load reduction) resource would be used. In fact, the simplest way to accomplish this was to drop annual loads by 30 average megawatts. This assumption assumes that the monthly shape of the conservation resource would exactly match the load shape for the region. This assumption is an approximation, and for a small FELCC loss, this assumption is appropriate. For cases where the FELCC loss is significantly larger, a more realistic replacement resource should be used. Either a thermal resource or a conservation resource with a more well defined monthly shape should be used.

### **Estimated market point price.**

*Comment:* Bonneville observed that in some cases, the estimated market point price is different between the pre-Phase 2 and Phase 2 cases. This leads to different treatment and prices for Canadian hydropower energy blocks.

*Response:* The pricing for the Southwest market was reviewed and it was determined that the SAM operation was appropriate. Because the studies were done on a 50-year continuous basis, after one year the base case and Phase 2 case begin to diverge, meaning that reservoir elevations at the beginning of each water year will be different. Different starting elevations may call for different policy actions and different pricing strategies.

### **Differences in combustion turbine operation.**

*Comment:* Bonneville observed differences in the combustion turbine operation between the pre-Phase 2 and Phase 2 cases. This led to a different operation for B.C. Hydro and affected B.C. Hydro's Shrum operation and non-Treaty operation.

*Response:* This observation does not necessarily mean that the simulation was incorrect. The dispatch logic in SAM has been reviewed and determined to be appropriate in each case. See also response to prior comment.

### **Actual energy regulation.**

*Comment:* Bonneville observed that in some months the Actual Energy Regulation (AER) did not produce the required FELCC in the pre-Phase 2 case. Yet in the Phase 2 case the AER generated the proper FELCC.

*Response:* The AER operation has been reviewed and SAM has been modified to correct the problem. This has little impact on the final results.

### **Using less than entire water budget.**

*Comment:* It was observed that in some years, not all of the water budget volume in the Snake River was used.

*Response:* This phenomenon is related to the mechanism used to release the water budget volume. In SAM, variable target outflows for Lower Granite are used to release the water budget volume. The target outflows are a function of runoff condition, in other words, the higher the runoff forecast, the higher the target. A minimum and maximum value were also set. This mechanism was used as a means to spread out the release of the water budget volume. If in one year the runoff came early, say in the second half of April, then most of the water budget volume would be held back for use in May and the first half of June. Or, conversely if the runoff was late in a particular year, then most of the volume would be used up early.

For further analysis, the parameters used to set the target flows will be revised to insure that all water budget volume is released by the end of the migration period, unless specific project limitations (such as spill limits) would be violated.

### **High Lower Granite flows.**

*Comment:* It was observed, in discussions with Bonneville staff, has observed that for the critical period operation in the Phase 2 case, a very high flow occurs at Lower Granite in June of the 1931 water condition. It is not clear what is causing this extra release since it is well above the required amount based on the Phase 2 actions. Correcting this action would have the effect of lowering the FELCC loss.

*Response:* The critical period operation has been reviewed and SAM has been modified to address this issue. The Council continues to work with Bonneville and others on modelling issues such as this.

**Consistent use of actual and forecasted runoff.**

*Comment:* It was observed that actual April-July runoff volumes for the Snake River at Lower Granite were used to calculate the water budget volume to be used from the Dworshak reservoir. In the final analysis, forecasted runoff volumes should be used.

*Response:* Forecasted runoff volumes will be used in further analysis.

## **DISPOSITION OF RECOMMENDATIONS**

**AF-0006, Columbia Basin Fish and Wildlife Authority (Replace Section 205 with provisions: (1) Adopting the Integrated System Plan to provide direction to all implementors; 2) recognizing that the plan is a dynamic document, and that objectives should be established on a subregional basis; 3) calling on BPA to fund measures consistent with the three priority levels in the plan; 4) calling on the Columbia Basin Fish and Wildlife Authority to submit annual reports on implementation and proposals for change; and 5) calling for Council action based on such reports).**

**The Council modified these proposals by calling for: 1) The Integrated System Plan to be used as a resource document, with other resource plans, in a subregional process (section 6.1B); 2) an expanded implementation planning process to coordinate and prioritize the actions of implementing agencies using policies established in connection with the fish and wildlife program's goals (section 2.1A); 3) the preparation of implementation workplans (section 7.1B.2) and monitoring reports (section 7.2A); and 4) implementation of the workplans, subject to Council review. Insofar as these measures are inconsistent with recommendation AF-0006, the Council rejects the recommendation and finds that the adopted measures are more effective (16 USC 839b(h)(7)(C)), primarily for two reasons. First, the Integrated System Plan needs to be adapted to the needs of weak stocks and the requirements of the Endangered Species Act (see Phase 3 Response to Comments, pp. 11-12). Second, the program requires the involvement of a broader range of implementing agencies than is accounted for in the recommendation.**

**AF-0012 and 13, U.S. Bureau of Reclamation (water conservation demonstration project in Snake Basin). The Council adopted the recommendations, as modified in section 6.6B.7.**

**AF-0018, Oregon Trout (Hatchery operations and policy development). The Council adopted the recommendation, as modified in section 6.2B.**

**AF-0019, Oregon Trout (Establish biological goal). The Council adopted the recommendation, as modified in section 2.1A (goal).**

**AF-0020, OT-04, OT-07, Oregon Trout and PNUCC-01, Pacific Northwest Utilities Conference Committee, (Establish escapement objectives for natural and wild stocks).**

**(Adopt spawning escapement objectives before receiving BPA funding). Oregon Trout (Implement a wild production policy: 1) collect data on wild fish populations; 2) develop a management program to maintain them, address limiting factors, and monitor and evaluate; 3) establish escapement goals; and 4) annually report on**

the results. The Council adopted the recommendation as modified in sections 6.2A.3-5 (information collection); 2.1A, and 6.1 (develop watershed and population-specific measures that respond to weak stock needs); and 6.2A.6 (wild and naturally-spawning population policy; and 7.2A (annual report, including stock status).

AF-0023, Trout Unlimited (Mark all artificially-produced fish). The Council adopted the recommendation, as modified in section 6.2B.16-20 (marking hatchery salmon).

AF-0029, Washington Department of Fisheries (Lower Columbia coho restoration). The Council adopted the recommendation, as modified in section 6.3D.

AF-0030, Washington Department of Fisheries (Study limiting factors of chum salmon and potential for population enhancement). The Council adopted the recommendation, as modified in section 6.3E (Columbia River Chum Salmon).

AF-0031, Bjornn (Smolt collection at Lower Granite). The Council adopted the recommendation, as modified in section 3.9.10.

AF-0032, National Marine Fisheries Service (Captive broodstock program). The Council adopted the recommendation, as modified in section 6.2G.1.

AF-0033, National Marine Fisheries Service (Evaluate carrying capacity of mainstem Columbia and Snake rivers for juvenile salmonids). The Council adopted the recommendation, as modified in section 6.2E (Environmental impacts and carrying capacity).

AF-0036, Idaho Trout Unlimited (Review harvest methods). The Council adopted the recommendation, as modified in sections 5.3, 5.4 and 5.5A.1.

AF-0037, Idaho Trout Unlimited (Production oversight group to: (1) oversee program implementation; and (2) develop a monitoring program that administers a gene bank, data base, and information on disease monitoring). The Council adopted the recommendation, as modified in sections 7.1-7.2 (coordinated implementation and monitoring), 6.2G.3-4 (cryopreservation) and 7.6 (coordinated information system).

AF-0042, Water Watch (Umatilla Basin water conservation, reallocation to instream use, enforcement of permits and other water management issues). The Council adopted the recommendation, as modified in section 6.6B.18 (Umatilla subbasin pumping project).



AF-0044, Washington Department of Wildlife (Resident Fish Substitution above Chief Joseph Dam and research at Moses Lake). This recommendation is deferred to phase 4, which will address resident fish measures.

AF-0045, U.S. Fish and Wildlife Service (water velocity standard for mainstem migration; improved coordination of hatchery operations). The Council adopted the recommendation for improved coordination of hatchery operations, as modified in section 6.2B. The Council rejected the recommendation for a water velocity standard for reasons given in connection with AF-0040, Phase 2 Response to Comments, Appendix V, p. 4.

AF-0046, Eugene Water & Electric Board (Recognize installation of existing screening and bypass at Leaburg project); AF-0047, National Marine Fisheries Service (Improve existing fish bypass screen at Leaburg dam); and AF-0048, National Marine Fisheries Service (Improve adult fish passage at Leaburg and Waterville projects). The Council adopted these recommendations, as modified in sections 4.1.14 & 15.

AF-0050, Warm Spring Tribes (Resident fish study for Bull Trout). This recommendation should be considered in phase four of the amendment process.

AF-0052, Umatilla Tribe (Lamprey research and restoration). The Council adopted the recommendation, as modified in section 6.2G.9 (Pacific lamprey).

AF-0054, Umatilla Tribe (Sturgeon supplementation). This recommendation is deferred to phase 4, which will address resident fish measures.

AF-0055, Nez Perce (Sturgeon hatchery between Lower Granite and Snake River dams). This recommendation is deferred to phase 4, which will address resident fish measures.

AF-0058, Pacific Northwest Utilities Conference Committee (Improve hatchery operations for smolt quality and reduce wild stock impacts). The Council adopted the recommendation, as modified in sections 2.1A, 6.2B (Goal and Improved operations of hatcheries).

AF-0061, Columbia River Inter-Tribal Fish Commission (Priority to rebuild wild and natural fish runs). The Council adopted the recommendation, as modified in section 2.1A (Goal).

AF-0062, Columbia River Inter-Tribal Fish Commission (Subregional planning). The Council adopted the recommendation, as modified in section 6.1B (subregional process).

AF-0063, Columbia River Inter-Tribal Fish Commission (Scientific Coordination Group). The Council adopted the recommendation, as modified in section 7.2C.1, 7.1B.3 (key uncertainties identified by independent scientific group, actions including research projects address key uncertainties).

AF-0064, Columbia River Inter-Tribal Fish Commission (Program Evaluation Group). The Council adopted the recommendation, as modified in section 7.2B (Independent scientific evaluation).

AF-0065, Columbia River Inter-Tribal Fish Commission (Coordinated information system). The Council adopted the recommendation, as modified in section 7.6.

AF-0070, Columbia River Inter-Tribal Fish Commission (Chelan PUD design, implement and evaluate a surface water downstream passage facility at Rocky Reach dam). The Council adopted the recommendation, as modified in section 3.7B.9.a (testing and evaluation of prototype bypass system).

AF-0071, Columbia River Inter-Tribal Fish Commission (1) operate all Columbia Basin hydropower projects within 1% of peak efficiency; 2) retrofit new turbine facilities at Bonneville first powerhouse). The Council adopted the recommendation for rehabilitation of old generating units at Bonneville (section 3.7B.4). The Council rejected the 1% of peak efficiency measure for the Mid-Columbia projects. These projects are already operating within 1% of peak efficiency where and whenever practicable, and adding such a requirement would do little for fish survival (see discussion at pp. 31-32, above). For periods of time in which such operations would be impracticable, the Council deemed the suggestion as not properly a recommendation because the measure is not one the Council could expect to be implemented by the relevant federal agency (16 USC 839b(h)(2)(A)).

AF-0073, Columbia River Inter-Tribal Fish Commission (monitor transportation). The Council adopted the recommendation, as modified in sections 3.9.3, 3.9.5, 3.9.7-8.

AF-0080, (Improved propagation at existing facilities). The Council adopted the recommendation, as modified in section 6.2B (Improved operations of hatcheries).

AF-0081, Columbia River Inter-Tribal Fish Commission (Bonneville fund development and testing of small-scale propagation facilities). The Council adopted the recommendation, as modified in sections 6.2D.1 and 6.2C.3.

AF-0082, Columbia River Inter-Tribal Fish Commission (Adopt Integrated System Plan supplementation guidelines). The Council modified the recommendation by calling for: 1) The Integrated System Plan, including its supplementation sections, to be used as a resource document in a subregional process (section 6.1B); 2)

coordination and prioritization of proposed in an expanded implementation planning process (section 2.1A); 3) the preparation of implementation workplans (section 7.1B.2) and monitoring reports (section 7.2A); and 4) implementation of the workplans, subject to Council review. Insofar as these measures are inconsistent with this recommendation, the Council rejects the recommendation for reasons given in connection with AF-0006.

AF-0083, Columbia River Inter-Tribal Fish Commission (Research and restore lamprey). The Council adopted the recommendation, as modified in section 6.2G.9 (Pacific lamprey).

AF-0095, Columbia River Sportfishing Association (BPA participate in feasibility study of ways to improve harvest management in lower river and ocean). The Council rejected this recommendation, finding that it did not address the effects of hydropower facilities, 16 USC 839b(h)(5), and was not an appropriate off-site enhancement measure, 16 USC 839b(h)(8)(A).

AF-0099, Bonneville Power Administration (Coordination and operation of hatcheries). The Council adopted the recommendation, as modified in sections 6.1, 6.2A.6-7, 6.2A-D.

AF-0101, BPA-20, Bonneville Power Administration (Flow-survival studies). The Council adopted the recommendation, as modified in section 3.6F.

AF-0103, Bonneville Power Administration (Juvenile fish migration elements). The Council adopted the recommendation, as modified in sections 3.3-5, 3.6B-C, 3.7-9.

AF-0110, Idaho Department of Fish and Game (Setting goals and objectives for salmon and steelhead). The Council adopted the recommendation, as modified in sections 2.1A, 2.2, 3.5, 3.6F, 5, 6.1C and 7.6.

AF-0113, Idaho Department of Fish and Game (improved practices at existing artificial production facilities, integrating natural and artificial propagation, natural production monitoring and sockeye protection). The Council adopted the recommendation, as modified in sections 6.1, 6.2A, 6.2B, 6.2C and 6.3A.

AF-0114, Idaho Department of Fish and Game (travel time objectives and water budget revisions). The Council rejected the recommended travel time objectives on the ground that the adopted measures (section 3) are a more effective way to protect, mitigate and enhance fish and wildlife (16 USC 839b(h)(7)(C)). See Phase 3 Response to Comments, p. 16, above.

AF-0116, Idaho Department of Fish and Game (Harvest management: 1) Escapement objectives; 2) regulate harvest in accordance with Council master

plans; 3) Council review of Compact and Columbia River Fish Management plan; 4) BPA share funded for electrophoresis; 5) BPA fund stock identification and known-stock fishery programs; and 6) condition habitat funds on compliance with harvest policies and escapement objectives). The Council adopted the recommendation, as modified in sections 5.1A-C (escapement objectives and rebuilding schedules); 5.3 & 5.4 (known-stock fisheries and stock identification); and 5.1A.1 (establishing and managing for escapement objectives and future funding).

### Production measures.

CBFWA-01, Columbia Basin Fish and Wildlife Authority (Increase fish feed palatability). The Council rejected the recommendation on the ground that it would not address the effects of hydropower facilities, 16 USC 839b(h)(5) & 7(A), and is not appropriate as an offsite enhancement measure.

CBFWA-12, Columbia Basin Fish and Wildlife Authority (Study natural production capabilities for selected Snake River tributaries). The Council adopted the recommendation, as modified in section 6.3B0.

CBFWA-48, Columbia Basin Fish and Wildlife Authority (Inventory Lower Columbia habitat). The Council adopted the recommendation, as modified in section 6.3D.

CBFWA-62, Columbia Basin Fish and Wildlife Authority (Develop spawning and incubation channels for Lower Columbia River chum salmon). The Council adopted the recommendation, as modified in section 6.3E.

BPA-06, BPA-14, BPA-15, BPA-16, BPA-17, Bonneville Power Administration and OT-05, Oregon Trout (Stream Habitat and Fish Population Monitoring; Wild Fish Life Cycle -- PIT, spawning surveys, wild/natural smolt physiology studies). The Council adopted the recommendations, as modified in section 6.2A and 7.6. Wild/natural smolt physiology studies also are called for generally in section 703(e)(1) of the 1987 fish and wildlife program.

The Council adopted a process (see section 6.1, coordinated production and habitat and subregional planning) that should be used to evaluate the following production recommendations:

CBFWA-08, Columbia Basin Fish and Wildlife Authority (Clearwater and Salmon Rivers master production planning). (See also section 6.2D.2.)

CBFWA-13, Columbia Basin Fish and Wildlife Authority (Construct Yankee Fork bioenhancement facility).

**CBFWA-19, Columbia Basin Fish and Wildlife Authority (Selway River Summer Chinook Enhancement Project).**

**CBFWA-21, Nez Perce Tribe (Assessment and Preservation of Summer Chinook Genetic Material in the South Fork Salmon River).**

**CBFWA-22, Columbia Basin Fish and Wildlife Authority (Develop acclimation facilities for summer chinook in Johnson Creek and the South Fork Salmon River).**

**CBFWA-23, Columbia Basin Fish and Wildlife Authority (Panther Creek Trap and Haul).**

**CBFWA-27, Columbia Basin Fish and Wildlife Authority (Evaluate feasibility of summer steelhead smolt trapping in selected tributaries to the Okanogan, Methow, Entiat and Wenatchee Rivers).**

**CBFWA-30, Columbia Basin Fish and Wildlife Authority (Feasibility of reintroducing sockeye salmon into Grande Ronde River and into Warm Lake of the South Fork Salmon River).**

**CBFWA-34, Columbia Basin Fish and Wildlife Authority (Reintroduce spring chinook and summer steelhead into Omak and Salmon Creeks).**

**CBFWA-39, Columbia Basin Fish and Wildlife Authority (Rehabilitate Looking Glass Hatchery).**

**CBFWA-40  
Columbia Basin Fish and Wildlife Authority (Rehabilitate Kooskia Hatchery).**

**CBFWA-41, Columbia Basin Fish and Wildlife Authority (Rehabilitate Carson Hatchery).**

**CBFWA-42, Columbia Basin Fish and Wildlife Authority (Rehabilitate Bonneville Hatchery).**

**CBFWA-43, Columbia Basin Fish and Wildlife Authority (Rehabilitate Sawtooth Hatchery).**

**CBFWA-44, Columbia Basin Fish and Wildlife Authority (Rehabilitate Rapid River Hatchery).**

**CBFWA-45, Columbia Basin Fish and Wildlife Authority (New rearing ponds at Skamania Hatchery).**

**CBFWA-58, Columbia Basin Fish and Wildlife Authority (Operate smolt collection facilities at Rocky Reach Dam).**

**CBFWA-61, Columbia Basin Fish and Wildlife Authority (Provide well water to South Santiam Hatchery).**

**CBFWA-64, Columbia Basin Fish and Wildlife Authority (Complete holding and spawning facilities at Winthrop Hatchery).**

**USFSR6-02, U.S. Forest Service Region 6 (Acclimation pond for juvenile steelhead, Wind River).**

**Habitat recommendations:**

**AF-0024, U.S. Forest Service (Habitat Bloc from Salmon Summit Habitat Subgroup). The Council adopted the recommendation, as modified in sections 6.4, 6.5, and 6.6.**

**AF-0028, Washington Department of Fisheries (Bonneville fund environmental review of proposed construction activities and water diversions to determine compliance with state law). The Council rejected the recommendation on the ground that it would not address the effects of hydropower facilities, 16 USC 839b(h)(5) & 7(A), and is not appropriate as an offsite enhancement measure.**

**AF-0059, Pacific Northwest Utilities Conference Committee (Establish Habitat Advisory Committee). The Council rejected this recommendation on the ground that it would be less effective than the adopted recommendations for protecting, mitigating and enhancing fish and wildlife. 16 USC 839b(h)(7)(C).**

**AF-0066, Columbia River Inter-Tribal Fish Commission (Develop habitat database). The Council adopted the recommendation, as modified in section 7.6 (Coordinated information system habitat data base).**

**AF-0085, Columbia River Inter-Tribal Fish Commission (Maintain habitat at current level of quality and improve degraded habitat). The Council adopted the recommendation, as modified in section 6.4.**

**AF-0086 & 0087, Columbia River Inter-Tribal Fish Commission (Guidelines for forest plans). The Council adopted the recommendation, as modified in section 6.6A.**

**AF-0089, Columbia River Inter-Tribal Fish Commission (Protect existing riparian area and restore damaged areas). The Council adopted the recommendation, as modified in section 6.4A & B.**

AF-0096-98, AF-0102, BPA-04, Bonneville Power Administration (Comprehensive habitat measures for Snake River spring, summer and fall chinook and sockeye). The Council adopted the recommendation, as modified in section 6.

AF-0127, Columbia-Snake Mainstem Flow Coalition (Shift to private landowners BPA habitat restoration monies). The Council rejected the recommendation on the ground that it would not protect, mitigate or enhance fish and wildlife affect. 16 USC 839b(h)(7)(A). In doing so, the Council does not intend to preclude projects involving private landowners, but cannot conclude that such projects are necessarily entitled to priority.

AF-0128, Association of Northwest Steelheaders (Policy against removing natural barriers to salmon and steelhead migration). The Council rejected the recommendation on the ground that the adopted recommendations, including the policy to undertake no action that poses appreciable risk to biological diversity, section 2.1A, would better protect, mitigate and enhance fish and wildlife, 16 USC 839b(h)(7)(C).

CBFWA-10, Columbia Basin Fish and Wildlife Authority (Five year implementation plans for habitat and tributary passage). The Council adopted the recommendation, as modified in sections 6.1A & B.

PNUCC-03, Pacific Northwest Utilities Conference Committee (Restrict grazing and protect riparian areas from additional degradation due to logging). The Council adopted the recommendation, as modified in section 6.6A.

USFSR4-03, U.S. Forest Service Region 4 (Concepts, methods, and requirements for protection and recovery of weak anadromous stocks). The Council adopted the recommendation, as modified in sections 6.2A, 7.2A & B.

USFSR4-04, U.S. Forest Service Region 4 (Develop GIS to evaluate forest management effects on fish habitat). The Council adopted the recommendation, as modified in section 6.6A.1.

USFSR6-20, U.S. Forest Service Region 6 (Inventory current habitat for comparison with historical data). The Council adopted the recommendation, as modified in section 6.6A.1.

The Council adopted a process (see section 6.1, coordinated production and habitat and subregional planning) that should be used to evaluate the following habitat recommendations:

AF-0001, Department of Agriculture, U.S. Forest Service Region 6 (Include habitat restoration projects submitted under phase one rulemaking that concluded August 14, 1991).

**AF-0008, Nez Perce National Forest (Habitat restoration and water quality project in Newsome Creek).**

**AF-0009, Nez Perce National Forest (Habitat in Red River).**

**AF-0025, Boise National Forest, Payette National Forests (Steelhead and summer chinook habitat, South Fork of Salmon River).**

**AF-0043, U.S. Soil Conservation Service (Prairie Creek watershed project).**

**AF-0053, The Nature Conservancy (Land and critical water rights on John Day River).**

**AF-0079, Columbia River Inter-Tribal Fish Commission (Remove Enloe Dam on the Similkameen and Condit Dam on the White Salmon). The Council calls for passage above these projects to be considered in the process outlined in section 6.1 (coordinated production and habitat and subregional planning). For Enloe Dam, rather than dam removal, the existing program calls for any holder of a license for an operating hydroelectric facility to design and construct 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, then FERC should require the licensee to build and operate appropriate downstream passage facilities. Upstream passage could provide the region with the opportunity to establish an anadromous fish run in more than 320 miles of habitat in the Similkameen Basin. This could be considered as off-site enhancement or mitigation for mainstem Columbia River anadromous fish losses that would not be the responsibility of the Enloe project licensee. Determination of regional responsibility, if any, for upstream passage facilities will be decided at a later time. The Council finds that this would be a more effective way to protect, mitigate and enhance fish and wildlife than would dam removal (16 USC 839b(h)(7)(C)).**

**BLM-01, Bureau of Land Management (Stream Restoration of Pine Creek).**

**CBFWA-14, Columbia Basin Fish and Wildlife Authority (Passage improvement and habitat enhancement in East Fork Salmon River).**

**CBFWA-15, Columbia Basin Fish and Wildlife Authority (Asotin Creek Habitat Improvements).**



**CBFWA-17, Columbia Basin Fish and Wildlife Authority (Study life history and critical habitat needs of chinook salmon and steelhead in Grande Ronde Basin).**

**CBFWA-28, Washington Department of Wildlife (Map summer steelhead habitat in Tucannon, Okanogan, Methow, Entiat, and Wenatchee Rivers).**

**CBFWA-31, Columbia Basin Fish and Wildlife Authority (Improve streamflow in Okanogan River for Sockeye Salmon).**

**CBFWA-33, Yakima Indian Nation (Fish habitat improvement in the Klickitat subbasin).**

**CBFWA-35, Columbia Basin Fish and Wildlife Authority (Improve fish passage into upper Klickitat River).**

**CBFWA-50, Bureau of Land Management and CBFWA (Complete Habitat enhancement on South Fork Clearwater).**

**CBFWA-51, Columbia Basin Fish and Wildlife Authority (Complete habitat enhancement on upper Clear Creek, Middle Fork of the Clearwater River).**

**CBFWA-52, Columbia Basin Fish and Wildlife Authority (Remove barrier on South Fork of Clear Creek, Middle Fork of the Clearwater River).**

**CBFWA-53, Columbia Basin Fish and Wildlife Authority (Complete habitat enhancement and barrier removal at Fish Creek, Lochsa River).**

**CBFWA-54, Columbia Basin Fish and Wildlife Authority (Complete habitat enhancement on Brushy Fork Creek, Lochsa River).**

**CBFWA-55, Bureau of Land Management, CBFWA (Implement habitat projects on Big Canyon Creek, Clearwater River).**

**CBFWA-56, Columbia Basin Fish and Wildlife Authority (Complete habitat enhancement projects on upper South Fork Clearwater).**

**CBFWA-57, Columbia Basin Fish and Wildlife Authority (Remove migration barrier and implement habitat projects on tributaries to the Lochsa River).**

**USFSR6-01, U.S. Forest Service Region 6 (Restore habitat diversity in the Lewis River).**

**USFSR6-03, U.S. Forest Service Region 6 (Clackamas River rehabilitation).**

USFSR4-01, U.S. Forest Service Region 4 (Effects of channel structure).

USFSR4-02, U.S. Forest Service Region 4 (Effects of channel structure).

USFSR6-04, U.S. Forest Service Region 6 (Sandy River rehabilitation).

USFSR6-05, U.S. Forest Service Region 6 (Columbia River Gorge tributary rehabilitation).

USFSR6-06, U.S. Forest Service Region 6 (Hood River habitat restoration and tributary passage improvements).

USFSR6-07, U.S. Forest Service Region 6 (White River rehabilitation).

USFSR6-08, U.S. Forest Service Region 6 (Fifteenmile Creek rehabilitation).

USFSR6-09, U.S. Forest Service Region 6 (Middle Fork John Day restoration).

USFSR6-10, U.S. Forest Service Region 6 (North Fork John Day Enhancement).

USFSR6-11, U.S. Forest Service Region 6 (Umatilla River Enhancement).

USFSR6-12, U.S. Forest Service Region 6 (Walla Walla River habitat Enhancement).

USFSR6-13, U.S. Forest Service Region 6 (Grande Ronde basin habitat improvement).

USFSR6-14, U.S. Forest Service Region 6 (Naches River habitat Improvement).

USFSR6-15, U.S. Forest Service Region 6 (Wenatchee Habitat Rehabilitation).

USFSR6-16, U.S. Forest Service Region 6 (Yakima River Basin Rehabilitation).

USFSR6-17, U.S. Forest Service Region 6 (Entiat River fish habitat rehabilitation).

CBFWA-63, Columbia Basin Fish and Wildlife Authority, U.S. Forest Service (Inventory and map habitat on Tucannon; control sediment and erosion).

**USFSR1-03, U.S. Forest Service (Adult and juvenile passage in South Fork Clearwater tributaries).**

**USFSR1-04, U.S. Forest Service Region 1 (Adult and juvenile passage in Selway River).**

**USFSR1-5, U.S. Forest Service Region 1 (provide passage above a natural barrier on the South Fork Whitebird Creek).**

**USFSR1-06, U.S. Forest Service Region 1 (Passage improvement Slate Creek).**

**WSWCD-01, Wasco Soil and Water Conservation District (Buck Hollow Watershed Enhancement Project).**

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