

Findings on the Recommendations for Amendments to the Anadromous Fish Portions of the 1994 Fish and Wildlife Program December 15, 1994

In *Northwest Resources Information Center v. Northwest Power Planning Council*, the U. S. Court Of Appeals for the Ninth Circuit remanded the Strategy for Salmon to the Council to provide, in the program, written findings for any recommendation that the Council rejected in the Strategy for Salmon process.

After the Strategy for Salmon process was completed, but before the Court issued its order in *Northwest Resources Information Center v. Northwest Power Planning Council*, the Council had already: incorporated the Strategy into the *1994 Columbia River Basin Fish and Wildlife Program*; issued a request to the fish and wildlife agencies, tribes and interested parties to submit recommendations for amendments to that program; and, in August 1994, received such recommendations. After receiving the Court's opinion, the Council consulted with the fish and wildlife agencies, tribes and other interested parties regarding the advisability of requesting new recommendations in light of the opinion. The fish and wildlife agencies and tribes were virtually unanimous in urging the Council to proceed to address the August 1994 recommendations as soon as possible, and not to request new recommendations. Based on this advice, the Council determined to proceed with the recommendations already received. Because these recommendations addressed the same issues raised in the Strategy for Salmon recommendations, the Council determined that it could respond to the court's remand when it acted on the August 1994 recommendations.

Accordingly, in this section of the program, the Council provides written findings explaining its disposition of all recommendations received in August 1994. Where the Council rejected a recommendation, or any part of one, the Council has explained how the rejection comports with section 4(h)(7) of the Northwest Power Act. The Council has also reviewed the record in the Strategy for Salmon process, and determined that the findings set out below address all of the issues remanded to the Council. These findings, together with the Responses to Comments, also satisfy the federal Administrative Procedure Act's requirement of a statement of the "basis and purpose" of the amendments.

Note: Some of the section numbers in the 1994 program have changed as a result of this amendment process. Old sections have been deleted, new sections added, and section numbers reorganized in certain instances, especially in Sections 3-5 and 7. In these findings, the section references in the headings, in the summaries of the recommendations and the summaries of the draft amendments and comments refer to the 1994 program before amendment. The section references in the findings (identified by a bold face **Finding**) are to the final program as amended.

SECTION 1: INTRODUCTION

Program Section(s): 1.1 (introductory text)
Source: CRITFC
Recommendation No.: 1-1

Recommendation: The Columbia River Inter-Tribal Fish Commission (CRITFC) recommended adding two paragraphs to the introductory text of Section 1, to emphasize an immediate need to make "serious

changes” in the hydro system and to state briefly the immediate, interim and long-term goal CRITFC recommended that the Council adopt into Section 4.

Finding: The Council did adopt in modified form CRITFC’s recommended three-tiered program goal at Section 4.1, and the Council has altered the introductory language of Section 5 to note the need for urgent action to respond to the historic low returns of salmon populations. Thus the Council is of the opinion that it has largely adopted this recommendation.

Program Section(s): 1.2C (role of the Council and other agencies)
Source: CRITFC
Recommendation No.: 1-2

Recommendation: CRITFC recommended adding a paragraph to Section 1.3C to call for the Bonneville Power Administration (BPA) to negotiate an agreement to transfer the administration of its Fish and Wildlife Program “to an entity created by the Columbia Basin federal and state fish and wildlife agencies and Indian tribes, or in the absence of such an entity, to the United States Fish and Wildlife Service.” CRITFC’s recommendation explained that the transfer would be a reasonable part of BPA’s effort to develop itself into a more competitive utility, would avoid the conflicts of interest inherent in BPA’s operations, and would minimize the duplicative implementation efforts of the fish and wildlife agencies and tribes and BPA. CRITFC further recommended that BPA should secure a commitment from the implementing entity to carry out the Council’s fish and wildlife program, add a condition to the transfer agreement that requires a thorough monitoring and evaluation of results tied to specific rebuilding targets; and ensure that the agreement holds the implementing entity accountable for results, perhaps with the assistance of independent audits.

The Council received a number of public comments on this recommendation. The Columbia Basin Fish and Wildlife Authority (CBFWA -- the coordinating body for all the region’s state and federal fisheries agencies and tribes), CRITFC, the Shoshone-Bannock Tribes, and the Confederated Salish-Kootenai Tribes all approved of the idea of transfer. These tribes and tribal groups particularly emphasized their preferred option of a transfer to an entity created by the fishery managers. The Upper Columbia United Tribes (UCUTs) were more emphatic on this point: They did not support transfer of implementation from BPA to the Fish & Wildlife Service in the event the agencies and tribes cannot form an entity, on the grounds that the Fish and Wildlife Service “has historically neglected the UCUT Tribes.” The UCUTs also did not support the transfer unless it occurred in accordance with guidelines approved by the UCUTs. The UCUTs stated that BPA must reduce its internal program management costs and that BPA’s process costs are way too high, but the UCUTs doubted that transfer will actually reduce process and costs.

On the other hand, a number of commenters, especially from the utility community, opposed the concept of transfer, expressing particular concern that to transfer funding responsibility to the agency or agencies that would then also receive the funds to do the work would be a conflict of interest, and that transfer would interfere with authorities and responsibilities assigned to BPA under the Northwest Power Act (Douglas County PUD, Chelan County PUD, Pacific Northwest Generating Cooperative or PNGC, Corps of Engineers, Direct Service Industries or DSIs). The Corps of Engineers added that it wondered why the Council would consider transfer to the Fish and Wildlife Service when NMFS is the primary federal agency with responsibility for management of anadromous fish. With regard to the requirements of the Act, PNGC commented most completely, stating that Congress intended the Act to be implemented by Bonneville and the federal operators, that under the Act measures are to be funded by Bonneville and included in its annual

budget submitted to Congress, that Congress required Bonneville and the Federal operators to balance their responsibilities to meet both power purposes and fish and wildlife purposes, and that transfer to an entity with no regional power responsibilities under the act would “subvert this balancing objective.”

BPA commented that the administrative structure for implementation was not an appropriate measure for inclusion in the program, and that BPA was willing to work with the Council to improve the manner in which the program is implemented. BPA stated that it was willing to consider transferring implementation under three conditions: (1) the entities that distribute or spend BPA ratepayer money should have a stake in BPA’s financial health; (2) these entities should have financial incentives and be accountable for producing efficient, measurable results; and (3) the agreement should create certainty with respect to the level of BPA funding over the term of the agreement. BPA noted that the recommendation submitted to the Council did not explain how all three concepts would be satisfied.

Finding: The Council adopted the CRITFC recommendation, with modifications, as an amendment to Section 1.2C. The recommendation called for BPA to “negotiate” an agreement to transfer its fish and wildlife program; the Council’s measure calls for BPA to “explore the potential for improving program implementation through an” agreement for transfer. The Council is mindful of BPA’s responsibilities under the Act and of BPA’s concern for its funding integrity. This is why the Council’s measure, and the recommendation, did not simply call for a transfer, but for an exploration and negotiated agreement for transfer whereby BPA and the fishery managers satisfy, if possible, the concerns of both groups while acting consistent with BPA’s obligations under the Act. The Council made this point more clear by its language, which focuses on the primary point of improving program implementation. The Council’s measure included additional implementing language and called on BPA to report to the Council by mid-1995 either with the provisions of such an agreement for Council review and approval or with an assessment of the status of negotiations if an agreement has not been reached.

Program Section(s): 1.1 1.2C, 1.3A, 1.3C, 1.4
Source: PNUCC
Recommendation No.: 1-3

The Pacific Northwest Utilities Conference Committee (PNUCC) recommended a number of changes to Section 1 to reflect some of PNUCC’s concerns about the program. The Council adopted in modified form a portion of these recommended amendments and rejected the rest, for the reasons explained below:

Section 1.1 (introductory text/funding targets)

Recommendation: PNUCC recommended the deletion of the last paragraph of Section 1.1 to eliminate the funding targets for resident fish and wildlife. In another recommendation (No. 2-1), PNUCC also recommended deleting the more expansive version of the funding target provision in Section 2.2F.

The Council adopted these funding targets in a past rule-making to ensure that resident fish and wildlife mitigation is funded at an approximate percentage of BPA’s fish and wildlife budget, responding to comments from resident fish and wildlife managers that funding for the resident fish and wildlife measures had proceeded at too low levels in the past. A comment received during this rulemaking from the UCUT Tribes strongly supported the Council’s adoption of the 15 percent program funding target for resident fish and 15

percent for wildlife, as in their view consistent with good biological sense for the Columbia River ecosystem and to balance the Council's role under Act to protect anadromous fish, resident fish and wildlife.

Finding: On this record, the Council rejected this recommendation as less effective than what has been adopted in ensuring the protection, mitigation and enhancement of resident fish and wildlife, 16 U.S.C. § 839b(h)(7)(C), and as not complementing the activities of the federal and state fish and wildlife agencies and appropriate Indian tribes, 16 U.S.C. § 839b(h)(6)(A). The Council rejected the companion recommendation for Section 2.2F for the same reason.

Section 1.2C (role of the Council and other agencies)

Recommendation: PNUCC recommended adding a paragraph to Section 1.2C that would have the Council coordinate the existing Scientific Review Group/Independent Scientific Group with the "Salmon Oversight Committee" recommended by the Snake River Salmon Recovery Team, assuming NMFS accepted the recommendation in its Recovery Plan. The recommendation also stated that "[t]he Council will incorporate the recommendations of the Salmon Oversight Committee in this program."

In comments received by the Council, the Yakama Indian Nation stated that the Council should give high deference to the implementation recommendations of the agencies and tribes and that the Salmon Oversight Committee proposed by Recovery Team should not share duties with the Independent Scientific Group or other Council planning or review bodies unless selection of the Committee is subject to the review and agreement of the parties described in Section 3.2B.2 of the program (which describes the ISG's policy group, created by input from the Council, BPA and the fishery managers). The Yakama Nation stated that in this and other areas, the Recovery Team and its recommendations do not have the confidence of fish and wildlife managers. The UCUTs opposed any new scientific review groups or planning or oversight authorities unless other, similar groups are eliminated first.

William Stelle, Regional Director of NMFS, stated in a consultation comment that NMFS is planning generally to follow the Recovery Team's recommendation and establish a "Scientific Oversight Committee" "to provide independent scientific advice concerning the priorities and effectiveness of salmon and other fish and wildlife recovery measures." Stelle also stated that NMFS is planning to establish a Columbia River Basin Steering Committee to oversee the implementation of NMFS' Snake River Salmon Recovery Plan. Stelle expressed hopes that these two groups would coordinate their activities with the Council and vice versa.

Finding: The Council adopted this recommendation in part. Section 3.2D acknowledges that the Recovery Team has recommended the formation of the Salmon Oversight Committee and that NMFS might follow that recommendation in some fashion. This section also suggests that the Independent Scientific Group itself could serve the needs of both the Council and NMFS, and that whatever NMFS decides as to policy and scientific oversight, the Council intends to work with NMFS to coordinate these functions. The Council rejected the suggestion that it "incorporate" recommendations of the Salmon Oversight Committee. Recommendations may only be considered under the terms of 16 U.S.C. § 839b(h). Whatever groups are established by NMFS will, of course, be free to submit recommendations to the Council for adoption into the program, which the Council will consider under the standards of the Act. This finding also applies to a similar recommendation made by PNUCC to amend Sections 3.1 and 3.2B, noted below.

Section 1.3A, Bullets 4, 5 and 6 (principles governing costs/research priorities/monitoring and evaluation/water budget evaluation)

Recommendation: In Section 1.3A the Council noted the economic and cost analysis principles set forth in the Act and then noted that “[t]he Council has taken specific steps in the following program areas to further the economic principles set down by Congress,” followed by a list of these program areas. PNUCC recommended changes in the description of some of the points on the list to correspond to other concerns and changes recommended by PNUCC for other portions of the program. With regard to existing Bullet 4 on “Research priorities,” PNUCC deleted the existing language and replaced it with a paragraph that calls for the research priority for the cost effectiveness analysis to shift to “[o]btaining biologically valid survival data in each life cycle of anadromous fish, in particular juvenile survival through the Columbia River system,” that states that this life-cycle data “will provide the foundation of the research necessary for the adoption and implementation of all measures relating to river flow, passage, bypass screens, spill and transportation. For example, prior to any additional flow measures, the relationship between flow, velocity, juvenile salmonid travel time and survival (if any) must be determined.” With regard to Bullet 5, “Monitoring and evaluation,” PNUCC similarly sought to shift the focus for the cost effectiveness analysis from changes in run sizes to benefits at each life-cycle stage. And with regard to Bullet 6, “Water budget evaluation,” PNUCC recommended deleting the existing language and replacing it with a new paragraph to emphasize need to “reexamine” the value of the water budget and flows for fish and to balance power and fish concerns.

Finding: This section of the program consists of simple statements that partly summarize activities called for elsewhere in the program. The Council values PNUCC’s editorial suggestions for this section and gave them serious consideration as policy suggestions for other portions of the program. The Council believes that many of the concerns expressed here by PNUCC are incorporated in the program in various ways -- e.g., the Council has stated in Section 5.0 that there is a need to continue testing the hypothesis concerning the relationship of flows to fish survival, and the Council has called in Section 1.8 for continued consideration of the proper balance between fish and power concerns. The Council also disagrees with other views expressed in the PNUCC recommendation, e.g., that the Council must conclusively determine the nature of the uncertain flow-survival relationship before taking further action, as discussed in Section 5 of the program and in the findings for Section 5. The Council saw no reason to revise Section 1.3A to reflect these points. Recommended editorial changes, especially to language that simply summarizes other portions of the program, do not by themselves constitute recommendations for measures that protect, mitigate, and enhance fish and wildlife, 16 U.S.C. § 839b(h)(5), and the Council may reject these recommendations on this basis.

Section 1.4 (Council commitments)

Recommendation: PNUCC recommended one deletion and one addition to Section 1.4, which is a short summary of Council commitments expressed elsewhere in the program. PNUCC recommended deleting the reference to avoiding upriver impacts “as much as possible, and to monitoring and evaluating them should they occur.” The recommendation would make the program state simply that the Council is committed to avoiding upriver impacts. PNUCC stated that the purpose of the recommendation is to avoid the need to mitigate the up-river impacts of lower river mitigation measures. And, PNUCC recommended adding a new paragraph stating that “[T]he Council is committed to base mitigation decisions on the scientific evidence and to test, demonstrate, and evaluate the biological effectiveness of all measures in this program. The Council is also committed to comparing and evaluating the economic costs of all measures in this program. At this time, the Council makes no presumption that any one restoration method (e.g., downstream passage options) is preferable to another.”

Finding: The Council did not adopt either of these recommendations. Again, these are editorial or policy suggestions and not recommendations by themselves for measures to protect, mitigate and enhance fish and wildlife, and they may be rejected on that basis. 16 U.S.C. § 839b(h)(5). And again, that is not to say that the Council did not consider these suggestions seriously. Concerning the first issue, the Council has taken steps, such as the upper-river reservoir constraints in Section 10, to minimize the up-river impacts of measures designed to benefit salmon in the lower river. But, it is impossible in this complex and carefully coordinated system to take action in one part of the system and have no impacts on other portions. The Council remains committed to avoiding or minimizing these impacts consistent with its legal obligation to protect, mitigate and enhance resident fish and wildlife, to act consistent with the legal rights of appropriate Indian tribes and to complement the activities of up-river agencies and tribes. The Council believes it is critically important to monitor program implementation to ensure that adverse impacts up-river are indeed minimized. Concerning the second issue, the Council is of the opinion that it does make its decisions with an understanding of the best available scientific knowledge, which is very uncertain on many key issues, and that the Council is committed to evaluating the effectiveness of measures and comparing the costs of alternative measures. For costly program measures that take years to implement - such as reservoir drawdowns - the Council has determined that it is reasonable and prudent planning to call for design, engineering and construction work to proceed on the basis of the information currently available, with “milestones” in the years ahead when the issue of actual implementation can be revisited to consider the impact of new information.

Program Section(s): 1.2C (role of the Council and other agencies) and
1.2D (lessons of the past decade)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: The Corps of Engineers recommended a minor editorial change to Section 1.2C to expand a reference to an action plan to make sure it is “a stand-alone, dynamic document in matrix form which identifies CRBFWP measures and schedules and correlates CRBFWP measures with other regional documents and studies.” The Corps also recommended a revision to the second paragraph of Section 1.2D to state that Pacific salmon return from the ocean after “one to five years, mostly one to three” (not “three to five years”).

Finding: The Council did not adopt the first recommendation, which is not by itself a recommendation for a measure to protect, mitigate and enhance fish and wildlife. 16 U.S.C. § 839b(h)(5). The same is true of the second recommendation. The Council did revise Section 1.2D to state that Pacific salmon return from the ocean after “one to five years, usually three to five,” which is the current scientific understanding.

SECTION 2: SYSTEMWIDE GOAL AND FRAMEWORK

Program Section(s): 2.1B, 2.2B, 2.2F, 2.2G
Source: PNUCC
Recommendation No.: 2-1

The Pacific Northwest Utilities Conference Committee (PNUCC) recommended a number of changes to Section 2. The Council adopted portions and rejected portions of these recommendations, for the reasons explained below:

New Section 2.1B (systemwide goal/independent life-cycle survival assessment)

Recommendation: PNUCC recommended adding a new Section 2.1B calling for the Council, the Bonneville Power Administration and “Other Parties” to fund “independent, third party scientific evaluations to obtain accurate baseline survival data in all stages of the life cycles of anadromous fish, particularly juvenile spring/summer and fall chinook and sockeye salmon” and to fund the development of “methods to obtain accurate survival data” if necessary. PNUCC further recommended language calling for the fishery managers to “[m]ake available the required numbers of salmon necessary to obtain the baseline survival data called for.”

Finding: The Council took the following steps, in response to this recommendation and to other recommendations and comments: First, in the draft rule, the Council proposed a different Section 2.1B, adding the Council’s voice to others calling on Congress to authorize the National Academy of Sciences to prepare a report “describing and analyzing the changes in the Columbia River ecosystem brought about by human development activities and the effects these changes have on efforts to rebuild salmon, steelhead, and other fish and wildlife populations in the basin.” The Council received a number of comments noting that the NAS study has been authorized and is in process, and so the proposed program measure should be deleted (e.g., Columbia Basin Fish and Wildlife Authority or CBFWA, the Upper Columbia United Tribes or UCUTs, Bonneville Power Administration or BPA, Chelan County PUD). These comments were often, though not always, joined with an expression of support for the NAS report. The Council did delete this measure, and anticipates the completion of the report. Second, the Council revised and expanded Section 7.1A.1 calling for BPA to fund an evaluation of “survival, ecology, carrying capacity and limiting factors” in each area of the salmon life-cycle, “tributary, mainstem (including reservoirs), estuary, plume, near shore ocean and marine.” The NAS report and the survival/carrying capacity study should provide most or all of the baseline data sought by this PNUCC recommendation. The Council concludes that the measures it has adopted and the reports in progress are the functional equivalent of the research and evaluation recommended by PNUCC and are better adapted to existing activities and measures and thus more effective in assisting in the protection, mitigation and enhancement of fish and wildlife. 16 U.S.C. §§ 839b(h)(2)(C), (5), (7)(C).

Section 2.2B (assess program measures)

Recommendation: PNUCC recommended changes in Section 2.2B, which called on the Council to periodically assess program measures to identify conflicts and assess trade-offs in the basin. PNUCC recommended additional language to make clear that the assessment of trade-offs will include conflicts “between measures designed to benefit a particular species or target group of species” because “[s]uccessful fish and wildlife mitigation efforts can easily be reversed by conflicting actions. As such, appropriate management policies will be developed to minimize the adverse effects of activities in other stages of a species’ life cycle to ensure that the region realizes the benefits of mitigation activities.”

Finding: The Council did not adopt the recommendation. The Council intends by the existing program language to periodically assess every type of potential trade-off and conflict identified in the program. Nothing in the existing language precludes the kind of assessment expressly called for by PNUCC.

Section 2.2F (target funding for resident fish and wildlife mitigation)

Recommendation: PNUCC recommended deleting most of Section 2.2F to eliminate the funding targets that ensure resident fish and wildlife mitigation is funded at certain percentage of BPA's fish and wildlife budget. PNUCC recommended deleting the summary version of this provision at Section 1.1, discussed above.

Finding: The Council explained above, as part of its response to Recommendation 1-3 from PNUCC, why it rejected this recommendation.

Section 2.2G (funding for actions that address transboundary species)

Recommendation: PNUCC recommended deleting Section 2.2G, which provides that if and when fishery managers on both sides of the U.S./Canada border can agree on measures or projects that will benefit both U.S. and Canadian populations, BPA and the fish managers should include funding terms in the agreement whereby the U.S. ratepayer funding is in proportion to U.S. benefits. PNUCC recommended deleting this section on the grounds that the Council "cannot obligate U.S. dollars to Canadian interests."

Finding: The Council did not adopt this recommendation. PNUCC's recommendation is clearly less effective in protecting, mitigating, and enhancing fish and wildlife than is the existing language, since PNUCC's would simply preclude the possibility of funding such activities. 16 U.S.C. § 839b(h)(7)(C). The Council disagrees with PNUCC that there can never be circumstances in which ratepayer money may be appropriately used in this manner. Whether any such circumstances exist will be determined when specific measures and projects are proposed to the Council and BPA for approval, implementation and funding.

SECTION 3: COORDINATED IMPLEMENTATION, RESEARCH, MONITORING AND EVALUATION

Program Section(s): 3.1, 3.1A.1, 3.1B, 3.1D, 3.2B, 3.2E, 3.2F
Source: PNUCC
Recommendation No.: 3-1

The Pacific Northwest Utilities Conference Committee (PNUCC) recommended a set of specific amendments to Section 3 that can be grouped into six categories: (1) consult with the "Salmon Oversight Committee" recommended by the Snake River Salmon Recovery Team; (2) modify the role of the Basin Oversight Group; (3) strengthen the Council's commitment to accountability and cost-effectiveness; (4) delete the implementation planning process; (5) delete the subregional process; and (6) delete a redundant Section 3.2F. The Council adopted some of these recommended amendments, although the Council did not usually adopt PNUCC's specific language, and rejected others, as described below:

Consult with "Salmon Oversight Committee"

Recommendation: PNUCC recommended changes to two provisions to call for consultation with and reliance on the "Salmon Oversight Committee" recommended by the Recovery Team:

Section 3.1 (coordinate implementation of fish and wildlife program). PNUCC recommended adding an introductory paragraph to Section 3.1 calling for the Council and NMFS to coordinate the existing

Scientific Review Group/Independent Scientific Group with the Salmon Oversight Committee recommended by NMFS' Recovery Team. As with PNUCC's recommendation for Section 1.2C, the recommended language here states that the Council will "incorporate" the recommendations of the Salmon Oversight Committee. This recommendation also states that the Council "will rely heavily on the existing scientific review group."

Section 3.2B.1 (independent scientific evaluation). PNUCC also recommended adding language to Section 3.2B.1, which describes the nature and role of the Independent Scientific Group, stating that the ISG "will coordinate with NMFS's Salmon Oversight Committee, recognizing the Salmon Oversight Committee is responding to similar questions for the listed salmon species."

Finding: A finding regarding the recommendation for coordination with oversight and steering committees planned by NMFS has already been made above, in response concerning PNUCC's recommendation for Section 1.2C (part of Recommendation No. 1-3). In addition, Section 3.2B.1 already indicates that the development of the Independent Scientific Group will begin with the Scientific Review Group.

Modify the role of the Basin Oversight Group

Recommendation: Section 3.1A.1 (Basin Oversight Group). PNUCC recommended revising Section 3.1A.1 to replace the existing Basin Oversight Group with a “forum” that will “ensure the integration of all regional fish and wildlife programs.” The forum is to consist of “policymakers from the state and federal implementing entities, utilities and other interested parties;” “utilities” has been expressly added to the list of participants in the Basin Oversight Group. The specific directions concerning the meeting and reporting requirements for the Basin Oversight Group have been deleted. PNUCC explains that this change is necessary because “[r]egional coordination at the policy level . . . is essential” and the Council’s program must be part of a “larger integrated effort.”

The only comment received by the Council directly related to the Basin Oversight Group was from the Northwest Forest Resource Council, which commented that the concept of the group has some merit, as it could help address concerns raised throughout the region about lack of coordination on salmon recovery efforts; such a group would have to have non-agency participation and be balanced.

Finding: Section 3.1A already allows broad representation on the Basin Oversight Group, and calls for all other committees to report to it. In addition, new Section 3.1A.2 calls for additional efforts to coordinate the Council’s work with the basin’s fish and wildlife managers and their programs. While utility representation on the Basin Oversight Group is perfectly permissible, the Council rejects the recommendation to specify membership beyond implementing agencies as a less effective way of protecting, mitigating and enhancing fish and wildlife. 16 U.S.C. § 839b(h)(7)(C).

Council’s commitment to accountability and cost-effectiveness

Recommendation: PNUCC recommended amendments to two provisions, amendments that PNUCC believed would strengthen the Council’s commitment to accountability and cost effectiveness:

Section 3.1B (implementation and monitoring). PNUCC recommended adding a subsection to Section 3.1B to emphasize the Council commitment to a “cost-effective, efficient and results-oriented” program that sets the “regional standard for performance and accountability.” PNUCC’s recommendation stated three specific features of this commitment: (1) a mitigation scorecard in the annual Implementation Report “which clearly shows the costs of each project and the biological benefits and progress toward the mitigation goals in consistent, quantifiable units;” (2) prioritizing of all measures, including research and overhead; and (3) efforts to end “duplicative processes.” As will be noted further below, PNUCC also recommends the deletion of all but one of the existing measures in Section 3.1B and all of Section 3.1D, essentially replacing the implementation planning process and subregional process with the cost-effectiveness accounting standard recommended here.

Section 3.2E.1 (prioritization and cost-effectiveness). PNUCC also recommended replacing the existing general statement in Section 3.2E.1 that the Council will review program measures for purposes of prioritization, cost-effectiveness and biological effectiveness with the following directive to “Bonneville, Others, Council:” “Develop criteria for measuring the cost-effectiveness of the program and of individual projects. Evaluate the cost-effectiveness of each project annually. Include a cost-effectiveness rating in the mitigation scorecard and in annual monitoring report. Discontinue projects and programs that do not meet the cost-effectiveness test.”

The Council received a number of comments on cost-effectiveness review criteria and methodology. The Columbia River Alliance, the Public Power Council and the Direct Service Industries (DSIs) agreed with PNUCC that the key to maintaining an economical and reliable hydroelectric power system while protecting and recovering weak salmon and steelhead stocks was to make management decisions that reflect basic cost-effectiveness criteria. The Alliance submitted with its comments, "Profiles in Cost-Effectiveness: Analyzing the Biological Benefits and Economic Costs for Snake River Salmon Recovery Measures," by Darryll Olsen and James Anderson (November 1994), analyzing the cost-effectiveness of various mainstem measures and also describing its cost-effectiveness methodology. The report noted that resource managers and political leaders need to confront squarely the fact that actions rendering poor and uncertain biological benefits do not make for good economic decisions and that the benefits of cost-effectiveness analysis for recovery plans are twofold: First, agency recovery planners are faced with the need to prioritize recovery measures. Second, cost-effectiveness analysis can prevent "overstatement" of the costs of any recovery plan under the ESA and increase social and political acceptance by minimizing economic costs and by optimizing for the highest rate of biological benefit per dollar spent. One particular manifestation of the Alliance's cost effectiveness analysis was a chart comparing the costs of salmon recovery measures per adult fish returned. The DSIs commented that the Council's program would itself benefit from such a chart that compared, in dollars per fish, the cost of the measures comprising the various flow options; the DSIs further commented that analysis often indicates that actions with the highest cost-effectiveness are also the actions with the lowest cost and which can be most immediately implemented.

The Lincoln County, Montana (Libby) Board of County Commissioners suggested adding another set of criteria to the review of costs and benefits - the Council should estimate costs and benefits accruing to each of four basin states under pre-1991 conditions, 1992-93 conditions and under a preferred alternative for 1994 and beyond. Benefits should be accounted for in areas of navigation, flood control, hydropower, recreation, fisheries and water supply, and the Council must seek equity in sacrifices asked for in region. The Commissioners seriously question the current proportion of sacrifices.

Indian tribes, state agencies and environmental groups took a different approach to cost and cost effectiveness analysis. The Save Our Wild Salmon coalition submitted an "Economic Framework" analysis as part of its wild salmon restoration plan, which emphasized the various benefits to the economy of healthy salmon populations and healthy watersheds. The coalition believed these benefits are understated in most cost analyses, that "investments" in salmon restoration should not just be thought of as costs. The coalition's analysis described the "costs" of various salmon recovery options and explained how those costs are not excessive compared to other taxpayer and ratepayer subsidies and investments in hydropower, the commercial agricultural infrastructure, the aluminum industry power supply, etc. The analysis also suggested various ways costs and the cost analyses can change by changing the way the power system is operated and the Bonneville Power Administration's other costs are managed. The Columbia River Inter-Tribal Fish Commission (CRITFC) also submitted general comments about the nature of salmon recovery costs and cost-effectiveness review. CRITFC argued that many cost analyses and cost-effectiveness reviews ignore the fact that "[s]ubsidies to natural resource exploiters are costing millions of dollars of tax payers money and additional losses from denied income from fisheries and ESA related costs." They provided a number of examples of federally subsidized activities (logging, grazing, irrigated agriculture, aluminum production) which, in their view, could be curtailed or factored into an analysis to offset the costs of salmon recovery measures, such as drawdown operations or habitat restoration.

The Idaho Department of Fish and Game (IDFG) submitted costs analyses and comments that mostly emphasized IDFG's position that there are errors in the Corps of Engineers' and the Council's approach to the cost analysis of structural changes in the hydropower system. IDFG's consultant also offered his table

showing the cost-effectiveness of various options, to counter the different cost-effectiveness charts of the Columbia River Alliance and others. Regarding the Council's use of a preliminary cost-effectiveness analysis developed by the Environmental Defense Fund (EDF) for use in selecting flow augmentation measures, IDFG believes it would be unduly rigid for the Council to require this or any other particular cost effectiveness methodology, especially where the methods are largely undefined.

Finding: The Council has adopted provisions for monitoring, evaluation, prioritization and cost-effectiveness in implementation (see Sections 3.1B, 3.1C, 3.1E, 3.2, 3.3). These provisions call for, among other things, an annual program monitoring report based on the Coordinated Information System and an annual program evaluation report to "evaluate progress toward the rebuilding schedules, performance standards, and other goals and objectives of the program." Pursuant to Section 3.2E.1, the Council's review of the program will include not only evaluation of biological effectiveness but also evaluation for cost effectiveness and prioritization. In addition, the Council has added language to Section 5.2A calling for an additional, specific cost-effectiveness review of alternative sources for additional salmon flows in the Snake River and for further review and refinement of the promising EDF cost-effectiveness methodology for future analysis of structural and non-structural water measures. These provisions provide for sufficient cost-effectiveness review as recommended by PNUCC.

The Council did not adopt PNUCC's particular recommendations insofar as they would essentially tie all monitoring and evaluation to a pre-specified approach to cost-effectiveness analysis, as a less effective way of protecting, mitigating and enhancing fish and wildlife than the approach that is already in the program, 16 U.S.C. § 839b(h)(7)(C). In addition to cost-effective implementation, the existing program measures are aimed at systematic learning and the effective integration of all implementing agencies in the implementation planning process, especially the fish and wildlife managers, and thus better complement the activities of the fish agencies and tribes, 16 U.S.C. § 839b(h)(6)(A), (7)(B). The provisions in the program preserve flexibility in evaluation and allow for analysis and evaluation to take the form or forms that the evaluators and the Council find to be useful, given the nature of the information and the circumstances, rather than specifying the analysis in advance. Given the wide divergence in approach to cost-effectiveness analysis, as outlined in the summary of comments and which reflects differing assumptions about the nature of costs and benefits, it is not prudent to specify any one particular approach or set of criteria.

Delete the implementation planning process

Recommendation: Section 3.1B (implementation and monitoring). PNUCC recommended deleting most of Section 3.1B to delete the implementation planning process. PNUCC explained that this change is necessary because BPA is redefining how it will implement the Council's program and may replace the implementation planning process. Thus the Council's program must remain flexible to accommodate BPA's new program.

Finding: As noted above in the findings on Section 1, in response to other recommendations, the Council has called for BPA and the fishery managers to explore the potential for improving program implementation through an agreement to transfer the administration of Bonneville's fish and wildlife program to an entity formed by the fish and wildlife managers. Once it is clearer whether and how this proposal will be addressed, the Council can consider amending the program. The Council did not otherwise amend this section of the program because the issue is in flux. While it is not possible to say what form the process will take in the future, the Council believes it would be unwise to abandon the old process before the new implementation process is in place.

Delete the subregional process

Recommendation: Section 3.1D (subregional process). PNUCC recommended deleting all of Section 3.1D to eliminate the subregional planning process. PNUCC explained that this process needed to be deleted for the same reason as the implementation planning process.

Finding: The Council does not agree that the possible transformation of the implementation planning process will render the subregional planning process obsolete or in any way make it less important. To the contrary, in response to other recommendations and comments, especially from the agencies and tribes, the Council adopted measures that make subregional planning an even more important part of the implementation process. These recommendations and comments are described in the findings on Section 7, as they relate to the issue of subbasin planning for production and habitat improvements. The Council thus rejected PNUCC's recommendation to delete the subregional process because it would fail to complement the activities of the fish managers, who strongly supported the subregional process, 16 U.S.C. §§ 839b(h)(6)(A), (7)(A), and would be a less effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. §§ 839b(h)(7)(C).

Delete a redundant Section 3.2F

Recommendation: Section 3.2F (streamlining implementation). PNUCC recommended deleting Section 3.2F, which calls for an independent consultant to report on ways to reduce process, on the grounds that it duplicates Section 3.1E.1 (management review).

Finding: The Council adopted PNUCC's recommendation to delete the repetitive section from the 1994 program. (Note: Section 3.2F in the amended program is a renumbered section.)

Program Section(s): **3.1B.1 (implementation and monitoring)**
Source: **Corps of Engineers**
Recommendation No.: **5-3**

Recommendation: The Corps of Engineers recommended revising Section 3.1B.1 to state expressly that the Corps is a participant in implementation planning process.

Finding: The existing language of Section 3.1B.1 includes the Corps within the category of "river operators." Notwithstanding that the Council did not try to specify all the participants in the implementation planning process, the Council recognizes that the Corps plays a key role in implementation and in this process.

Program Section(s): **3.2 (monitoring and evaluation)**
Source: **CRITFC**
Recommendation No.: **3-2**

Recommendation: The Columbia River Inter-Tribal Fish Commission (CRITFC) recommended replacing all of Section 3.2 with CRITFC's version of an "effective monitoring and evaluation" program to evaluate both the program as a whole and specific measures. The purpose of the recommended evaluation process will be to "identify ineffective actions so that the Program can be modified accordingly and ensure that

the Council systematically improves its knowledge,” and to “determine if fish runs are being rebuilt and thereby measure progress toward the Program's production goals.” An effective evaluation process requires that each Council measure include “measurable objectives that can be directly translated into the Program’s production goals in terms of increased adult fish runs, increased habitat capacity, or increased survival rates at specific life stages.” Besides clearly defined goals and objectives, the evaluation process requires a “close correspondence between the Program objectives and the evaluation objectives” and an organized set of baseline information. The “core information needed for monitoring and evaluation” is to be supplied by the Coordinated Information System (CIS) project. The Council will be responsible for overall program evaluation, while the fishery agencies and tribes will be responsible for evaluating specific projects. BPA will fund the evaluation process.

In proposed implementing measures, the recommendation calls on the Council to develop and run the overall program evaluation process, including, among other things, the creation of a “Program Evaluation Group (PEG) staffed primarily by the Council but with assistance from appropriate entities, project staff, or individuals.” The duties of PEG will include, among others, “to refine and elaborate the Council’s fish losses analyses to allocate the relative contributions of various human activities to fish losses at appropriate levels of resolution; to regularly review Program measures for prioritization according to biological effectiveness, contribution to the doubling goal, urgency, proper sequencing, and cost-effectiveness.” The fishery managers are then called upon to develop a monitoring and evaluation plan that includes, among other things, the monitoring of key indicator populations, the development of new methods for monitoring and evaluating population numbers, status, and vulnerability, and the development of “tools to measure the biological integrity of habitat.”

By recommending the deletion and replacement of all of existing Section 3.2, CRITFC would eliminate the independent scientific group, the analytical models coordination process, and the other monitoring and evaluation procedures in the existing program. These procedures directly and specifically involve the participation of independent scientists, BPA, the Corps, etc., as well as the fishery managers, in efforts to review and refine program implementation and coordinate not just monitoring and evaluation but also research in a situation of much scientific uncertainty. One purpose served by CRITFC’s recommendation is to give the fish agencies and tribes greater control over the development, coordination and implementation of the monitoring and evaluation and the assessment of scientific uncertainties.

The Council received a number of comments in support of a better monitoring and evaluation program, some in favor of CRITFC’s proposal to place the fishery managers in the firmest control of monitoring, evaluation and scientific assessment; some in favor of continued emphasis on independent scientific evaluation. The Columbia Basin Fish and Wildlife Authority (CBFWA) generally supported the CRITFC recommendation. CBFWA said the Council should establish a monitoring program to address both progress toward rebuilding goals and individual indicator stocks, as identified by the Council. The general principles to govern the monitoring program should include: projects to help reduce uncertainties; priorities that reflect systemwide analysis of major uncertainties; BPA and the Corps’ funding to be consistent with key uncertainties; knowledge to be reviewed by fish managers and made available to others; fish managers will participate in development and implementation of monitoring program; BPA and other project operators will fund monitoring; and projects are to be coordinated with activities of others. Fish managers should evaluate the program, instead of an independent scientific group, although the fish managers should continue to work with the Scientific Review Group, the independent scientific group established by BPA as part of its implementation and funding process. Fish managers also should prepare an annual monitoring report based on coordinated information system data. Finally, fish managers should submit a list of indicator stocks to Council by the end of 1994, along with a proposal for a program to monitor them, including appropriate technology. The Oregon

Department of Fish and Wildlife (ODFW) stated more emphatically than CBFWA that while the program needs to be scientifically evaluated, the evaluation should be conducted by region's fishery managers. The Council should hold fishery managers accountable for objective and credible evaluation of benefits of program implementation, and the development of specific biological objectives will be part of an effective evaluation program by fishery managers.

BPA commented that the program must include a credible, comprehensive and long-term monitoring and evaluation program with the opportunity for adaptive management and measurement of progress toward regionally prioritized goals annually or regularly. The monitoring and evaluation program should be coupled with a rebuilding framework by incorporating measurements of biological benefit and relating those measurements to biological objectives and to costs in a cost effectiveness evaluation. The Council should set clear, measurable goals and timelines for resolving critical uncertainties, as well as for biological outcomes. The Chelan County PUD commented generally in support of the need to learn from implementation through rigorous evaluation measures adopted in the face of scientific uncertainty, that "[m]ore rigorous procedures are needed to truly study the efficacy of program measures," and evaluations need to include test and control comparisons in the study design. Mark Reller of the Montana Council staff, commenting as the State of Montana's representative on the Snake River Drawdown Committee and alternate member of the Fish Operations Executive Committee (FOEC) stated that the Council should not call for implementation, especially of major system changes, until a monitoring and evaluation program is in place and ready to function.

As noted above, William Stelle, Regional Director of NMFS, stated that NMFS is planning generally to follow the Recovery Team's recommendation and establish its own "Scientific Oversight Committee" "to provide independent scientific advice concerning the priorities and effectiveness of salmon and other fish and wildlife recovery measures."

Finding: In adopted revisions to Section 3.2, especially Section 3.2A.2, the Council calls for the Council staff to perform the evaluation role CRITFC recommended (although the Council did not adopt the PEG name). That is, the Council, in consultation with the fishery managers, will prepare an annual program evaluation report to "evaluate progress toward the rebuilding schedules, performance standards, and other goals and objectives of the program." The report will be based on the annual monitoring report from the Coordinated Information System, and it is the fishery managers who play the primary role in compiling the monitoring data for the CIS and producing the monitoring report. The Council further revised Sections 3.2A, 3.2B, 3.2D, 3.2F, 3.3, and 4.3C to incorporate a number of monitoring and evaluation measures and concepts that CRITFC recommended. For example, revisions and additions to Section 4.3C incorporate, in somewhat modified form, CRITFC's specific recommendation to have the fishery managers develop a coordinated program to monitor key indicator populations. In addition, the portion of the recommendation calling for the evaluation group "to refine and elaborate the Council's fish losses analyses to allocate the relative contributions of various human activities to fish losses" is already covered by the Section 3.2C.2, which calls on the Council to "[r]efine and elaborate analyses of the relative contributions of various human activities to fish mortality." These aspects of the recommendation were accepted.

The Council rejected the recommendation to put the fishery managers more fully in charge of evaluation, and to delete all reference to or use of independent scientific evaluation. The Council believes that a credible monitoring and evaluation program is absolutely essential if the salmon rebuilding program is to be sustainable over the long term. To be credible, monitoring and evaluation must be competent, independent, and it must be seen to be free of institutional bias. The fish and wildlife managers have unquestioned scientific expertise in this area and should and will play a key role in the monitoring and scientific evaluation of the

program. But, the fishery managers play an even more key role in recommending and implementing the fish and wildlife measures that must be evaluated. They cannot bring the kind of independence to monitoring and evaluation that will be needed, as NMFS also recognized when it stated its intention to involve a Scientific Oversight Committee in recovery efforts. No matter how competent their science, the fisheries managers, if they alone controlled the evaluation of the program, would be perceived as bringing institutional bias to this work. An independent scientific group, with members who lack institutional links to the fishery managers or to the river operators and utilities, will bring a measure of outside perspective that will not replace or supplant the authority of the fishery managers, only supplement and assist the fishery managers' efforts. Thus the Council has rejected this part of the recommendation on the grounds that (a) the adopted provisions are a more effective way to protect, mitigate and enhance fish and wildlife and to assure that program evaluation is based on the best available scientific knowledge, 16 U.S.C. §§ 839b(h)(7)(B), 7(C), and (b) given that NMFS is one of the fishery managers, and NMFS has indicated that part of the evaluation process should include independent scientific evaluation, it can be said that the Council's similar approach does complement the activities of a key federal anadromous fishery manager.

CRITFC's monitoring and evaluation program recommendation included general language about the role and use of measurable objectives, an issue that was repeated in various forms in the comments. The role of biological objectives, measurable objectives and similar concepts and terms is discussed below, in findings on Section 4.

SECTION 4: SALMON AND STEELHEAD GOAL AND FRAMEWORK

Biological objectives/biological framework

Section 4 establishes a biological framework for the entire anadromous fish portion of the program. It includes an overall program goal and population rebuilding targets, and it also provides a process for developing additional biological targets, objectives and standards to assist further in program development and evaluation of rebuilding efforts.

One of the most contentious issues during this rulemaking has been the meaning and role of "biological objectives," a term used in the Act in an apparently ambiguous fashion, and the debate itself has the most relevance to the developing framework in Section 4. This part of the findings is intended to explain and respond to this debate, analyzing the issue in the context of the recommendations received by the Council in this rulemaking process and in the last, in 1991.

The Council last amended the anadromous fish portions of its fish and wildlife program in 1992, in what the Council called the Strategy for Salmon. In *Northwest Resource Information Center v. Northwest Power Planning Council*, 35 F.3d 1371 (9th Cir. 1994), the U.S. Court of Appeals for the Ninth Circuit remanded the Strategy for Salmon after faulting the Council for failing to incorporate into the program written findings responding to the recommendations submitted to the Council in 1991 to initiate that amendment process. The Court also questioned whether, among other things, the measures the Council adopted were sufficiently tied to "biological objectives." Thus one of the main areas of concern in this amendment process has been the issue of "biological objectives" -- what are they, what does the Act require of the Council in this

regard, and what do the recommendations received by the Council in 1991 (the remanded Strategy for Salmon recommendations) and 1994 contain in the way of biological objectives?

This section of the findings is intended to address these issues. The Council has analyzed both what the 1991 and 1994 recommendations contain and what the Act requires. This has been an iterative process -- the nature of the recommendations received indicates a particular meaning and role for “objectives” and “biological objectives” in the program as of this date. The language of the Act is consistent with the Council’s sense that what it has received in its recommendations is sufficient for the Council to take action in response, and that the Act does not require, although it certainly permits, something broader and more comprehensive than what the Council has received in recommendations.

Some commenters, primarily from utility groups, major utility customers, and agricultural industry groups, have suggested that the Council must adopt a comprehensive set or framework of separate, distinct, quantifiable biological objectives for the entire salmon life-cycle and the entire program before the Council may adopt or even propose measures. The Council did not receive any recommendations for such a fully developed framework in 1991 and 1994, and neither the Act nor the Court’s opinion support the position that the Council must either wait until it receives such recommendations or develop the specific, quantified framework independently before it may consider program measures. Developing such a comprehensive biological framework could be a good policy, and so the Council has outlined a framework in Section 4 and called for the fishery managers and others to develop and recommend the framework when possible. But the adoption of such a framework is not a legal prerequisite for Council action. Whether or not the larger framework exists, the Act fully supports the Council’s decision to adopt measures on the basis of what it has received in recommendations -- biologically-based operational objectives for the hydropower projects and qualitative, narrative explanations of the biological objectives or purposes underlying proposed measures.

1. The Act: recommendations, objectives and biological objectives

The Act itself does not define the terms “objectives” or “biological objectives.” Nowhere in the Act is the Council directly instructed to develop a comprehensive set of distinct, quantified “biological objectives” to support the whole of the program. Instead, the Act’s circumscribed use of the term “objectives” (in one provision) and “biological objectives” (in two provisions) indicates a more focused relationship between objectives and the development and operation of the hydroelectric projects and a much less specific or technical meaning for the general term biological objective. The Ninth Circuit did not closely scrutinize the relevant language of the Act or the legislative history of this particular topic. The one statement by the Court that may be the most consistent with the language of the Act, as will be explained below, is the Court’s observation that biological objectives “relate the biological needs of fish and wildlife to the operations of the hydropower system.” *NRIC v. Northwest Power Planning Council*, 35 F.3d at 1391. More important, the Court provided some guidance to the Council that is central to understanding this issue in the present context: (1) the Act requires that program development be largely a recommendations-driven process; (2) broad program goals and rebuilding targets without timelines are not adequate by themselves in the face of more specific recommendations for objectives, especially from agencies and tribes; (3) the Council must give deference to the biological expertise of the agencies and tribes in the identification of biological objectives; and (4) if the agencies and tribes are united in their view that the best available scientific knowledge indicates that, to use the Court’s example, a water particle travel time target is an appropriate biologically-based objective for project operations, the Council may not second-guess that judgment without a very solid explanation, based in the standards of the Act, as to why it is rejecting the recommendation.

A. Recommendations

Perhaps the most important message in the Ninth Circuit's opinion was its reminder to the Council that the "recommendations" called for in Section 4(h)(2) (16 U.S.C. § 839b(h)(2)) are to be the basis for program development. Section 4(h)(2)(A) provides for the Council to request from the state and federal fish agencies and tribes recommendations for "measures" to protect, mitigate and enhance fish and wildlife "affected by the development of any hydroelectric project on the Columbia River and its tributaries." Section 4(h)(2)(B) then calls for recommendations for "establishing objectives for the development and operation of such projects on the Columbia River and its tributaries in a manner designed to protect, mitigate, and enhance fish and wildlife." (Section 4(h)(3) provides that others may submit these types of recommendations as well.) This means that in the Act's first mention of the concept of "objectives," as part of the central building block in the program development process, Congress tied the concept of objectives directly to the development and operation of the hydroelectric projects. Congress did not call for the agencies and tribes to recommend comprehensive, quantified, distinct biological objectives that relate to or encompass the whole biological life-cycle of fish and wildlife or that concern aspects of the program unaffected or indirectly affected by project operations. The aspects of hydroelectric project development or operation that affect fish and wildlife are the projects' effects on flows, passage, reservoir size and levels, water temperatures, and the like. Objectives that express how these project characteristics should affect or not affect fish and wildlife are what the plain language means by the objectives to be recommended for inclusion in the Act.

Thus the language of Section 4(h)(2) calls for recommendations for what can be called "operational" objectives, that is, objectives for the operation of the hydroelectric projects. These operational objectives must, of course, be biologically based -- that is, have a biological purpose or objective as their basis which can express or implicit in the actual language of the objective. That the operational objectives must be biologically based is required by the fact that the objectives must be designed to "protect, mitigate, and enhance fish and wildlife," Section 4(h)(2)(B), and be supported by "detailed information and data," Section 4(h)(3), and by the fact that program measures derived from the recommendations must "protect, mitigate and enhance fish and wildlife" and "be based on, and supported by, the best available science," Sections 4(h)(5), 4(h)(6)(B). This point is true, of course, for every recommendation, whether for a measure or an objective, whether related directly to the mainstem hydropower projects or to "related spawning grounds or habitat." All recommendations, and thus all measures in the program, must have a biological basis, purpose or objective, whether implicit in the language of the measure or stated expressly, in narrative terms or quantitative.

From this analysis, two critical points are clear: First, the only "objectives" actually called for in the recommendations process are objectives narrowly tied to hydropower project development and operations. If program development must be tied closely to the recommendations process, it is too great a leap to read the rest of the Act as containing a mandate to the Council to develop, independently, a more comprehensive set of separate, distinct, quantifiable biological objectives. Second, all recommendations, for objectives and for measures, must be biologically based, that is, have a "biological objective" in the common sense meaning of the term, even if not expressly stated in the language of the measure or operational objective. The recommending party and the Council must be able to identify this biological objective or purpose and evaluate whether the recommended measure actually serves this purpose (and, as will be discussed below, whether some other measure serves it better or at a lower cost).

The recommendations received by the Council in 1991 and 1994 are consistent with this reading of the Act, as will be demonstrated below. That is, the Council received, mostly from agencies and tribes and environmental groups, a set of biologically-based operational objectives for the hydropower projects. The Council also received a few other specific goals, objectives, and standards for other parts of the program, but mostly it received recommendations for measures that either included a narrative or qualitative statement of

biological purpose or “biological objective” right in the recommended measure or that had an implicit biological purpose or objective stated more clearly in the explanation submitted with the recommended measure. Nothing in the Act prevented recommending parties from recommending a more comprehensive set of distinct, quantified biological objectives for all or large parts of the program, which the Council would have had to evaluate and adopt or reject under the standards of the Act. The Council did not receive any such recommendations, and the Act neither requires the Council to wait until it does or allows the Council to develop these independently.

B. Standards for program measures

The term “biological objective” appears twice and only in Section 4(h)(6), which lists a set of standards for the Council to consider as it adopts measures. One use of the term is in Section 4(h)(6)(C), which provides that the Council will “utilize, where equally effective alternative means of achieving the same sound biological objective exist, the alternative with the minimum economic cost.” Section 4(h)(6)(C) does not direct the Council to develop biological objectives. Instead it calls for a least-cost comparison of two measures assuming that biological objectives already exist by virtue of the recommendations process. It seems quite odd to conclude that Section 4(h)(6)(C) is an indirect mandate to the Council to develop a full array of specific, distinct, quantified biological objectives for the entire program and to evaluate all measures against this framework before taking any action. If Congress had intended the Council to start its work with the development of such a complex and uncertain framework of “biological objectives,” we would expect to see a clear expression of that requirement in the Act and its legislative history.

A better way to read this section to be consistent with the rest of the language in the Act (especially the language describing the recommendations process), and the way the Council understands this section, is to conclude that the “biological objectives” referred to in Section 4(h)(6)(C) are the biological bases or purposes underlying recommended measures, again, whether implicit or expressly stated, whether narrative or quantified by the recommending parties. These must be “sound” biological objectives in that they must be supported by data and information and reflect the best available scientific knowledge.

The other mention of the term “sound biological objectives” is in the “sufficient flows” standard in Section 4(h)(6)(E)(ii). More precisely, this section states that the Council is to include in the program measures for anadromous fish that will “provide flows of sufficient quality and quantity between such [hydroelectric] facilities to improve production, migration, and survival of such fish as necessary to meet sound biological objectives.” Here again, Congress did not conceive of or mandate biological objectives in any broad or comprehensive way. Instead biological objectives are only expressly relevant to survival improvements related to the changes in the flows provided between the hydroelectric projects.

The sufficient flows provision in Section 4(h)(6)(E)(ii) already includes a general biological objective -- sufficient flows are needed “to improve production, migration, and survival” of anadromous fish. And as noted above, Sections 4(h)(2), (3), (5), and (6)(C) together demonstrate that all measures, for flows and for other activities, must have an underlying biological objective or purpose. And, it is clear from Section 4(h)(2)(B) that agencies and tribes and others may recommend biologically-based operational “objectives” for operation of the hydropower projects, which obviously includes flow measures. Thus why did Congress insert the explicit reference to measures “to meet sound biological objectives” in, and only in, the flows section? This section can be read to state that the Council cannot adopt flow measures without basing them on explicitly stated biological objectives or biologically based operational objectives, although there is no indication that these objectives must be numerical or quantified instead of qualitative or narrative. This means that while the recommending entities and the Council have some leeway under the Act for other aspects of hydropower operations, if flow measures are recommended, the Council cannot adopt the flow recommendations without express (and “sound”) biological objectives.

Congress did not explain why it chose to mandate explicit biological objectives only for flows (if indeed that is what Section 4(h)(6)(e)(ii) means). Various comments in the legislative history indicate that Congress understood that the issue of increased flows for fish would be the most contentious of all issues, pitting the agencies and tribes -- considered in the legislative history to be the repository of biological expertise and biological interest -- against the hydro projects’ other users in the most acute way. To ensure that the Council

arrived at flow decisions for anadromous fish based on biology, and to ensure that the Council provided an express form of proof that the flow decisions were based on biology and not other considerations, Congress emphasized that flow decisions must be explicitly related to biological objectives. In fact, the documentation function, along with their possible use in a program evaluation process, may be the main functional purpose of biological objectives.

Thus the Act indicates that the Council should expect to receive and consider recommendations for biologically-based objectives for hydroelectric project operations and development, instead of an elaborate and comprehensive quantified biological framework for the whole program. All recommendations and measures must be biologically based, that is, have a biological objective, but that biological objective may be qualitative or narrative in nature and may be implicit in the measure. The recommending entities are free, of course, to recommend more comprehensive, distinct numerical objectives. The Act does not require the Council to hold off from adopting measures to protect, mitigate and enhance fish and wildlife until it receives such a set of objectives.

This conclusion is entirely consistent with the Act's action-forcing language: Congress, legislating in atmosphere of great urgency, directed the Council to promptly develop the first fish and wildlife program in its first year of its existence (before the power plan), requesting the first set of recommendations "promptly" after the Council was established. The recommendations were to be submitted 90 days after the request. See Sections 4(d)(1), 4(e)(2), (3)(F), 4(h)(1)(A), (2), (3). Measures were to be based on the "best available scientific knowledge," a term intended to convey (as explained in the House Commerce Committee report) that the Council was to act quickly to develop a program to reverse serious population declines even in the face of imperfect data and scientific knowledge. Congress obviously did not intend for the Council to develop a complex, separate, comprehensive biological framework before or along with the program measures. The action-forcing language is consistent instead with an interpretation of the Act that requires a less systematic set of biologically-based objectives for hydro project development and operations, the area of great emphasis in the Congressional comments on the fish and wildlife provisions, and biological purposes or objectives underlying all measures.

2. 1991 and 1994 Recommendations

In 1991 (and 1994) the Council received only a very few recommendations actually calling on the Council to adopt express objectives or biological objectives. The nature of the recommendations received is entirely consistent with the analysis of the Act set forth above, and vice versa: Almost all these recommendations called for specific, physical, operational objectives for the hydropower projects, which were submitted with statements (mostly qualitative) of the biological purpose or objective that was the basis for the operational objective and with an explanation of the scientific analyses justifying the link between the operational objective and the biological purpose. The Council also received a few recommendations that asked for amendments to the program goal or for specific population rebuilding targets, that discussed the issue of biological objectives in general terms, or that recommended that the Council adopt biological objectives without recommending any specific objectives. To summarize the recommendations:

A. 1991 Recommendations

(1) Travel time and flow objectives and other hydro project objectives. State and federal fishery agencies, lower river treaty fishing Indian tribes and environmental groups recommended in

1991 that the Council adopt water particle travel time objectives through the mainstem Columbia and Snake Rivers, for these reasons:

In 1990 the Columbia Basin Fish and Wildlife Authority (CBFWA), the collective voice of the region's state and federal fish agencies and tribes, proposed a mainstem flow regime intended to produce flows of 300,000 cubic feet per second (300 kcfs) through the full reservoirs of the lower Columbia and 140 kcfs through the full reservoirs of the lower Snake (while at the same time calling for up-river reservoir levels to be held to a high level to protect resident fish in those reservoirs). In February 1991, CBFWA supported the flow proposal with its "Biological and Technical Justification for the [CBFWA] Flow Proposal." In that report, CBFWA explained that its members' review of the existing biological information indicated that the migration speed (or "travel time") of juvenile salmon through the lower river and to the estuary was of vital importance to the survival of the fish, that there was a close correlation between water particle travel time and fish travel time through the lower river at all flows levels, and that the higher water velocities and thus decreased travel times realized by flows much higher than the current system normally produced would maximize salmon survival.

CBFWA did not submit its particular flow proposal to the Council as a recommendation, partly due to uncertainty as to whether these particular flow regimes could be achieved and whether there was a better way to accomplish the same purpose. Neither CBFWA nor its members backed away from their expressed understanding of the need for and association of high water velocities, decreased water particle travel time, increased juvenile migration speed and decreased juvenile migration time, and increased survival. For recommendations to the Council, what many of the agencies and tribes, and a set of environmental groups, did was convert the CBFWA flow proposal and flow justification report into a set of travel time objectives for the hydropower system.

This is illustrated by the recommendations submitted by the Idaho Department of Fish and Game. IDFG submitted a coordinated group of recommendations, and the central pivot to that coordinated set of measures was a specific recommendation that the Council adopt a travel time objective for mainstem hydro project flow operations. More precisely, IDFG stated that the Council should establish

"a biological objective of decreasing fish travel time from the point of origin to below Bonneville Dam to as near the pre-dam condition as practicable. This biological objective is measured by the physical parameter of water particle travel time, which is directly related to fish travel time. To reach the biological objective, water particle travel times are established for the river reaches from the head of Lower Granite reservoir and the head of Wells Dam reservoir to Bonneville Dam for spring and summer migrating fish. These water particle travel time objectives are set forth in Table 1. These travel time objectives represent daily average river velocities."

"Table 1" referred to this table listing "[w]ater particles travel times, as determined by the reservoir replacement method, at given CBFWA flow proposal flows:"

	McNary Dam to Bonneville Dam days	Wells Pool to McNary Dam days	Lower Granite Pool to McNary Dam days
January	23.3	20.1	54.6
February	23.3	20.1	54.6
March	23.3	20.1	39.2
April 1-15	7.5	8.5	12.0
April 16-30	6.2	8.1	8.9
May	6.2	8.1	8.9
June 1-15	6.2	8.1	8.9
June 16-30	9.3	10.2	14.9
July 1-15	9.3	10.2	14.9
July 16-31	11.6	11.7	22.7
August	11.6	11.7	22.7
September	23.3	28.9	34.8
October 1-15	23.3	28.9	34.8
October 16-31	23.3	15.0	34.8
November	23.3	15.0	34.8
December	23.3	20.1	34.8

IDFG presented information arguing that there was not sufficient water available in the upper Snake to produce CBFWA's 140 kcfs flows through the full reservoir pools of the lower Snake and thus produce the desired water velocities and water particle travel times to meet the objectives. IDFG proposed drawing down the reservoir levels in the lower Snake, whereby a lesser amount of water and lower absolute flows would produce equivalent water velocities and travel times. For this reason IDFG made clear in its drawdown recommendation that the "objective for the lower Snake River is intended to provide river velocity equivalent to a flow of 140 kcfs through full reservoirs."

Others who recommended the same travel time objectives were not as prescriptive in focusing on reservoir drawdowns, willing to allow the Council to craft the best possible combination of flow augmentation and reservoir drawdowns to produce the needed velocities and travel times. All of the environmental groups took this position. Three coalitions of groups -- the Northwest Conservation Act Coalition (NCAC), Northwest Environmental Defense Center (NEDC) and others, and the Northwest Resource Information Center (NRIC) and others -- submitted variations on the same travel time objective theme, all of them including the same travel time objective table submitted by IDFG. The Natural Resources Defense Council's (NRDC) 1991 recommendation consisted mainly of a set of water management recommendations for flow augmentation. But NRDC stated that the Council's first priority should be to get rid of its existing Water Budget water volume approach and adopt instead "a biologically based travel time objective and a system of minimum flows capable of meeting that objective," also phrased as a "biologically based objective for smolt travel time." NRDC did not specify any particular travel time objective; instead it simply referred for justification and specific to CBFWA's "Biological and Technical Justification for the [CBFWA] Flow Proposal." NRDC also stated that the travel time objective and improved flows were intended to serve two general biological goals: "(1) fish must be able to migrate safely downstream in the rivers; and (2) wild salmon must be protected and genetic resources maintained."

The U.S. Fish and Wildlife Service (USFWS), the Oregon Department of Fish and Wildlife (ODFW) and the Columbia River Inter-Tribal Fish Commission (CRITFC) took the same tack in 1991 -- they

recommended the Council adopt travel time objectives; they did not recommend particular flow measures. USFWS, for example, did not recommend any particular flows, flow augmentation measures, or water management measures, stating instead:

“We recommend that the Council establish a biological objective of decreasing transit time of juvenile anadromous fish from their point of origin to below Bonneville Dam and for adult fish during their upstream migration. We recommend that this objective be expressed in terms of water velocities or water particle travel times for the river reaches from the head of Lower Granite reservoir and the head of Wells Dam reservoir to Bonneville Dam for the entire period of juvenile and adult salmon and steelhead migration. Water particle travel time and water velocity are recommended as the units of measure rather than flow because actions that augment flows or reduce the cross-sectional area of the reservoirs and increase water velocities can be expressed in the same terms.

“We recommend that the Council include in its deliberations consideration of water velocities and water particle travel times equivalent to the flow levels in the flow proposal of [CBFWA] in order to ensure that a range of alternatives are considered. These levels are also consistent with the system strategies for mainstem fish migration recommended in the Integrated System Plan.”

Like USFWS, ODFW’s 1991 recommendation was really a recommendation to adopt a set of objectives or targets, not specific measures, although ODFW’s set of objectives was much more extensive than what the FWS recommended:

First, with regard to downstream migration of spring/summer chinook, ODFW recommended using water particle travel time as a “tool” (later also labelled as an “objective” and as a “target”), as follows:

“We believe the linkage between reduced downstream travel time and survival for spring and summer chinook and sockeye is sufficiently established that the council should select specific water particle travel times as one of the tools to increase downstream juvenile survival of those stocks. The best available information demonstrates that reduced water particle travel time, and hence reduced fish travel time, results in increased fish survival.”

For fall chinook downstream migration, ODFW integrated travel time with flow and temperature concerns:

“With regard to fall chinook juvenile migrants, we believe increased flow will reduce the amount of time these fish are exposed to detrimental temperature levels. The value of increased flow to fall chinook downstream juveniles is two fold: first in reducing ambient water temperature and second in reducing the exposure time to undesirable temperatures and predation by reducing fish travel time.”

ODFW did not recommend any particular travel time objectives for spring/summer or fall chinook, although the agency did state that “[t]he travel times specified should insure that, when combined with other program measures, the production goals of the [ISP] are achieved.” ODFW recognized that the “travel time targets might not be achieved in the early years” or in every year, yet it was important for the Council to set the targets anyway and that “[t]o meet the travel time targets, the Council should adopt specific actions to achieve the objectives over time.” Finally, ODFW emphasized the flexibility of setting travel time objectives instead of specific flows or flow targets or other specific measures.

With regard to fall chinook, ODFW also recommended the adoption of a set of what it variously labelled “measures,” “goal” and “objectives.” This included a population rebuilding target which is discussed

further below, and two migration improvement standards: “increase average downstream juvenile survival by 75 to 100 percent” and “increase upstream survival of adult fish by 25 percent. The department believes the major obstacles to upstream migration are temperature, flow and problems at passage facilities. At a starting point, the Department believes that maintaining a temperature of 68 degrees or less in the Snake will reduce observed pre-spawning mortality.”

Like USFWS and ODFW, CRITFC’s 1991 recommendation for the mainstem flows section of the program focused on objectives, not measures. The only specific objective recommended concerned water temperatures -- a 62-degree F objective during migration season. The rest of the recommendation stated general biological or operational objectives or standards that could function either as the objectives against which to evaluate measures and/or as the general biological underpinning to more specific objectives that would then be used to evaluate measures. More precisely, CRITFC recommended the following, written to correspond to the language of Section 4(h)(2)(B) of the Act:

“The following standards are intended to serve as objectives for the operation of hydroelectric projects on the Columbia River and its tributaries in a manner designed to protect, mitigate, and enhance fish and wildlife. Specific measures to improve downstream survival must be evaluated in the context of these standards and be consistent with them. At and between each hydroelectric project on the Snake and Columbia Rivers, such measures must:

1. Decrease smolt migration travel time to the estuary to avoid residualism, exposure to predation, and adverse water quality impacts (e.g. water temperatures exceeding 62 degrees F).
2. Reduce water temperatures during adult and juvenile migrations when temperatures exceed 62 degrees F.
3. Increase water velocities to aid smolt migration.
4. Be consistent with the rebuilding strategies specified in the Integrated System Plan.
5. Protect substantially all juvenile migrants, particularly the progeny of naturally spawning adults (e.g. protection for only the middle eighty percent of the migration presents unacceptable risks to naturally spawning populations).
6. Not degrade upstream migration of adult anadromous fish.
7. Be sufficiently flexible to accommodate changing management needs for fish protection.
8. Allow real time management by the tribes and fishery agencies.
9. Be readily verifiable with measurable criteria for annual operations.
10. Account for real time (daily and hourly) migration needs.”

CRITFC stated that it was recommending standards rather than actual measures “[i]n the interest of fostering regional dialogue and consensus.”

While CRITFC did not recommend a specific travel time or flow objective, it did state, in the explanation for its recommendation, that the best available scientific information for the Council to consider as it wrestled with these objectives included CBFWA's Biological and Technical Justification for the [CBFWA] Flow Proposal, the Council's passage model and its System Planning Model and the parameters and justifications for the models, and the Fish Passage Center annual reports, because "eight years of implementing the Water Budget [has] provided a substantial amount of experience with regard to the efficacy of measures to improve flow for downstream migrants."

(2) Program goal and population rebuilding targets. In 1987 the Council adopted an overall interim program goal to double the salmon and steelhead populations in the basin. In 1991, Oregon Trout recommended a companion "Biological Goal:" "To maintain genetic resources of salmon and steelhead in native, naturalized, and artificially propagated populations with no irreversible losses for genetic diversity resulting from management interventions or inactions." Oregon Trout also recommended that the Council begin a process to develop more specific production and escapement objectives and effective populations sizes to implement this goal.

CRITFC recommended a similar addition or revisions to the program goal: "The conservation and rebuilding of wild and natural fish runs is accorded priority." CRITFC recommended a subregional planning process and a Program Evaluation Group to flesh out specific objectives and standards.

Finally, ODFW recommended establishing interim aggregate population rebuilding targets (which the program did not then have), at least for fall chinook, recommending an interim target of achieving a spawning escapement level of at least 1000 to 1500 fall chinook adults above Lower Granite Dam within four brood cycles. With spring/summer chinook, ODFW stated that while it had not undertaken an analysis of those populations as it had the fall chinook, it "proposed that the goal of such an analysis would be an escapement of 25,000 naturally spawned spring chinook and 20,000 naturally spawned summer chinook as previously identified in *U.S. v Oregon* discussions."

(3) Other recommendations for specific objectives, standards and biological objectives. The Council received little else in the nature of discrete or express operational or biological objectives in the 1991 Recommendations. Certainly, no entity recommended any version of a comprehensive set of discrete, quantified biological objectives for all phases of the program. The recommendations that the Council did receive are as follows:

CBFWA recommended adoption of the Integrated System Plan. The central features of the ISP, in the view of CBFWA, were the "900 projects or activities, which together with changes in mainstem survival, are estimated to produce the additional 2.5 million adult salmon and steelhead necessary to reach the interim doubling goal." The doubling goal is a very general, if measurable, biological objective itself, and the ISP may have contained more specific "biological objectives" beyond the doubling goal to the extent the plans contained subbasin adult return numbers, estimated increases in smolts (or spawning habitat) per subbasin and other objectives intended as subordinate objectives or goals on the way to the doubling goal.

The Bonneville Power Administration (BPA) recommended an adult fall chinook temperature "objective" of "68 degree F or below during the major portion of the adult fall chinook migration, i.e., late August to mid-October." The Pacific Northwest Utilities Conference Committee (PNUCC) recommended a set of flow augmentation measures based on a couple of flow targets. One was a recommendation "to increase mid-Columbia flow levels to a weekly average of 160 kcfs to assist flows in the lower Columbia"

after May 31 (with a cap at 3.45 million acre feet total augmentation), and the other was “[t]arget flows of 85 kcfs at and below Lower Granite Dam for 46 days (April 15 through May 31).”

Assuming that harvest rate reductions are biological objectives, PNUCC also recommended a 50 percent reduction in the harvest of all Columbia River salmon and a reduction in the river harvest rate of fall chinook “to 27 percent which is equal to a 50 percent reduction of the 1990 harvest rate.” More germane to biological objectives, PNUCC also recommended as part of its harvest recommendation package that the Council “[e]stablish “stock specific escapement goals for all naturally spawning stocks by 1993.” BPA recommended that the Council incorporate into the harvest section of the program the interim escapement goals at Bonneville and Lower Granite Dams developed in the *U.S. v Oregon* process, and that the Council begin a process to develop “biologically-based escapement goals” for these runs to replace the interim goals borrowed from *U.S. v. Oregon*.

Finally, PNUCC and the Forest Service submitted recommendations for discrete objectives that related to habitat. PNUCC recommended two general habitat “objectives:” “Target zero net loss of watershed and riparian habitat in areas used by naturally spawning weak stocks,” and [t]arget rehabilitation of 50 percent of existing degraded watershed and riparian habitat in areas used by naturally spawning weak salmon stocks by the year 2000.”

The Forest Service submitted a habitat improvement plan for the South Fork of the Salmon River, which included, as did many recommendations (for all parts of the program), general narrative statements of the biological goal and objectives of the recommended measures. That is, the Forest Service stated a general goal “to increase the quality and quantity of summer chinook salmon and summer steelhead habitat with an emphasis on increasing the survival of wild and natural stocks.” “Project objectives” were “to increase summer chinook and steelhead production by reducing sediment loading, cleaning spawning gravels, eliminating migration barriers, and providing habitat diversity. Attainment of these objectives should result in increased juvenile rearing densities and smolt production of summer chinook and summer steelhead.” The Council’s analysis of what the Act means by its use of the term “biological objective” in Section 4(h)(6)(C) corresponds to this type of general statement of the biological goal or purpose of a recommended measure, whether stated explicitly in the recommended measure or implicit in the measure but included in the explanation submitted with the recommended measure. It is not legally necessary for a recommending entity to go beyond this level, and most do not, though they can if they choose recommend developing the biological objectives to a more specific and quantified level.

And in the rare case of the Forest Service’s habitat recommendation for the South Fork Salmon River, this is precisely what occurred. The Forest Service went beyond the general narrative language of biological benefit to include charts with more specific, numerical objectives, apparently derived from data provided for the subbasin plan development process for the Integrated System Plan. For various stretches of the South Fork Salmon River and smaller tributaries and for two larger tributaries, the Sesech River and its tributaries, and the East Fork Salmon River and its tributaries, the charts stated the quality of habitat, the density of summer chinook and summer steelhead smolts per square mile, the potential smolt capacity, and the estimated increase in the number of smolts that could be obtained by improving fair and poor habitat to excellent habitat. These numbers could be seen as specific, measurable biological objectives.

(4) Qualitative statements of biological purpose or general discussions of biological objectives in the 1991 recommendations. Most 1991 recommendations that made use of the term “biological objective” or “objective” somewhere in the recommendation or in the explanation of the recommendation used the phrase to mean the general if usually implicit purpose or biological goal of the action (as opposed to a

power or recreation or other purpose). Another type of recommendation included a similarly general, non-numerical biological objective in the recommended measure, without specifically using the label "biological objective" or "objective." Still another set of recommendations specifically asked the Council to begin the development of a set of specific biological objectives, usually based on a general biological goal or objective. And, of course, some of the recommendations combined these approaches (such as, for example, many of CRITFC's). Examples include:

The Bureau of Reclamation recommended that it develop and implement three demonstration water conservation projects in tributary habitat areas. The Bureau's proposed program language said nothing about a biological objective. In the accompanying explanation -- in the section of the form asking the recommending party to "describe alternative means which would achieve the same biological objective as the proposed amendment" -- the Bureau stated that "[t]he biological objective of the proposed demonstration projects is to improve habitat quantity and quality in tributaries used by anadromous fish for spawning, rearing, and migration." Similarly, the Bureau stated, in the explanation for its recommendation to devote 90,000 acre-feet of uncontracted storage to flow augmentation, that "[t]he biological objective of the proposed amendment is to use water accruing to existing uncontracted storage space in the Snake River basin to improve water velocities, smolt and adult travel times, and water quality in the lower Snake and Columbia Rivers."

The Environmental Defense Fund recommended that the Council "revise [the] hydrofacility operation rules to include wild migratory fish objectives and constraints."

As noted above, CRITFC's general mainstem flow recommendation was a combination of one quantified objective (temperature) with a number of general narrative biological objectives that could be the basis for the evaluation of measures, for the development of more specific objectives, or both. Most of CRITFC's 1991 recommendations were of this general nature, often expressed along with recommended measures. In other examples relating to flows and passage, CRITFC recommended a set of flow augmentation efforts specifically "to improve passage conditions of juvenile fall chinook." At various mid-Columbia dams, CRITFC recommended specified project operations and passage improvements facilities to "alleviate juvenile downstream passage mortalities" and "reduce juvenile turbine mortality." Specified improvements in collection facilities at Lower Granite were needed to "reduce predation" and "reduce direct and indirect mortality to juvenile salmonids."

With regard to hatchery production, CRITFC called for the evaluation of and reprogramming of the existing hatcheries so that production programs and actions were consistent with the conservation and rebuilding of wild and natural populations, with the development of "conservation, restoration, mitigation [and] harvest objectives." And as one part of the evaluation process, "[a]ll hatchery programs will be evaluated in terms of adult production (e.g. total numbers and biomass of adult fish harvested and spawning escapement) and efficiency ratios (e.g. biomass of adults produced per unit biomass of smolts released)." CRITFC stated that the immediate objective for its recommended supplementation program was to increase the number of smolts in a set of subbasins as set forth in the subbasin plans of the Integrated System Plan; increases in adult returns were the ultimate objective although numbers were not specified.

With regard to habitat, CRITFC recommended a number of mostly general habitat objectives and standards, as well as processes for developing and/or reviewing habitat objectives and standards. In 1994 CRITFC superseded those recommendations with a much more specific set of habitat objectives and standards, discussed below.

PNUCC recommended a process to develop escapement and production objectives, while also recommending a general development process for subbasin biological objectives. With regard to this latter recommendation, PNUCC recognized that the ISP “provided biological objectives for some stocks in some tributaries, but additional work is needed to develop consistent, biologically sound objectives for all stocks.” PNUCC recommended that the “group of independent scientists” established in Section 703 (of the 1987 program) develop “an interim set of biological objectives for the program,” with the expectation that these objectives would “specify the minimum number of adult salmon for each stock needed to occupy currently available spawning habitat in each tributary” and also establish “[m]inimum broodstock needs for each artificial production facility.”

Finally, the Forest Service recommended the following set of habitat “objectives:” “[m]aintain existing salmon and steelhead habitat quantity and quality in Columbia River basin subbasins,” “[r]estore degraded salmon and steelhead habitat in Columbia River Basin subbasins,” “[m]anage all activities in the Columbia River Basin subbasins that affect production of salmon and steelhead on a watershed basis,” and “[g]ive priority to habitat for critical stocks.” The Forest Service then proposed a process whereby the Council would develop more specific objectives, standards and criteria for habitat improvement.

B. The Council’s Response to the 1991 Recommendations in the Strategy for Salmon

On a record based on these recommendations, and on comments received in response to the recommendations and to draft amendments, the Council made the following decisions for the Strategy for Salmon, briefly summarized:

Program goal. The Council amended its program goal to state that the population doubling goal should be achieved without loss of biological diversity. The Council took this step in response to the recommendations and comments of Oregon Trout, CRITFC and others, in response to the increasing level of scientific knowledge about the value for genetic and biological diversity and the threat to that diversity in the basin, and in response to the mere fact of the Endangered Species Act listings and what that would mean for anadromous fish management.

Aggregate population rebuilding targets. In response to the recommendation from ODFW and comments from many, the Council adopted interim aggregate population rebuilding targets for Snake River stocks: 50,000 adult spring chinook; 20,000 summer chinook, and 1000 fall chinook.

Travel time objectives. The Council declined to adopt the recommended travel time objectives, for a number of reasons that to the Council called for caution and more deliberation. First, the Council determined that the high flows needed to achieve the objectives could not be produced in the immediate term in any but the very highest of water years and that to try would end up violating other requirements of the Act. The Council called for a presumptive path toward reservoir drawdowns, but whether those could be implemented and provide equivalent survival benefits was uncertain. Also, the precise relationship between flows, velocity, water particle travel time, fish travel time, and survival was (and is) highly uncertain and contentious. The Council chose to use a general rebuilding analysis and passage model that estimated the flow/survival relationship in terms acceptable to the agencies’ and tribes’ viewpoint of the relationship, and used that analysis to determine that the Council’s immediate flow measures were insufficient. But the Council judged that further debate and analysis were needed before the Council could commit to a specific understanding of that relationship as would be represented by adopting the recommended travel time objectives.

Biological rebuilding framework. In response to the recommendations from ODFW, PNUCC and others and from other comments and circumstances (including the ESA listings), the Council proposed in its Phase Three amendments the adoption of a comprehensive biological rebuilding framework for the weak Snake River stocks, proposing both the skeleton of the framework and some of the specific numbers. This included the interim aggregate population rebuilding targets for Snake River spring, summer, and fall chinook plus some proposed percentage increases in survival for the various stages in the life-cycle of the different stocks. Comments received by the Council overwhelmingly indicated that while the framework was a good idea, more time was needed to develop its particulars. Thus in the Strategy for Salmon, the Council retained only the interim aggregate rebuilding targets, while placing the skeleton of the proposed rebuilding framework in Appendix A and calling for the fishery managers and others to begin fleshing it out in 1993-1995.

The ISP and subbasin plans. The Council did not adopt the ISP and the subbasin plans, and thus did not adopt the subbasin plan population objectives. The subbasin plans had been developed in significant part to accomplish the population and harvest objectives of the Columbia River Fisheries Management Plan from the *U.S. v. Oregon* harvest litigation. The addition of the ESA listings and process brought new perspectives and problems that had to be addressed in the subbasin planning process. Thus the Council called for the existing subbasin plans to be used as the underlying resource documents in identifying particular habitat and production measures and for the revision and adoption of subbasin plans through the development of the biological objective framework noted above and the subregional planning process.

Harvest escapement objectives. For similar reasons the Council chose not to adopt particular escapement objectives to guide harvest management. The Council agreed that developing escapement objectives should benefit harvest management and the management of other human activities affecting salmon and called for their development as part of the development of the rebuilding framework.

In the Ninth Circuit, the petitioners' challenges to the program focused narrowly on the adequacy of the Council's flow measures. The environmental groups and the Yakama Indian Nation in particular challenged the Council's decision not to adopt the travel time objectives recommended by agencies and tribes and by environmental groups. The Court refrained from an actual substantive holding that the Council erred in not adopting these recommendations, holding instead that the Council's findings of rejection were not sufficient to satisfy the Act. But the Court noted that it was disturbed by the Council's rejection of what seemed to be a nearly consensus recommendation of the fish agencies and tribes that the best available scientific knowledge indicated the need for and benefits of establishing water particle travel time targets as an expression of an appropriate biological objective for project operations. The Court also concluded that the doubling goal and the aggregate rebuilding population targets were both too broad and lacking in timelines to represent a fair expression in the program of what the agencies and tribes recommended.

C. 1994 Recommendations

Just prior to the Court's opinion the Council received the 1994 recommendations. The Council thus began the process of analyzing the 1994 recommendations coupled with its analysis of the Court's opinion, what the Act requires of the Council with regard to biological objectives, and the remanded 1991 recommendations. The 1994 recommendations in general repeat the 1991 recommendations in nature -- a host of specific operational objectives for the hydro projects from agencies and tribes and environmental groups (this time, flow targets and velocity objectives took the place of travel time objectives), a recommended revision to the program goal, recommended measures that came with qualitative, narrative statements of their

biological purpose or objective, and little else. No entity recommended a developed comprehensive biological rebuilding framework. The recommendations were as follows:

(1) Flow targets, velocity equivalent objectives and other hydro project operation objectives. The lower river tribes, the state fishery agencies and the environmental groups continued to recommend that the Council set objectives for flows in the lower Columbia and Snake River, based on the same understanding of the relationship between flows, velocities and survival set forth in CBFWA's 1991 Biological and Technical Justification for its flow proposal. The recommendations for 1994 were particularly derived from the Detailed Fishery Operating Plan (DFOP) produced in late 1993 by the fish agencies and tribes. (Note that the up-river agencies and tribes along the Columbia River subsequently commented during the Council's 1994 rulemaking process that they did not support the Columbia flows that would be produced for anadromous fish under DFOP because of the effect on up-river reservoir levels and thus on resident fish in those reservoirs.) The recommended objectives are now expressed as flow targets and velocity equivalents and not travel time objectives, but the underlying basis and purpose has not changed.

(i) Columbia River flow targets. CRITFC recommended (Recommendation No. 5-2) the DFOP Columbia River flow regime to provide the following minimum flow targets at The Dalles, in first, second and third year critical year declarations:

April 15-30	300, 260, 220 kcfs
May	300, 260, 220
June 1-15	300, 260, 220
June 16-30	250, 250, 200
July	200, 200, 200,
August 1-15	160, 160, 160
August 16-31	160, 160, 160

In addition to the DFOP targets, CRITFC recommended a minimum flow of 120 kcfs at the Dalles in September.

ODFW (5-8) recommended the same April-August flow targets, though not the September target. The same is true for NRDC and its coalition partners (5-4).

(ii) Snake River velocity equivalent objectives, flow targets and volume objectives. In line with its 1991 recommendation, IDFG (5-9, 5-10) recommended a velocity equivalent objective for the lower Snake River, as follows:

“The biological objective of the Snake River drawdown is to achieve river velocity equivalent to a flow of 140[,000] cubic-feet per second through full reservoirs in all but low flow years.”

[This is the only self-labelled “biological objective” in the 1994 recommendations.] The environmental group Idaho Rivers United (5-6) similarly called for drawdowns and flow augmentation in the Snake “to produce the equivalent velocity created by 140,000 cfs at full pool.”

Matching the sliding-scale flow targets in the Columbia River, ODFW (5-8) recommended a companion set of April-August minimum flow targets for the Snake at Ice Harbor. More precisely, ODFW called for flow measures to “[a]chieve water velocities equivalent to the following flows at full pool:”

April 16-30	140, 100, 85 kcfs
May	140, 100, 85
June 1-15	140, 100, 85
June 16-30	85, 65, 50
July	80, 60, 50,
August 1-15	50, 50, x
August 16-31	50, x, x

Flow targets in columns marked with an “x” are to be “determined through in-season management decisions.”

CRITFC (5-2), on the other hand, did not recommend flow targets in the Snake. Instead, it recommended what it called “flow augmentation volume objectives” in the Snake River from April 15 through September:

The total volume to be made available for augmentation increases from 4.3 million acre feet in 1995, to 4.874 million acre feet in 1996, to 4.914 million acre feet in 1997 and 1998, broken down as follows: From Dworshak, in all these years, 1.5 million acre feet April 15 to July 1; 1.0 million acre feet from July through September. From Brownlee, in all years, 110,000 acre feet in May, and 137,000 acre feet in July. In August, 50,000 acre feet in 1995, 100,000 in 1996, and 140,000 in 1997 and 1998. In September, 100,000 acre feet in all years. From the Upper Snake, 1.427 million acre feet in 1995 and 1.927 million acre feet in 1996-1998 to be available between April 15 and September 30.

NRDC recommended the same augmentation volumes as did CRITFC, except that the August volume called for from Brownlee in 1996 and after is 100,000 acre feet (CRITFC went to 140,000 acre feet in 1997 and 1998). NRDC did not, however, call the augmentation volumes “objectives.”

(iii) FPE/bypass/spill. CRITFC, ODFW, NRDC and Idaho Rivers all recommended bypass/spill objectives or standards. Thus ODFW recommended “[p]rovid[ing] spill to achieve 80 percent Fish Passage Efficiency [FPE -- percentage of fish passing inriver that do not go through the turbines] at each Snake River project within the guidelines of the state’s water quality agencies April 15-July 31 and at each Columbia River project May 1-August 31 as specified in the 1994 DFOP.” NRDC and its coalition partners and Idaho Rivers similarly recommended that the Council adopt spill as the “primary means of dam passage” and that it call for “enough spill (primarily at night) to attain 80 percent FPE.”

CRITFC's recommendation differed to this extent: (a) CRITFC characterized the standard more clearly as a bypass performance standard, not a “spill” standard [i.e., bypass to 80 percent FPE; spill to that FPE level because it cannot be met by current bypass systems]; CRITFC called for a 90 percent standard for summer migrants; and CRITFC specifically added a recommendation for “spill to achieve an 80 percent FPE for the entire migration of early releases (March) of hatchery salmon.”

(iv) Upper-river reservoir drawdown constraints. The Montana Department of Fish, Wildlife & Parks and the Confederated Salish-Kootenai Tribes recommended (beginning in the Council’s 1993-94 Phase Four resident fish rulemaking, and carried over to this process), biologically-based “integrated rule curves” to protect environmental conditions for resident fish and wildlife in the Hungry Horse and Libby storage reservoirs in Montana. The central purpose of the integrated rule curves is to prescribe reservoir levels under various conditions below which the reservoirs will not be drawn for power production or

to provide flows for lower river anadromous fish. Similar reservoir constraints have been recommended for Lake Pend Oreille and proposed in a comment for Grand Coulee.

(2) Program goal recommendation. As noted above, in the program amendments in 1992, the Council adopted an interim, overarching biological goal for the anadromous fish portion of the program: to double the number of salmon and steelhead in the basin without loss of biological diversity. CRITFC (Recommendation No. 4-2) recommended a refinement of this program goal, creating a three-phase program goal (or three goals in sequence) to “address short, medium, and long-term progress to be achieved in mitigating for hydrosystem losses,” in which doubling of the basin’s salmon and steelhead population became the middle phase. The three phases of the system-wide goals were:

1. Immediately halt the declines in existing salmon populations and begin rebuilding by 2000;
2. Further rebuild populations to an aggregate level equal to the doubling goal by the year 2030; and
3. Rebuild populations to a level that will fully mitigate for losses caused by development and operation of the hydropower system by 2194.

CRITFC’s recommendation also included language calling on the Council to consult with the fishery managers and adopt “phased, qualitative and quantitative performance standards by March 31, 1995, to implement the goals of this program.” The performance standards are to be used in the annual program evaluations and at the time of program amendments, and to be revised as progress is made.

(3) Other recommendations for objectives, standards and biological objectives. As in 1991, the Council received few other recommendations for biological objectives. No entity recommended a comprehensive biological framework. What the Council did receive:

CRITFC (in Recommendation No. 7-3) also recommended a Tribal Restoration Plan consisting of nearly two dozen subbasin plans containing smolt release targets and adult return “harvest objectives” numbers for each subbasin. The subbasin plan recommendation is discussed more fully in the findings on Section 7; the lack of agency and tribal agreement on these plans led the Council to call for further refinement of the plans in the next year.

For the habitat section of the program, CRITFC recommended (7-2) a new habitat program goal and a whole series of new habitat objectives, policies and performance standards, some of them quite specific. To the extent that specific standards for water temperatures, sediment, cobble embeddedness, etc. can be called “biological objectives,” the CRITFC recommendation contained these. The recommendation also contained broader, more general, biologically-based and qualitatively expressed objectives, goals and policies for habitat protection activities. The habitat standards are also discussed more fully in the findings on Section 7.

Finally, with regard to harvest, PNUCC this time recommended that the Council adopt the escapement goals established by the Snake River Salmon Recovery Team. This recommendation is discussed more fully below in Section 8; the Council rejected this recommendation due to the opposition of the fishery agencies and tribes, calling instead for the development of these objectives as efforts continue to develop a comprehensive rebuilding framework.

Thus with the exception of CRITFC’s subbasin plan numbers and habitat standards and PNUCC’s harvest escapement objectives, which are dealt with elsewhere, the 1994 recommendations for specific,

discrete types of objectives presented the Council with nothing more than a set of hydro project operational objectives or standards.

(4) General discussions of biological objectives in the 1994 recommendations. The recommendations in 1994, as in 1991, also included general statements of biological purpose or objective, a few general discussions of biological objectives, or general calls for the Council to develop biological objectives. For example, CRITFC recommended (5-2) an evaluation and then the adoption of measures to meet the goal “to move the river hydrograph back toward historical timing and duration” in order “to reestablish critical mainstem and estuarine floodplain habitat.”

CRITFC (3-2, 4-2) also coupled its revised program goal with a call to the Council to adopt more specific population rebuilding performance standards and with a monitoring and evaluation program where eventually “each Council measure and each project funded by the Program should have measurable objectives that can be directly translated into the Program’s production goals in terms of increased adult fish runs, increased habitat capacity, or increased survival rates at specific life stages.” The recommendation did not state where these objectives are to come from or who is to develop them, nor the extent to which the Council can adopt measures and monitor and evaluate the program without the objectives. Also calling for the development of a biological objective framework was NRDC and its coalition partners. In the middle of its Columbia flow target recommendation (5-4), this group recommended:

“By January 1995, the fishery agencies and Tribes will develop a framework for biological objectives to guide salmon restoration actions in the mainstem Columbia and Snake. This framework will include salmon rebuilding schedules, survival improvement targets for each life-cycle phase, and performance standards to achieve those improvements (e.g., travel time/flow/velocity objectives for smolt-to-ocean survival improvements). By January 1996, the fishery agencies and Tribes will identify detailed objectives to be adopted by the Council.”

In the area of habitat, CRITFC combined its specific and general habitat objectives and standards with a recommended process for the development of additional objectives and standards and their use and review (7-2). The Forest Service’s habitat recommendations (7-6) included a number of statements to the effect that the Service is developing habitat objectives and standards in its various PACFISH, President’s Forest Plan, Eastside and Upper Columbia River Basin EISs, etc. processes and that the Council should essentially defer to these as the land management objectives and standards for the national forests.

Finally, part of PacifiCorp’s explanation for its recommendation (7-10) to reopen consideration of the passage issue at Condit Dam revolved around the lack of biological objectives:

“The present wording in the Fish and Wildlife Program calling for passage at Condit Dam is inconsistent with this standard [i.e., Section 4(h)(6)(C)] because no clear biological objectives exist for salmon and steelhead production in the White Salmon River. The White Salmon River Subbasin Plan, which did contain biological objectives, has been repudiated by the agencies. The Columbia River Fisheries Management Plan, which calls for the release of 1.45 million hatchery spring chinook into the lower White Salmon River, appears to conflict with a natural production goal. Without biological objectives, it is impossible for the Council to identify a least cost alternative for achieving them.”

(PacifiCorp repeated this position in its 1994 comments. PacifiCorp’s Condit Dam recommendation is discussed more fully below, in Section 7).

D. Comments on the 1994 Recommendations and Draft Amendments

The Council's draft rule included CRITFC's three-tiered program goal in a set of alternative approaches to a biological framework for the program, alternatives largely without specific objectives or numbers. One of the alternatives, Alternative E, was based on a framework developed by agency and tribal personnel and submitted to the Council in response to a consultation request. The Council's proposed amendments also included mainstem options that incorporated the specific mainstem operational objectives (the flow targets, FPE standards, etc.) recommended. The draft also included the subbasin plans and the habitat performance standards recommended by CRITFC. The Council received extensive comments on the issue of biological objectives, on the recommendations and on the draft rule.

With regard to CRITFC's recommended change to the program goal, CBFWA included CRITFC's three-tiered goal in CBFWA's program re-write comment. One issue that was not clear from CRITFC's recommendation was the role of the other half of the Council's existing program goal -- rebuilding population numbers without loss of biological diversity. In CBFWA's program re-write, CBFWA's statement of the "specific goals" included only the three-tiered goal noted above, but the text of CBFWA's explanation of the program goal continues to speak of the "challenge of balancing the need to increase the number of fish in the Columbia while maintaining and enhancing biologic diversity" and the need to "adhere to the principles that conserve biological diversity," which need not be incompatible with population increases. CRITFC submitted comments restating its support for the three-phased goal, but its comment was silent on the biological diversity issue. The Yakama Indian Nation stated explicitly that the salmon and steelhead goal should be to double the runs, that maintenance of biological diversity is not properly a goal, it is a biological objective, or one means to reach the program goal; that it may not be possible to rebuild upriver salmon and steelhead runs without losing some biological diversity; and thus that the Council should remove "without loss of biological diversity" from the goal statement. Many other commenters, led by Oregon Trout, commented that the program's biological framework must include the program goal of maintaining genetic or biological diversity, as well as more specific objectives that express that goal, such as smolt age, age at maturity, rare alleles, run timing and distribution.

Concerning the third tier or phase or goal recommended by CRITFC - fully mitigating for the losses caused by the hydropower system - a number of commenters stated that full mitigation for losses caused by the hydropower system is not attainable and not required or supported by the Act; this goal is not attainable given that 50 percent of the historic habitat in the mainstem Snake and tributaries and 500 miles of the upper Columbia and tributaries historic habitat has been permanently removed by hydroelectric and flood control developments, because of reductions in the carrying capacity of the existing river, and because of resident fish substitutions (e.g., PNGC, Chelan County PUD, Northwest Forest Resource Council, Mark Reller, Montana representative on Snake River Drawdown Committee and FOEC). PNGC added the only additional comments on the proposed revision of the goal. It supported the first tier of the revised goal, and expressed conditional support of the second tier of the goal "to further rebuild to a level that will support a commercial and sport harvest, but only in so far as that harvest is restricted to what is biologically prudent to maintain a genetically diverse naturally spawning population." These goals, especially the second, are "aspirational." "Failure to achieve this second goal at a reasonable cost should not be understood as failure of the Program. . . . There is no requirement in the [Act] to provide desired harvestable levels of fish to support the fishing industry." PNGC did not support the third tier of the goal, stating that goals or statements implying a requirement to "restore" hydropower-related fish losses are not supported anywhere in the Act or its legislative history; "[i]f restoration was to have been a statutory obligation, Congress would have stated this, particularly given the magnitude of the costs and efforts required to do so."

Concerning the other recommendations and issues, the comments received from the agencies and tribes were consistent with the approach they had been taking in the 1991 and 1994 recommendations. CBFWA incorporated into its program re-write, which it submitted as a comment, all of the flow targets, velocity equivalent objectives, flow augmentation volume objectives, FPE standards and reservoir constraints recommended by its various members. With regard to the rebuilding framework, and besides adopting CRITFC's three-tiered goal, CBFWA provided little more than some introductory explanations and definitions for the program, stating, for example, that “[b]iological objectives are identified under section 4(h) . . . as a necessary component of the Council’s program,” and that biological objectives are “intended to provide a standard against which to compare alternative measures and should not necessarily constrain the Council to a single course of action,” an “important contrast with success indicators which are specific to the measures.” “Biological objectives” was defined as statements “describe fish population attributes (e.g. number, age composition, survival) or environmental attributes necessary to achieve protection, mitigation and enhancement of fish and wildlife resources of the Columbia River Basin.”

CBFWA also stated that similar work is going on in the ESA process. In October 1994, as part of the settlement process in the *Idaho v. NMFS* ESA litigation, a Biological Requirements Work Group (made up of state, federal and agency fisheries scientists) produced a Progress Report to NMFS titled, “Analytical Methods for Determining Requirements Of Listed Snake River Salmon Relative to Survival and Recovery,” which the Group recommended for use as part of process of developing jeopardy standard. CRITFC, ODFW, Idaho and Save Our Wild Salmon all requested that the Council place this report in the administrative record and make use of it in developing the biological objective framework for the program, without much guidance as to how to use it. The report is quite technical in its focus on the problems of endangered stocks and the ESA process, so it is not precisely relevant to the Council's mandate and this rulemaking. And it did not contain anything resembling a discrete set of biological objectives for the Council's program. It did, however, describe the nature and direction of the agencies and tribes’ continuing work in this area. As will be noted in more detail below, the analytical methods described in the report included a historical approach to developing population profiles and objectives that may prove useful in future development of the framework.

CBFWA further stated that it would continue to work on the framework and would try to supplement its comments by the end of the Council's consultation period, December 6, 1994. CBFWA did submit additional comments at this date, as will be discussed below.

CRITFC basically repeated what was in its recommendation and in the sketchy biological framework requested from the agencies and tribes by the Council at the time the Council proposed the draft amendments and sent out for public comment as a rebuilding framework Alternative E. Most of its comments were general definitions and principles, but CRITFC did go further in the comments by identifying certain specific targets and standards in the CRITFC recommendation as “biological objectives” that had not been labelled so before. The CRITFC framework included:

Goals - defined as “[t]angible statements of the governing purposes for adopting and implementing the Fish and Wildlife Program.” As noted above, CRITFC again stated the three-tiered goal of halting decline by 2000, doubling by 2030, and full mitigation by 2194.

Performance Standards - Defined as “[t]erms for measuring whether goals are being achieved.” CRITFC gave the examples, without numbers, of adult returns to a subbasin, egg-to-smolt survival ratio in a subbasin, and smolt-to-adult survival ratio to a subbasin, noting that “[m]easuring the efficacy of a mitigation program by adult returns has been a long held position of the fishery managers” and that the Council should “adopt performance standards based on survival of salmon by life stage keyed to adult returns.” CRITFC also

noted that “relevant information” is being developed through the *IDFG v. NMFS* settlement process. CRITFC attached the Biological Requirements Work Group’s Analytical Methods analysis from that process (described below), making only the major point “[a]mong other things, this report indicates that based on recent conditions (1975-1988) various stocks of salmon in the Snake River basin are significantly below threshold levels where their survival is assured. Unless survival rates are significantly improved, we expect that additional stocks will become extirpated.”

Biological Objectives - Defined as the “attributes of the affected environment needed to meet the program’s goals as measured by its performance standards.” In the October/Alternative E framework, CRITFC gave only general examples at this point. In its public comment, CRITFC stated that “CRITFC’s August 15 submittal to the Council contained a number of recommendations for such biological objectives. These include:

“With Regard to Mainstem Habitat --

Sliding Scale Flow Targets at The Dalles Dam;
Snake River Flow Augmentation Volume Objectives;
80 percent Fish Passage Efficiency . . . ;
Ceasing transportation of juvenile salmon.

“With Regard to Tributary Habitat --

Surface fine sediment . . . less than 20 percent in spawning habitat;
Specific Watershed Biological Objectives are identified . . . in the CBFWA markup. These objectives are generally consistent with the CRITFC recommendations [in what were then called habitat performance standards].”

Measures - Defined as “actions needed to achieve certain biological objectives.” Examples given here were “specific flow augmentation volumes from the Upper Snake River, Dworshak Dam and Brownlee Dam” and a “[r]equest to USFS and BLM to amend all Columbia Basin forest plans and land management plans to achieve the Council’s habitat performance requirements.”

Success Indicators - Defined as “immediately ascertainable results of implementing measures that can be used to assess the degree to which measures are likely to achieve the biological objective.” Examples given were “[r]eductions in grazing activity in a targeted stream reach” and “[r]eductions in predator populations.”

In separate comments, the Yakama Indian Nation stated, as noted above, that sustaining biological diversity should not be part of the program goal, but only one biological objective among others. The Yakama Nation added that it did not support any biological objective framework or set of biological objectives that focused only on the Snake River.

The Shoshone-Bannock Tribes stated their support for biological objectives based on specific survival rates, although they did not recommend any specific survival rates. They did comment that the goal for Snake River salmon should be more than merely preserving them, and thus the Council should not adopt as biological objectives smolt-to-adult survival rates that do not allow upper Snake salmon runs to rebuild. They also suggested to the Council that the Council add to its population rebuilding targets a rebuilding target or recovery

goal for sockeye, of no less than a mean of 6000 sockeye adults over two life cycles returning to the upper Salmon basin.

A number of the upper Columbia river tribes (the UCUTs, the Colville Confederated Tribes, and the Confederated Salish-Kootenai Tribes) supported the upper river reservoir drawdown constraints, and they opposed the Columbia flow augmentation needed to achieve a 300 kcfs flow objective because of its adverse impacts on the upper river reservoirs and resident fish. The upper river tribes did not state an opinion on the adoption of lower river flow targets or velocity equivalent objectives assuming the Council also adopted the objectives intended to protect the upper river reservoirs and their resident fish. The UCUTs were the only one of the upper river tribal groups to add additional comments on the general issue of biological objectives. The UCUTs opposed one provision in proposed Section 4.0 that would have the ISG “develop an overall conceptual foundation for the program,” on the grounds that the fishery managers should do this work. In their view, the Ninth Circuit, when it instructed the Council to give high deference to the fishery managers, “was very clear that the biological objectives it was talking about were the biological objectives developed by the agencies and tribes in managing fish resources.” In addition, the UCUTs did not agree with the Council’s priority on protecting weak stocks, that the Council and BPA should focus biological efforts on recovery of moderate stocks with more genetic variability.

Idaho Fish and Game Department’s comment approach to biological objectives consisted mostly of qualitative or narrative goals and objectives for the program, as well as the quantitative objective of a 140 kcfs velocity equivalent in the Snake, subbasin escapement numbers and a general production goal of 70 percent of the carrying capacity of each subbasin. In the comments directed at the draft amendments, Idaho noted that it had submitted “proposed biological objectives” on previous occasions, that the Council should adopt those objectives in this rulemaking (e.g., travel time and velocity equivalents; subbasin numbers), and that these objectives reflected the goals and objectives in IDFG’s own Anadromous Fish Management Plan, 1992-1996, attached as an exhibit to Idaho’s comments. According to IDFG, “[t]he plan and IDFG’s proposed biological objectives reflect the following principles:” (1) Snake River stocks should be restored to fishable levels; (2) management decisions should aim for self-sustaining populations over the long term; (3) the region should focus on reducing water particle travel time to the ocean, and a 140 kcfs equivalent water particle travel time should be the objective for spring migrants; this should not be a hard constraint on reservoir operations, however, because it cannot be achieved with flow augmentation; rather, it is a standard with which to evaluate alternative measures; and (4) priority attention should be devoted to downstream survival.

IDFG’s management plan then contains a number of goals, policies and objectives. Most are qualitative, including (1) maintain genetic diversity of naturally-produced populations and artificially-produced populations used for natural production enhancement, and maintain natural production and productivity of wild and natural populations; (2) secure adequate flow and passage conditions to increase juvenile and adult survival through the federal hydrosystem downstream of Idaho, with survival sufficiently high to support annual harvest seasons and self-sustaining natural populations; (3) rebuild wild and natural populations to levels which optimally utilize production potential of accessible and potentially accessible habitat; (4) achieve full mitigation for losses caused by the hydrosystem through a combination of survival improvements and production; (5) restore sport and tribal fisheries for salmon and steelhead; and (6) integrate and coordinate Idaho’s efforts to boost survival and production with the rest of the basin to ensure achievement of Idaho’s escapement goals, with a short-term conservative approach to harvest and production and priority attention on improving downstream survival. IDFG then followed the set of goals with a set of narrative policies providing greater detail, focusing mostly on habitat and production issues.

IDFG did elaborate on the third goal noted above -- to rebuild wild and natural populations to “optimally utilize” the production capacity of habitat. IDFG noted that both the fishery managers and the public desired that the state set adult escapement goals for natural production to carry out this goal. IDFG chose an “interim production goal of 70 percent of estimated carrying capacity” to estimate escapement needs. “Information from density dependent survival relationships indicate that managing populations at 100 percent of carrying capacity is not optimal for both harvest and production goals.” Using information generated through the Council’s ISP subbasin planning process, IDFG produced a series of charts for each productive subbasin in the state for steelhead, spring chinook and summer chinook, in which was calculated the smolt capacity of the subbasin, 70 percent of the smolt capacity, the number of eggs needed to get that level of smolt production, the number of spawners to get that many eggs, and, finally, the escapement number above Lower Granite (and the smolt-to-adult-survival ratio to the subbasin) needed to get that number of spawners.

Both ODFW and WDFW supported CBFWA’s comments, including CRITFC’s revised three-tiered goal. ODFW also submitted the Biological Requirements Work Group Analytical Methods report referred to above, calling it “technical support of our call for development of biological objectives” and adding additional if general comments on how this document is “broadly applicable” to their on-going effort to develop biological objectives for stocks of concern and the “foundation” for determining the requirements of salmonids relative to survival and recovery. WDFW commented that a critical element of an adaptive management approach to learning about the effectiveness of juvenile survival actions would be the establishment of survival improvement targets associated with the rebuilding of runs. The assessment work being conducted under the auspices of the Marsh court settlement negotiations should provide the basis for these survival improvement targets. WDFW also agreed with CBFWA/CRITFC that biological objectives describe fish population attributes (e.g., number, age composition, survival) or environmental attributes necessary to achieve protection, mitigation and enhancement of fish and wildlife resources of the Columbia Basin. WDFW did not endorse CRITFC/CBFWA’s reference to the specific habitat standards as “biological objectives;” WDFW’s recommends retaining the original terminology of “performance standards” for salmon and steelhead habitat.

Environmental and similar groups provided little comment on this issue. The Northwest Sportfishing Industry Assn. endorsed the mainstem migration measures generally favored by the environmental groups, including “biological objectives with hard flow and velocity constraints.” Oregon Trout added to its 1991 recommendation that a biological framework must include biological objectives that express the goal of maintaining genetic diversity, such as smolt age, age at maturity, rare alleles, run timing and distribution. The Save Our Wild Salmon coalition stated generally that a proper biological framework must call for an “ecosystem approach, emphasizing in-river salmon migration and coordinated actions for other imperiled species” and “specific rebuilding schedules and timetables, which lead to harvestable runs (i.e., restoration not just recovery).”

Other groups -- utilities, customers, entities linked to commercial agriculture -- took a different view of the issue of biological objectives, and PNUCC and PNGC found a biological framework for the Council to adopt in the Recovery Team’s recommendations, which no entity recommended to the Council.

PNUCC began by stating that the biological objective alternatives proposed by the Council “lack detail and supporting justification,” while biological objectives are a “critical element of the fish efforts and the Council should take the needed time.” PNUCC also stated that it “is certain that biological objectives are not physical characteristics like water particle travel time or flow level.” The Council instead should develop biological objectives “based on the format used by the Recovery Team,” including the “goal of achieving a spawner to spawner ratio of 2 to 1,” plus the Recovery Team’s “identified survival rates for specific life-history stages that are necessary to achieve the overall goal.” Indicator stocks, which are “representative of

all stocks and species in the basin,” need “customized” biological objectives and need to be “identified, marked and monitored.” Also, naturally spawning stocks and hatchery stocks need distinct biological objectives. The biological objectives should set the overall survival needed in each life stage, and then the Council is to identify measures that will improve survival and achieve the objective. Survival at each life stage is affected by human and non-human factors, so it may not be possible (because of non-human influences) to improve survival sufficiently in one life stage, and thus it may be necessary to compensate by increasing survival in another stage, with the example of ocean survival less than expected and thus a need to decrease harvest and improve upriver passage. “Monitoring during each life stage will be required to (1) measure survival; (2) determine if the biological objectives are being achieved; and (3) to evaluate the success of specific measures.” At this point PNUCC attached a table of spring/summer chinook life-cycle survival percentages from Page IV-12 of the Recovery Team recommendations:

Given that PNUCC (and PNGC) emphasized the Recovery Team’s approach to measurable biological goals, the Recovery Team approach must be summarized, from Chapter IV, Delisting Criteria, of the Final Recommendations of the Snake River Salmon Recovery Team. Actually, two analytical approaches underlie the Recovery Team’s biological framework: (1) future productivity related to habitat capacity and (2) “historic” survival data (mostly data from the 1960s). These two approaches are expressed in three different levels of objectives:

First, the Recovery Team stated a “preferred” set of delisting criteria for all listed chinook species:

“For each listed ‘species’, the spawner-to-spawner ratio should achieve a geometric mean greater than 2.0 over at least two generations (approximately eight years), and habitat seeding as measured by spawner abundance or parr densities should show similar increases in levels of abundance and use of available spawning and rearing habitats. These criteria should be applied both to the species in aggregate and to component subpopulations selected as subbasin indicators of species recovery.”

The Recovery Team developed the 2:1 ratio based not on any particular or complicated methodology but rather and more simply on the basis of a general understanding of what is an appropriate productivity jump-start for a listed population with the available habitat.

Second, the Recovery Team produced an “alternative numeric delisting criteria” for spring/summer chinook. The Recovery Team recognized managers’ desire for “immediate population numbers as convenient delisting targets,” even though the Team had a lack of confidence in any particular numbers generated. The Recovery Team looked at “historic data” on five factors that could contribute to this criteria -- spawner-to-spawner ratios, composite run size, redd counts, parr densities, and smolt abundance. For “historic” data, the Recovery Team looked to the period 1962-1967, a time with fairly good data and non-threatened, relatively abundant runs. The Recovery Team then decided that as a reasonable if tentative objective “[d]elisting could be recommended when natural production numbers reach some reasonable (probably arbitrary) fraction of that historic natural productivity (50 percent was considered by the Team as a provision fraction.” The end result was the following population-level delisting criteria for spring/summer chinook:

“Spring/summer chinook salmon delisting may be considered when an eight year geometric mean of naturally produced adult fish passing over Ice Harbor Dam approximates a reasonable fraction (e.g., 50 percent) of the average number passing over that same dam in a base period 1962-1967; and when spawner abundance or parr densities in subpopulation watersheds approach equivalent proportions of the 1960s levels of abundance and habitat use.”

Using this criterion, and the 1962-1967 base period data, the Recovery Team recommended that “a tentative 50 percent delisting target would be an eight year average count of 26,200 naturally produced adult spring/summer chinook salmon passing over Ice Harbor Dam.” PNUCC chose not to include the alternative numerical criteria in their comments, without explaining why.

PNUCC did include the third leg of the Recovery Team tripod for spring/summer chinook -- life-stage survival targets. On the one hand, the Recovery Team noted that a number of the reviewers of the draft “urged the Team to apportion recovery efforts by life stage on the basis of modeling analysis or other information sources” and the Recovery Team recognized the desirability of doing just that. On the other hand, the Recovery Team also recognized that present limited knowledge rendered this an exercise in “fallibility.” On this understanding, the Recovery Team produced a table of what it described as “highly tentative targets” for life stage survival improvements. It appears that the Recovery Team derived these survival percentage rate “recovery objectives” by using survival data from the relatively recent historical base period of the 1960s to compare to present conditions. This table is what PNUCC submitted in its comment). PNUCC agreed with the Recovery Team that these survival rates were highly tentative and “variable” and that they would need to be refined with new information.

In PNUCC’s analysis, the Council should view the life-stage survival objectives as subordinate targets that help “achieve the goal” of the spawner-to-spawner ratio. PNUCC’s view of the relationship between the Recovery Team’s spawner-to-spawner ratio and the life stage survival rate improvements does not appear to be correct. The Recovery Team developed the spawner-to-spawner ratio by deciding on the near-future productivity level that will be needed to seed the available habitat and boost the population. The Team developed the life-stage objectives by looking to the past, to historic survival levels. The two numbers -- the Recovery Team’s 2:1 spawner-to-spawner ratio and its life-stage survival objectives -- have little to do with each other analytically. The spawner ratio was not conceived of as the cumulative result of achieving the proposed life-stage survival targets.

The analytical approaches used by the Recovery Team could be seen to be broadly parallel to the biological framework paths the agencies and tribes have been taking. For example, as noted above the Recovery Team’s preferred criteria of a spawner to spawner ratio is derived from a focus on boosting productivity and the number of adults returning to subbasins to spawn. One can see much the same analytical approach in the subbasin plans and in IDFG’s Anadromous Fish Management Plan (discussed above). The Idaho Plan adopts a subbasin planning approach, using adult escapement numbers and smolt-to-adult survival ratios that will require boosts in overall system productivity to match available subbasin habitat. Idaho’s approach is not dissimilar to the Recovery Team’s use of a productivity increase to seed available habitat.

There are also agency and tribal analyses that parallel the Recovery Team’s other analytical approach. This is, as noted above, the use of “historic” 1960s data and a general objective of trying to improve survival and rebuild to those historic numbers or some fraction of them that underlies the Recovery Team’s spring chinook population target and life-stage survival targets. A similar conceptual approach can be seen in the Biological Requirements Work Group’s Analytical Methods report discussed above. The Group did not endorse the Recovery Team’s numbers and did not establish any particular objectives, but it did use, in part, an approach that focused on pre-1970 “historic” data (mostly 1950s and 1960s) -- redd counts, escapement numbers, survival data, etc. -- when it discussed possible analytical methods for establishing preliminary recovery goals, indicator stock population profiles, the “probabilities of persistence” with respect to survival and recovery, etc. In other words, the Group found a useful analytical tool in the comparison of present population conditions with recent historic non-threatened levels, to help determine what is and is not a stock on the rebound.

PNGC also provided extensive comments on the Council's proposed biological objective alternatives, both general and specific, and it also relied on the Recovery Team approach for the specific objectives. As noted above, PNGC began with comments on CRITFC's proposed three-tiered revision to the program goal. PNGC also disagreed with any description or definition of biological objectives as physical or environmental conditions necessary to achieve rebuilding targets. "Biological objectives are biological characteristics of the fish at various life-stages, such as survival targets and spawning numbers, not environmental conditions;" thus PNGC opposed mainstem biological objective expressed as 140/300 kcfs velocity equivalent objectives or the improvement in survival related to flows of 140/300 kcfs. PNGC also disagreed with the adoption of numeric targets and management objectives derived from system and subbasin plan process, as these "appeared to be driven by harvest desires rather than preservation and recovery of natural populations and relied heavily on artificial production, including supplementation." It also opposed waiting for the ESA process to provide a biological framework for the Council to consider, as "[r]ebuilding targets and biological objectives are critical to guiding the Program and evaluating measures."

PNGC recommended instead using the Recovery Team's delisting objectives as "reasonable" interim population targets for the "halt decline" tier of the goal -- for spring/summer chinook, 26,200 naturally produced adults returning annually over Ice Harbor; for fall chinook, 1000 adults over Ice Harbor or Lower Granite, with at least 25 percent naturally produced. The Council might also consider adopting the Recovery Team's very "provisional" escapement objectives of 29,000 spring chinook and 22,800 summer chinook as interim doubling goal objectives. PNGC also opposed the use of biological objectives that cross several life stages [such as a smolt-to-adult ratio). "[T]o be useful, biological objectives should be discretely tied to each life-stage of the fish. . . . Only in this way will the Council be relatively assured that changes in survival are the result of specific measures and are not actually reflecting the effects of some other factor at another life-stage." In somewhat of a contradiction, PNGC also suggested adopting the Recovery Team's preferred delisting criteria of a spawner to spawner ratio of 2:1 as another interim objective, which in theory expresses improvements across life-stages. PNGC also recommended using the Recovery Team's tentative life-stage survival improvement targets as interim biological objectives.

Less extensive but similar comments came from a number of other groups. The Columbia River Alliance stated that there are two technically supportable measures for the mainstem biological objective: (1) increased smolt survival rates from the rearing area to the estuary; and (2) increased returning adult survival, with all other factors held constant. Developing and measuring the biological objective(s) for mainstem passage should be accomplished through life-cycle model runs that have been calibrated to reflect technical data now being collected by the National Marine Fisheries Service and the University of Washington, for both in-river and barge transportation survival rate estimates. The Douglas County PUD commented that target flows are not biological objectives, but proposed measures instead. The Okanogan Resource Council stated that biological objectives for mainstem passage should be based on production output, not input, and should allow for standardized comparisons among all mainstem options. Two "technically supportable" measures for mainstem biological objectives are increased smolt survival rates from rearing area to estuary and increased return adult survival with other factors held constant. Measures should be evaluated against these biological objectives using life-cycle modeling runs calibrated to reflect NMFS/UW data on in-river and transportation survival. The Chelan County PUD added that "the biological objective for mainstem passage of 140 kcfs in the Snake and 300 kcfs in the Columbia is not supported by adequate scientific evidence."

Idaho Power commented that the Council violated the Power Act and acted in an arbitrary and capricious manner in violation of the APA by not adopting biological objectives first and then sending out proposed program amendments for comment so that the public could evaluate them against biological

objectives. Idaho Power also said it was impossible to evaluate the proposed options without biological objectives. And the Public Power Council agreed that the Council's first priority ought to be to determine sound biological objectives. Such objectives should be a function of measurable salmon survival at different life stages. The PPC added its agreement that water particle travel time is not a biological objective; at most, it is a controversial performance standard that may or may not be related to salmon survival. Specific biological objectives are the key to a proper cost effectiveness analysis. Finally, Montana Council staff member Mark Reller, speaking as the State of Montana's representative on the Snake River Drawdown Committee and alternative member of the FOEC, also commented that biological objectives must be established first, then measures chosen based on those objectives, that the Council should use the Recovery Team's work concerning percent survival improvements by life stage, and that hydrologic objectives are not biological objectives, and water particle travel time and velocity equivalents are hydrologic objectives.

The BPA and DSIs commented more extensively on this issue. BPA began by stating that sound biological objectives must be developed before the Council can develop program measures. With regard to the skeleton framework proposed by the Council in Section 4.0, BPA agreed with Council's definitions and explanations, including the definition of biological objectives, with one exception: individual life stage survival targets are not objectives; instead, the entire set of life stage survival targets collectively can be considered an objective. Setting survival goals and objectives for the life stages is necessarily a comprehensive ecosystem approach; since salmon use many different types of habitat in their life cycle over a broad geographic range. Thus survival goals by life stage are a simple but direct way to design a framework for rebuilding. BPA agreed that biological objectives should be independent of the measures, and agreed with the Council that a biological objective is not the same as a measure -- in BPA's opinion, water particle travel time is a means of achieving a biological objective, not a biological objective itself.

BPA gave the most focus to flow objectives, stating on the one hand that flow augmentation should be viewed only within the context of an entire ecosystem approach, in which multiple measures over the various life-stages add up to improved survival; BPA stated that this view is consistent with the Recovery Team's approach. On the other hand (in what seems an apparent inconsistency), BPA stated that the Council should specifically set downstream migration survival goals and use those to evaluate flow augmentation against other mainstem survival improvements. BPA also contended that the Council seemed on the verge going beyond giving the fish agencies and tribes "due weight" and totally deferring to their recommendations for biological objectives, objectives based the agencies and tribes flawed understanding of the flow/survival relationship that is not consistent with the most recent data. The Council should select an alternative, redraft the amendments and seek further comments from the region, and include the operating agencies, in addition to agencies and tribes, in developing biological objectives. Coupled with the rebuilding framework should be a monitoring and evaluation program and a comprehensive cost-effectiveness evaluation. To fully comply with provisions in the Northwest Power Act, the Council should link each measure to a biological objective, and complete both cost estimates and estimated biological outcomes of the measures.

The DSIs also stated that the Council needed to establish biological objectives before selecting fish and wildlife measures, so as to select least-cost measures that meet the objectives. Implicit in the Northwest Power Act is the sense that biological objectives will be in place against which each recommendation may be assessed; and thus it is not logical to adopt measures before adopting biological objectives. The selection of appropriate biological objectives that focus on impacts caused by dams, and cost-effective measures to meet those objectives, will be required to assure an adequate, efficient, economical and reliable power supply. The DSIs in general lauded the Recovery Team, without specifically adopting any of their recommendations, and partly rejecting them, in effect, by expressly rejecting the use of adult returns as a biological objectives, in a complex passage: "Given the myriad of factors which influence salmon survival at all stages of the salmon

lifecycle, and the lack of cogent data on estuarine and marine mortality, the Council cannot fairly measure progress in making the hydrosystem more fish-friendly by framing a biological objective of adult returns. This is particularly true to the extent the Basin is at its carrying capacity for anadromous fish. It is certainly true that some upriver habitat, particularly in Idaho, is underseeded, but emerging evidence suggests that the estuary itself and competition from hatchery smolts may cause bottlenecks in salmon production that mean improvements in mainstem passage of juveniles and adults will accomplish nothing in terms of population increases.”

The DSIs recommended that the most appropriate mainstem biological objective was a passage survival rate: DSIs noted that “pre-dam passage survival” was far less than 100 percent, in the sense that many juveniles died before beginning migration and many that began migrating died in the migration. The Council should develop a pre-dam passage survival rate as an objective to manage the hydrosystem towards. “At present, the Council lacks a yardstick to measure progress toward achieving pre-dam passage survival. What is certain, however, is that reducing passage mortality to natural levels -- which may well be achieved through the transportation program alone -- discharges the Council’s job of offsetting mortality arising from the mainstem projects. The only sensible biological objective for offsetting such mortality is an objective that compares pre-dam and current passage survival rates.” To the DSIs water particle travel time and flow targets are not appropriate biological objectives. Selecting water particle travel time as a biological objective “appears calculated to remove the ability sensibly to distinguish between transportation and inriver improvements, both of which may achieve the ultimate biological objective of improving the survival of migrating smolts.”

During the consultation process the Council received a legal briefing on the issue of biological objectives from two attorneys who represent the DSIs, Paul Murphy and Eric Redman. Murphy in particular appeared to express an understanding of the Act consistent with the analysis set forth here -- that the recommendations process is what brings biological objectives to the Council for consideration, and that, on the whole, biological objectives have been and are the biological goal or purpose or “thing” that underlie recommended measures.

Finally, at the close of the Council's consultation process, the Council received additional comments as expected from CBFWA concerning the program framework. CBFWA provided a very useful overview of the program framework and a useful assemblage of framework-related insights, none of which were new concepts or discrete, quantified life-stage survival objectives. CBFWA pulled together and organized the general, qualitative, biological goals, purposes, objectives and strategies underlying the various sections of the programs and the individual measures, biological objectives that had sometimes been stated explicitly but often have been implicit in the narrative and the measures.

3. Findings

On this record, the Council has made the following decisions with regard to the issue of biological objectives:

A. Program goal

The Council adopted CRITFC’s recommendation as an amendment to Section 4.1, somewhat modified. It is far from clear that the Act would allow the Council to set a goal calling for full mitigation of the losses caused by the development and operation of the hydropower system. It is clear that simply doubling the runs is an interim goal and that under the Act the Council can and should have a long-term goal to protect,

mitigate, and enhance salmon populations (and other fish and wildlife) to the greatest extent possible while assuring the region an adequate, efficient, economical and reliable power supply. That is the goal prescribed for the Council in the Act. 16 U.S.C. § 839b(h)(5). For this reason, the Council stated that the third tier of the program goal was to ultimately rebuild the salmon populations to a level that will protect, mitigate and enhance fish and wildlife affected by the operation and development of the Columbia River basin hydroelectric system. In addition, the program continues to state explicitly that the program goal includes rebuilding populations without loss of biological diversity. The agency and tribes and the non-agency and tribal commenters all agree that avoiding the loss of biological diversity should be a central principle of the Council's program. While they differ on how to express that principle, the Council believes the way to make this point clear to the public and the implementing agencies is to state it explicitly as a part of the program goal. The Council does not believe this is necessarily inconsistent with the recommendation submitted by CRITFC.

B. Biologically based operational objectives

The Council has received a set of recommendations for biologically-based operational objectives for the hydropower projects. As noted in the beginning of this section, operational objectives of this type seem to be precisely what is described in Section 4(h)(2)(B) of the Act. Whether or not the Council believed the Act required something more in the way of biological objectives in the program, the Council would still have to consider these operational objective recommendations and either adopt or reject them under the standards of the Act. The Council cannot reject these objectives simply by saying, as some commenters imply, that they are not "biological objectives."

The substantive merit of these recommended objectives is discussed in the introduction to Section 5 and in extensive findings on the objectives and on mainstem measures in the findings below for Section 5. Summary comments are appropriate here: As explained in the introduction to Section 5, the Council has decided to accept the agencies' and tribes' judgment on the expected biological value of these operational objectives, and has set forth for these areas of the program both operational objectives and the qualitative biological objectives addressed by the operational objectives. The validity of these objectives, especially the high flow/velocity objectives, remains a highly contentious area, in which the biological judgments of especially the state agencies and lower river tribes are contested by the judgment of the biologists and others outside of these agencies and tribes, especially linked to the utility and industry groups. In this situation the Council must give due weight to the recommendations of the agencies and tribes and rely on their biological expertise, as required by the Act. If the agencies and tribes had submitted recommendations for which the Council concluded that there was no reasonable scientific basis or rationale and the recommendations were simply policy judgments, then in that hypothetical situation the Council would reject these recommendations. But the fact that the science is highly contested or uncertain in this area is not the same as demonstrating that the best available science conclusively undermines the recommendations of the agencies and tribes. Competent scientists inside the agencies and tribes and out are of the reasonable opinion that the link between high flows and velocities and survival is positive, even though the evidence is less than conclusive. Independent scientific review conducted by Dr. Cada for the Council supports this position. The Council will not substitute its judgment, or the judgment of other credible biologists, who take a contrary view. This is not to say that the Council accepts these agency and tribal judgments conclusively. The scientific data are not clear, and the genuine disagreements among capable scientists mean that the Council cannot consider the issue resolved conclusively. The critical scientific uncertainty means that the issue must continue to be studied, evaluated and argued.

C. Biological framework

With regard to that portion of CRITFC's recommendation (4-(2) concerning the adoption of "performance standards" to implement the three-phased goal and to be used in the annual program evaluations, and the other recommendations to develop a comprehensive program biological framework -- the Council has adopted this recommendation in a modified way by developing a set of biologically-based operational objectives for hydroelectric project operations, by noting the various biological objectives, purposes and goals underlying measures throughout the program, by describing in Section 4.0 a possible biological framework and set of concepts and general biological purposes for the program that is to be revised and fleshed out in the near future in consultation with the fishery managers, and by establishing an annual monitoring and evaluation process, as described in Section 3 above.

As explained in the opening section, there is no basis in the Act for the Council to conclude that it must adopt a comprehensive, discrete, quantified biological framework or set of biological objectives for the whole program before it can propose or adopt measures. Moreover the Council could not adopt such a framework on the basis of the 1991 and 1994 recommendations. The Act supports a course of action in which the Council takes action on the basis of the operational objectives in the recommendations and on the general and qualitative understanding of the biological basis or objectives for program measures, while describing a possible comprehensive biological framework that the fishery managers and others are to help the Council flesh out in the near future,

The Council continues to believe in the value of developing a comprehensive biological framework for the program, which should include both life-stage survival improvement targets and broader measures of survival, such as adult returns objectives, subbasin productivity numbers or ratios, and smolt-to-adult ratios. The Council has called for the fishery managers and others to continue work on this framework, work that is continuing in any event in the ESA recovery plan and *Idaho v. NMFS* settlement forums. The Council decided not to adopt the tentative biological framework recommended to NMFS by the Recovery Team, which is the only source of an actually fleshed out biological framework known to the Council. The Council declined to adopt the Recovery Team's numbers for a variety of reasons, including: (1) No entity submitted it to the Council in the recommendations; (2) the Recovery Team's mandate under the ESA is not the same as the Council's mandate under the Act, which has its implications for the nature of the goals and objectives in the biological framework. The Council cannot simply incorporate such a framework without critical evaluation (the same will be true of anything produced in the ESA process); (3) the Recovery Team itself noted that its life-stage survival targets were an exercise in "fallibility," and that further research, analysis and evaluation needs to occur before these numbers have any solid basis; (4) the state agencies and tribes have commented that they do not support the Recovery Team's recommendations; and (5) the biological analysis and framework development in the *Idaho v. NMFS* ESA litigation appears likely to supersede what the Recovery Team recommended. The Council did find much to value, however, in the Recovery Team's recommendations -- and, as noted above, the Council believes the analytical approaches taken by the Recovery Team and the agencies and tribes are not necessarily inconsistent. The Council expects that the Recovery Team's approach and numbers will receive serious consideration by all parties, including the fishery managers, as the work of fleshing out the Council's framework continues.

The Council's decisions with respect to the recommended habitat standards/objectives, subbasin plans and population targets and harvest escapement objectives are analyzed below in the findings for Sections 7 and 8.

Program Section(s): **4.1, footnote (definition of biological diversity)**

Source: CRITFC
Recommendation No.: 4-1

Recommendation: CRITFC recommended changing the definition of “biological diversity” in footnote 1 to Section 4.1 from “the array of genetic, physical, life history and behavioral characteristics contained within the salmon and steelhead resource of the Columbia River Basin,” to “the variety and variability among living organisms and the ecological complexes in which they occur.” CRITFC stated that the proposed definition was “in line with that commonly used by conservation biologists and is the formal U.S. government definition used by the U.S. Office of Technological Assessment.” CRITFC recommended a similar change in the definition of “biodiversity” in the program’s Glossary.

Finding: Adopted.

Program Section(s): 4.1B (basis for salmon and steelhead goal)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: The Corps recommended revising the passage mortality statistics in Section 4.1B that the Council summarized from its 1987 salmon loss estimate to reflect recent research and NMFS Biological Opinions. The existing program language, based on the information available in 1987, states that passage mortality has been estimated to be 15 to 30 percent of downstream migrants per dam and 5 to 10 percent of upstream migrants per dam, and the cumulative juvenile downstream passage mortality past nine dams has been estimated to be 77 to 96 percent, depending on the volume and timing of flows, while the cumulative adult upstream passage mortality for fish passing nine dams has been estimated to be 37 to 61 percent. A footnote adds the caveat that the downstream and upstream mortality estimates “do not include higher survival levels that may be attainable by further improvements in bypass and transportation.”

According to the Corps, NMFS’ estimates current losses through the power system under the proposed operations in the 1994-1998 Biological Opinion of 58 to 84 percent for Snake River sockeye and spring/summer chinook juveniles, and 67 to 88 percent for fall chinook juveniles. Adult loss estimates are 11.4 percent for sockeye, 20.9 percent for spring/summer chinook, and 39.3 percent for fall chinook. The Corps also recommended that the Council note that “some natural mortality of juvenile and adult salmon occurred in their migration . . . before construction of dams.”

Finding: The Council did not adopt this recommendation. The Council set forth these passage rate estimates as part of its 1987 analysis of the overall, historical impact of hydro projects on salmon migration. The Council recognized then and recognizes now that system and operational improvements might provide higher survival levels than these historic baseline estimates and that the baseline numbers are indeed just “estimates” and may be subject to revision. However, it is premature and information is too uncertain to revise these numbers in this rulemaking. The Corps would have the Council revise the passage mortality estimates based on what NMFS estimated would be the passage mortality rates if operations conformed to the 1994-1998 Biological Opinion. However, the validity of the analysis and of the measures in that biological opinion have been placed in doubt by the federal court in the *Idaho v. NMFS* litigation, and NMFS will be producing a new biological opinion and a recovery plan in 1995. It is impossible now to know what system and operational improvements will be analyzed in that opinion or whether the analysis of passage mortality will take a different approach. A number of commenters also asked the Council to alter the migration mortality estimates based on

indications from UW/NMFS researchers that survival through Lower Granite reservoir is higher than expected (e.g., Douglas County PUD, Chelan County PUD, PNUCC, DSIs, PNGC). Others, including the fishery agencies and tribes (e.g., IDFG), and the Fish Passage Center responded that for various reasons these reservoir survival data are too preliminary, unreported, and limited in scope or study design to be a sufficient basis for revising our understanding of migration mortality at this time. The UW researches themselves have noted that their work is not final and conclusions are tentative and should be used with caution. Nor do they want their research on two upriver reservoirs extrapolated to the entire river system. NMFS has not yet asked the Council to revise its understanding of passage mortality. The biological analyses, recovery plans and research reports expected in 1995 and in the years shortly thereafter should provide a much better, sufficient source for re-analyzing these issues, and it is at that time that the Council will expect recommendations for analyzing these issues. On these circumstances, the Council did revise Section 4.1B by noting that recent analyses “suggest the reservoir mortality in upriver reservoirs or portions thereof could be lower in some instances.” However, at this point, revising the passage mortality estimates based on the Corps of Engineers recommendation would not complement the on-going activities and research of the various fish agencies and tribes. 16 U.S.C. § 839b(h)(6)(A).

SECTION 5: JUVENILE SALMON MIGRATION

Note on biological objectives for juvenile salmon migration:

The findings for Section 4 above contain a lengthy discussion of the meaning and role of biological objectives in the Council’s program. Those findings include a discussion of the recommendations the Council received to adopt objectives for the operation of the basin’s hydroelectric projects. The appropriate place in the program for most of these objectives is Section 5, Juvenile Migration, since most are objectives intended to improve the survival of juvenile salmon migrating through the system. This introduction to Section 5 includes a brief discussion of the recommendations received, the comments received, and the Council’s decisions. The biological and operational objectives are then set forth in the relevant subsections of Section 5. The findings for Section 5 will briefly restate portions of the general discussion on biological objectives from Section 4 and add substantive detail about the recommended objectives and the measures intended as steps toward achieving the objectives.

For biological objectives for the juvenile salmon migration section of the program, the Council started, as does the Northwest Power Act, with the recommendations received from the fish and wildlife agencies, Indian tribes and others. The fish and wildlife agencies and tribes recommended a number of objectives related to hydroelectric project operations, consistent with 16 U.S.C. § 839b(h)(2)(B):

The fish managers’ recommendations reflect a fairly broad consensus that flows or equivalent velocities of 140,000 cubic feet per second (140 kcfs) in the Snake River and 300 kcfs in the Columbia River would improve salmon survival rates, but concerns were raised about resident fish impacts.

There were similarly strong recommendations for an 80 percent fish passage efficiency (FPE) objective for measures to reduce fish mortalities at the mainstem hydroelectric projects.

There were recommendations to control summer and early fall temperatures in the rivers to improve the survival of summer juvenile migrants and returning fall adult chinook salmon.

The Columbia River Inter-Tribal Fish Commission (CRITFC) recommended that the hydropower facilities be managed to achieve 120 kcfs in the Columbia River in September.

The Montana Department of Fish, Wildlife and Parks and the Salish-Kootenai Tribes recommended “integrated rule curves” to protect environmental conditions for resident fish and wildlife at storage reservoirs in Montana. Reservoir constraints were also recommended for Lake Pend Oreille and suggested in comment for Grand Coulee, to protect resident fish and wildlife.

As discussed below in connection with specific recommendations, commenters expressed a variety of concerns about these objectives. The record shows real and potential conflicts in the use of stored water for resident and anadromous species, for juvenile anadromous fish migrating at different times of the year, and for juvenile and adult salmon. In addition, some commenters were skeptical that these operations would produce the survival benefits suggested by the objectives’ proponents.

There also were concerns about the power system impacts of operating to these objectives. A key issue is whether the region would be assured of an “adequate, efficient, economical and reliable power supply.” The Council has made findings on this issue in Section 1.8 of the program. However, these questions require further exploration in the longer term. The Council intends to work with Bonneville, the fishery managers, utilities and others to assure the continuing adequacy, efficiency, affordability and reliability of the region’s power supply. In 1995-96, the Council will conduct a revision of the power plan that will address these issues more thoroughly.

As the program states, for the near term it is not clear when and how mainstem anadromous and resident fish and wildlife objectives can be achieved along with the other purposes of the hydropower system. The measures in the program outline ways of moving toward the objectives, recognizing that they may not be achievable in some years, especially in the near term. The Council is hopeful that the discussions between the upriver and downriver fish and wildlife agencies and tribes, which are being facilitated by CBFWA, will lead to the development of improved insights for evaluating tradeoffs between anadromous and resident species. Inevitably, determining how far these objectives can be achieved in any given year will require careful annual planning and in-season management.

Beyond the near term, the Council and the region must continue to explore changes in the hydroelectric system to make fish and wildlife objectives more achievable, to minimize the need for or impacts of tradeoffs among objectives, and do so while carrying out the purposes of the Northwest Power Act.

The measures outlined in the program are the Council’s prescription for carrying out these courses of action. Consistent with the discussion in Section 4 above, the measures are accompanied by a statement of their biological objective, which was explicit or implicit in the original recommendations and in the Council’s proposed amendments. This approach, in which biological objectives are understood to be the biological purpose of any given measure, is consistent with the Council’s interpretation of the Northwest Power Act, and with comments received from the fish and wildlife agencies and tribes in this process.

Program Section(s): 5 (introductory text)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-9

Source: PNUCC
Recommendation No.: 5-1
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendations: These three recommended different revisions to the introduction to Section 5 to reflect their particular position on the central issues of juvenile migration, especially the nature of the relationship between the needs of migrating salmon and higher flows and velocities, the validity of using reservoir drawdowns to meet those needs, and the validity of the use of juvenile salmon transportation around the projects.

Idaho proposed various amendments to the introductory text of Section 5 to reflect the focus of its proposed measures. These included an explicit statement that juvenile migration survival rates correlate with productivity rates for the Snake basin populations; a specific description of the velocity, travel time and survival impacts of the mainstem dams, especially the four in the lower Snake; a description of the limits of flow augmentation (e.g., the Snake River flows through an arid region with relatively low potential storage capacity and long refill times; existing storage is committed to other use, including resident fish and water rights for irrigation; 2/3 of inflow to mainstem reservoirs comes from watershed with little or no controlled storage); and the deletion of references to the use of and improvements in transportation. The recommendation was included in the draft, in Option 3, Introduction.

PNUCC recommended deleting the Salmon Strategy language concerning intermediate measures, such as additional water and drawdowns, to delete references to the promise of reservoir drafting and drawdowns and any language describing implementation of intermediate measures. They would replace it with language noting that the Council's adoption of these measures will depend upon the evaluation and biological effectiveness of current measures. This recommendation was included in the draft, as Option 1, Introduction.

The Corps recommended revising the second paragraph to delete reference to "biological time clock, because research does not support this concept in their view. The draft amendments did not incorporate the recommendation.

The only comments received on the precise subject of the "biological time clock" were the Corps', although the Corps made this point as part of comments that were generally similar to the general comments of PNUCC and a number of other groups and entities, primarily from utility and industry groups. That is, PNUCC, the Corps and others contended that measures to maximize survival of Snake River salmon should focus on improving juvenile fish transportation, decreasing predation and competition, and increasing in-river survival for both juvenile and adult fish. They opposed increases in flow, velocity, spill, or reservoir drawdowns outside those described in Option 1, contending that it has not been scientifically proven that spill and drawdown actions will increase fish survival, that gas supersaturation caused by spill poses a serious threat to fish survival, and that there is no direct evidence linking survival to travel time. Comments from others, particularly fish agencies and tribes and environmental groups, corresponded roughly to the introductory revision recommended by IDFG.

Finding: The Council largely adopted IDFG's recommendation and rejected the other two. To reiterate, these recommendations are part of the larger dispute reflected in this rulemaking record, in the record of the Council's rulemaking process for the Mainstem Hypotheses, and in the record for the Strategy for Salmon, over the scientific validity of the flow/velocity/travel time/survival relationship, drawdowns and

transportation. The findings below on recommendations for particular flow and drawdown measures discuss this debate in more detail. To summarize in the context of these particular recommendations: The biologists for the fish agencies and tribes have developed an understanding, based on their view of the best available scientific knowledge available, of the biological needs of migrating juvenile salmon, including an understanding that delays in migration time through the hydro projects and reservoirs to the estuary result in significant mortality for a number of reasons. The fish agencies and tribes also understand that increasing river flows and water velocities would aid in reducing juvenile migration time and increasing survival, that the benefits continue to increase as flows and velocities increase, and that reservoir drawdowns will need to be a part of that effort. The Council's Mainstem Hypotheses, Section 5.0E, provide a more complete explanation of the flow/survival relationships and hypotheses to be tested. Other entities, as represented here by the Corps of Engineers and PNUCC dispute that the best available scientific knowledge supports these understandings.

The recommendations for the introductory language, as well as the recommendations for specific flow and drawdown measures, are thus in conflict. In resolving these conflicts in the substantive measures, from which the introduction derives, the Council must give due weight to the expertise, rights and responsibilities of the fish agencies and tribes, and adopt measures that complement their activities, 16 U.S.C. § 839b(h)(6)(A), (7). The Council's review of the information and analyses, and reviews by independent consultants, indicate that the scientific judgments and recommendations of the agencies and tribes are supported by, and certainly not conclusively undermined by, the best available scientific knowledge, 16 U.S.C. § 839b(h)(6)(B), (7)(B). Thus the Council has concluded that to adopt measures in this area based on the agencies and tribes' recommendations is reasonable and is the more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(5), (7)(A), (C). At the same time the Council believes these issues and measures deserve continued consideration and evaluation, and the Council has called for an adaptive management approach to address critical uncertainties while taking action.

The Council therefore concluded that the Corps' particular recommendation is not supported by the best available scientific knowledge. While there are no direct measurements that support the concept of the "biological time clock," it is supported by theory, has indirect support in flow/survival data, and is not seriously contradicted by any data that have been brought to the Council's attention. The Council rejected PNUCC's recommendation as inconsistent with the obligation to include measures that are supported by the best *available* scientific knowledge. The Council interprets this standard as requiring action notwithstanding scientific uncertainty, albeit action that is carefully monitored and evaluated so that mid-course corrections may be made. The case for proceeding with drawdowns is described below, in connection with specific drawdown recommendations.

Program Section(s): 5 (introductory text)
Source: Regional Services Inc.
Recommendation No.: 5-7

Recommendation: Regional Services recommended revising Section 5 and its introduction as part of a long-term proposal calling for 8 million acre feet more water from the upper Columbia and Snake. Regional Services proposed a measure calling for 3 million acre feet more water from the Snake and 5 million acre feet more from the Columbia above 1994 operations. To explain and justify the measures, Regional Services proposed to add seven new paragraphs at the end of the introductory text to Section 5, after the “Intermediate measures” discussion and with a heading of “Long-term measures.” The discussion focused on how the “vast expansion of water storage capabilities on the upper reaches of the Columbia and Snake” for the purposes of lower river power generation (mostly) and flood control and irrigation is both a primary cause of the salmon decline and also a potential source of resolution of the problem, if the region will make major changes in the way these projects are operated and coordinated. The discussion also emphasized how over the long-term water can be obtained through transformations in water use and in the way the power system and power markets operate, “while minimizing impacts on the regional economy.” This long-term measure was to be implemented between 1996 and 2024.

The recommendation was not included in the draft, and no comments were submitted on it.

Finding: The Council rejected the recommendation for the reason that the adopted recommendations are a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The full findings on this issue are provided in the response to the substantive recommendations, below. The Council recognizes that there could be significant advantages to changing patterns of water use (see the Environmental Defense Fund analysis), and the Council has called for the use of structural and nonstructural methods, whichever are more cost-effective, to be used to supply additional flow augmentation water from the Snake River and other basins. However, reports by Hydrosphere and Bookman-Edmonston Engineers showed that there are significant barriers to water transactions, conservation and other nonstructural alternatives, which make it unlikely that flow changes of the kind and extent recommended here are realistic. Instead, the Council calls for a combination of flow and velocity improvements, such as drawdowns, to achieve mainstem objectives.

Program Section(s): 5 (and others)
Source: Natural Resources Defense Council, et al.; Idaho Rivers United
Recommendation No.: 5-4, 5-6

Recommendation: Declare a salmon extinction emergency in Columbia basin. Call for President to direct federal agencies to take all immediate steps necessary to avert further decline and begin recovery of wild stocks. Call on Congress (and actively lobby) to immediately appropriate funds to implement all measures necessary.

The recommendations also call for the implementation of the recommendations of the House of Representatives' BPA Task Force, including the transfer by BPA of the work of its Fish and Wildlife Division to “an appropriate agency, or to some appropriate board of fishery agencies and Tribes.” The other recommendations would allow BPA to gain or save money to devote to fish and wildlife: (a) BPA to terminate

the irrigation power discount and replace it with variable, conservation-inducing rates; (b) Congress to authorize the Bureau to “pay market rates for power for its projects,” (c) BPA to manage WPPSS-2 more efficiently; and (d) BPA to terminate moth-balling of WPPSS-1 and -3.

The draft amendments, Option 5, Extinction Emergency, Salmon Funding, and BPA Task Force Recommendations proposed this recommendation.

A number of documents and comments in the record state the case for the salmon emergency in 1995. One of the most useful is a memorandum from the Fish Passage Advisory Committee, submitted by the Save Our Wild Salmon coalition. More precisely, this was an August 8, 1994 memo from the FPAC to the CBFWA Liaison Group entitled “Snake River Spring/Summer Chinook Expectations, 1995-1997,” based primarily on the data collected by the Fish Passage Center. This memo explained the statistical situation: dramatically lower adult returns in 1994 and expected in 1995; an expected order of magnitude decrease in juvenile migration in 1996 and 1997; and thus the importance of the 1995 juvenile migrating class. The memorandum concluded that “[a]ctions should be implemented immediately to avert the immediate specter of extinction.” The memorandum recommended among other things immediately enhanced flows, velocities and spill and an end to research programs that stress the population and have little management application.

The Council received hundreds of letters, cards and petitions supporting this position, proposed mainstem Options 3 through 5 (or Option 5 alone), and the environmental groups’ general position on various issues. While the recommendations of Idaho Rivers, built into Option 5, differed in significant ways from those of American Rivers, NRDC, etc., which were reflected in Options 3 and 4, those differences were not generally reflected in the comments. The vast majority of these comments were from private individuals not representing any organization, although a number stated the organization(s) they belong to. Most of the rest represented very small and local, even ad hoc groups. Comments from representatives of larger organizations include those from Liz Hamilton of Northwest Sportfishing Industry Assn. (285), Pacific Coast Federation of Fishermen’s Associations (392), Bill Arthur, NW Regional Director of Sierra Club (394), Pacific States Marine Fisheries Commission (478), American Whitewater Affiliation (484), Friends of the White Salmon River (575), Colorado Oil & Gas Assn. (586); Save Our Wild Salmon Coalition (628); Trout Unlimited (701); Northwest Environmental Defense Center (708); American Rivers/NRDC/Trout Unlimited (715); Sierra Club, Columbia Basin Field Office (735); Idaho Trout Unlimited (788); Idaho Wildlife Federation (814); Sawtooth Wildlife Council (821); Friends of the Wild Swan (827); Friends of the Earth (829); Trout Unlimited, Panhandle Chapter (Idaho) (880).

On the other hand, PNUCC submitted a paper from the consulting biologist Don Chapman refuting the idea that 1995 juvenile class needs emergency treatment, “Is 1995 the Last Chance for Snake River Spring/Summer Chinook?” The main conclusion of the paper is that the 1995 juvenile class is no more important than other year classes at various stages in the life cycle, and to take extreme actions to benefit the 1995 juveniles that could negatively impact others (such as returning adults) or risk the intended beneficiaries from possible if not certain harm (such as possible negative effects of drawdowns) is not wise. The paper also noted that even if this class is critical, it is not clear what can or should be done to mitigate for problems, especially given Chapman’s view that mainstem passage problems are not the major limiting factor on the populations at this time, and his view that with regard to mainstem passage, there is still the question of whether survival of this special class is best ensured by in-river migration or transportation.

Finding: The Council revised the introduction to Section 5, Juvenile Salmon Migration, to incorporate the sense of urgency that is represented by the recommendation for a declaration of a salmon emergency. The

Council concluded that conveying this sense of urgency is important, and that conveying it through a declaration of a salmon emergency, which would have no independent legal force, is not. The Council agrees that the 1995 year class is important, but also agrees that taking strong actions for a single year class should avoid major risks for returning adults.

A number of issues raised by this recommendation, including the institutional, power and cost issues raised by the BPA Task Force, have been addressed in Sections 1-4 of the program and in the findings on those sections, including the program discussions of the history and present status of salmon runs, the salmon and steelhead goal, the management of the power system, and general matters of regional funding and staffing. The recommended transfer from BPA and the issues of power system management and costs, for example, have been discussed in Section 1, in the findings for Section 1, in the hydropower costs and impacts analysis, Appendix B, and in the analysis of "Assuring an Adequate, Efficient, Economical, and Reliable Power Supply and the Ability to Carry Out Other Purposes of the Power Act," Appendix C.

SECTION 5.1: COORDINATE RIVER OPERATIONS

Program Section(s): 5.1 and 5.1C.1 (coordinating river operations)
Source: PNUCC/Corps of Engineers
Recommendation No.: 5-1 and 5-3

Recommendation: Revise whole section to reflect provisions in NMFS 1994-98 biological opinion regarding coordinating river operations through in-season management process (Corps). Delete references to the participation of Fish Operations Executive Committee in this process and replace with In-Season Management Team (PNUCC).

The draft amendments did not include these recommendations. Option 2 incorporated the NMFS Biological Opinion flows, but no language was added on NMFS' river operations process and the In-Season Management Team. No comments were received.

Finding: The Council rejected the recommendations as less effective than the adopted recommendations for the protection, mitigation and enhancement of fish and wildlife, 16 U.S.C. § 839b(h)(7)(C), and as failing to complement the activities of the fish and wildlife agencies and Indian tribes, 16 U.S.C. §§ 839b(h)(6)(A), (7)(B). The fishery managers recommended operational flow/velocity objectives for the lower Snake and Columbia Rivers to address all weak salmon stocks in the Columbia River Basin, not just endangered species. In addition, the recommended In-Season Management process fails to include key participants in important salmon recovery decisions, and instead is limited to federal agencies. The Council believes that the In-Season Management Process, if it continues to function as it has in recent years, will continue to generate undue controversy and make less effective decisions because of its narrow membership.

Program Section(s): 5.1B, 5.1C.2
Source: PNUCC
Recommendation No.: 5-1

Recommendation: PNUCC proposed to drastically restructure the Fish Passage Center. The center and its manager and staff would be limited to the collection and distribution of data, as a “regional data center for the smolt monitoring program.” The manager “will not make decisions or recommendations on the use of the water budget and will not engage in advocacy and/or lobbying.” Revise Section 5.1C.2 to delete references to the fish passage manager as a participant in the winter meetings to review the run-off forecast and develop an augmentation plan.

Finding: The Council rejected the recommendation as less effective than the adopted recommendations for the protection, mitigation and enhancement of fish and wildlife, 16 U.S.C. § 839b(h)(7)(C), and as failing to complement the activities of the fish and wildlife agencies and Indian tribes, 16 U.S.C. § 839b(h)(6)(B). The Council sees the utility of the Fish Passage Center in its ability to collect mainstem passage data, and to operate as the primary coordinating mechanism for agency and tribal requests regarding mainstem operations. Whether or not these functions generate controversy, the Council believes it is important that the Center meet the agencies’ and tribes’ needs in these respects, so long as the Center also affords open access to its data -- a point emphasized by the Council.

Program Section(s): 5.1B.3, 5.1B.5 (Fish Passage Center) and 5.1C
(coordinated plan of operations)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 5.1B.3 to refer to Fish Passage Center as just “a center” for housing data and information on juvenile passage (not “the primary program center”). Section 5.1B.5 describes the role of the fish passage manager as the primary point of contact between power system and fish agencies and tribes and the activities of the manager in requesting flows, spills, etc. Revise this to explain the current process, especially role of NMFS -- flows and spills are developed and implemented through in-season management process created through ESA consultations with NMFS.

The draft amendments did not include the recommendation, and no comments were received on it.

Finding: The Council rejected the recommendation as less effective than the adopted recommendations for the protection, mitigation and enhancement of fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Fish Passage Center operates as the primary coordinating mechanism for agency and tribal requests regarding mainstem operations under this program, and has since adoption of agency and tribal recommendations in 1982. The program already recognizes the critical role of the National Marine Fisheries Service under the Endangered Species Act.

Program Section(s): 5.1C.2 (coordinated plan of operation for flow
augmentation)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Reference in Section 5.1C.2 to “volume-of-runoff” forecast should be changed to “water supply” forecast.

The draft did not propose this change, and no comments were received on it.

Finding: The Council adopted the recommendation.

Program Section(s): 5.1D (operating rules for flow augmentation)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: The Corps should reduce its use of power peaking and establish appropriate ramping rates for daily flow fluctuations at mainstem Columbia and Snake projects to “reduce impacts to anadromous fish migrations and littoral biota” and “allow fish passage facilities to remain in criteria.” “There shall not be more than a 10 percent reduction or increase in total flow per 24 hour period” at the Corps’ Snake and Columbia mainstem projects.

Draft: In the draft amendments, the specific ramping rates recommendation was proposed as a new Section 5.1D.4 in Option 4, Constraints on Flow Variation. Proposed revisions to Section 6.1A.1 (in the adult passage section) call on the Corps to, among other things, “minimize power peaking, establish ramping rates for daily flow operations and eliminate zero-flow operations.”

Comments: Douglas County PUD opposed the recommendation to establish ramping rates that ensure no more than 10 percent reduction or increase in total flows in 24-hour period, contending that it would have dramatic impact on load following capabilities, and was not supported by data. CBFWA supported the recommendation.

Findings: The recommendation was not supported by detailed information and, on this record, the Council was unable to evaluate the potential effects of the recommendation on the adequacy, efficiency, economy and reliability of the region’s power supply. Accordingly, the Council called in Section 5.1D.4 for an evaluation to be conducted, rather than implementing the recommendation *per se*. Preliminary estimates indicated that the recommended constraints could raise reliability problems in the short term, and broad financial implications for the power system and, as described in the Council’s findings and analyses on power system impacts, on Bonneville’s ability to carry out some of the purposes of the Northwest Power Act. In the power plan revision, the Council will evaluate this recommendation further. The Council rejected the recommendation to establish such rates now, because the Council could not adopt it and still assure the region of an adequate, efficient, economical and reliable power supply, 16 U.S.C. §§ 839b(h)(5), (7)(A).

Program Section(s): 5.1D.1 (operating rules for flow augmentation)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 5.1D.1 to reflect current process and terminology for flow requests established by NMFS biological opinion and used by In-Season Management Operations Team. In particular, Columbia flows are now requested for “McNary,” not for “Priest Rapids and /or The Dalles” as stated in Section 5.1D.1. Snake flows are now requested from Dworshak and/or Brownlee to provide flow

augmentation not only at Lower Granite but also in the lower river. Use of flow augmentation to meet target flows at McNary and Lower Granite is discussed at weekly meetings of In-Season Management Team.

Finding: The Council rejected this recommendation as a less effective way to protect, mitigate and enhance fish and wildlife than the adopted measure, 16 USC § 839b(h)(7)(C). Because McNary Dam is upstream from the John Day project, it cannot measure the velocity benefits of a John Day drawdown. By using The Dalles as a point of measurement, these benefits can be accounted for.

SECTION 5.2: IMPROVE SNAKE RIVER FLOW AND VELOCITY

Program Section(s): 5.2 (Snake River flows)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise all of Section 5.2 to make Snake flow-related measures consistent with NMFS 1994-98 biological opinion.

In the draft, Option 2, Biological Opinion Flows and Velocities (concerning spring flows in the Snake) and Additional Snake Water (the part of this proposition concerning the summer flow target proposed for Section 5.2B and the volumes from Dworshak and the upper Snake to meet that target in Sections 5.2B.2 and 5.2B.3). Also, a proposed amendment to Section 6.1D reflected the implications of the NMFS Biological Opinion for the use of Dworshak for fall chinook temperature controls.

Finding: The Council adopted the recommendation. For the reasons explained below, the Council called for additional flows and velocity improvements beyond those called for in the 1994-1998 Biological Opinion.

Program Section(s): 5.2, 5.6C.1, 5.6C.4 (Snake River flows/additional water measures)
Source: CRITFC
Recommendation No.: 5-2
Source: Natural Resources Defense Council, et al.
Recommendation No.: 5-4
Source: ODFW
Recommendation No.: 5-8

Recommendations: Snake flow recommendations from CRITFC and ODFW and a coalition of environmental groups:

CRITFC

For the Snake in 1995 to 1998, CRITFC called for the following “flow augmentation volume objectives” from April 15 through September, essentially derived from the fish managers’ 1994 Detailed Fishery Operating Plan (DFOP):

The total volume to be made available for augmentation increases from 4.3 million acre feet in 1995, to 4.874 million acre feet in 1996, to 4.914 million acre feet in 1997 and 1998, broken down as follows:

From Dworshak, in all these years, 1.5 million acre feet April 15 to July 1; 1.0 million acre feet from July through September. "The Fishery Managers' in-season recommendations" are to determine "management of available runoff volumes and tradeoffs among spring, summer and fall releases." Augmented flow levels "should be maintained through the lower Columbia River." The July through August volume is intended both to augment flow levels and reduce water temperatures.

From Brownlee, in all years, 110,000 acre feet in May, and 137,000 acre feet in July. In August, 50,000 acre feet in 1995, 100,000 in 1996, and 140,000 in 1997 and 1998. In September, 100,000 acre feet in all years. These volumes are to be shaped by the Fishery Managers, with no refill. The project would pass through inflow. Idaho Power is then to "draft in October for Hells Canyon Complex fall chinook plan."

From the Upper Snake, 1.427 million acre feet in 1995 and 1.927 million acre feet in 1996-1998 to be available between April 15 and September 30. The Bureau, State of Idaho and Idaho Power are called upon to "take all steps necessary" to provide this water. Flow augmentation from the Upper Snake is to be shaped "to benefit juvenile migrations, allowing use of Dworshak water supplies for temperature abatement, specifically targeted for adult fall chinook and steelhead."

NRDC

NRDC, et al. recommended the same flow augmentation volumes as did CRITFC, except that the August volume called for from Brownlee in 1996 and after was 100,000 acre feet (CRITFC went to 140,000 acre feet in 1997 and 1998). These groups attached a report titled "Strategies for Flow Augmentation in the Upper Snake River." The report calls for the Council to adopt "a biologically based travel time objective and a system of minimum flows capable of meeting that objective. The minimum flows are to be "incorporated as hard constraints into the operating plans and rule curves of the hydropower system. In the longer term, flow augmentation is to be measured by adopting a smolt-to-adult return ratio."

The report also elaborated on four "strategies" that it wants the Council to call for to obtain the extra water from the Snake:

(1) Dry-year option market. The Bureau is to establish and BPA is to fund a dry-year option market, with lease prices sufficiently high to provide farmers with a profit and compensate them for uncertainties in farm planning.

(2) Purchase programs for natural flow rights and unused storage rights. The Bureau is to strengthen and expand, and BPA is to finance, the existing program of purchasing natural flow and unused storage rights, with purchase prices that are "competitive with profits that farmers in the area make on lower value or surplus crops."

(3) Expand Idaho water bank. The Bureau is to work with the Idaho Department of Water Resources (IDWR) to expand the current Idaho water bank so that it could provide flow augmentation for salmon in addition to fulfilling its current purposes. Changes needed include (a) allowing water bank prices to reach free market prices; (b) obtaining a waiver in 1995 of "Rule 3.6, regarding refills," and eliminating the rule in the long

term; and (c) obtaining a waiver in 1995 of the provision preventing downstream transfer prior to July 1 eliminating the rule in the long term.

(4) Eliminate water spreading. The Bureau is to “quickly adopt procedures” to eliminate “all forms” of water spreading and reallocate water to “instream uses, including flow augmentation for salmon.” Before the Bureau approves any expansion of use it is to reallocate a portion of the water to instream flows.

To facilitate these transfers of water, the Bureau is to work with the Idaho Department of Water Resources (a) to identify necessary changes in Idaho water law to allow markets to function and transfers to take place and to ensure the water may be used for salmon flows, including possible use of trust water rights, and (b) to seek expedited approval of processes for water transfers.

ODFW

For the Snake, ODFW called for minimum flow targets at Ice Harbor, rather than the flow augmentation volume objectives recommended by CRITFC and the environmental groups. ODFW stated that flows be augmented to reach these targets “utilizing PNCA critical year (1929-32) planning to incorporate target flows into firm planning under PNCA. The flow targets --in kcfs and for first, second and third year critical-year designations -- are:

April 16-30	140, 100, 85 kcfs
May	140, 100, 85
June 1-15	140, 100, 85
June 16-30	85, 65, 50
July	80, 60, 50
August 1-15	50, 50, x
August 16-31	50, x, x

Targets in columns marked with an “x” are to be “determined through in-season management decisions.”

Draft: In the draft amendments, Option 4, Additional Flow and Velocity (DFOP) and Additional Brownlee Water generally reflect CRITFC’s and NRDC’s recommendations. Option 2, Additional Snake Water, incorporates NRDC’s market-based strategies into a call for an additional 1 million acre-feet from the Snake. Proposed Section 7.8F.3 called on the Bureau to identify cases of water spreading and propose actions to make at least some of that water available for instream uses, an issue further discussed in the findings on Section 7. Option 4, Water Temperature Reduction, called for the retention of 400 kcfs in Dworshak for fall chinook temperature controls. CRITFC did not specifically recommend this, but did recommend managing flow augmentation to reserve the use of Dworshak for cool temperature releases. ODFW’s recommended sliding-scale flow targets for the Snake, which was similar to a comment from ODFW in the Strategy for Salmon process, were not included in the draft. However, Option 4, Additional Flow and Velocity (DFOP) and Additional Brownlee Water reflect the water quantities that would be produced in at least the high and medium flow years under ODFW’s recommendation.

Comments: The CRITFC, ODFW and NRDC flow augmentation and flow target recommendations raised the issues raised by all of the recommendations for increased flows, high flow and velocity equivalent targets, increased flow augmentation, and drawdowns -- whether there is a need for increased flows and velocities to improve the survival of juvenile salmon. All of these groups, along with Idaho and Idaho Rivers

United, recommended Snake River drawdown measures as well. These measures issues were also bound up in the debate over the survival benefits of juvenile salmon transportation, in both an absolute sense and as compared to the survival benefits from in-river migration with increased flows and velocities. Comments and analysis on these interrelated issues will be addressed here.

Besides the detailed information that CRITFC submitted with and referenced in its recommendation, CRITFC submitted four documents during the comment period that it called “particularly useful for the Council in its deliberations on mainstem passage amendments.” “Taken together, these documents describe the inability of the 94-98 Biological Opinion . . . to allow for the survival and recovery of listed Snake River salmon stocks. In contrast, the documents show large survival improvements associated with implementing mainstem passage measures contained in the DFOP.” Three of the are relevant to the Snake flow measures.

Two of the documents were the State and Tribal Fisheries Analytical team’s final reports to NMFS on February 10, 1994, for the 1994 ESA Section 7 assessment of Snake River spring/summer chinook and Snake River fall chinook, produced by Howard Schaller of ODFW, Charles Petrosky of IDFG, Earl Weber of CRITFC, Paul Wilson of CBFWA, and Tom Cooney and Olaf Langness of WDF. The reports are summaries and explanations of FLUSH and ELCM model runs of various alternatives, including a base case, the 1994 biological assessment from BPA, three NMFS proposed sliding scale options, and the DFOP, describing the models and the assumptions and parameters used in the models and then displaying and describing the results. The third document was an independent evaluation of the region’s various passage models. It was produced by Lawrence Barnhouse of Oak Ridge National Laboratory on behalf of the Scientific Review Panel and titled the “Interim Report of the Columbia River basin Salmonid Model Review,” dated October 1994. This was an analysis primarily of the UW/BPA model CRiSP and the fish managers’ FLUSH passage model, with a few comments on the Council staff’s Passage Analysis Model (PAM). The report’s main conclusion was that the models do not work differently, they just have different core assumptions built into them, especially differences in survival assumptions for transportation and flows.

Idaho, as noted above and below, believed that the large amounts of water from the upper Snake recommended by CRITFC and NRDC are unlikely to be available and thus the better course is to set a velocity equivalent objective in the Snake and try to reach it by reservoir drawdowns. But Idaho was fully in accord with CRITFC, ODFW and others on the value and need for increased river flows and velocities to improve survival. Idaho submitted the same analyses by federal, state and tribal biologists that CRITFC submitted, and highlighted the Biological Requirements Work Group’s “Analytical Methods” report from the *Idaho v. NMFS* settlement process (also submitted by CRITFC, ODFW and others), which analyzed population trends for six index stocks of spring/summer chinook. The analysis indicated that under current system conditions, in contrast to pre-1970 conditions, key stocks are likely either to decline to extinction or cycle at such very low levels where they are vulnerable to genetic and demographic risk and to environmental variability. Substantial survival improvements are needed.

Idaho argued that this and other analytical work by state and tribal biologists rebuts the argument that ocean, estuary and drought conditions are responsible for the decline of Snake River salmon and that the hydropower system is not a major cause of decline, best demonstrated in a comparative analysis submitted by IDFG by Petrosky and Schaller, comparing Snake River spring/summer chinook (primarily Marsh Creek spring chinook and Imnaha River summer chinook) with Warm Springs River spring chinook stocks. The analysis indicated that lower Columbia stocks have retained their productivity.

Idaho also responded to arguments and comments from others, especially from the utility, agricultural and industry groups and the Corps of Engineers, that the NMFS/UW studies of survival in Lower Granite pool

indicate very low reservoir mortality and no benefit from increased flows and velocities and drawdowns. Idaho noted first that no report of those studies has been released, and so the fish managers have had no opportunity to evaluate them; that the two weeks of data collection in 1993 was a pilot study only and “not a reliable estimate of reservoir survival”; that the 1993 Little Goose survival study “showed reservoir mortality for the hatchery release groups within the range estimated in the Sims and Ossiander study”; that all that exists for the 1994 study is a brief memorandum that “merely recite[s] certain figures;” and that there are a number of questions about the accuracy of the study that cannot be answered until a report is released, such as the choice of FGE assumptions at Lower Granite Dam and the sampling methods. Second, the studies do not even attempt to evaluate the cumulative mortality effects of migration delay through the system; “[m]any of the problems associated with delayed migration time are cumulative in nature, such as increased stress due to extended migration time and poor fish condition at the time of saltwater entry;” Council’s own mainstem hypothesis “recognized the limitations of reach survival data.” In the opinion of IDFG and other state agencies and tribes, NMFS reservoir studies are not a sufficient basis for reversing the current understanding of the flow/survival relationship and should not be the basis for deciding on actions. The UW researchers themselves have noted that their work is not final and conclusions are tentative and should be used with caution. They have also indicated that they do not want their research on two upriver reservoirs extrapolated to the entire river system.

Idaho said that further research activities on the flow/transportation/survival relationship, such as envisioned by Options 1 and 2, although important, need to be tempered by two considerations; first, the decline of the Snake River populations does not permit further studies before action is taken, while there is information to act; second, major research involves stress to fish which raises additional risks for their survival.

CBFWA supported all these recommendations, both the ODFW recommended sliding scale flow targets and the CRITFC recommended flow augmentation volume objectives. CBFWA recognized that in some years, such as 1994, these targets and volumes cannot be achieved. The Washington Department of Fish and Wildlife endorsed CBFWA’s position on the Snake River flow targets. WDFW also said that approaches to improving juvenile survival are based on assumptions regarding survival relationships; evaluation and monitoring of efforts during the initial phases of implementation must test these relationships; the Council should call for the development and oversight of an experimental plan. The fishery agencies and tribes, provided with access to outside expertise, should be charged with the primary responsibility for developing the design.

William Stelle, Regional Director of NMFS urged the Council to phase in flow changes to evaluate significant additional flows in Snake River and seek conservative operation of the hydropower system to ensure meeting the flow targets.

Save Our Wild Salmon urged a sliding-scale, share-the-wealth flow requirements; minimum flows that salmon need in dry years, increased flows in better years.

Idaho Power attached a “Flow Augmentation Analysis,” describing the scientific debate about the relationship between flow, velocity and survival; noting the weaknesses in past data and analysis, especially the Sims/Ossiander studies; and noting the confounding variables that make exploring the relationship of river flow/travel time and survival difficult. But Idaho Power also noted that “despite the difficulty in assessing the sources of mortality and exploring relationships, there is a group of biologists that support the idea that higher water velocities will improve smolt survival (Giorgi 1993),” substantiated in part by the 1983 and 1984 flows and adult return data.

BPA, the Corps of Engineers, and utility, commercial agricultural and industry groups took a different view of the existing science. Extensive comments came from PNUCC. PNUCC contended that the Council staff's modeling analysis showing Snake River spring chinook survival with Snake River drawdowns to achieve higher velocities "is only true if you assume that transportation is not effective and that there are other large, unsubstantiated benefits of drawdown. The conservative modeling assumptions and inherent bias of [PAM] to overestimate river mortality create an overly pessimistic outlook of fish survival and optimistic view of drawdown benefits." PNUCC listed a number of specific criticisms of the Council's passage model and SPM analysis, and about the science underlying those modeling efforts. First, PNUCC stated that the Council's modeling analysis conflicts with modeling for the BPA/Corps of Engineers System Operating Review (SOR), especially on the issue of the efficacy of transportation. CRiSP 1.4; 1986 transportation data and the SLCM life-cycle model show transportation "effective in maintaining or increasing future Snake River spring chinook runs" and clearly beneficial to yearling salmon in almost all scenarios, while SOR modeling of 40 years without transportation and with drawdowns could not prevent chinook extinction. PNUCC contended further that the Council based its transportation hypothesis on 1986 and 1989 transportation studies, without recognizing that two years of data are not sufficient to show a statistical relationship and thus does not do as the federal agencies do and bracket the uncertainties with variable transportation survival estimates.

Second, PNUCC argued that the survival benefits from drawdown that are in the model are unsubstantiated, and that the model does not account for negative effects which may result from drawdowns. Recent data on survival through Lower Granite (Schiewe 1994) indicates survival is high, so a model analysis based on mortality in reservoir and use of drawdowns to reduce mortality is not supported by the empirical evidence. At the same time, unknown biological risks are under-represented in model, such as predator concentration, decreased turbine efficiency; and changes in food availability. The Council's model should be expanded to reflect SOR modeling, which used an optimistic and pessimistic assumption on reservoir mortality, and under pessimistic assumption juvenile survival and adult returns were less than with current river operations.

Third, PNUCC stated that the way the Council models the flow/survival relationship -- using Sims/Ossiander data -- is questionable in light of more recent data and reports indicating the S/O relationship is invalid due to use of 1973-1980 data that does not reflect current river operations; because sampling methods were too variable and unreliable and the statistical model was too simplistic to be useful. Recent reservoir survival studies in their opinion show little or no mortality in Lower Granite reservoir and that juvenile survival is not sensitive to flow over a range of flows; PAM itself is overly simplistic because all reservoir mortality is represented by flow, ignoring effects of fish condition, predator density, river temperatures, differences in spill, and gas bubble disease.

Fourth, in the Council's model, ocean survival estimates are too conservative, according to PNUCC. Long-term ocean temperature cycles and currents have always affected salmon survival (Pearcy 1992), but predicted extirpation of Snake spring chinook is based on the assumption that poor ocean conditions from 1974 to 1992 will continue indefinitely, ignoring cyclic nature of ocean conditions. Council should model ocean conditions as it does freshwater habitat, with a sensitivity analysis showing low, medium and high levels of ocean productivity.

Fifth, PNUCC argued that the end result is that the Council's dismal forecasts for spring chinook runs are not justified, as they ignore the true range of effects on the salmon from human and non-human influences. PAM needs to be recalibrated, while Council's graphs mislead the reviewer.

The Columbia River Alliance and the DSIs submitted extensive comments similar to PNUCC's. They (and the Corps of Engineers) commented that salmon declines are a coast-wide, not a basin problem, submitting the study by Darryl Olsen and Jack Richards, "Inter-Basin Comparison Study: Columbia River Salmon Production Compared to Other West Coast Production Areas, Phase II Analysis (October 1994)," prepared as part of the Corps' SCS study. In their view the best available science indicates that the very greatest part of the decline is due to poor ocean conditions and drought. Thus the agencies and tribes' and the Council's focus on the effects of hydropower system is not supported by science. The Corps itself emphasized that the extreme survival problems with Snake River stocks must be related to ocean conditions, drought and bad spawning/rearing habitat conditions, and it opposed the recommended flow targets as unsupported by scientific evidence.

The DSIs also said that estimates of historic losses associated with hydropower are grossly inflated and irrational, and do not take into account habitat, harvest and other factors that depleted populations. In their view, recent examinations indicate that runs were in serious decline due to overharvest at the time of dam construction, and that dam passage mortality has never been as great as assumed and is negligible now. The Council has adopted the conventional wisdom of 10-15 percent turbine mortality at each dam, yet recent studies show mortalities as low as 2 or 3 percent, even at Bonneville II, and 3.5 percent at Lower Granite, equivalent mortalities to spill. Consequently, Council should, for example, call for greater use of Bonneville II, not more study.

The DSIs argued further that the goal of reducing water particle travel time is not supported by good science, and that predictions of significant improvements in salmon flow augmentation schemes largely emanate from computer models that are hard-wired to give such results. In their view the Council remains biased in favor of bolstering the flow/travel time/survival hypothesis, while the question is not whether the positive flow/survival relationship still appears to be reasonable, the question is whether the Council's program of augmenting spring flows under all conditions has had any measurable effect on salmon survival. The DSIs stated that the Council has no evidence that the flow augmentation program has had any effect on salmon survival.

The DSIs followed PNUCC in asserting that the Council's use of scientific data in its PAM model and elsewhere is defective. Anderson and Hinrichsen of the University of Washington pointed out that reducing travel time through reservoirs may increase, decrease or leave unchanged overall mortality to migrating juvenile salmon, depending on whether predation rates are higher or lower below the reservoirs. Decreased migration timing may lead to shorter freshwater residence time, but actually provide little or no benefit from a life history perspective. This can occur because reducing time at risk to mortality in freshwater serves to increase risk in the estuary during the vulnerable juvenile stage. If the juvenile is flushed or transported to the estuary before it is sufficiently smolted, or at a time when mortality is not better in the estuary, then it is possible that these measures provide no benefit. A broader approach than primarily on the freshwater stage of the life cycle is needed. Existing computer models don't account for this phenomenon.

The DSIs urged the Council to keep in mind the limitations of the models in interpreting model runs, and stressed that PAM and FLUSH are simply not constructed to answer the questions at issue. The DSIs attached to their comments the model analysis by UW's James Anderson also submitted by the Columbia River Alliance, entitled "FLUSH and PAM models: A critique of concepts and calibrations." Specific problems Anderson identified with these models included: (1) FLUSH and PAM do not account for adverse effects of spill and drawdown; (2) FLUSH and PAM are based on 1970s data that have no relevance in assessing impacts of the present hydrosystem; (3) FLUSH assumes mortality rises as travel time rises, but there is no proof of that; (4) FLUSH predicts greater than 100 percent survival with low travel times; (5)

FLUSH assumes less benefit to transportation under low flow conditions, contrary to empirical data; (6) FLUSH has serious errors in its treatment of the predation rate. Both models are seriously flawed and should not be used to evaluate the impact of the hydrosystem on spring chinook.

PNGC said that although the Council's Strategy for Salmon was based on the best available scientific information at the time, studies since then call into question even the validity of those flow measures. "There is no scientific information that justifies flow levels higher than those of the Council's Strategy". In their view, Dr. Cada, who undertook an independent review of the scientific literature on the relationship between flow and survival for the Council (discussed below), could find no justification for higher flows and the NMFS Recovery Team concluded that CBFWA evidence that higher flows are necessary was not convincing. The best available science indicates only a general positive relationship between flow and survival at low flows but it is unknown at higher flows. PNGC believed that "until valid scientific studies are conducted to quantify the relationship between flow and survival, the sufficient quality and quantity of flows necessary to meet sound biological objectives remains unknown." The Council should heed the advice of the Recovery Team and others and require more research and analysis to determine whether there exists a flow/velocity/survival relationship, and if so, what is the relationship. PNGC attached to its comments a paper written by Chapman and Giorgi titled "Comments on Work of Biological and FCRPS Alternative Work Groups," which explains the scientific viewpoints and literature underlying the recommendations of PNGC as to the best available science on the host of mainstem issues, and on the nature of the scientific process itself with regard to Columbia River anadromous fish.

BPA added that the Cada report's conclusions on the flow/survival relationship should be used cautiously, because (1) the vast majority of flow/survival data available is for yearling chinook, which do show a much stronger response to flow than subyearling chinook; and (2) the (Cada) report was a literature review, not a critical scientific report.

Chelan County PUD questioned the scientific basis for a relationship between flows, velocities and survival at any level above low flows, also emphasizing the recent UW/NMFS Lower Granite reservoir studies showing greater survival than previously assumed, and identifying ocean conditions as the big source of mortality. Chelan noted that neither transport or in-river flow/velocity augmentation can override the effects of poor ocean conditions or drought; still, flow/velocity measures have a poorer record for demonstrating benefits than does transportation.

With regard to the specific issue of extra water from the upper Snake and from Idaho Power's Brownlee Reservoir, Idaho Power Co. commented that because of limited transmission capacity to import power, Brownlee is 100 percent of Idaho Power's power reserves during the same time period that the fish are migrating downstream. As a result, the company cannot significantly draft Brownlee Reservoir during the fish migration period. Idaho Power also included an analysis of the adverse impacts on the natural and cultural resources in and around Brownlee Reservoir from heavy flow augmentation demands. Any significant increase in flow augmentation must come from either an increase in intra-region transmission capability, an increase in Upper Snake River channel capacity, or both. Idaho Power also said it has fully mitigated the impact of its dams on fish, and included a copy of the agreement with the Federal Energy Regulatory Commission on that matter, desiring the Council to recognize this point explicitly. In Idaho Power's view, the Council's flow augmentation proposals are clearly attributable to passage problems at the federal dams, not at Idaho Power's dams, and the Council should make that clear.

The Washington Department of Fish and Wildlife supported the call to the Bureau of Reclamation, Idaho, Idaho Power and BPA to provide water for flow augmentation, "including the implementation of a

willing buyer/willing seller program. As a longer term project, the Bureau should proceed with planning, design and environmental law compliance for additional upper Snake River storage, including the potential Galloway storage project for salmon and steelhead flow augmentation.

Idaho Fish and Game supported the recommended flow augmentation levels only on the condition that the additional water is acquired on a willing buyer/seller basis and that resident fish and wildlife protection and other reservoir values are protected. Idaho opposed CRITFC's DFOP-derived recommended Snake flows as proposed by the Council in Option 4 because the Option did not include these approaches. The Department said that flow augmentation is not a long-term viable option for the Snake Basin because of its aridity and limited storage space, most of which is dedicated to irrigation. In 1994, for example, even though 2.7 million acre-feet were released for flows, flows still fell 4.5 million acre-feet short of NMFS flow targets; 1994 releases also decreased the likelihood of refill in future years. IDFG also urged caution in relying on the Bookman-Edmonston report on Snake River Water Alternatives, especially about large-scale conservation in the Rigby Fan area. Even modest changes in flow require large amounts of water; drawdowns would be less costly, more effective and less socially and economically disruptive. Four principles should guide flow augmentation: (1) Ensure that any contracted storage is acquired only on a willing buyer/seller basis; (2) any storage water that is obtained must be delivered in accordance with state law; (3) flow augmentation should minimize impacts to resident fish and wildlife; and (4) if agricultural land is voluntarily taken out of production, impacts to local communities should be mitigated (citing National Research Council, *Water Transfers in the West*, National Academy Press at 10-11, 257-59 (1992)). IDWR observed that any long term flow augmentation program will require changes in water rights and water law. Idaho attached reservoir reports; affidavits of IDWR and IDFG personnel from the Marsh court proceedings; water market reports; analyses of the impacts of downstream flow augmentation on resident fish and wildlife in Idaho, etc. -- to support its position on the limitations of flow augmentation potential in the Snake basin, the adverse impacts to resident fish and wildlife, and the nature of the emerging water market.

With regard to the water market, IDFG supported a call for water bank prices to achieve market levels (Section 5.2A.5), but not the waiver of water bank rules such as the last-to-refill rule (Section 5.2A.6), which protects spaceholders who have not leased their water. The call for elimination of obstacles to downstream use of this water for salmon is not objectionable but Idaho does not have the authority to curtail valid water rights in downstream areas; Idaho does have an effective moratorium on new water rights, but cannot ensure that downstream states have the same protection in place. Idaho also submitted comments and reports on the comparative cost-effectiveness of flow augmentation and drawdown.

Rosholt, Robertson & Tucker, for Twin Falls [Idaho] Canal Co. and North Side Canal Co. said the Bookman-Edmonston report on Snake River water management opportunities is "seriously flawed" in its assumptions as to how water can be conserved by new distribution and irrigation practices. The commenters are opposed to taking any further water from Idaho for salmon due to agricultural and economic impacts and lack of evidence that it will increase survival; the amount that can realistically be gained from willing sellers is minimal.

The Bureau of Reclamation commented that it is committed to finding needed volumes for flow augmentation consistent with protection of water rights and with the need to develop cooperative and creative ways to obtain water. The Bureau attached two charts depicting the reservoir storage required, acres permanently removed from irrigation and costs for selected volumes of flow augmentation: .427, .927, 1.427, and 1.927 million acre feet, with variables as to whether the Bureau used the last-to-fill rule or not and whether the Bureau seeks 50 percent or 95 percent reliability of achieving the flow volume. Costs range from \$750,000 for .427 million acre feet without last-to-fill and 50 percent reliability, to \$1 billion for 1.927 million

acre feet with last-to-fill rule and 95 percent reliability. The number of acres the Bureau estimates would have to be taken out of production permanently range from 22,000 to 925,000. Total Idaho and Oregon Snake Basin irrigated acreage (above Brownlee) is 3.7 million acres; highest flow augmentation volumes could take up to 25 percent out of production.

The Bureau said it is addressing local Idaho water bank rules, including the last-to-fill rule, which is designed to avoid third party impacts. Water purchased for flow augmentation comes only from those whose storage entitlements are purchased; if last-to-fill rule is not followed, flow augmentation may further affect reservoir levels, streamflows in non-augmentation months, non-participating irrigators, resident fish and recreation. Providing more than 427,000 acre feet will require several years, changes in implementation of Idaho law, significant changes in cooperation of water users and legislature, and more funding.

The Bureau observed that proposed Section 5.2A.5 (in Option 2) calls for review of cost-effectiveness of measures identified in Bookman-Edmonston report; that report was at a "subappraisal" level and did not include the kind of detailed cost, technical feasibility and environmental studies to be able to convert quickly to cost-effectiveness analysis; additional time will be needed. With regard to planning called for in Section 5.6B.1 (Option 2) for three possible new storage sites, the Galloway analysis done by Corps in 1980 need only be updated; the other two will require full blown feasibility studies; Council should prioritize.

Idaho Power agreed with the Idaho Department of Fish and Game's comments indicating that there is not enough water in the state of Idaho to sustain flows at Lower Granite at the 140,000-cubic-foot-per-second level recommended by the agencies and tribes. The best available scientific knowledge does not support the use of water from the Snake River above Lewiston to augment flows to aid downstream migrating fish, nor does such a program complement the existing and future activities of the relevant agencies and tribes, attain any sound biological objective, or improve survival of the fish. The only sound alternative is to draw down the Lower Snake projects and spill the fish past them; flow augmentation has failed because it has not been able to provide similar conditions to the high flows observed in 1983 and 1984.

Regarding water temperatures for fall chinook, the Corps of Engineers said there are no data supporting the idea that cold water from Dworshak for affects adults' entry into the Snake River. Measures proposing to hold significant amounts of Dworshak water for fall chinook temperature control conflicts with water availability for juveniles and with the Draft Recovery Plan which considers juvenile use a higher priority.

BPA said that adult Snake River migrants need cooler water than they experience now; improve the chances of adult migrants surviving to spawning areas by using flow augmentation in late summer for adults (especially out of Dworshak) instead of early summer for juveniles.

Findings

The biological value of flow augmentation and velocity improvements:

The rationale for the Snake River flow recommendations is based on several considerations cited by the fish and wildlife agencies and tribes and by NMFS in the Appendix to the 1994-1998 Biological Opinion, and found reasonable by the independent review conducted by Dr. Cada of the Oak Ridge National Laboratory. The fishery managers assert that anadromous fish evolved to survive in a natural river environment. NMFS, in particular, has noted that the fish evolved biologically and physiologically to an environment that is markedly different than that of today. Taking steps such as flow augmentation to move toward a natural river condition can be expected to improve anadromous fish survival. The fish will survive

best in conditions that resemble those in which they evolved, the fish managers suppose. By the same token, they contend, moving toward a swifter-flowing river can be expected to provide a less hospitable habitat for predators, primarily resident fish that adapt well to slow moving, warmer reservoirs. Especially in the spring, the fish managers say, moving fish down the river faster should allow them to arrive at the estuary and ocean earlier, when environmental conditions are expected to be better, and limit their exposure to predators and other sources of mortality in the reservoirs.

The scientific evidence for and against this position was reviewed exhaustively in the Council's "Mainstem Hypotheses" amendment process over the summer of 1994, which focused precisely on the issue of the relationship between flows, river velocity, transportation and salmon survival. The Council adopted amendments that set out the Council's hypotheses regarding these relationships. Section 5.0E, Mainstem Passage Hypotheses, represents the result of that process, and the Council believes it fairly reflects what is known and unknown about these relationships. In sum, notwithstanding continuing controversy over the relationship between flow/velocity augmentation and salmon survival, the best available scientific knowledge indicates that the relationship is positive and that efforts to move the ecosystem in a direction more closely resembling that under which the fish evolved should be beneficial. See also Response to Comments, Mainstem Hypotheses.

Documentation supplied by the Idaho Department of Fish and Game responded to many other points raised by critics of flow augmentation. Idaho points to analytical work by state and tribal biologists in response to the argument that ocean, estuary and drought conditions are responsible for the decline of Snake River salmon and that the hydropower system is not a major cause of decline. Idaho cites, for example, the comparative analysis of Snake River spring/summer chinook (primarily Marsh Creek spring chinook and Imnaha River summer chinook) with Warm Springs River spring chinook stocks by Petrosky and Schaller, indicating that lower Columbia stocks below the mainstem dams have retained their productivity.

As noted above, Idaho also responded to arguments that the NMFS/UW studies of survival in Lower Granite pool indicate very low reservoir mortality and no benefit from drawdowns. Idaho noted that no report of those studies has been released, and so the fish managers have had no opportunity to evaluate it; that the two weeks of data collection in 1993 was a pilot study only and "not a reliable estimate of reservoir survival"; that the 1993 Little Goose survival study "showed reservoir mortality for the hatchery release groups within the range estimated in the Sims and Ossiander study;" that all that exists for the 1994 study is a brief memorandum that "merely recite[s] certain figures;" and that there are a number of questions about the accuracy of the study that cannot be answered until a report is released, such as the choice of fish guide efficiency (FGE) assumptions at Lower Granite Dam and the sampling methods. Second, the studies examined two upriver reservoirs only, and did not purport to evaluate the cumulative mortality effects of migration delay through the system. "Many of the problems associated with delayed migration time are cumulative in nature, such as increased stress due to extended migration time and poor fish condition at the time of saltwater entry." The Council's own mainstem hypotheses, IDFG argued, "recognized the limitations of reach survival data." Idaho contends that NMFS reservoir studies are not a sufficient basis for reversing the current understanding of the flow/survival relationship and should not be the basis for deciding on actions. Because their results are preliminary and relate to only a limited portion of the river, the NMFS researchers have advised using the data with caution.

The Council agrees that ocean mortality appears to be a major factor in recent declines, and that this may help explain why recent declines are coastwide. Salmon have always been subject to fluctuating ocean conditions, however, but before now have not been brought to the edge of extinction by them. Ocean conditions are not generally subject to the Council's control, except perhaps to the extent that the region can

alter the flow regimes of the Columbia River and its tributaries to produce an ocean plume that more closely corresponds to the conditions in which salmon evolved. In-river conditions that decrease the survival margin of these fish are, however, within the Council's purview. The Council believes that the region should improve conditions in the river, as the Northwest Power Act envisions, with the expectation that this will help restore stock productivity so that the basin's salmon runs can withstand occasionally severe adverse ocean conditions.

The Council's own analysis buttresses these conclusions. In a Council analysis of the correlation between flow and spring chinook returns, higher returns of spring chinook were associated with higher flows during the outmigration (see Memorandum from Chip McConnaha to Ted Bottiger, November 25, 1994). While this correlation did not explain all of the variation in adult returns from year to year, it did account for about 26 percent of the variation in returns. As commenters point out, this argues that other factors, such as variation in ocean conditions (which the Council knows is a major factor), drought and other natural conditions also contribute, and in the aggregate these natural conditions may be a bigger factor in salmon mortality than slow river flows. However, it remains apparent that flow variations appear to explain a significant portion of the annual variation in fish runs. If the bulk of annual variation is controlled by the ocean and other factors outside our control, then flow may remain as the largest factor humans can hope to influence.

The criticisms of the Council's passage model and model analyses are either not accurate or are misleading. First, the SOR modeling cited by PNUCC as superior to the Council's did not include the most recent information on returns of wild spring chinook to the Snake River. In 1994 the return was about 1,500 fish, while the projection for 1995 is considerably worse. In the Council's analysis, the model was calibrated so that it recreated the returns from 1975 to 1995 (1995 projection). The analysis then proceeded into the future from this basis.

Second, the contention that the Council staff has been overly pessimistic regarding transportation benefits ignores the fact that, in contrast to virtually all of the modeling cited by PNUCC, BPA, the Corps and the DSIs, the Council has attempted to explicitly show the importance of alternative transportation assumptions and their impact on the results. The Council staff has analyzed the options over a wide range of benefits suggested by several commentors, including those making the criticism. Most recently, the Council staff added an assumption set based on ideas from the Columbia River Alliance that suggest that transportation survival is very high (80 percent) and that the hydroelectric system has a nominal effect on salmon survival. It is true that all of the Council's assumptions about transportation have been based on the results from NMFS for 1986 and 1989. However, this is because these are the only data relating to modern transport conditions. In contrast to PNUCC's assertion, the Council has recognized this limitation; it has been frequently noted in the analytical documentation and in presentations to the Council. This is one of the main reasons the Council has focused on this uncertainty, in the Mainstem Hypotheses and elsewhere, and have addressed it by bracketing the model analysis and results within a range of plausible transportation benefits.

Third, many of the positive *and* negative aspects of drawdown are unsubstantiated. Drawdown is outside the range of conditions of almost all scientific studies relating to mainstem passage. This is because almost all of the studies have been conducted after the hydroelectric system was in place; very few studies were conducted prior to the development of the hydroelectric system. This allows endless opportunity for speculation on the potential positive and negative aspects, none of which will be known with certainty until drawdown is tried. The Council's analysis has been neutral on many of these areas of speculation. For example, PNUCC and other utility interests frequently assert that drawdown will have a negative impact by concentrating predators; in other words, the number of predators will stay the same, but the volume of water will decrease under drawdown. With more predators in a smaller volume of water, they contend that predation rates will go up. There is absolutely no empirical evidence to support such a claim. In fact, an at least equally

plausible hypothesis is that the drawdown will increase velocities and so decrease the suitable habitat for predators, and thus decrease mortality beyond what would be expected on the basis of water velocity improvements alone. Because these assertions are speculation, the Council has not attempted to incorporate them into the routine analysis as suggested by PNUCC.

Fourth, the Council's analysis has used the flow/survival relationship advocated by the fishery managers based on the Sims and Ossiander data. Despite the obvious weaknesses in the Sims/Ossiander data, which the Council has been informed of many times over the years in memoranda and staff briefings, the data and analysis do present a reasonable biological model of the flow-survival relationship that is consistent with other data and analyses, including the Marsh Creek analysis by IDFG and the data and reports from the Fish Passage Center's smolt monitoring program. The scientific review conducted by Dr. Cada for the Council's mainstem hypothesis rulemaking is only the latest review to confirm this point. Still, the Council staff recently contrasted this with a model suggested by the Columbia River Alliance which suggests that the development and operation of the hydroelectric system is not an important factor limiting Snake River chinook production. PNUCC and others have advanced the recent work by NMFS as invalidating the older Sims/Ossiander data. To do this they have had to extrapolate a limited data set from portions of two upper reservoirs in two years to all eight reservoirs in all years. The analysts who conducted the NMFS research do not support extrapolation of this work to all the mainstem reservoirs. The Council supports this research and hopes that it will lead to an improved understanding of this important relationship. However, the Council does not agree with those who would use the results beyond their limited scope and progress to radically alter the region's understanding of the flow-survival relationship through the system. Instead the results argue for continued work in this area. The nature and breadth of this controversy is the basis for the Council's use of a range of assumptions in its analysis and the development of an adaptive management approach.

Fifth, while the Council fully acknowledges the cyclic nature of ocean survival conditions, no one has suggested a way to meaningfully incorporate them into the existing models. Further, the present pattern of adverse ocean conditions is unusually persistent, and has lasted longer than many would have predicted. This points to the limitations in our ability to predict ocean events. The Council has chosen to be conservative biologically and not arbitrarily presume some marked improvement in ocean conditions in the future.

Sixth, PNUCC's assertion that the Council's analysis is too conservative is not based on fact as shown above. The Council's analysis is, in fact, calibrated to the most recent information that indicates that Snake River spring chinook are at all time record low numbers; given these low numbers many populations risk extirpation or loss of genetic diversity. While natural variability in survival and scientific uncertainties are such that we could all be pleasantly surprised with large future returns in the absence of additional actions, recent experience and the present low abundance suggest no reason for optimism.

Descriptions of the Council's staff analysis for this rulemaking can be found, among other places, in Part II of Technical Appendix B of the Appendices to the Draft Amendments (Document No. 94-47) and in Appendix D to this revised program, which is a description of the latest staff analysis; the technical documentation for the analytical model is in the administrative record.

Considering the data and information presented by the fish and wildlife agencies and Indian tribes and others in the current amendment process, the independent scientific review conducted by Dr. Cada, the Council staff's analysis, and the extensive scientific work that supported the mainstem hypotheses, and giving due weight to the authorities, expertise and rights of the agencies and tribes, the Council accepts the agencies' and tribes' judgment on the expected biological value of the recommended flow and velocity objectives and concludes that it is supported by the best available scientific knowledge. The Council concludes that the

recommended flow/velocity targets would protect, mitigate and enhance fish and wildlife. Regarding the potential impacts on the region's power supply, see Section 1.8, the introduction to Section 5, and Appendices B and C (hydropower costs and impacts analysis and the analysis of "Assuring an Adequate, Efficient, Economical, and Reliable Power Supply and the Ability to Carry Out Other Purposes of the Power Act"). The biological benefits of the Council's measures are summarized in Appendix D, "Staff Analysis of Biological Benefits of Mainstem Passage Actions."

The need for better information:

The Council does not accept these judgments conclusively. As the mainstem hypotheses show, the scientific data are not clear, and there are genuine disagreements among capable scientists on these matters. The region must evaluate the biological assumptions that underlie these operations to see if they achieve the expected biological benefits. One of the central purposes of the Mainstem Hypotheses section of the program is to focus research and evaluation on critical aspects of these relationships. Similarly, in the current amendment process the Council calls for a multi-year evaluation of the relative survival benefits of flow/velocity versus transportation, probably the single most critical issue surrounding efforts to protect juvenile migrants from the effects of the dams. As new information emerges, the region must be prepared to adjust these operational objectives.

Recommended flow/velocity objectives and volumes of water:

Flow/velocity objectives: The Council adopted sliding scale flow/velocity objectives or targets in the Snake, ranging from a minimum spring targets of 85 to 140 kcfs, and a summer flow/velocity target of 50 kcfs. The Council did not call for these objectives to be incorporated into firm planning because they cannot be met by doing so, at least not until drawdowns are implemented. The only project called on to contribute these objectives that is actually included in firm power planning is Dworshak Dam, and the Council does call for its contribution to be factored into firm planning. Its storage capacity is virtually exhausted by the flow augmentation measures the Council calls for, but even so it cannot meet the recommended targets. In order to meet the recommended targets in dry water years, approximately 13 million acre-feet of flow augmentation water in addition to that called for in the Strategy for Salmon would be required in the lowest water years. The Snake Basin reservoirs apart from Dworshak and Brownlee comprise approximately 11 million acre-feet of storage, but little or none of this is actually incorporated in firm power planning because most of it is committed to irrigation uses for which these projects were principally authorized. The Council has called for the water volumes to be contributed by the upper Snake to be incorporated into firm power planning, if possible, but not the flow targets. Accordingly, instead of calling for these targets to be met through firm power planning, the Council has adopted a drawdown strategy to supplement a flow augmentation program. Analysis shows that the targets can be met in most years through a combination of drawdowns and flow augmentation. The Council concluded that this combination of flows and drawdown is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C).

Dworshak: The Council calls for 1 million acre feet from Dworshak in the spring as part of the effort to meet the 140 kcfs velocity equivalent objective. This is less than the 1.5 million acre feet recommended by CRITFC. CRITFC recommended a further 1 million acre feet in the summer and fall. The Council called in summer for Dworshak to be allowed to draft to elevation 1520 (an average of 500,000 acre-feet) by the end of July if needed to meet the minimum summer flow/velocity objective of at least 50 kcfs. If Dworshak is above elevation 1520 by the end of July, FOEC is to consider using its water for late summer/fall temperature control. Ignoring the spring volume, these summer and fall volumes are not likely to add up to 1 million acre feet in most years. However, analysis showed that the DFOP-derived operation recommended by CRITFC and NRDC would reduce Dworshak's probability of refilling in succeeding years to approximately zero, compared to a 34 percent probability with the adopted measures (see among other DFOP analyses, the analysis of Option 4 in Appendix B, Draft Amendment Document No. 94-47). In effect, the recommendation would convert Dworshak into an unreliable fish flow augmentation resource if the region experiences a succession of low-water years, as it has in the last 8 out of 10 years. Analysis showed that the Dworshak drafts called for by the Council, together with reservoir drawdowns and volumes from the Upper Snake, should achieve the flow/velocity objectives for the Snake River in most years, and without severely depleting water storage for succeeding years. Accordingly, the Council rejected the recommendation for more water from Dworshak because the adopted measure is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Council adopted the recommendation for maintaining flows through the lower Columbia, and called for in-season shaping to be managed by the Fish Passage Center and the Fish Operations Executive Committee.

Brownlee: The Council accepted the recommendation regarding Brownlee, insofar as the recommended releases are needed to meet flow objectives. The Council appreciates the fact that Idaho Power Co. relies heavily on Brownlee, that its license entitles it to certain operations, and that the Company has a settlement agreement regarding the Hells Canyon Complex. However, the Council does not agree that Brownlee necessarily bears no responsibility for downstream flow problems, especially summer flows for fall

chinook, much of whose spawning grounds are blocked by the Idaho Power Company projects. The extent to which Brownlee contributes to those problems, and Idaho Power Company's right to compensation from Bonneville, is addressed in Section 5.2C.1.

Snake River Basin: Regarding the Snake Basin, the Council calls for an additional million acre-feet of water to be secured through nonstructural (willing buyer/seller transactions, water conservation, etc.) and/or structural means (storage reservoirs), for a total of 1.437 million acre-feet by 1998. The Council believes this to be an ambitious target, which can be reached only through voluntary measures because of limitations on the Council's authority with regard to water rights, 16 U.S.C. § 839g(h). However, reports by Hydrosphere and Bookman-Edmonston Engineers and comments by the Bureau of Reclamation showed that there are significant legal, political, economic and hydrologic obstacles to obtaining Snake Basin water from existing users through voluntary transactions. These problems were illustrated during the past two years, when very little water was made available from Snake River water banks for salmon flows, due to drought conditions. The Environmental Defense Fund's analysis shows that securing this water through voluntary transactions would be the most cost-effective way to reduce water particle travel times. However, finding ways to secure even 1.437 million acre-feet through voluntary measures cannot be assured. The Council concluded that calling for more water than 1.437 million acre-feet could actually make it more difficult to secure water for salmon by undermining efforts to effect the legal and political changes that will be needed if this water is to be acquired. There is a possibility that additional new storage could help, and this will be explored further under the Council's program. Accordingly, the adopted recommendation is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). As ways are found to secure this water, and as drawdowns are implemented, the Council can review the region's experience in securing this water, if appropriate. The Council calls for all this water to be shaped for maximum benefit to fish.

Temperature control: The Council accepted the need to continue evaluation of temperature control for fall chinook, but leaves to the fish managers and the Fish Operations Executive Committee decisions about whether to shift water from spring to summer for this and other purposes.

Additional measures: The Council's analysis showed that the adopted flow augmentation measures, and even the recommended flow augmentation measures, would not achieve flow/velocity objectives in all water years. The Council concludes that this is in large part for the reasons given by Idaho Department of Fish and Game. The Department contended that flow augmentation is a difficult option for the Snake Basin because of its aridity and limited storage space, most of which is dedicated to irrigation. In 1994, for example, even though 2.7 million acre-feet were released for flows, flows still fell 4.5 million acre-feet short of NMFS' flow targets; 1994 releases also decreased the likelihood of refill in future years. Even modest changes in flow require large amounts of water. For these reasons, in Section 5.3 the Council calls for the implementation and evaluation of various reservoir drawdowns to increase water velocities in the mainstems of the Snake and Columbia Rivers.

The Council also concludes that no party has recommended less costly alternative measures to achieve the Council's flow/velocity objectives.

Program Section(s): 5.2A (Snake River performance standard)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-9

Recommendation: Revise introductory text to Section 5.2A to state that 85 kcfs minimum monthly average flow equivalent is not biologically adequate but reflects hydrologic constraints and that “consistent with its hypothesis that increased river velocity improves migrant survival, the program emphasizes mainstem reservoir drawdown actions” to achieve a 140 kcfs velocity equivalent in all but low flow years.

Draft: This particular change was not proposed in the draft, but Option 3, Introduction and Lower Snake Drawdown, proposed changes to the introductory text for Section 5 generally and for Section 5.5 (now Section 5.3) that reflect the same position.

Findings: The Council adopted the substantive recommendation (see above and below), but with its own introductory statement.

Program Section(s): 5.2A.2 (Snake River flows)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise footnote to Lower Granite flow figure to state that minimum flow from Dworshak is 1200 cfs, not 2000.

Draft: The draft proposed this change in general Section 5 amendments.

Findings: The Council adopted the recommendation.

SECTION 5.3: IMPROVE COLUMBIA RIVER FLOW AND VELOCITY¹

Program Section(s): 5.3 (Columbia River flows)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise all of Section 3 to make Columbia flow-related measures consistent with NMFS 1994-98 biological opinion.

Draft: In the draft, Option 2, Biological Opinion (concerning the Columbia River spring migrant performance standard) and Biological Opinion Flows covered the NMFS biological opinion flow targets and measures for the Columbia.

Findings: The Council adopted the recommendation. For the reasons explained above and below, the Council called for additional flows and velocity improvements beyond what was called for in the 1994-1998 Biological Opinion.

¹ **Note:** This section of the original 1994 Fish and Wildlife Program -- concerning Columbia River flow and velocity -- has been renumbered Section 5.4 in the amended program.

Program Section(s):	5.3, 5.6 (Columbia River flows/additional water measures)
Source:	CRITFC
Recommendation No.:	5-2
Source:	ODFW
Recommendation No.:	5-8
Source:	Natural Resources Defense Council, et al.
Recommendation No.:	5-4

Recommendations

CRITFC

For the Columbia, from DFOP, CRITFC calls for a sliding scale of minimum flow targets at The Dalles “based on [PNCA] firm power planning” and thus “critical year designation established at the beginning of each power planning year (August 1 to July 31) to allow for fall and winter operations that provide minimum targets the following spring and summer.” The flow targets --in kcfs and for first, second and third year critical-year designations -- are:

April 15-30	300, 260, 220 kcfs
May	300, 260, 220
June 1-15	300, 260, 220
June 16-30	250, 250, 200
July	200, 200, 200
August 1-15	160, 160, 160
August 16-31	160, 160, 160

Also from the DFOP, in addition to the minimum flow targets, use a “sharing formula” in years of above average January-July runoff (at Grand Coulee based on March 1 forecast) to store “shapeable volumes” for flow augmentation. Forty percent of the above average runoff would be provided for flow augmentation; 40 percent and 20 percent would be stored in Libby and Hungry Horse to improve reservoir elevations.

In addition to the DFOP measures, CRITFC calls for two other measures:

(1) Minimum flow of 120 kcfs at The Dalles during September to benefit both the end of the subyearling fall chinook out-migration and the adult fall chinook and steelhead in-migration.

(2) “BPA shall immediately take steps to secure at least an additional 3.5 million acre feet in available Canadian storage” for augmentation and “reconstruction of the historical hydrograph.”

ODFW

ODFW calls for the same April-August The Dalles flow targets as CRITFC calls for and the same sharing formula in years that exceed normal run-off. ODFW stated that provision of flows to meet the targets “is dependent on inclusion of Canadian reservoirs and use of Non-Treaty storage volumes.” In addition: (1) provide flexibility in Grand Coulee, Arrow and Mica Reservoir elevations to meet flow targets and limit fall and

winter power drafts of Libby, Hungry Horse and Grand Coulee to maintain pool elevations for resident fish; and (2) in future years, “allow FELCC to be impacted in low water years to achieve Lower Columbia flow targets.”

NRDC

NRDC, et al., called for the same April-August flow targets at The Dalles as CRITFC. To help meet these targets “and to minimize the release of water from upstream U.S. storage projects,” the recommendation called for the Corps to operate John Day at minimum operating pool and for BPA to “pursue long-term arrangements with B.C. Hydro for the purchase and release of Canadian storage” (CRITFC specified at least 3.5 million acre feet from Canadian storage; the groups did not specify an amount.) The groups did not include two elements from CRITFC’s Columbia flow proposal: the sharing formula for above average runoff years and the September flow target. The recommendation also called on the fishery agencies and tribes to develop “biological rule curves” for all the mainstem reservoirs, to be implemented on a systemwide basis.

Draft: Option 4, Additional Flow and Velocity generally reflected these recommendations. The Option 4 proposals did not specifically include the two elements added by ODFW, although reservoir constraints were proposed in Section 10 for Libby, Hungry Horse and Grand Coulee. Reservoir constraints for Hungry Horse and Libby were proposed at Section 10.3A and 10.3B, for Grand Coulee at Section 10.3E, and as a study measure for Lake Pend Oreille at Section 10.6E. Criteria for developing biologically-based constraints on “hydro project operations” were proposed at Section 2.2E.6.

Comments: The recommended Columbia flow targets raised the same general issues of the flow/velocity/survival relationship as were raised and discussed above, in the findings on Section 5.2, with regard to the Snake River flow/velocity objectives and flow augmentation recommendations.

CBFWA in its comments incorporated the recommended flow targets for the Columbia, as well as the upper-river reservoir constraints at Hungry Horse, Libby, Grand Coulee, and Albeni Falls/Lake Pend Oreille, and notified the Council that CBFWA internally will attempt to resolve any inconsistencies between the two sets of objectives and any conflicts between upper-river and lower-river fish managers and report to the Council in February or March 1995. The Washington Department of Fish and Wildlife endorsed the Columbia sliding scale flow targets as stated in the CBFWA comments, stating that this approach should take into account biological impacts on storage reservoirs and the availability of Canadian water.

The Upper Columbia United Tribes and the Colville Confederated Tribes disagreed with the Columbia flows represented by the DFOP flow targets, noting that there was a lack of consensus among members of the Columbia Basin Fish and Wildlife Authority (CBFWA) about whether the flow targets allow for protection of resident fish and wildlife and a reliable power supply; and noting the CBFWA process for trying to resolve these issues by February 1995. The UCUTs particularly objected to augmenting flows for summer migrants during July and August in below average water years, due to severe negative impacts to resident fish in storage reservoirs. The UCUTs also commented that the program “should include a description of the projected impacts of this plan to resident fish in Grand Coulee, Hungry Horse, Libby and Dworshak Reservoirs. It shall also specifically evaluate tradeoffs between anadromous fish and resident fish and be consistent with equalizing the benefits to both types of fish.” The UCUTs also suggested revising the provision in Section 1.5 on the use of Canadian reservoirs as a source for flows, so that section reads: “In determining the sources of water for fish and power flows, as well as protecting fish in storage reservoirs, the

use of Columbia And, “[i]n general, fish flows, as well as reservoir elevation and water retention time required to protect resident fish in the storage reservoirs, should be accommodated”

The Colville Tribes were concerned about the impact of target flows for anadromous fish on resident fish and wildlife in upriver storage reservoirs; the resident fishery in Lake Roosevelt (Grand Coulee reservoir) was of particular importance. They said that resident fish in Lake Roosevelt should be considered in the same light as salmon; and they urged that the operation of Grand Coulee Dam and Lake Roosevelt could undergo a complete environmental evaluation of the various mainstem options. They noted that the proposed changes in operations of Grand Coulee would result in unprecedented summer drawdowns with a series of severe environmental consequences. The Colville Confederated Tribes also noted that proposed Section 5.7D.2 contained language requiring monitoring and evaluation of the impact of salmon flows on resident fish and that CBFWA left that out in its comments. The Council should retain this section until it is replaced by something equivalent as a result of the CBFWA upriver/downriver process. The current Lake Roosevelt monitoring program conducted by UCUTs does not adequately address the fisheries concerns with regard to anadromous fish flows on resident fisheries; the program primarily addresses the evaluation of kokanee hatcheries and rainbow trout production programs; does not adequately address naturally producing kokanee and trout or other aquatic species important to the health of Lake Roosevelt ecosystem.

The Direct Service Industries (DSIs) said flow targets cannot be imposed without regard to natural conditions. Although the targets make some effort to distinguish among water years in setting flow targets, its crude approach continues to require hydrosystem operators to offset drought conditions. Instead, the Council should provide a fixed amount of water per year, if good science supports it. The record before the Council conclusively demonstrates that CBFWA flow targets and levels cannot possibly be achieved in many, if not most, years. Perhaps as a negotiating tactic, the fishery agencies and tribes represented by CBFWA have sought flow levels that are impossible to achieve; but note that several fishery agencies and particularly upriver tribes are opposed to radically increased flow regimes (and drawdown) proposals. Chelan County PUD also opposed flow targets and any increases in fish flows until such time as the flow/velocity/survival hypothesis is validated.

BPA said that, given its view of the flow/survival relationship above low flows, BPA has serious questions as to whether Columbia River flow targets will benefit salmon. A limited flow augmentation water supply should be managed on a volume basis; managing by minimum flow targets is an unsound departure from water budget practice. Flow augmentation is best managed on a volume basis instead of a minimum-flow basis, because flow targets often cannot be met at all times anyway and because biological information can be incorporated to determine when best to use augmentation and thus enhance augmentation effectiveness. Strategic water management, such as pulsed flows, may increase the effectiveness of flow augmentation, although this needs a more thorough analysis. Pulsing flow augmentation would provide increased flow levels for individuals of wild stocks that are ready to migrate, and also throughout a greater proportion of their migration period. BPA further commented that efficient use of a limited flow augmentation water supply necessitates using biological information and criteria to augment flows when it will be most effective.

Bonneville also said that for “natural selection reasons,” the region should work to improve the chances of returning adult migrants by using flow augmentation in late summer for adults instead of early summer for juveniles; travel time studies reveal that the extent to which subyearling chinook respond to water velocity (as indexed by flow) is uncertain; but, if they do respond, the effect is neither consistently predictable nor pronounced. Consequently, BPA stated, if the flow/survival relationship described by Hilborn, et al, reflects a true survival advantage during high flow years, it is not apparent that the effect would be associated with

increased migration speed; other mechanisms accompanying high flow years, such as spill, may explain the increased survival.

Douglas County PUD commented that the flows proposed in Option 4, Additional Flow and Velocity, instruct the mid-Columbia dams to provide FERC mandated spill and to pass through flow augmentation releases. The PUD wants clarification that these provisions will not be construed too strictly once flow augmentation begins so as not to allow necessary reservoir fill that occurs under normal operations to reverse pool reductions caused by load following, even though these normal operations have no real impact on the bulk movement of flow augmentation releases through this run-of-the-river project.

Findings: The Council adopted the recommended flow targets, in a renumbered Columbia flow and velocity section, Section 5.4. As with the flow objectives in the Snake River, in addition to reviewing the detailed information supplied by CRITFC and others in this process, the Council conducted an amendment process over the summer of 1994 concerning the relationship between flows, river velocity, transportation and salmon survival, and adopted amendments that set out the Council's hypotheses regarding these relationships. Section 5.0E, Mainstem Hypotheses, represents the result of that process, and the Council believes it fairly reflects what is known and unknown about these relationships. Notwithstanding continuing controversy over the relationship between flow augmentation and salmon survival, the best available scientific knowledge shows the reasonableness of concluding that the relationship is positive.

Considering the data and information presented by the fish and wildlife agencies and Indian tribes and others in the current amendment process, the independent scientific review conducted by Dr. Cada, the extensive scientific work that support the mainstem hypotheses, and giving due weight to the authorities, expertise and rights of the agencies and tribes, the Council accepts the agencies' and tribes' judgment on the expected biological value of the recommended objectives, concludes that this judgment is supported by the best available scientific knowledge, and concludes that the recommended flow/velocity targets would protect, mitigate and enhance fish and wildlife.

The Council does not accept these judgments conclusively, however. As the mainstem hypotheses show, the scientific data are not clear, and there are genuine disagreements among capable scientists on these matters. The region must evaluate the biological assumptions that underlie these operations to see if they achieve the expected biological benefits. One of the central purposes of the Mainstem Hypotheses section of the program is to focus research on critical aspects of these relationships. Similarly, in the current amendment process the Council calls for a multi-year evaluation of the relative survival benefits of flow/velocity versus transportation, probably the single most critical issue surrounding efforts to protect juvenile migrants from the effects of the dams. As new information emerges, the region must be prepared to adjust these operational objectives.

The Council rejected the recommendation to incorporate the targets into firm power planning because analysis indicated that it could take another 11 million acre feet of water above the volume called for in the Strategy for Salmon to meet the flow targets. Producing the volume of water needed to meet the flow targets from upriver storage would not allow the system to operate pursuant to the integrated rule curves called for to protect resident fish at Hungry Horse and Libby, as recommended by the Montana Department of Fish, Wildlife and Parks and supported by a number of upper river tribes, by CBFWA in its comments and by people and groups in Montana. This level of flow augmentation also would not allow the system to prevent significant degradation of nutrient retention times at Grand Coulee, as supported by upper river tribes and by CBFWA in its comments. The analysis of Option 4 in Appendix B, attached to the Council's draft

amendments (document 94-47) shows these effects. After considering the concerns expressed by the Upper Columbia United Tribes, the Council consulted with the Columbia Basin Fish and Wildlife Authority, which said that the upper and lower basin fish and wildlife agencies and tribes plan to discuss tradeoffs between flow targets for salmon and steelhead and reservoir levels for resident fish in storage reservoirs, and will report to the Council in February and March, 1995. The Council committed to review both the Columbia River targets and the Grand Coulee nutrient retention standard after receiving the Authority's report.

Finally, the Council's analysis showed that if the system were operated solely to meet anadromous fish flow objectives, refill impacts would be enormous (see analysis of Option 4 in Appendix B, attached to the Council's draft amendments, document 94-47). The resulting reservoir levels would have serious implications for resident fish and wildlife, greatly exacerbating the problems the upriver tribes and fish and wildlife agencies already foresee.

In view of these factors, the Council concluded that the adopted measure was a more effective way to protect anadromous fish, resident fish and wildlife, 16 U.S.C. § 839b(h)(7)(C), and a better way to complement the activities of the fish and wildlife agencies and Indian tribes who intend to address upriver-downriver tradeoffs further in early 1995, 16 U.S.C. § 839b(h)(6)(A). Regarding the potential impacts on the region's power supply, see Section 1, the introduction to Section 5, and Appendices B and C (hydropower costs and impacts analysis and the analysis of "Assuring an Adequate, Efficient, Economical, and Reliable Power Supply and the Ability to Carry Out Other Purposes of the Power Act"). The biological benefits of the Council's measures are summarized in Appendix D, "Staff Analysis of Biological Benefits of Mainstem Passage Actions."

Aware of the difficulty of meeting the flow objectives by flow augmentation alone, the Council also called (in Sections 5.4C and 5.4D) for the drawdown of the John Day reservoir to minimum operating pool, for an evaluation of a further drawdown of that reservoir, and for an evaluation of the possibility of other velocity improvements in the system (discussed below in the findings on what was Section 5.6 of the original 1994 program). The Council also adopted in Section 5.6D.5 the recommendation calling for negotiations with Canada to secure additional water for flow augmentation. The Council did not specify a particular amount, but clearly, the more water can be obtained to help meet mainstem flow/velocity objectives and alleviate refill concerns and benefit resident fish populations in storage reservoirs, the better. In response to the UCUTs' suggestion that a portion of this water be specifically dedicated to maintaining nutrient retention times, the Council suggests that this matter be taken up in the discussions between upper and lower basin fish and wildlife agencies and tribes concerning potential tradeoffs between anadromous and resident species. At that time, the nature of any such tradeoffs should be clearer, as should the need for such remedies.

The Council adopted CRITFC's recommended minimum flow target of 120 kcfs at The Dalles during September.

In response to the comment from the Douglas County PUD, the Council's flow/velocity objectives for the Columbia are specified in bi-weekly periods. Accordingly, these flow provisions should not be construed to constrain daily load following operations.

The Council also concludes that no party has recommended less costly alternative measures to achieve the Council's flow/velocity objectives.

Program Section(s): 5.3A.3 (Columbia River flows/runoff forecast at The Dalles)
Source: Confederated Salish and Kootenai Tribes
Recommendation No.: 5-5

Recommendation: Revise Section 5.3A.3 so that storage volumes and flow targets in the Columbia are based on the forecasted runoff volume at Grand Coulee, not The Dalles, to protect flows and reservoir levels in upper Columbia.

Draft: In the draft, the recommendation was proposed as an alternative Section 5.3A.3 in the general Section 5 amendments.

Findings: This recommendation is designed to ensure that the Columbia River is not called on to contribute water to make up for drought or other flow shortfalls in the Snake River. The Confederated Salish and Kootenai Tribes are concerned about impacts on Hungry Horse and Libby reservoirs. The Council staff's analysis indicates, however, that the result would be to decrease by approximately 85 percent the amount of stored water that could be used for Columbia River flow augmentation for anadromous species in below average water years. The Columbia Basin Fish and Wildlife Authority is facilitating discussions between the upper and lower Basin fish and wildlife agencies and tribes to address this very subject. The Authority expects that those discussions will be completed by next spring. In the meantime, the Council adopted integrated rule curves to protect resident fish and wildlife in Libby and Hungry Horse reservoirs, and a nutrient retention time standard to protect resident fish and wildlife at Grand Coulee. The Council finds that these measures are a more effective way to protect salmon, resident fish and wildlife than the recommended measure, 16 U.S.C. § 839b(h)(7)(C), and to complement the activities of the fish and wildlife agencies and tribes, 16 U.S.C. § 839b(h)(6)(A).

Program Section(s): 5.3B.1 (Columbia summer flows/non-treaty storage)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Delete the text of Section 5.3B.1, which calls for the use of non-treaty storage water in July and August in below-average water years. Replace with a call to evaluate the relationship in July and August between "water temperature, fish size, flow, and survival of subyearling salmon," and the relationship between temperature and survival of returning adults. PNUCC requests a similar alteration of Section 5.3B.2.

Draft: The draft did not propose to adopt this measure.

Findings: The mainstem hypotheses section of the program provides a framework for addressing the questions raised by the recommendation. Deleting the non-treaty storage measure could only be expected to provide less water for summer flow augmentation and for such evaluations. As such, it would not protect, mitigate or enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(A), and the Council rejected it.

Program Section(s): 5.3B.2 (Columbia summer flows/energy exchanges)

Source: PNUCC
Recommendation No.: 5-1

Recommendation: Revise Section 5.3B.2 to state that BPA will seek energy exchanges and other energy alternatives that have a potential for “shaping” (not “increasing”) summer Columbia flows, for the purpose only of facilitating the evaluations of the effects of water temperatures on juvenile fall chinook and returning adult salmon (and no longer also for the purpose of increasing survival of summer migrants).

Draft: The draft did not propose to adopt this measure.

Findings: The Council calls for measures that would increase Columbia River flows in the spring and summer, including through different operations at Grand Coulee and negotiations with Canada regarding their large storage reservoirs. By the same token, energy exchanges and other energy alternatives have the potential for increasing Columbia River flows if needed to meet the Council’s objectives. All will be evaluated as they are implemented. Accordingly, the Council rejected the recommendation because it would not protect, mitigate or enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(A).

SECTION 5.5: DEVELOP, DEMONSTRATE AND IMPLEMENT SNAKE RIVER RESERVOIR DRAWDOWN STRATEGY²

Program Section(s): 5.5 (Snake River drawdown)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-10

Recommendation: Delete almost all of Section 5.5 and replace with a re-focused, specific Snake River drawdown implementation program, as follows:

Section 5.5: Change the title of Section 5.5 [now Section 5.3] to “Implementation of the Snake River Reservoir Drawdown Strategy.” Delete introductory paragraph and replace with three that highlight Idaho's phased approach: Snake reservoir drawdown to increase river velocities and survival; drawdown of Lower Granite in 1995 to spillway crest will provide “essential biological data necessary for a long-term commitment” to Snake drawdown strategy; Corps to “initiate measures in support of Lower Granite drawdown immediately;” Lower Granite drawdown is not to be a one-time test but instead “first stage of an adaptive management plan;” knowledge gained to be used to implement “more effective” 1998 drawdown of Little Goose; information gained from 1998 drawdown to be used for 2002 drawdown at all four; biological objective is a river velocity equivalent of 140 kcfs in all but low flow years; adaptive management also necessary for each stage because “it is possible some of the central components of ultimate drawdown strategy” will not be completed in time for Lower Granite drawdown; Council instructs Corps to mitigate any possible negative impacts to salmon “resulting from any element of drawdown strategy being incomplete;” Corps cannot avoid or delay implementation schedule “merely because” an element of the ultimate drawdown strategy is not complete.

² **Note:** This section of the original 1994 Fish and Wildlife Program -- concerning the Snake River drawdown strategy -- has been renumbered Section 5.3 in the amended program.

Sections 5.5C.1: Delete Section 5.5C.1 (concerning development of interim plans and implementation schedule) and replace with the heart of Idaho's phased implementation plan, broken into three stages, as follows:

Lower Granite drawdown: The Corps, in consultation with fishery managers of Snake basin, is to implement drawdown to spillway crest at Lower Granite from April 15 to at least June 15, starting in 1995 and continuing thereafter. BPA is to fund the modifications necessary for the drawdown. The 1995 drawdown is contingent on the manufacture of dipping baskets capable of handling the smolts that enter the gatewells and the establishment of operational conditions in which the number of smolts will not overwhelm the dipping basket system. The Lower Granite drawdown is to contain the following elements: (1) fishery managers will develop a spill management and monitoring plan for use by the Corps in conjunction with the drawdown to provide 80 percent FPE while providing acceptable adult passage conditions and controlling dissolved gas levels; (2) the Corps is to extend auxiliary water pumps for the adult fish ladders to permit a maximum drawdown to elevation 690; and (3) the Corps will commence refill on or about June 1, minimizing impacts on June flows by shifting a portion of the spring water budget to June. If the dipping baskets are not capable of handling fish in gatewells "or if insurmountable obstacles preclude implementation" of the three elements noted, the Corps is to take immediate action to ensure that a 1996 drawdown can be implemented; the 1996 drawdown should incorporate a lift-tank system to get fish from gatewells.

Lower Granite and Little Goose drawdown: The Corps, in consultation with fishery managers of Snake basin, is to complete modifications to Lower Granite and Little Goose by 1998, including installing either lift tanks or improved dip net baskets or a combination at Lower Granite and "rock weirs on the downstream sides of Lower Granite and Little Goose." When completed, in consultation with fishery managers of Snake basin, implement drawdown to spillway crest at Lower Granite and Little Goose from April 15 to at least June 15, starting in 1998 and continuing thereafter. BPA is to fund the modifications necessary for the drawdown. The two-pool drawdown is to be consistent with the fishery managers' spill management and monitoring plan.

Lower Snake River drawdown: Based on information gained from the drawdowns of Lower Granite and Little Goose, the Corps is to implement drawdown of all four by 2002. BPA is to fund the modifications necessary for the drawdown. The full lower Snake drawdown is also to be consistent with the fishery managers' spill management and monitoring plan.

Monitoring: Beginning in 1996, the fishery managers are to develop a monitoring program for the Corps to implement to determine whether the drawdowns reduce travel time and sustain an 80 percent FPE rate.

Surface collection: By 1996 the Corps is to develop prototypes for surface guidance and collection of smolts.

Mitigation: The Corps is to develop a mitigation plan to assist "local property owners" in mitigating impacts to buildings, facilities and roads from each stage of the Snake drawdown. Corps is to submit plan to Council no later than two months prior to beginning of Lower Granite drawdown and submit similar plans prior to each subsequent drawdown.

Section 5.5C.3: Revise to call for only the Council (not Council, BPA, Corps and Bureau) to establish a committee to coordinate analyses and oversee development of plans and drawdown actions.

Section 5.5C.4: Revise to state that BPA will fund the coordination and oversight committee established by the Council “based upon a scope of work approved by the Council no later than two months following the adoption of this rule.”

Section 5.5C.7: Delete Section 5.5C.7, which calls for Congress and the Corps to authorize and evaluate dredging to maintain navigation channel.

Draft: The recommendation was included in Option 3 of the draft amendments, Lower Snake Drawdown.

Comments: Drawdown recommendations raise again the same flow/velocity/survival issues already discussed above in Section 5.0E, Mainstem Hypotheses, in the response to comments for the hypotheses rulemaking, and in the findings for Sections 5, 5.2 and 5.3. Drawdown proposals also present additional issues explored in the comments.

Idaho stated that several analyses, including the Council staff’s, show that drawdowns have real potential to rebuild Snake River stocks. The Corps’ cost estimates and timelines are too high and long; cost and construction time estimates by others have been much less. A one pool drawdown in 1995 will yield valuable information on a number of points, particularly on dam passage, although not on reservoir survival. In response to opponents of drawdowns, IDFG makes the following points: (1) There is no evidence that drawdowns will concentrate predators; in fact, SOR and other Corps documents show that drawdowns will reduce resident fish populations, including squawfish; moreover, spill will disperse predator populations; (2) dissolved gas levels can be controlled by dividing flows between the powerhouse and spillway; and (3) there is no evidence that changes in the food chain caused by drawdown will affect migrating smolts. Idaho noted that Option 3 would delay drawdown of all four pools until 2002; earlier drawdowns at Lower Granite and Little Goose are possible; and more immediate measures such as are included in Option 5 (Idaho Rivers’ recommendation for a 1995 spillway-crest drawdown of all four reservoirs) may be needed. IDFG recommended a 2-month drawdown rather than a 5-month drawdown; IDWR supports only an April 15-June 15 near-spillway drawdown.

Idaho also said that Option 5 correctly characterizes the nature of the emergency, although it raises serious implementation problems for 1995, especially problems with extracting smolts from gatewells and interrupting the water supply for Lyons Ferry Hatchery and other uses. Option 5 should receive priority attention for 1996 and after; the adult trap-and-haul strategy merits careful attention, and should be tested in 1995 to see if it reduces adult mortality between dams. Idaho also submitted comments and reports on the costs of drawdown and the comparative cost-effectiveness of drawdown and flow augmentation.

CBFWA called for implementation of a 4-pool drawdown by 2002, using an adaptive management strategy leading to one of two options: (1) natural river drawdown without dam modification, reconfiguring the river channel; or (2) drawdown to spillway crest and structural modification of the dams. Complete the engineering, biological and economic assessments in 1995 and implement an alternative in 1996. The fish managers should develop a monitoring program to determine whether drawdowns reduce fish travel time and sustain an 80 percent passage efficiency rate. William Stelle, Regional Director of NMFS, said that drawdowns could be an important tool in recovery, and urged the Council to continue to plan and design changes in dams to accommodate drawdowns long term. The Shoshone-Bannock Tribes supported quick implementation of lower Snake River drawdowns and John Day to spillway crest drawdown, as interim steps

to control sedimentation and as a first step toward further drawdowns to natural river levels. With natural river levels in the Snake the mudflats that would be exposed as the reservoirs dropped, but eventually they would be revegetated and a new, healthy riparian habitat would develop. The Columbia River Inter-Tribal Fish Commission (CRITFC) supported the CBFWA comments generally, but also stated that while CBFWA calls for “an immediate choice between natural river (dam breach) and spillway crest drawdown,” CRITFC “does not believe that these choices are mutually exclusive.”

The Save Our Wild Salmon coalition supported expedited implementation of the lower Snake reservoir drawdown, starting at Lower Granite Dam. Hundreds of individuals sent cards, letters and petitions to the Council urging the same.

Idaho Power said that the only compelling flow/survival data for Snake River juvenile migrants is that from the high flow years of 1983 and 1984. In those years, nature provided flows above 140,000 cubic feet per second at Lower Granite Dam, and because of the high flows, most fish were spilled past the hydro projects instead of being barged. The result were high returns for the 1983 and 1984 outmigrations. The only way to duplicate 1984 flow and migration conditions, with the same river velocities and method of dam passage for the fish, would be to draw down the Lower Snake projects and spill the fish past them. Flow augmentation has failed because it has not been able to provide similar conditions to the high flows observed in 1983 and 1984.

The Washington Department of Fish and Wildlife urged the Council to continue to explore the feasibility of spillway crest drawdowns in the lower Snake River and the natural river scenario. WDFW urged the Council not to make a decision at this time that forecloses any survival options. Flow augmentation, drawdowns, and increased survival with spill and improved bypass systems as elements of long-term survival improvements will take years to evaluate and implement fully and all are associated with significant uncertainties. Transportation remains appropriate, too, and the “region should embark on an aggressive, adaptive based approach, developing the capabilities to quickly implement each of the major alternatives while systematically evaluating the critical uncertainties.” “The Council should combine this recommendation with the draft elements regarding program oversight listed under Section 5.02 of Option 2.” The Washington Dept. of Transportation said that if drawdowns take place, it “strongly supports” mitigation plans to address direct and secondary impacts to physical facilities.

The DSIs said that the Council’s assumptions for passage survival in the presence of drawdown are inadequately explained, and appear to represent no more than rank speculation that is contrary to recent data on reservoir survival. Western Montana Electric G & T urged the Council to drop drawdowns because the UW/NMFS data says reservoir mortality is less than supposed. The Columbia River Alliance commented that Snake River drawdowns, even full reservoir drawdowns, will not exceed the survival rate benefits from the transportation program. Chelan County PUD objected to the four pool Snake drawdown on the grounds that it will cause major ecosystem disruption, placing at risk all adult salmon as well as juveniles.

PNGC and PNUCC commented that the Council should follow the Snake River Recovery Team’s approach to Snake River drawdown, which PNGC summarized as follows: (1) collect baseline smolt data at Lower Granite Reservoir for 1995-97; (2) if baseline data indicate that drawdown could significantly increase smolt survival such that the risks and costs are justified, design a biological test of Lower Granite Reservoir drawdown; (3) only if a scientifically sound biological test can be designed and conducted, should a test be implemented. In the meantime the region should continue the Salmon Strategy flows and not alter operations without more information on survival benefits. Council should also “maintain existing navigation system.”

The Port of Portland opposed drawdowns as threatening to disrupt shipping and navigation along entire river system, and with no compelling evidence they will work. The Port said that no assessment has been made of these costs over the long term. The 1992 drawdown test cost shippers \$150,000 per month to ship through Seattle instead of Portland; this could cost Portland, and possibly the whole Pacific Northwest, European and other national markets. Trucking goods is not a viable alternative due to unwanted increase in truck traffic in the Gorge's scenic area; similarly, additional use of rails would overburden existing rail system; both trucks and rails add more pollution, also, and are less efficient means of transportation. The Council should not adopt drawdowns without a clear case that drawdowns will provide measurable biological benefits, with a clear discussion of impacts on transportation and a plan to mitigate those impacts. The Port added that time periods for drawdown are not realistic; analyses should recognize that with drawdown and refill time, a 2 1/2-month drawdown is really 80 to 125 days, while a 4 1/2-month drawdown stretches to nearly nine months.

The Corps provided only limited comment on Snake River drawdowns. They said that "[d]rawdown has not been scientifically shown to increase fish survival;" that they are unaware of any evidence that supports the drawdown of Lower Granite to benefit fall chinook spawning and rearing; and that drawdown of any Snake reservoirs to spillway by April 1995 is not possible; 1997 would be more realistic.

Mark Reller, Montana representative, said that options that call for drawdowns in lower Snake will reduce the amount of water needed in the Snake to reach flow targets, which means an increased demand on the upper Columbia projects to meet lower Columbia flow targets.

Findings: The Council largely adopted Idaho's recommendation, in an amended Snake River drawdown section renumbered as Section 5.3. The rationale supporting the recommendation is based on several considerations cited by the fish and wildlife agencies and tribes, and is similar to that discussed in connection with Snake River water volume recommendations, discussed in the findings for Section 5.2. First, the fish and wildlife managers assert that anadromous fish evolved to survive in a natural river environment. Taking steps such as drawdown to move toward natural river conditions can be expected to improve anadromous fish survival on the theory that these fish will survive best in conditions that resemble those in which they evolved. By the same token, they contend, moving toward a swift-flowing river can be expected to provide a less hospitable habitat for predators, primarily resident fish that adapt well to slow moving, warmer reservoirs, as well as reduced time of exposure to the predators and to warm waters. Especially in the spring, the fish managers say, moving fish down the river faster should allow them to arrive at the estuary and ocean earlier, when environmental conditions are expected to be better, and limit their exposure to predators and other sources of mortality in the reservoirs.

The Council recognizes that there is risk in the drawdown proposals, but the risks are fairly evenly balanced. Commenters point out that there is risk that drawdowns will actually concentrate predators and improve their ability to prey on anadromous fish. However, if that were true, higher pool levels could be expected to reduce predation by dispersing predators, which runs counter to experience. It is at least as likely that higher velocities caused by lower pool levels will reduce exposure to predators and reduce predation overall. It is also possible that drawdowns will be less effective than barge transportation, equally effective, or, as the fish managers suggest, more effective. Without comparative data, we cannot know.

It is true that recent studies of reservoir survival in the top two Snake River reservoirs indicate that survival in those two reservoirs may be higher than previously believed. However, these data do not resolve these issues. As Idaho Fish and Game point out, no report of those studies has been released, and so few parties have had an opportunity to evaluate them. The two weeks of data collection in 1993 was a pilot study

only and “not a reliable estimate of reservoir survival.” The 1993 Little Goose survival study “showed reservoir mortality for the hatchery release groups within the range estimated in the Sims and Ossiander study,” which are the data that undergird much of the case for flow augmentation supported by the fishery managers. Questions have been raised about the accuracy of the study that cannot be answered until a report is released-- e.g., the choice of FGE assumptions at Lower Granite Dam and the sampling methods. Finally, the studies do not even attempt to evaluate the cumulative mortality effects of migration delay through the system. As Idaho said, “[m]any of the problems associated with delayed migration time are cumulative in nature, such as increased stress due to extended migration time and poor fish condition at the time of saltwater entry.”

None of these risk factors -- the potential effects on predators, the comparative merits of drawdowns and transportation, or the ultimate message of the studies of Lower Granite and Little Goose pools -- is quantifiable at present, and the question ultimately requires an exercise of judgment. The Council has exercised its judgment giving due weight to the expertise, authorities and legal rights of the fish and wildlife agencies and tribes, and determined that the drawdown recommendation will protect anadromous fish, is supported by the best available scientific knowledge, and otherwise is consistent with Sections 4(h)(5) and (6) of the Northwest Power Act.

However, based on the comments of the Washington Department of Fish and Wildlife and others, the Council also concluded that the relative merits of transportation and flow/velocity augmentation are sufficiently unclear that the region should conduct an evaluation of transportation and flow/velocity augmentation, as well as other options, in order to improve the available scientific knowledge. The nature of this critical evaluation is described in Section 5.0. This can take place even while drawdowns are proceeding. In this way the risks discussed above can be managed, if not altogether avoided.

Including Snake River drawdowns in the combination of spring measures has the additional benefit of allowing the spring flow/velocity equivalent in the Snake River to be achieved with less water out of Dworshak reservoir (and elsewhere) than without drawdowns. This should allow the fish managers to use more Dworshak water for summer juvenile migrants and summer and fall adult migrants.

Regarding drawdown costs, the Council contracted with the Environmental Defense Fund to evaluate the cost-effectiveness of various ways to increase water particle travel time in the Snake and Columbia Rivers. This evaluation, which is in the record, indicated that water leasing and land fallowing alternatives, which are endorsed elsewhere in the program, are the most cost-effective ways to achieve these objectives. Other analysis indicates, however, that the amount of water that these alternatives can be expected to contribute is to a large extent speculative, and hinges on legal and political matters, and the development of a water market that is only in its infancy. To account for the risk that this water may not be secured, it is prudent to put other options in place. One option is Galloway dam, which EDF believes to be relatively cost-effective, but which cannot be counted on for a major contribution to flows. Beyond this, drawdowns, at various levels and for various lengths of time (short of natural river drawdowns), appear to be the next most cost-effective strategy. Actual costs and construction times (which have an important effect on costs) have been estimated, and appear to be significantly less costly than the remaining options. Within this frame of reference, the Council finds the adopted drawdown strategy to satisfy the requirements of Section 4(h)(6)(C) of the Act.

The adopted measure differs from the recommendation in two respects. First, the recommendation was for Lower Granite to be lowered to spillway crest beginning in 1995, while the adopted measure calls for lowering to elevation 710 feet in 1995, and to elevation 690 (spillway crest) in 1996. The record showed that adult ladder modifications and other changes probably cannot be completed in time for a 1995 drawdown to

spillway crest. Second, the recommendation proposed a 1998 drawdown of Little Goose. The record shows that 1998 is probably unachievable even if the Corps were to embark on engineering, NEPA and related work now. Third, the recommendation was to approve drawdown of all four Snake projects now. The Council added explicit checkpoints at which information should be reviewed. This merely makes explicit what is implicit: as experience with drawdowns is gained, the region may wish to make additional decisions. For these reasons, the Council concluded that the adopted measure is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C).

The Council recognized the possibility that undue burdens would be imposed on shippers, and called for mitigation of those impacts.

The Council appreciates that the Recovery Team's report takes a more cautious approach to drawdowns. The Council concluded that the team's report, however, does not supply strong enough reasons for rejecting this recommendation.

As noted above, the Council acknowledges the possibility that Snake River drawdowns will reduce the amount of water needed in the Snake to reach flow targets. The Council also acknowledges that this may increase demand on the upper Columbia projects to meet lower Columbia flow targets. However, the Council has adopted other measures that are intended protect resident fish and wildlife at the upper Columbia projects and yet try to meet the flow targets, including integrated rule curves, a constraint on nutrient retention time reductions, the drawdown of the John Day project to minimum operating pool, and evaluation of other flow/velocity augmentation opportunities, all of which could help relieve pressures on the upper Columbia projects.

Program Section(s): 5.5 (Snake River drawdown)
Source: ODFW
Recommendation No.: 5-8

Recommendation: In 1994-95, operate all Snake reservoirs within one foot of MOP April 15 to December 1. By 1996 complete necessary modifications to adult ladder, juvenile bypass, spillway, tailrace, and turbines at Lower Granite to operate in 1996, in a prototype test, at elevation 695 from April 15 to August 31. If test is "successful" annually operate at spillway crest or level necessary level to achieve velocity equivalent of 140 kcfs (April 16-June 15), 80 kcfs (June 16-July 15) and 50 kcfs (July 16-August 31). Complete modifications of water intakes, boat ramps, and other reservoir affected.

Complete "expeditiously as possible," necessary ladder, bypass, spillway, tailrace and turbine modifications to operate Little Goose, Lower Monumental and Ice Harbor at spillway crest level. "Two years after successful prototype testing, annually lower" Little Goose to elevation 595, Lower Monumental to 497 and Ice Harbor to 405 from April 15 to August 31 or to achieve velocity equivalents listed in Section 5.2 amendments. Complete modifications of water intakes, boat ramps, and other reservoir affected. If drawdown to spillway crest "proves to be successful," modify spillways to allow drawdown of Lower Granite to elevation 686, Little Goose to 586, Lower Monumental to 488 and Ice Harbor to 396 and annually drawdown to achieve velocity equivalents.

Draft: The draft amendments did not specifically propose this recommendation, but Option 3, Lower Snake Drawdown, based on IDFG's recommendation, is similar.

Comments: The comments summarized in connection with IDFG's drawdown recommendation (5-10) apply equally to this recommendation.

Findings: The Council largely adopted the recommendation, for the reasons given in connection with IDFG drawdown recommendation.

Program Section(s): 5.5 (Snake River drawdown)
Source: Natural Resources Defense Council, et al.
Recommendation No.: 5-4

Recommendation: By March 1995, the Corps should complete modifications to allow Lower Granite drawdown to near spillway crest, including extensions of emergency exit and pumps of adult fish ladder, installation of gatewell lift-tanks or dip nets, mitigation for other facilities, and resolution of tribal cultural issues. Operate at near spillway crest from April 15 to at least June 15 in 1995; spill to attain 80 percent FPE but not to exceed nitrogen supersaturation standards set by Fish Passage Center; BPA to reimburse Corps for permanent repairs to physical damage.

By March 1996, Corps to complete modifications at Little Goose to allow drawdown to near spillway crest, including extensions of emergency exit and pumps of adult fish ladder, installation of gatewell lift-tanks, dip nets, forebay surface-oriented collectors and/or baffles on spillway gates, mitigation for other facilities, and resolution of tribal cultural issues. Also complete modifications of Lower Granite necessary to allow Little Goose drawdown, including construction of rock weirs to provide passage to adult ladder entrance. In 1996 and 1997 operate both Lower Granite and Little Goose at near spillway crest from April 15 to at least June 15; BPA to reimburse Corps for permanent repairs; and Fish Passage Center to develop, and Corps and NMFS to implement, monitoring program to assess whether these measures reduce travel time and sustain 80 percent FPE; Corps to maintain in fully operational condition PIT-tag detectors.

Following "successful drawdowns" in 1995 and 1996, Corps to immediately begin modifications at Little Goose, Lower Monumental and Ice Harbor to allow drawdown of all four Snake reservoirs to near spillway crest by April 1, 1998. BPA is also to fund an implementation plan, including engineering designs, timetables and costs, for faster or more extensive drawdown options: (a) emergency drawdown of all four to near spillway crest in 1995 and after, providing juvenile passage with spill and adult passage with trap-and-haul until modification of fish ladders; (b) modifications to operate Lower Granite and Little Goose under "natural river" option and Lower Monumental and Ice Harbor at near spillway crest; and (c) breaching all four lower Snake dams. The Corps is to complete this plan by December 31, 1994.

Draft: In the draft amendments, this recommendation was most closely reflected in the proposed amendment derived from IDFG's Snake River drawdown recommendation (Option 3, Lower Snake Drawdown), although the NRDC recommendation called for an earlier four-pool drawdown and there were other differences. The recommendation's call for a "natural river" option is best reflected in the Option 4 drawdown, Lower Snake Drawdown.

With regard to other issues mentioned, amendments calling for the 1996 installation of juvenile PIT-tag detectors at John Day and Bonneville were proposed as a revised Section 5.7B.2 (and then renumbered as a

new Section 5.2B.(2) in Option 2, Adaptive Management Introduction, and as a new Section 5.7B.3 in Option 5, Salmon Funding. A proposed revision of Section.6.1B.6 derived from a PNUCC recommendation called for the installation, if feasible, of adult fish PIT-tag detectors in adult passage facilities at mainstem dams as soon as possible. Proposed amendments concerning spill/passage to 80 percent FPE were proposed independent of the drawdown amendments, and are discussed below.

Comments: The comments summarized in connection with IDFG's drawdown recommendation (5-10) apply equally to this recommendation. In addition, Idaho commented that the proposal for emergency drawdown, trapping and hauling adults, etc., (contained in Option 5 and some elements of this recommendation) presents serious problems that have to be addressed before it could be implemented, but it correctly characterizes the nature of the emergency.

Findings: The Council largely adopted the main part of the recommendation, for the reasons given in connection with IDFG's drawdown recommendation. The Council rejected the recommendation for Bonneville to fund a plan for emergency drawdown of all four projects to near spillway crest in 1995 and after, spilling to protect juveniles and trapping and hauling returning adults pending modification of fish ladders. As Idaho noted, this proposal poses serious risks for returning adults, and the Council concluded that the adopted measure is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Council adopted the recommendation to include in the drawdown implementation plans a plan for modifications to operate Lower Granite and Little Goose at natural river levels, as a possible option for implementation rather than a spillway crest drawdown. The Council will review the natural river option at the checkpoints along the way to implementation. Spillway and natural river level options are also part of the evaluation for Ice Harbor and Lower Monumental reservoirs.

Program Section(s): 5.5 (Snake River drawdown)
Source: Idaho Rivers United
Recommendation No.: 5-6

Recommendation: Idaho Rivers called for an emergency Snake drawdown plan: In 1995 the Corps is to draw down all four Snake reservoirs to near spillway crest by April 15 and maintain at least until June 30; and install pumps to keep adult fish ladder at Ice Harbor in operation in time for drawdown. The objective of the drawdown is to attain a velocity equivalent of 140 kcfs at Lower Granite from April 15 to June 30. If “natural inflow” into the lowered Lower Granite is not sufficient to produce 140 kcfs velocity equivalent, the Corps, Bureau and states are to “provide flow augmentation” to make that flow equivalent. These entities will cooperate in any event to secure approximately 800,000 acre feet to refill the lower Snake reservoirs, refilling Ice Harbor first with successive upstream refills. Idaho Rivers also called for an adult migrant trap-and-haul program at Ice Harbor to transport adults to a release above Lower Granite Dam, due to anticipated problems with the adult passage facilities at the lower Snake reservoirs with a 1995 drawdown. The adult trap and haul proposal is further discussed in the findings for Section 6.1A. Idaho Rivers describes this as an emergency measure for the 1995 migration season. It did not recommend action for future years.

Draft: In the draft amendments, Option 5, Lower Snake Drawdown, Additional Snake River Water and Trap and Haul Adult Migrants, reflected this recommendation.

Comments: Idaho commented that the proposal for emergency drawdown, trapping and hauling adults, etc., (contained in Option 5 and this recommendation) presented serious problems that have to be addressed before it could be implemented, but it correctly characterizes the nature of the emergency. Consultation comments from WDFW emphasized the importance of protecting the wild spring chinook run into the Tucannon River above Lower Monumental Dam, one of the healthier spring chinook populations among the Snake River tributaries. The adult trap and haul proposal that is part of this recommendation presents particular and potentially severe survival problems for the adult fish returning to the Tucannon River, as all the transported adults would be released above Lower Granite Dam, two dams above the Tucannon River.

The Council received hundreds of cards, letters and petitions from individuals supporting this recommendation, as well as numerous letters from individuals and businesses opposing the idea. Idaho Senator Larry Craig said that Option 5 is “imaginative fiction” of which the Council should be “embarrassed.” More important, none of the agencies and tribes supported this recommendation; CBFWA did not include it in the Authority’s program comments.

Findings: While the Council adopted elements of this recommendation for implementation after 1995, for the 1995 migration season the Council adopted measures based primarily on flow augmentation and spill. The Council concluded, on the advice of such parties as Idaho Fish and Game, that the risks of trapping and hauling adults are substantial, especially to the important Tucannon run, even if emergency drawdowns were otherwise feasible, which they do not appear to be. The Council finds the adopted measures are a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C), and better complement the activities of the fish agencies and tribes, 16 U.S.C. § 839b(h)(6)(A), (7)(C).

Program Section(s): 5.5 (Snake River drawdown)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: In the middle of CRITFC's recommendations concerning structural improvements to bypass systems, CRITFC also called for the Corps to investigate, by 1997, drawdown to spillway crest and dam breaching at Ice Harbor, Lower Monumental and Little Goose. At Lower Granite the Corps is to "[i]mmediately drawdown pool to spillway crest," and investigate dam breaching by 1997. CRITFC also calls for an investigation, by 1997, drawdown to spillway crest and dam breaching at Ice Harbor, Lower Monumental and Little Goose. At Lower Granite the Corps is to "[i]mmediately drawdown pool to spillway crest," and investigate dam breaching by 1997.

Draft: In the draft, CRITFC's recommendation for a 1995 drawdown of Lower Granite to spillway crest was best reflected in Option 3, Lower Snake Drawdown and, in part, the Option 5 Lower Snake Drawdown. A natural river drawdown option is proposed in Option 4, Lower Snake Drawdown.

Findings: The Council adopted the recommendation for drawdown to spillway crest at Lower Monumental and Little Goose, but rejected the recommendation to immediately lower the Lower Granite pool to spillway crest. The adopted measure calls for lowering Lower Granite to elevation 710 feet in 1995, and to elevation 690 (spillway crest) in 1996. The record showed that adult ladder modifications and other changes probably cannot be completed in time for a 1995 drawdown to spillway crest. Accordingly, the Council finds that the adopted measure is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). In the planning process for the drawdowns, the Council called for an investigation of the option of operating the four lower Snake pools at natural river level. The Council calls for a review of the region's experience with drawdowns prior to 2002, and, depending on what that review shows, drawdown of Ice Harbor and Lower Monumental. Earlier drawdown of those two reservoirs is not practical. It would also preclude the in-river/transportation evaluation, in Section 5.0, and the phased-in evaluation of the biological value of drawdowns, in Section 5.3, both of which are essential elements in the Council's risk management strategy. And the Council's course of action does complement the recommendations and comments of state fishery agencies such as IDFG and WDFW, and appears to be consistent with the views expressed by NMFS. For these reasons, the Council concluded that proceeding with this evaluation process and risk management strategy is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): 5.5A (develop Snake drawdown strategy)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 5.5A to "further define and make the public aware of" what the Council means by "structurally or economically infeasible, biologically imprudent or inconsistent with Sections 4(h)(5)-(7)." Also revise to reflect current situation: Corps has established no date for drawdown implementation and has no plans for drawdown test in 1995; additional testing and research is necessary because there is little information available on biological effectiveness of drawdown and 1993 and 1994 NMFS survival research indicates high survival through Lower Granite pool; no biological drawdown test has been identified that will provide needed information.

Draft: This recommendation was reflected in the PNUCC-based Option 1, Drawdown.

Findings: The Council rejected this recommendation based on its findings that the drawdown strategy the Council adopted is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Council’s reasoning is given in the findings on IDFG’s drawdown recommendation (5-10), above.

Program Section(s): 5.5 (Snake River drawdown strategy)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Delete all of Section 5.5 and replace with a simple paragraph concerning “preparatory steps to a reservoir drawdown testing program.” Consideration of a drawdown program cannot begin until results are obtained from research projects collecting “accurate survival data regarding juvenile passage” and evaluating “the relationship (if any) of flow and water velocity to travel time and survival” of juveniles. A drawdown test may be considered once accurate baseline data is in, but only if the research demonstrates a correlation between flows/velocity/travel time and survival. Even then a drawdown test should proceed “only if a scientifically valid, technically sound reservoir drawdown test can be designed.” PNUCC intends this paragraph to apply not only to the Snake reservoirs but to John Day as well, see the findings below on recommendations for Section 5.6A of the original 1994 program.

Draft: The recommendation was reflected in the draft amendments in Option 1, Drawdown.

Findings: The Council rejected this recommendation based on its findings that the drawdown strategy the Council adopted is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Council’s reasoning is given in the findings on IDFG’s drawdown recommendation (5-10), above.

SECTION 5.6: PURSUE ADDITIONAL MEASURES TO INCREASE SURVIVAL³

Program Section(s): 5.6 (additional measures)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: PNUCC recommended revising the introductory text to Section 5.6 to emphasize that no additional measures -- drawdowns or additional water for augmentation -- should be implemented until proven effective. PNUCC called for the deletion of language stating that additional measures “should begin right away” and setting dates for reports and actions. PNUCC also deleted the language stating that an object of the review process for immediate measures is to “remove impediments to these measures and to implement expeditiously those that achieve rebuilding targets unless they are shown to be structurally or technically infeasible, biologically imprudent, or inconsistent” with the Act. The quoted language would be replaced with

³ **Note:** The provisions in this section of the original 1994 Fish and Wildlife Program have either been deleted or amended and then moved to either Section 5.2 (Snake River flow and velocity) or Section 5.4 (Columbia River flow and velocity) in the amended program.

language stating that the object of the process is only to identify “future measures. The Council will adopt the measures if they are biologically effective, structurally and economically feasible, and consistent” with the Act.

Draft: In the draft, this recommendation was reflected in Option 1, Additional Flow and Storage.

Findings: The Council rejected this recommendation. The measures the Council adopted are more effective ways to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Council’s reasoning is given in the findings above on the Snake River drawdown recommendations, in the findings in this section on the adopted recommendations on the John Day drawdown; in the findings for Section 5.2 concerning additional water from the Snake River Basin, and in the findings in this section concerning new storage in the Snake basin.

Program Section(s): 5.6A (John Day drawdown below minimum irrigation pool)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Delete all of Section 5.6A, with no replacement. PNUCC’s explanation indicates clearly that the drawdown evaluation language in PNUCC’s replacement Section 5.5 applies to the John Day as well.

Draft: The draft amendments, Option 1, Drawdown, reflected this recommendation.

Findings: The Council rejected this recommendation based on its findings that the John Day drawdown measure the Council adopted is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The Council’s reasoning is given in the findings below.

Program Section(s): 5.6A (John Day drawdown)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-10

Recommendation: IDFG recommended that the Council revise Section 5.6A [now Section 5.4C] to call for the Corps and BPA, together with the fishery managers, to implement drawdown of the John Day reservoir to minimum operating pool (MOP) by April 15, 1996. The Corps is to develop a budget by January 1995 to finish design work, extend irrigation pumps, modify passage facilities, move boat ramps and complete mitigation measures; install flip lips on all spillways; and develop a monitoring process to determine whether John Day drawdown reduces predation and travel time. Complete these measures by January 1996 and lower John Day to MOP by April 15 “for duration of the spring migration period.” Continue in subsequent years unless drawdowns “would be” structurally or economically infeasible, biologically imprudent or inconsistent with Sections 4(h)(5)-(7) of the Act. IDFG also called on the fishery managers to study, by the end of 1995, the feasibility of lowering John Day to spillway crest, in coordination with the Corps and funded by BPA.

Draft: For the recommendation for a John Day MOP drawdown in 1996, see Option 3, John Day Drawdown to Minimum Operating Pool. A John Day MOP drawdown in 1995 was proposed in Option 2, John Day Drawdown, and Option 5, John Day Drawdown.

The recommendation for a 1995 evaluation of a John Day drawdown to spillway crest was reflected in Options 4 and 5, John Day Spillway Drawdown Evaluation. Option 3, John Day Drawdown to Spillway Evaluation called for evaluation and other actions to allow an implementation decision by the end of 1997. The same proposed amendment was part of Options 2 and 4.

Comments: CBFWA supported the John Day drawdown plan to minimum irrigation pool in 1995, minimum operating pool (MOP) in 1996, April 15-September 30, and by 1998, a complete reconnaissance level analysis of drawdown to spillway crest and natural river level. No member fish agency or tribe objected to the CBFWA position.

CRITFC supported operating the John Day reservoir at the lowest level possible as fast as possible, including a recommendation to evaluate a spillway crest or natural river level drawdown. Among the information submitted by CRITFC was a November 9, 1994, memo from Mal Karr of CRITFC, titled "John Day Reservoir Temperature Regimes." CRITFC summarizes this analysis as a discussion of the "effects of John Day drawdown on temperature regimes in the John Day reservoir," noting that "temperature changes within the reservoir [are] directly dependent upon the time of exposure to heat transfer components." The "analysis concludes that at drawdown to spillway crest, John Day reservoir would be subject to approximately one-fourth of the heat uptake that the reservoir would experience under full pool." The Washington Department of Fish and Wildlife also stated its support for the John Day drawdown to minimum operating pool, and urged the Council to continue to explore the feasibility of spillway crest drawdown. The Yakama Indian Nation and the Confederated Tribes of the Umatilla Indian Reservation supported the CRITFC position on all the flow and drawdown measures, including John Day. The Shoshone-Bannock Tribes stated its support for the spillway and natural river level evaluations of John Day. The Upper Columbia United Tribes and the Colville Confederated Tribes stated that Option 2 was their preferred option out of the mainstem options submitted by the Council for public comment, and a crucial part of Option 2 was the John Day drawdown to MOP with a spillway crest evaluation. The Confederated Salish-Kootenai Tribes stated their support for Options 1 through 3, and Options 2 and 3, again, included the John Day drawdown as a significant element. The environmental groups and many individuals, led by the Save Our Wild Salmon coalition, also called in written testimony and at public hearings, for operation of John Day reservoir at MOP as soon as possible and for the further evaluation of operating at lower levels.

On the other hand, the Douglas County PUD opposed John Day drawdown, saying that the biological benefits and flow/velocity/survival benefits had not been proven. Drawdowns could have adverse effects on mid-Columbia summer/fall chinook rearing and migration "by eliminating the benthic (river bottom) communities and submergent vegetation these fish depend on for food and cover." Drawdowns would also have severe and irrefutable impacts on riparian vegetation and wildlife. PNGC said the biological benefits are unknown since the relationship between smolt survival and flows in the reservoir are unknown; drawdown results in a reduction in water particle travel time of only 0.8 to 1.9 days (8.6 percent) and is not likely to significantly improve smolt survival, while the adverse impacts to adult salmon, wildlife and water supplies are potentially significant. PNGC called instead for smolt survival studies of the reservoir.

The Columbia River Alliance submitted a number comments and analyses objecting to the John Day drawdown to MOP, arguing that it does not have a technical basis and that it would be a meaningless gesture with negative biological impacts, including to the wildlife refuge. The CRA and its allies in the irrigation community submitted a couple of memoranda from their consultant, Darryll Olsen of the Pacific Northwest Project, criticizing the idea of a John Day drawdown to MOP. He said that the Council's consultant Harza, the

Corps, the Recovery Team and others were in substantial agreement that John Day drawdown to minimum operating pool provides little or no biological benefit to Snake River or Mid-Columbia salmon, is not a cost-effective alternative, and has significant environmental effects within and along edge of John Day pool. He critiqued a Council staff 1993 analysis, including critical points made in a letter by Don Bevan of the Recovery Team to Council Member Duncan. The CRA also submitted the public record from the Corps' SCS study, which included a large number of letters from people and groups in the agricultural community and connected to the utilities objecting to the John Day drawdown.

The Council received a large number of comments from businesses, public officials and individuals connected to the commercial agricultural community, objecting to the John Day to MOP proposal, in writing and in public hearing testimony. To give some examples, the Council received a proclamation from a Hermiston public hearing signed by 25 mayors, city council members, port officials, electric coop officials, etc. opposing the John Day drawdown. A comment from Bob Hoeffel, consultant for the Oregon Water Coalition, opposed drawdowns in general and the John Day drawdown in particular on cost and biological grounds, although the OWC stated that "[w]e could even support a degree of drawdown as long as scientific and biological fact show it to provide enough benefit to be cost effective." C and B Livestock, Inc. emphasized the economic and social costs of John Day drawdown, especially the impact to irrigated agriculture, food processing industry and navigation needs of commercial agriculture. The City of Boardman described possible adverse affects to water quality in John Day pool caused by changes in river operations; main concern is that EPA-required microscopic particulate sampling noted large loss of certain microscopic organisms following changes in operations to increase flows; no data tells yet whether these biota changes will have significant changes on river biology, fish food chain or other characteristics of fish survival, or on human health (Boardman gets water from wells influenced by river). The Oregon Water Resources Department said that studies indicate a John Day drawdown could impact groundwater supplies in adjacent area, and that further study needs to precede any drawdown decision.

Morris Le Fever, a retired USFWS project leader at the Umatilla Wildlife Refuge, described the adverse impact of temporary or permanent John Day drawdown on a wildlife refuge and other riparian habitat and wildlife, due mostly to loss of thousands of acres of riparian/wetland acreage.

As noted in the comments on the Snake River drawdown, the Port of Portland opposed drawdowns as threatening to disrupt shipping and navigation along entire river system, and with no compelling evidence they will work. The Port said that no assessment has been made of these costs over the long term. The 1992 drawdown test cost shippers \$150,000 per month to ship through Seattle instead of Portland; this could cost Portland, and possibly the whole Pacific Northwest, European and other national markets. Trucking goods is not a viable alternative due to unwanted increase in truck traffic in the Gorge's scenic area; similarly, additional use of rails would overburden existing rail system; both trucks and rails add more pollution, also, and are less efficient means of transportation. The Council should not adopt drawdowns without a clear case that drawdowns will provide measurable biological benefits, with a clear discussion of impacts on transportation and a plan to mitigate those impacts.

The Portland District of the Corps of Engineers suggested discontinuing consideration of operating John Day pool at MOP, based on "available information to date regarding flow/survival relationships in general, biological research in John Day pool and elsewhere, model studies, and appreciation for the small change in water travel time afforded by the proposed operation." Benefits would be marginal, at best, for yearling migrants and would likely be outweighed by the negative impacts to subyearling migrants due to shallow rearing habitat losses, increased predation, and other negative impacts to resident fish and wildlife. At worst, the John Day drawdown could actually harm the migrants, especially the subyearling migrants, "due to shallow

water rearing habitat losses, potential predator competition, and adverse effects associated with poorer passage survival at McNary and John Day projects.” Also, the immediate strategy for listed stocks, absent significant immediate drawdowns on the Snake, must include transport, particularly during lower-than-average flow conditions, yet with Snake River and McNary transport, almost none of the listed stocks would encounter John Day, making any minimal benefits irrelevant. If listed stocks are returned to the river under a spread-the-risk policy, John Day MOP operation would provide only a marginal benefit and because of the negative impacts discussed above, the Corps believes that such a strategy would be ill-advised. John Day operation at MOP does not warrant the significant effort and resources that it would require; the alternative of a John Day drawdown could be brought back later if warranted by flow/survival studies. The Corps also suggested deferring any study and consideration of spillway crest drawdowns while flow/survival studies continue. If pursued, it must include critical studies of flow/survival in John Day pool.

Several commenters pointed out that both Harza and the Snake River Recovery Team found the travel time benefits of the drawdown of John Day to MOP to be too small to justify the expense.

Findings: Revised and renumbered as Section 5.4C, the Council adopted the recommendation to operate John Day at minimum operating pool in 1995, conditioned on full, prior mitigation to affected reservoir water users, and allowing load-following operations outside the fish migration season if needed and unavailable at other projects. The Council also adopted the recommendation to evaluate operation of the project at spillway crest.

The Council’s analyses showed that a drawdown from the present minimum irrigation pool levels to minimum operating pool results in water particle travel time reductions of between 0.8 and 1.9 days in the John Day pool alone during the May through August period. In the pool itself, the relative change in water particle travel time is reduced about 14 to 17 percent. This analysis indicates that to achieve a similar reduction in water particle travel time to benefit Snake River migrants as the John Day drawdown to MOP from minimum irrigation pool would require an additional release of about 3.1 million acre-feet of water from upstream storage projects. This volume would be in addition to both the existing 3.45 million acre feet water budget and 3.0 million acre feet operational volumes called for in the Strategy for Salmon. This additional 3.1 million acre feet volume (note that this volume probably cannot feasibly be stored in U. S. facilities, but might be secured from Canadian storage facilities), would also result in additional water particle travel time benefits for mid-Columbia stocks through the mid-Columbia reach of between 0.6 and 1.1 days, while benefiting both Columbia and Snake stocks through the lower Columbia reach by between 0.8 and 1.9 days, as noted above.

To put these travel time benefits into perspective, every small increment in travel time improvement can translate into significant improvements in smolt survival. This is particularly true in the John Day reservoir, which is the longest pool on the mainstem Snake or Columbia rivers (76-miles long) and a noted fish killer. Reiman et al. (1989) estimated, based on their research, that predators in the John Day pool consume an average of 1.9 to 3.3 million juvenile salmon each year. This figure represents between 9-19 percent of estimated number of juvenile salmon entering the reservoir. So, even small reductions in travel time can reduce the smolts’ exposure to large numbers of predator species present in the John Day pool, including squawfish and introduced species such as walleye, smallmouth bass, and channel catfish. For example, Reiman estimated that approximately 20,000 and 30,000 chinook smolts are consumed each day in the John Day pool during the months of May and August, respectively.

Benefits from this strategy are higher if fewer fish are transported. Transported fish are removed from the river so that faster flows do not benefit them. The Council’s spread-the-risk approach to

transportation increases in-river migration and decreases transportation, and thus make measures such as the John Day drawdown that much more important in improving in-river conditions. In addition, John Day drawdown is one of the few in-river improvements the region can make without itself impacting the transportation program. Unlike Snake River drawdowns, transportation can remain fully operational with John Day at minimum operating pool.

Other advantages obtained by the John Day drawdown, as with the Snake River drawdown, stem from the fact that less water is required from up-river storage to meet the spring flow objectives in the lower river. This makes it easier to satisfy the two other biological demands on that water -- flows for summer salmon migrants, and higher reservoir levels in upper river reservoirs to protect resident fish.

For these reasons, and giving due weight to the expertise, authorities and rights of the fish and wildlife agencies and Indian tribes, which approached true consensus on this issue, the Council concluded that operating John Day at minimum operating pool would protect, mitigate and enhance fish and wildlife.

Operating John Day at minimum operating pool can affect the power system's energy capacity, and the Council considered the effect this proposal could have on the adequacy, efficiency, economy and reliability of the region's power supply. The Corps recently estimated costs for both a 4-month and 12-month John Day pool drawdown at \$65 million and \$99 million, respectively. These costs are October 1992 price level and do not include inflation. Major project cost items include mitigation for impacts to adult fish passage facilities, wildlife habitat, recreation sites, irrigation pump stations, the City of Umatilla's treated sewage effluent outfall pipe and hatchery water supplies. Economic impacts for proposed drawdown operation are substantially derived from lost hydropower generation. The Corps estimates that, for a 4-month drawdown, this loss could be about \$3.8 million annually. For the year-round option, the cost estimate is \$12.3 million. The Corps estimated total average annual costs are nearly \$11 and \$24 million, respectively, for the 4-month and 12-month drawdowns. These annual costs include amortized project and interest during construction, annual O & M, and annual economic costs.

In 1992, BPA staff produced estimates of power system costs and impacts of a John Day drawdown operation. Bonneville estimates that a drawdown to MOP will result in a firm energy loss of only about 1-2 MW, total nonfirm energy losses of about 200 to 500 MW-months annually, and total capacity losses of roughly 1000 MW in May, 400 MW in June, and 100 MW in both July and August. These impacts are for a 4-month drawdown operation only. The first 1000 MW capacity loss in the spring-summer period would have no additional cost. The next increment of capacity loss would be priced at about \$4 per kW-month, about \$2.4 million per year. Capacity losses associated with a year-round drawdown were not estimated, but would be considerably greater than \$2.4 million per year. Council Staff Briefing Paper 94-40 documents these findings further.

With these considerations in mind, the Council made clear in the measure itself that John Day may be operated for load-following purposes outside the fish migration season, if it is needed and capacity is not available at other projects. For a finding on the effect of the program as a whole on the adequacy, efficiency, economy and reliability of the region's power supply, see Section 1.8 and Appendix C.

The Environmental Defense Fund cost-effectiveness evaluation indicates that John Day drawdown to minimum operating pool is a relatively cost-effective way to secure reductions in water particle travel time, which the fish managers believe is a reasonable surrogate for reduced fish travel time and increased survival. The Council's reasoning on the biological merits of drawdowns *per se* is explained in connection with findings on the Snake River drawdown recommendations.

The Council acknowledges concerns over the potential impacts of drawing down the John Day reservoir, and calls for full, prior mitigation to affected reservoir water users before proceeding.

The record indicates that concerns over wildlife impacts associated with the drawdown at John Day will be somewhat alleviated with a year-round drawdown rather than a two to four month drawdown, in which riparian vegetation and associated wildlife habitat would have no opportunity to reestablish itself. It is estimated that an annual drawdown and refill of the John Day reservoir would have a number of negative impacts on wildlife populations. Lowering the pool level by 8 to 11 feet to MOP will result in lowered ground water levels in areas adjacent to the river, withdrawal of water from established marsh and riparian areas, and exposure of presently shallow water habitat. An estimated 8,400 acres of backwater sloughs, marshes, and shallow water areas would be exposed and 2,095 acres of wetland/riparian habitat would be impacted. Of particular concern are the impacts to the Umatilla National Wildlife refuge, and the Willow Creek and Irrigon wildlife areas managed by ODFW.

Most of the impacts would result from the perching of marshes and riparian habitats along the shoreline and from the loss of backwater sloughs from dewatering. Loss of standing water from emergent vegetation communities will preclude nesting or decrease nesting success of species such as diving ducks. Desiccation of marshes and shallow open water habitat will result in the loss of aquatic plant and invertebrate populations which provide food resources for many bird species. More terrestrially-associated avian and mammalian species dependent on riparian forest and wetland plant communities for nesting and foraging would incur loss of habitat and reduced forage availability. Colonial birds that use offshore islands could be jeopardized due to the possible creation of land bridges associated with drawdown.

However, an annual drawdown of John Day pool may benefit some species which rely on exposed mudflat habitat and very shallow water. During the 1992 drawdown test in the Snake River, it was noted that the mudflats were attractive to such species as black-necked stilts, American avocets, and killdeer.

A permanent drawdown of John Day pool would cause less significant impacts to existing wildlife habitat, as this option would allow for additional land base upon which new habitat would develop over time. It is not known whether the new land base would develop comparably to the existing habitat on the refuge or management areas. Such development would be dependent on topography and soils within the drawdown zone. A rough estimate is that perhaps 25 percent of the existing acreage to be impacted by drawdown could be recovered. Permanent drawdown might also have a positive impact on island habitats. Since the impoundment of John Day pool in 1968 approximately 40 percent of five islands within the pool has been lost (165 acres lost from a base acreage of 410 acres). Most of the losses are caused by fluctuating pool levels, wind generated wave action, and erosive soils. Lowering the pool would expose more island areas, and depending on the operational regime to be used, could reduce the existing impacts causing current island losses.

A drawdown of John Day may exacerbate water supply problems at neighboring fish hatcheries. The hatcheries' water supply is already a critical problem. Mitigation for impacts to hatchery water supplies has been part of the John Day drawdown evaluations and cost estimates.

Considering the benefits and costs of the John Day drawdown to minimum operating pool, the Council concludes that the requirements of Sections 4(h)(5) and (6) of the Act are satisfied.

Determining whether to draw John Day down to spillway crest is an idea worth exploring. The Council makes no judgment at this time, however, on its cost-effectiveness or impacts.

Program Section(s): 5.6A (John Day drawdown)
Source: ODFW
Recommendation No.: 5-8

Recommendation: In 1994-97 operate John Day within one foot of MIP (elevation 263), April 15 to August 31. Beginning in 1998, operate at MOP (elevation 257) for same period. By 1998 complete evaluation of drawing down John Day to lower depths including spillway crest (elevation 210).

Draft: The approach taken in the draft amendments, and the public comments, are summarized in connection with the prior recommendation, IDFG's John Day drawdown recommendation (5-10).

Findings: The Council adopted the recommendation to operate John Day at minimum operating pool in 1995, as noted above, conditioned on full, prior mitigation to affected reservoir water users. The Council also adopted the recommendation to evaluate operation at spillway crest. Provided mitigation can take place, the Council concluded that the adopted measure, which calls for an earlier drawdown than recommended by ODFW, would be a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C), than waiting until 1998.

Program Section(s): 5.6A (John Day drawdown)
Source: Natural Resources Defense Council, et al.; Idaho Rivers United
Recommendation No.: 5-4, 5-6

Recommendation: Operate John Day at MOP from May 1 to August 31, beginning with spring 1995 juvenile migration, with temporary mitigation. No later than January 1, 1996, complete all mitigation measures. Any "reasonable cost" modifications that allow for even deeper drawdown should be made. BPA, through the Corps, is to fund retrofitting of non-federal facilities, such as irrigation pumps; the Corps will develop budget and complete designs for this work by December 31, 1994. BPA is to fund feasibility study of operating John Day at near spillway crest; the Corps is to complete study by December 31, 1995. The Corps is to install PIT-tag detectors at John Day and Bonneville by March 1996; the Fish Passage Center will develop, and Corps and NMFS will implement, monitoring program to assess whether John Day MOP operation reduces travel time and predation of juvenile salmon.

Draft: The approach taken in the draft amendments, and the comments, are summarized above in connection with the John Day recommendation from IDFG (5-10).

Concerning the PIT-tag detectors and other matters, amendments calling for the 1996 installation of juvenile PIT-tag detectors at John Day and Bonneville were proposed as a revised Section 5.7B.2 (and then renumbered as a new Section 5.2B.(2) in Option 2, Adaptive Management Introduction, and as a new Section 5.7B.3 in Option 5, Salmon Funding (which is not really about salmon funding; part of the John Day drawdown proposal recommended by NRDC et al./Idaho Rivers). A proposed revision of Section.6.1B.6 derived from a PNUCC recommendation calls for the installation, if feasible, of adult fish PIT-tag detectors in adult passage facilities at mainstem dams as soon as possible.

Findings: The recommendation was adopted, for reasons given in connection with IDFG's John Day recommendation (5-10). The Council calls in Section 5.4C for the Corps to operate John Day at minimum operating pool in 1995, conditioned on full, prior mitigation to affected reservoir water users. The Council also adopted the recommendation to evaluate operation at spillway crest. The PIT-tag recommendations are discussed elsewhere; see Sections 5.0F.9 and 5.0F.10 (revising and renumbering Section 5.7B from the original program) and Sections 5.0F.13, 5.0F.14 and 6.1B.6 and in findings relevant to those sections.

Program Section(s): 5.6A, 5.6B (John Day drawdown/McNary, Wanapum, Priest Rapids)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: In the middle of CRITFC's recommendations concerning structural improvements to bypass systems, CRITFC also calls for the Corps to immediately draw down John Day reservoir to minimum irrigation pool and investigate modifications to achieve spillway crest drawdown and dam breaching. By 1997 the Corps is also to investigate drawdowns to spillway crest and dam breaching at McNary. And in the section on Priest Rapids and Wanapum, either the Corps or the Grant County PUD (it is unclear which) is to investigate drawdowns, particularly at Wanapum pool.

Draft: With regard to the John Day drawdown recommendation, the approach taken in the draft amendments, and the comments, are summarized above in connection with the IDFG's John Day recommendation (5-10). No proposed amendment discussed a natural river/dam breaching alternative for John Day. An evaluation by 1997 of McNary to spillway crest could be found in Option 2, Evaluate McNary Drawdown to MOP, and Option 4, McNary Drawdown Evaluation. The Option 4 amendment also called for an evaluation of McNary to natural river elevation. A 1997 evaluation of Wanapum to spillway crest evaluation was in Option 4, Wanapum Drawdown Evaluation. No proposed amendment referred to Priest Rapids.

Findings: The John Day recommendation was adopted, for reasons given in connection with IDFG's recommendation (5-10).. The Council calls for the Corps to operate John Day at minimum operating pool in 1995, conditioned on full, prior mitigation to affected reservoir water users. The Council also adopted the recommendation to evaluate operation at spillway crest. No measure specifically calls for an evaluation of operating John Day at natural river level or for an evaluation of drawdowns at McNary, Priest Rapids or Wanapum. Instead, Section 5.4D.4 calls for an evaluation by 1996 of all the Columbia Basin water storage and hydropower facilities to determine the availability of additional velocity improvements.

Program Section(s): 5.6A (John Day drawdown)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 5.6A to reflect (a) information from SCS Phase I draft report and Recovery Team indicating that proposed operation at minimum operating pool is not likely to produce a

significant benefit for fish relative to impacts, and (b) admonition from Senate Appropriations Committee for Corps and Council to coordinate review of plans in light of this information.

Draft: The recommendation was reflected in Option 1, Drawdown.

Findings: The Council considered the information proffered by the Corps, but found that operating John Day at minimum operating pool would protect, mitigate and enhance fish and wildlife, and otherwise satisfy the requirements of Sections 4(h)(5), (6) and (7) of the Northwest Power Act. The Council's reasoning is given in connection with findings on IDFG's John Day recommendation (5-10), above.

Program Section(s): 5.6B (additional storage)
Source: PNUCC
Recommendation No.: 5-1
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: PNUCC recommended revising Section 5.6B.1 to state that evaluation of new storage sites should continue, based on storage site appraisals already completed. The Corps similarly recommended that the Council revise Section 5.6B to reflect the information in Appendix C to the Corps' SCS Phase I draft report regarding the potential for new Snake storage.

Draft: PNUCC's recommendation was reflected in Option 1, Additional Flow and Storage.

Comments: The Bureau of Reclamation said of the three possible new storage sites they have identified, Galloway, Upper Rosevear Gulch and Jacobsen Gulch, the Galloway dam analysis done by the Corps in 1980 needs only to be updated, while the other two will require full blown feasibility studies. The Bureau asked the Council to provide a sense of priority. The Washington Department of Fish and Wildlife commented that the Bureau should proceed with planning, design and environmental law compliance for additional upper Snake River storage, including the potential Galloway storage project for salmon and steelhead flow augmentation.

Findings: The Council accepted these recommendations, revised and renumbered as Section 5.2E, except that the Council did not limit evaluation to already completed appraisals. Further work may be needed to evaluate particular sites. The cost-effectiveness analysis done for the Council by the Environmental Defense Fund shows the Galloway project to be more cost-effective than other storage sites, but with limited potential to help meet flow objectives. Other storage sites need also to be investigated as options, but all projects should be evaluated in order of their cost-effectiveness.

Program Section(s): 5.6C (additional water measures)
Source: Regional Services Inc.
Recommendation No.: 5-7

Recommendation: BPA, the Corps, the Bureau and "other parties" are to "secure" (a) at least 3 million acre feet of water above the amount provided in 1994 "from storage projects sited in the upper Snake and tributaries above Hells Canyon Dam," and (b) at least 5 million acre feet above 1994 amount "from storage projects sited in the upper Columbia River and tributaries above Chief Joseph Dam." The FOEC, in consultation with NMFS, FWS and "other parties," is to "determine the best uses for the additional water storage" called for here, including but not limited to "improving conditions for juvenile and/or adult salmon migration and mitigating impacts on resident fish and wildlife resources." The measure itself does not set a target date, but explanatory material added to the introductory text to Section 5 calls for implementation between 1996 and 2024.

Draft: The recommendation was not included in the draft.

Finding: The Council rejected the recommendation because the adopted recommendations are more effectively protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). There could be significant advantages to changing patterns of water use (see Environmental Defense Fund report), and the Council has called for the use of structural and nonstructural methods, whichever are more cost-effective, to be used to supply flow augmentation water from the Snake River and other basins. However, reports by Hydrosphere and Bookman-Edmonston Engineers showed that there are significant barriers to water transactions, conservation and other nonstructural alternatives, which make it unlikely that changes of the kind recommended in this recommendation are realistic. Instead, the Council calls for a combination of flow and velocity improvements to achieve mainstem objectives. In particular, drawdown could obviate the need for large-scale changes in water use patterns that are the subject of this recommendation.

Program Section(s): 5.6D (flow augmentation and timing through flood control evaluations and river system investigations)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: CRITFC recommended that the Council call for the evaluation of the opportunity for additional flow augmentation made possible by re-establishing floodplains and taking other steps to move river system operations back toward “historical timing and duration.” The Council, in consultation with fishery agencies and tribes, should undertake a “basinwide comprehensive hydrologic, hydraulic geometry and biological analysis,” to determine “appropriate flow regimes with respect to duration and magnitude to reestablish critical mainstem and estuarine floodplain habitat.” “Aggressively explore relaxing flood control evaluations,” “implement shifting of reservoir release times to meet flood control elevations,” and “modify power sales contracts to move the river hydrograph back toward historical timing and duration.” Implement additional flow augmentation beyond the DFOP flows in 1996 based on this analysis.

Draft: The recommendation was included in Option 4, Mainstem & Estuarine Habitat Restoration.

Findings: The Council adopted the recommendation in Section 5.4D.2 in all respects but one. In view of the Council’s analysis and findings on the DFOP proposal (in the findings on recommendations to amend Section 5.3 of the original 1994 program) concerning the problems and impacts caused by trying to use flow augmentation to meet the DFOP flow targets, the Council could not find that calling for additional flow augmentation before knowing the results of the evaluation would assure the region of an adequate, efficient, economical and reliable power supply or protect upriver resident fish, 16 U.S.C. § 839b(h)(5), (7)(A).

SECTION 5.7: CONDUCT ADDITIONAL RESEARCH AND MONITORING⁴

Program Section(s): 5.7 (additional mainstem research)
Source: CRITFC
Recommendation No.: 5-2

⁴ **Note:** The provisions in this section of the original 1994 Fish and Wildlife Program have either been deleted or amended and then moved/renumbered as parts of Sections 5.0, 5.5, and 5.6 of the amended program.

Recommendation: The Corps and BPA should not fund any mainstem research without the consensus agreement of fish agencies and tribes. Beginning in 1995, BPA is to fund: (1) CRITFC and member tribes to develop passive monitoring technologies, including tributary video monitoring, and; (2) fishery agencies and tribes in “comprehensive scale analysis research to determine and monitor critical stock characteristics such as time and size at saltwater entry.”

Draft: No amendments were proposed that specifically prevent BPA and Corps from funding mainstem research or that directly call for comprehensive scale analysis research. Proposed revisions to Section 4.3C.1 call for the Fishery Managers to develop and submit to the Council by the end of 1994 a “proposal for the use of video counting technology for population monitoring at mainstem dams and at tributary dams and weirs.” Appendix D, Proposed Amendment No. 64, proposes to revise Section 6.1B.5 as requested by the Corps to call for a 1997 feasibility analysis of video monitoring, while CRITFC wanted the Corps to report by 1995.

Findings: The Council agrees that the fishery managers are by expertise and authority essential participants in research activities. Requiring consensus of all fishery managers, however, would authorize a veto of research to which a single agency objects. Research activities should be pursued regardless of whether they threaten the interests or assumptions of management agencies. Creating a minority veto of this kind could make independent research under this program impossible. The Council rejected this recommendation because the adopted measures more effectively protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). The recommendation concerning video monitoring is addressed in the program and findings on Sections 4.3C and 6.1B.5. No specific measure calls for the comprehensive scale analysis recommended. Instead Section 5.0 describes a mainstem experimental program linked to the mainstem hypotheses that has as part of its purpose increasing our understanding of the natural survival processes relating to in-river survival, which should include the study of “critical stock characteristics such as time and size of saltwater entry.” The Council has not specified the technical design of the overall experiment or its many elements, calling instead for the technical aspects of the experiment to be developed under the aegis of the Independent Scientific Group. A comprehensive scale analysis such as recommended here should be considered for inclusion as part of the study.

Program Section(s): 5.7A.1, 5.7A.2 (flow, velocity and salmon survival)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Delete Sections 5.7A.1 and 5.7A.2 because these measures have been completed. Section 5.7A.1 called for an independent evaluation of information and analysis of the river velocity/survival relationship, and Section 5.7A.2 directed the Council to review and possibly amend the program to state the Council’s position on that issue.

Draft: No proposed amendment reflects that the evaluation called for in Section 5.7A.1 has been completed. With regard to Section 5.7A.2, the Council’s flow/survival hypothesis rulemaking is not yet final, as noted and built into Option 2, Adaptive Management Introduction.

Findings: The Council adopted the recommendation in the course of the Mainstem Hypotheses amendment process.

Program Section(s): 5.7A (flow/velocity/survival research)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-9

Recommendation: Delete Section 5.7A. Section 5.7A.1 called for the independent evaluation of information and analysis of the river velocity/survival relationship. Section 5.7A.2 directed the Council to review and possibly amend the program to state the Council's position on that issue.

Draft: Not deleted in the draft. No proposed amendment reflects that the evaluation called for in Section 5.7A.1 has been completed. With regard to Section 5.7A.2, the Council's flow/survival hypothesis rulemaking is not yet final, as noted and built into Option 2, Adaptive Management Introduction.

Findings: The Council adopted the recommendation in the course of the Mainstem Hypotheses amendment process.

Program Section(s): 5.7A.3 (flow, velocity and salmon survival)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Minor revisions to Section 5.7A.3 to call for continued funding of additional independent scientific evaluations of the flow/velocity/travel time/survival relationship. PNUCC would add express directions for the evaluations, by stating that they "should include: (1) obtaining accurate survival data through the Columbia River system and; (2) determining whether there is a correlation between flow and water velocity and enhanced survival."

Findings: Not proposed in the draft, but the Council calls for continued funding of independent scientific evaluations of these relationships in Section 5.0, Mainstem Passage Experimental Program.

Program Section(s): 5.7B (PIT tags)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise to reflect that Corps is funding design and construction at John Day; BPA is funding design at Bonneville and Corps is funding construction.

Draft: No changes were made to reflect this split in funding responsibility.

Findings: The Council did not change the language of the program as recommended because the measure referred to a number of different projects with different funding arrangements. The Council understands that the Corps is funding design at John Day and Bonneville dams, and is funding construction at John Day, and supports these activities.

Program Section(s): 5.7B (PIT tags)
Source: Natural Resources Defense Council, et al.
Recommendation No.: 5-4

Recommendation: Corps to install PIT-tag detectors at John Day and Bonneville by March 1996; Fish Passage Center to develop, Corps/NMFS to implement, monitoring program to assess whether John Day MOP operation reduces juvenile travel time and predation.

Draft: Option 5, Salmon Funding addressed the recommendation.

Findings: The Council adopted the recommendation in the Mainstem Hypotheses amendment process, Sections 5.0F.9 and 5.0F.10, except that the Council called for this work to be coordinated through a technical group under the Independent Scientific Group. For reasons explained in connection with CRITFC's monitoring and evaluation recommendation (see the findings on Section 3.(2)), the Council finds that in this respect the adopted measure is a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): 5.7C.1 (gas supersaturation study)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 5.7C.1 to reflect (a) that the gas study is to include evaluation of effects of supersaturation on salmon passing through reservoirs, and (b) the Corps is studying and considering projects to reduce gas supersaturation, including revised spill patterns, modified flip-lips and modified spill gates.

[Note: A number of recommendations contain gas study measures as part of spill programs; these have been summarized and responded to at the spill sections, 5.8A.11 and .12.]

Draft: Draft Section 5.7C.1 called for a dissolved gas study that incorporated the Corps' concerns and others. Draft Section 5.7C.2 called for the installation of various gas abatement project modifications and monitoring equipment on mainstem federal projects (some as prototypes, some as permanent changes), not just a study as recommended by the Corps. Draft Section 5.7C.3, reflecting the recommendations of CRITFC especially, called for further development of gas abatement and monitoring systems, further development of the gas spill model, and additional funding for fish agencies and tribes in their efforts to monitor and evaluate gas data.

There were a number of proposed amendments concerning gas abatement and monitoring in the mainstem options, often mixed-in with spill or bypass measures:

- Options 1 and 2, Bypass System: Derived from a PNUCC recommendation, this called for a new Section 5.7E that includes an independent study of, among other things, the feasibility of using spill in conjunction with bypass without violating state water quality standards.
- Option 2, Adaptive Management Introduction, along with Option 2, Spill, outlined a set of gas abatement and monitoring measures in conjunction with spill, FPE and bypass measures. These included a general call for structural changes in the hydro projects to lessen the gas problems with spill. These proposed Option 2 amendments also called for spill to achieve 80 percent FPE, managed

“in close cooperation with [NMFS] to ensure appropriate responses to monitoring information for gas bubble trauma.” and “within the total dissolved gas guidelines established by state water quality agencies.” Option 2, Spill, also called for an exceptions process: “Exceptions to the state standards should be approved by the states on a showing, by [NMFS] and state and tribal fishery managers that the risk of fish mortality from exposure to higher levels of dissolved gas is less than the risk of failure to provide the spill regime that may result in such levels.” Option 3, Spill, repeated the Option 2, Spill, proposal.

- Option 4, Summer Spill, repeated the language from Options 2 and 3, Spill, with two differences: First, Option 4, Summer Spill, included CRITFC’s recommendation for spill to 80 percent FPE in spring and 90 percent FPE in summer. Second, the Option 4 amendment did not include the call for a state exceptions process. Given the logic of the options, this was probably an oversight. CRITFC called for “controlled spill” as outlined in the DFOP and 1994 agency and tribal spill rationale.
- Option 4, Bypass, based on CRITFC’s recommendation, called for gas abatement structures at Rocky Reach, Rock Island and Wanapum dams.
- Option 5 provided a slightly different set of spill/gas measures, based on the NRDC/Idaho Rivers recommendations. Option 5, Spill, called for spill to 80 percent FPE for all juvenile migrants, to be managed “in close cooperation with the Fish Passage Center to ensure appropriate response to monitoring results . . . for gas bubble trauma. “Gas-bubble monitoring shall be considered along with data on temperature, exposure time, passage conditions, and comparative risks of other means of dam passage. The objective shall be to minimize harmful effects of gas-bubble trauma on adults and juveniles without increasing relative risk(s) in dam passage.” Option 5, Gas Supersaturation, called for the installation by April 1995 of prototype spillway gate baffles at Lower Granite to improve spill efficiency, control gas supersaturation and increase FPE, installing these at all the other mainstem dams on an “expedited schedule.” Prototype surface-collection systems were to be installed by April 1995 at Lower Granite and The Dalles and everywhere else on an expedited schedule, and these were explained as also intended to improve spill efficiency, control gas supersaturation and increase FPE.

Findings: The Corps’ recommendation was adopted as part of broader provisions regarding gas supersaturation adopted (and renumbered) in Section 5.6C and 5.6E, discussed below. The Council believes it is important to address gas supersaturation expeditiously.

Program Section(s): 5.7C.1 (gas supersaturation)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Revise Section 5.7C.1 to state expressly that the gas supersaturation study “should focus on the relationship between spill level at each federal project, gas supersaturation level, and symptoms of gas supersaturation in juvenile and adult salmon and other aquatic species.” Section 5.7C.1 does not state who will do the study (only that BPA will fund it); PNUCC recommends that the study shall be directed by the “National Marine Fisheries Service Seattle Laboratory Director for the Northwest Fisheries Science Center.”

Draft: See above discussion on gas abatement measures. The gas supersaturation study in the proposed revision of Section 5.7C.1 incorporated PNUCC's research concerns. The study was to be funded by BPA and NMFS, but Section 5.7C.1, even as revised for the draft, did not state who will actually do the study.

Findings: The recommendation was adopted as part of the broader provisions regarding gas supersaturation. The Council did not adopt the recommendation to specify who should carry out the study. Because Bonneville and, especially, NMFS are better suited to select the implementer, the Council finds that the adopted measure is in this respect a more effective way to protect, mitigate and enhance fish and wildlife, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): New 5.7E (additional research and monitoring/bypass evaluation)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Fund an independent evaluation of current bypass technology in terms of FGE, FPE, and survival; compare data to Council standards; evaluate "feasibility of using spill in conjunction with mechanical passage measures without violating the states' water quality standards for gas supersaturation."

Draft: The recommendation was addressed in Options 1 and 2, Bypass System. Other proposed amendments that concern gas abatement, standards and monitoring have been discussed above, in the discussion of the recommendation from the Corps for revisions to Section 5.7C.1. Other spill and bypass measures are discussed below.

Findings: The Council adopted the recommendation.

SECTION 5.8: COMPLETE INSTALLATION OF BYPASS SCREENS⁵

Program Section(s): 5.8A (improve passage facilities)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: With regard to turbines, no deviations from operating turbines "within 1 percent peak turbine efficiency criteria" without coordination with tribes and fishery agencies. No deviations during peak migration periods. By 1996, the Corps is to "complete the extant turbine index testing program by testing and outfitting all turbine units with electronic 3-D cams which are capable of instantaneous adjustments." The recommendation was accompanied by a detailed discussion, with references, supporting the biological value of such operations (see pp. 21-27 of the recommendation).

⁵ **Note:** This section of the original 1994 Fish and Wildlife Program -- concerning bypass systems and spill -- has been renumbered Section 5.6 in the amended program. The provision concerning gas supersaturation problems associated with spill that was in Section 5.7C.1 in the original 1994 program has been expanded into various provisions in Sections 5.6C and 5.6E.

Draft: Options 2 through 4, Turbine Operation called on BPA and the Corps to operate within 1 percent peak efficiency from April through August, “and especially during peak migration periods,” and to “[p]lan and coordinate deviations from the one percent peak efficiency criterion with the fishery agencies and tribes.” This proposed amendment also called on the Corps and BPA to complete the turbine index testing program by 1996, although the proposed amendment did not specifically mention the electronic 3-D cams.

Comments: The Corps stated that all turbine units are currently operated at 1 percent peaking efficiency and that no new action is needed. They suggest that an additional measure should be included for modifications of turbines to make them more “fish friendly” and point out that Congress has provided the Department of Energy with funds to investigate this potential.

Douglas County PUD opposed recommendations to operate turbines to 1 percent of peak efficiencies; Kaplan adjustable blade propeller turbines are designed to provide for optimum relative velocity of water approaching the blade; literature indicates high survival rates across a broad range of operations; no data show that turbine efficiency changes of a few percent have a measurable change in fish survival. Limiting turbine operation to peak efficiency flow levels during high flows means increasing spill at a time when high dissolved gas levels may be toxic to adults and juveniles, and wastes a source of efficient, economical and reliable energy. Chelan PUD opposed the recommendation because of the weak scientific basis for presuming such operational limits will improve survival; increase in startups and shutdowns required when operating in this range may be more detrimental to fish.

Findings: The Council adopted the recommendation at Section 5.6D. While the mid-Columbia PUDs disputed the benefits of the recommended operation, given the information in the record in support of this recommendation, and giving due weight to the expertise, authorities and legal rights of the tribes and fish and wildlife agencies, the Council concluded that adopting the recommended measure would protect, mitigate and enhance fish and wildlife and otherwise satisfy the requirements of Sections 4(h)(5-7) of the Act. Sections 5.6A.13, 5.6A.14 and 5.6D.1 call for or allow the Corps and others to complete the turbine index testing program and to make any changes to the turbines or their operation that would facilitate operations at 1 percent peak efficiency should be made. This includes, without specific mention, the installation of electronic 3-D cams where appropriate, which the Council recognizes is already a high priority of both the Corps and CBFWA.

Program Section(s): 5.8A (improve passage facilities)
Source: ODFW
Recommendation No.: 5-8

Recommendation: Operate turbine units within 1 percent of peak operating efficiency during entire migration period; identify ways to improve efficiency of existing turbines; develop and test new turbine designs to improve operational efficiency and fish survival.

Draft: As noted above, Options 2 through 4, Turbine Operation call on BPA and the Corps to operate within 1 percent peak efficiency from April through August, “and especially during peak migration periods,” and to “[p]lan and coordinate deviations from the one percent peak efficiency criterion with the fishery agencies and tribes.” This recommendation also calls on the Corps and BPA to complete the turbine index testing program by 1996. In the general Section 5 amendments, a proposed new Section 5.8A.15, while mostly derived from a Corps recommendation, is also relevant to ODFW’s recommendation on turbine efficiency

improvements. It calls on the Corps and others to conduct studies and prototype testing “to develop an improved understanding of the mechanisms of fish mortality in turbines,” and then use this information to “develop biological design criteria to be used in advanced turbine designs or modified unit operations to increase fish survival,” reporting results by 2001. Based on these efforts the Corps and others are to replace, rehabilitate or modify turbine operations.

Findings: The Council adopted the recommendation (as part of the renumbered Section 5.6) for the reasons cited in the above recommendation.

Program Section(s): 5.8 (evaluation of turbine efficiency)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 5.8 to reflect Appendix F to SCS Phase I draft report, evaluating turbine replacement with more efficient units to improve juvenile migration survival.

Draft: Proposed Section 5.8A.15, derived from this Corps recommendation (although without the reference to the SCS report), called on the Corps and others to conduct studies and prototype testing “to develop an improved understanding of the mechanisms of fish mortality in turbines,” and then use this information to “develop biological design criteria to be used in advanced turbine designs or modified unit operations to increase fish survival,” reporting results by 2001. Based on these efforts the Corps and others are to replace, rehabilitate or modify turbine operations.

Findings: The Council adopted the recommendation at Section 5.6A.14.

Program Section(s): 5.8, 5.8A.1, 5.8A.3, 5.8A.11 (complete installation of bypass screens/improve Lower Columbia and Snake River passage)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Edit Section 5.8 in a variety of ways to re-focus the bypass program toward surface collection systems. Change the name of Section 5.8 to Complete Installation of Bypass “Systems” (not “Screens”), and edit the introductory text at three places to note the Council’s interest in the evaluation and installation of surface collection systems. Amend Section 5.8A.1 to call for use of a 90 percent FGE standard as a design criteria for turbine intake screens “and surface collectors,” unless demonstrated to the Council that the standard cannot be achieved based on hydraulic model studies or prototype “powerhouse collection systems” (not “screens”). Add to Section 5.8A.3 to ensure a 98 percent or greater survival rate from the deflector screens “or surface collection entrances” to bypass system outfall. Add a paragraph to Section 5.8A.11 calling for an investigation of the use of surface collection systems at all federal mainstem projects, including an FGE comparison between surface collection systems and existing intake screen designs.

Draft: Option 1, Surface Collection, was generally responsive to this recommendation, while adding a more specific measure deferring consideration of screens at The Dalles if a surface bypass system is prototyped. This proposed amendment was repeated in Options 2 and 3. Also, a general call to compare

screens to surface bypass systems was included in the general Section 5 amendments as a revised Section 5.8A.5.

Note that Option 1, Public Utility District Bypass, also called for surface bypass system prototype testing at Rocky Reach, Wanapum and Priest Rapids, with installation of the surface bypass system rather than screens if successful. This proposed amendment was repeated in Option 2, titled Mid-Columbia Dam Passage.

Comments: There was widespread support for development and testing of surface bypass systems, discussed below in connection with ODFW's bypass recommendation (5-8).

Findings: The Council adopted the recommendation in the various measures of Section 5.6A.

Program Section(s): 5.8A (improve Lower Snake and Columbia River passage)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: The Corps recommended three pages of changes to Section 5.8A, summarized here together:

Section 5.8A: Revise where appropriate to reflect the PIES program.

Section 5.8A.1: Revise to reflect the development of the Fish Passage Plan (FPP) in coordination with the fish agencies and tribes and BPA. The FPP will be implemented, evaluated and revised as specified in the FPP, as operational circumstances warrant, or as required through ESA consultation with NMFS. Revise also to reflect that 90 percent FGE for all species may not be achievable with screens, that Corps should evaluate surface collection systems, and that it might be wise to delay extended-length screen program.

Section 5.8A.2: Section 5.8A.2 calls for installation of juvenile bypass system at The Dalles by March 1998. Revise to reflect that while this is still the schedule, and the Corps is on a path to complete designs for a screened bypass system and award construction contracts by October 1995, this schedule may conflict with Congressional language directing Corps to evaluate effectiveness of screened bypass system versus surface collection system and test prototype surface collection system in 1996. Similar studies may also be conducted at Ice Harbor, which could also alter its installation schedule.

Section 5.8A.3: Revise to reflect greater than 99 percent survival in Lower Granite, Little Goose and Lower Monumental collection facilities in 1993; also that Corps is developing alternative bypass outfall release strategies, including possible use of short-haul barging, as discussed in SCS Phase I draft, Appendix F.

Section 5.8A.5: Revise extended-length screen schedule to call for complete installation at McNary and Lower Granite by December 1996 (instead of March 1995 and March 1996), at Little Goose by May 1996 (instead of March 1996), and at John Day by March 2002 (instead of March 1998), as stated in Appendix F to SCS Phase I Report; schedules may be delayed or eliminated to pursue testing and possible implementation of surface collection systems.

Section 5.8A.7: Delete because work called for -- installation of fish guidance improvements at Bonneville II -- has been completed.

Section 5.8A.8: Revise to reflect that FGE evaluation at Bonneville I has been included in SCS Phase I draft report, Appendix F; rehabilitation of old generating units is on schedule for contract award in late 1994, first turbine work in early 1997, and completion in 2002, all dependent on Congressional funding.

Section 5.8A.10: Revise to reflect Lower Granite juvenile fish facility modification information in SCS Phase I draft report, Appendix E. Corps is coordinating with NMFS on installation of new separator and flume at Lower Granite; completion date not set but will not be March 1996, as currently called for here.

Section 5.8A.11: Delete reference to Lower Monumental - with installation and operation of juvenile bypass facility, voluntary spill is no longer needed. Revise to reflect that Ice Harbor spill is no longer in accordance with Spill Agreement but is governed instead by NMFS biological opinion.

Section 5.8A.13: Revise to state: "Explore promising new approaches to fish bypass technologies, including surface collection, surface spill, or other behavioral devices to guide fish." If results "indicate high efficiency at costs less than screen or other bypass modifications, and show no reason to preclude use of a new technique, propose to the Council incorporation into bypass strategies."

Section 5.8A.14: Revise to reflect cancellation of December 1992 sluiceway pilot study at Ice Harbor since fishery managers did not provide test fish; no studies planned.

Draft: The proposed amendments picked up a number of items that the Corps recommended, though not all. As noted above, Option 1, Surface Collection, was generally responsive to the recommendation to begin the development, testing and installation of surface bypass systems. It also added the specific language about deferring screens at The Dalles while a surface system is tested, with final installation of a juvenile bypass system by 2000. This proposed amendment was repeated in Options 2 and 3.

Option 1, Spill, deleted the direct reference in Section 5.8A.11 to spill at Lower Monumental and added that spill is to be provided in conformance with the Spill Agreement or the NMFS 1994-98 biological opinion.

Option 2, Bypass, revised Section 5.8A.3 to call for the Corps to increase survival in passage by, among other things, relocating bypass outfalls, particularly at Bonneville, and/or by modifying project operations to reduce predation. The same proposed amendment to Section 5.8A.3 was included in the general amendments to Section 5, while a general call to compare screens to surface bypass systems was included in the general Section 5 amendments as a revised Section 5.8A.5.

In the proposed general Section 5 amendments, Section 5.8A.14, concerning the sluiceway study at Ice Harbor, was proposed for deletion.

Appendix D contained a number of the Corps' recommended changes in text to reflect recent developments or changes in dates for completing work or reporting studies, including Proposed Amendments No. 119 (deletions and revisions to Section 5.8A.7 to reflect development of fish guidance improvements at Bonneville, with an added call for continued improvements, especially for subyearling chinook, and revisions to Section 5.8A.8, calling for rehabilitation of old generating units at Bonneville by 2002, with annual reports on

attempts to improve fish passage conditions); Proposed Amendment No. 120 (revise Section 5.8A.10 to call for Lower Granite fish separator and flume by 1999); and Proposed Amendment No. 122 (changes in Section 5.8A.5 schedule for extended length screens).

Findings: The Council largely adopted the recommendations in Section 5.6, with two exceptions: (1) The Council did not make the recommended date changes; and (2) the Council rejected the recommendation to lower the 90 percent fish guidance efficiency (FGE) design criterion. The Council understands that this criterion may not be achievable with screens in all conditions for all species, but retaining it as an objective and attempting to achieve it is still desirable. Both aspects of the rejection are based on the Council's finding that they would be a less effective way to protect, mitigate and enhance fish and wildlife, 16 USC § 839b(h)(7)(C).

Program Section(s): 5.8A (Lower Columbia and Snake bypass facilities)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: Short-term elements in a passage improvement program for the federal dams in the lower Columbia and Snake: Beginning in 1995, the Corps is not to operate Bonneville Powerhouse II during juvenile migration "unless desired by the fishery agencies and tribes for adult passage or other temporary operations." By 1996 the Corps, with fishery agencies and tribal consultation, is to complete structural analysis of all mainstem fishways. Provide for immediate structural corrections and point and non-point pollution source correction where needed. Evaluate impact of juvenile bypass systems on adult fall back.

Long-term elements: By 1996 the Corps is also to secure funding for a "PIES II Program" for the following projects, with fishery agency and tribal consultation and approval for each item:

(a) Bonneville Dam: By 1996 investigate systems to run both powerhouses independently; implement by 1998; by 1997 install a prototype juvenile surface flow bypass system at Powerhouse I and a dissolved gas abatement structure at spillway.

(b) The Dalles: By 1997 modify to provide independent operation of turbine units closest to spillway from others to "increase flow net and spill efficiency; by 1998 install prototype surface flow bypass system.

(c) John Day: By 1997 install spillway deflectors; modify juvenile mechanical bypass system, especially collection channel and outfall; by 1998 install prototype surface flow bypass system.

(d) McNary: By 1995 complete evaluation of and modify mechanical bypass system.

(e) Ice Harbor: By 1997 install spillway deflectors; by 1998 install a prototype surface flow system; cease investigation and construction of mechanical bypass system.

(f) Lower Monumental and Little Goose: Immediately complete comprehensive evaluation of mechanical bypass system.

(g) Lower Granite: Minimize operation of current mechanical bypass system.

Draft: The recommendation to discontinue operations of Bonneville Powerhouse II during juvenile migration was not proposed.

Second, a proposed new Section 6.1G called for a structural evaluation by 1996 of all mainstem fishways, making any needed immediate corrections and eliminating point and non-point pollution sources "correctable by minor structural modifications." This amendment, by its location and title, was only relevant to adult fishways, not to the juvenile bypass systems. The proposed new Section 6.1G also included the call for a "comprehensive evaluation of the impact of juvenile bypass systems on adults that fallback through them."

All of CRITFC's long-term elements could be found in Option 4, Bypass, or in the gas abatement structural measures called for in the proposed new Sections 5.7C.2 and 5.7C.3 (in the general Section 5 amendments).

Findings: The Council adopted the recommendation in Sections 5.6A, 5.6E and 6.1G, except with respect to the recommendation to shut down the Bonneville second powerhouse to alleviate problems with the outfall. The cost of shutting down the powerhouse would be very high -- the Council staff estimated the cost in the mid 1980s as at least \$8 million -- while improvements in the bypass outfall may very well cost less and would allow the system to take advantage of the relatively high fish guidance efficiencies experienced as the second powerhouse at certain times of the year. Thus instead of this aspect of the recommendation, the Council adopted measures to relocate the outfall (see Section 5.6A.(3), and to develop a surface collection system, which the Council finds would be less costly ways to achieve the biological objective of reducing smolt mortality associated with the outfall of the Bonneville second powerhouse, 16 USC §§ 839b(h)(6)(C), (7)(B).

Program Section(s): 5.8A (Lower Columbia and Snake bypass facilities)
Source: ODFW
Recommendation No.: 5-8

Recommendation: Two different recommendations from ODFW: First, by 1997 design and test a vertical slot (Wells-type) bypass system on Snake and Columbia rivers. Second, “if site-specific prototype tests prove successful,” install extended-length screens at all Snake and Columbia projects.

Draft: Surface bypass system design and testing were called for in various places. Option 1, Surface Collection, was generally responsive to this recommendation, while also adding a specific measure deferring consideration of screens at The Dalles if a surface bypass system is prototyped. This proposed amendment was repeated in Options 2 and 3. Option 4, Bypass, presented a different version of the same idea. Also, a general call to compare screens to surface bypass systems was included in the general Section 5 amendments as a revised Section 5.8A.5. In addition, Option 1, Public Utility District Bypass, also called for surface bypass system prototype testing at Rocky Reach, Wanapum and Priest Rapids, with installation of the surface bypass system rather than screens if successful. This proposed amendment was repeated in Option 2, although with the slightly different title, Mid-Columbia Dam Passage.

With regard to the second half of ODFW’s recommendation, a proposed revision to Section 5.8A.5 (in the general Section 5 amendments) called on the Corps to continue prototype testing of extended length screens and to install them “if more effective than surface bypass systems.” Note also that the Corps has called for changes in the Section 5.8A.5 schedule for extended length screens, in Appendix D, Proposed Amendment No. 122.

Comments: The concept, testing and development of surface bypass systems garnered wide support, including from CBFWA, Washington Department of Fish and Wildlife, ODFW, Idaho, City of Irrigon, Corps of Engineers, PNUCC, John Harville, PNGC, Columbia River Alliance and many others.

The Corps of Engineers said it is implementing “an expedited and comprehensive plan to investigate the surface bypass concept” at the Corps dams in the lower Snake and Columbia, including pilot studies at Ice Harbor and The Dalles in 1995. One impact would be slipping the construction plan two years for the juvenile bypass and screen system at The Dalles. Chelan County PUD reported that it has tested turbine intake screens at Rocky Reach, and has determined they are ineffective; it is now testing a surface collection system and will install it if and when prototype tests show it to be effective.

IDFG supported the expedited design, testing and implementation of surface collectors, as long as they are not used in connection with transportation; these facilities should be designed to work in connection with lower reservoirs.

Findings: The Council adopted the recommendations in Section 5.6.

Program Section(s): 5.8A.11, 5.8A.12, 5.7C (Lower Columbia and Snake bypass systems/spill/standard)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: CRITFC recommended that in consultation and with concurrence of fishery agencies and tribes, the Corps is to establish bypass system performance standards by 1995. If the standards cannot be met, spill to meet 80 percent FPE for spring migrants and 90 percent FPE for summer migrants. Before 1995 migration season evaluate all bypass systems for impacts on salmon and Pacific lamprey, including impingement and descaling.

Implement “controlled spill” immediately at all mainstem dams, as outlined in DFOP and “1994 agency and tribe spring and summer spill rationale.” For entire migration of early released (March) hatchery salmon, provide spill to achieve an 80 percent FPE.

With regard to gas supersaturation problems associated with spill, the Corps is to fund “an extensive hydroacoustic monitoring system across the entire length of each dam to monitor smolt movement and to improve the timing, duration and volume of spill with the goal of improving spill efficiency and limiting total dissolved gas.” The Corps is also to fund (1) an “extensive dissolved gas monitoring system” to identify “the physical aspects of the gas plumes” in the water column; (2) state and tribal water quality monitoring and evaluation and backup monitoring equipment ready for immediate use; and (3) additional development of “existing gas spill model” with a goal of being able to accurately predict “on a real time basis” gas levels under different river and spill conditions. And, immediately implement operational and structural measures to reduce TDG elevations caused by turbine discharges and install “gas abatement structures” at all projects by 1997.

Draft: Option 4, Summer Spill, called for spill to meet an 80 percent (spring)/90 percent (summer) standard beginning on April 15 at the Snake projects and May 1 at the Columbia. There is no reference in the draft rule to spill for March release of hatchery fish.

The draft did not include a general call for a 1995 evaluation of all bypass systems, and nothing called specifically for a review of bypass system impacts on lamprey or for an analysis of impingement and descaling. On the other hand, a number of the specific bypass measures in Option 4, Bypass, called for 1995 evaluations (e.g., at McNary, Lower Monumental and Little Goose) and for other on-going evaluations and surface bypass design and testing.

The gas abatement structures, hydroacoustic monitoring system, and other gas monitoring and evaluation recommendations can be found in proposed new Sections 5.7C.2 and 5.7C.3 (in the general Section 5 amendments).

Comments: As will be noted below, ODFW, IDFG and the various environmental groups all recommended an 80 percent FPE bypass/spill standard, although only CRITFC raised the standard to 90 percent for summer migrants.

In comments, Idaho supported spill to achieve 80 percent FPE, and stated that dissolved gas standards should be developed by the fish managers and then submitted to water quality agencies. Idaho attached to its comments a number of documents relative to the spill and TDG issues: (1) “Scientific Rationale for Implementing a Summer Spill Program to Increase Juvenile Salmonid Survival in the Snake and Columbia

Rivers,” by CRITFC, IDFG, ODFW, USFWS, WDFW (July 15, 1994); (2) a critical analysis in a letter by Backman of CRITFC of a draft of NMFS’ dissolved gas panel report (July 1, 1994); (3) the FPC’s June 22, 1994 system request for June and July flow and spill; (4) a June 13, 1994, letter from Michele DeHart of the FPC to Ed Chaney of NRIC rebutting the CRA and Weitkamp criticisms of the 1994 emergency spill program; (5) DeHart’s June 7, 1994 memo on “1994 dissolved gas levels and gas bubble symptom observations”; and (6) FPC’s 1993 “Dissolved Gas review and 1993 summary.”

CBFWA supported the spill recommendations of CRITFC, Idaho, and ODFW, including CRITFC’s call for a 90 percent FPE bypass/spill standard for summer migrants, but only as a long-term objective. Washington Department of Fish and Wildlife endorsed the CBFWA position on spills and gas abatement. Save Our Wild Salmon emphasized spill to pass fish over each dam along the migration route, and for investigation of improved spill methods.

In a discussion of the 1994 emergency spill program, Columbia River Inter-Tribal Fish Commission noted that concerns about spill and the effects on fish of high gas levels should have been “eased” “by the results of an unprecedented monitoring program which failed to find a single fish that died of gas bubble trauma.” The reference to the “unprecedented monitoring program” is contrary to the statements by others that one of the biggest problems with the 1994 spill program was the lack of an effective monitoring program. However, these other comment appear to mean the lack of a program for monitoring the benefits of the spill to juvenile survival. CRITFC also expressed exasperation that “the only state water quality standards for which there has been any concerted call for compliance appear to be those relating to dissolved gas.” In contrast, the Corps responded to the smolt kill at McNary by saying that it was not unusual to see thermal mortality at McNary.

William Stelle, the Regional Director of NMFS, urged the Council to use spill, with a cap based on dissolved nitrogen levels.

On the other hand, the DSIs said that the 1994 spill program was a vast experiment at massive expense with unknowable results. The Council should not be promoting flow options that require variances from the existing 110 percent TDG standard, and the Council ought to call for independent scientists, not NMFS and the fishery managers, to make any case for variances from water quality standards.

BPA supported a moderate spill program as an interim measure to improve fish passage conditions pending installation of adequate bypass. BPA stated that empirical data on the contribution of spill to increased system survival are lacking, because most studies of the impact of spill on fish survival were conducted 20 years ago or more and the incremental benefit of spill to system survival today is probably less than when past studies were conducted. For salmonid species, according to BPA, total dissolved gas levels of up to 120 percent are reasonable and provide a balance between the risk of detrimental effects of gas on fish survival vs. turbine passage and associated mortality. BPA called for accelerated research on the impact of spill on fish, including improved monitoring for internal signs of gas bubble disease, perhaps through the use of ultrasound.

John Harville, member of the NMFS Recovery Team but speaking for himself, said that he is uneasy at placing high reliance on spill, given gas bubble uncertainties. Chelan County PUD said that at many projects, spill is ineffective in passing fish; the benefits may be minimal while the detrimental effects of gas supersaturation could pose severe problems for adults ascending fishways as they are particularly susceptible to gas bubble disease. Chelan also stated that more conclusive tests of the effects of flip-lips or other gas abatement structures on survival of juvenile fish are needed before installation of additional structures at

Columbia and Snake dams. PNGC and PNUCC urged the Council to call for spill at Ice Harbor, John Day, and the Dalles consistent with the 1989 spill memorandum of agreement (incorporated in the Salmon Strategy); spill should not be conducted that would exceed total dissolved gas (TDG) standards.

Oregon DEQ said that total dissolved gas (TDG) standards are violated most of the time at higher levels of spill; water quality standards must be met, and mitigation measures to reduce dissolved gas should be carried out as soon as possible.

The Corps of Engineers suggested that studies be continued to determine the best option for reducing nitrogen supersaturation before complete installation of spillway deflectors. The Corps recommended caution in the installation of deflectors since there remain unanswered questions about the effect on adults. Also, NMFS' spillway data showed a higher mortality during passage through a deflector bay than through a non-deflector bay; although not statistically significant it raises questions. The Corps suggested that action be deferred until the Gas Abatement Study, currently underway, is completed, since this study "may achieve more significant results by looking at more comprehensive modifications. Preliminary tests may occur at Ice Harbor and Lower Granite in 1995, with a prototype test at Lower Granite in 1996." The Corps recommended that the Council include the monitoring plan being developed by the Expert Panel on Dissolved Gas sponsored by NMFS, rather than developing another one. Corps also noted that in several instances 80 percent FPE will not be attainable at all projects within TDG guidelines.

Douglas County PUD questioned the recommendation for summer spill to 90 percent FPE; the proposal did not consider possible adverse effects of nitrogen supersaturation resulting from such "tremendous spill levels"; and would have a "substantial impact to the region's ability to meet electrical demand."

Findings: The Council adopted the recommended spill objectives to achieve 80 percent fish passage efficiency in spring and summer migration periods consistent with state water quality standards, with exceptions from state water quality standards to be sought by fish managers. See Sections 5.6A, 5.6C and 5.6E. The benefits of spill, apart from gas supersaturation, are well documented. Analysis showed that the 90 percent passage efficiency summer standard recommended only by CRITFC was unachievable consistent with such water quality standards, while the 80 percent passage efficiency standard in spring and summer was consistent with the recommendations of other fish and wildlife agencies. Accordingly, the Council concluded that 80 percent efficiency was a more effective way to protect, mitigate and enhance fish and wildlife, 16 USC § 839b(h)(7)(C). The Council endorses spill as a means of passage only until better means are available for passage juvenile migrants past the dams. As commenters noted, spill is a costly measure and the Council hopes its use can be minimized by perfecting mechanical or other less costly means of bypass.

Regarding impacts of bypass systems on lamprey, Section 7.5F.1 already calls for a report on research needs for lamprey passage.

With regard to gas supersaturation problems, the Council adopted the recommendation regarding monitoring and evaluation, including a hydroacoustic monitoring network and continued development of the existing gas spill model to allow accurate predictions. See Section 5.6E.

Regarding a 1995 evaluation of bypass systems, the Council adopted measures for such evaluations at specific projects (John Day, Lower Monumental and Little Goose). Such evaluations also will be conducted in association with tests of surface collection systems at Lower Granite, The Dalles and Bonneville, and in

connection with extended length screen development at McNary and Little Goose, authorized in other sections of the program.

Program Section(s): 5.8A.11, 5.8A.12, 5.7C (spill/gas abatement measures)
Source: ODFW
Recommendation No.: 5-8

Recommendation: ODFW's spill and gas abatement measures were similar to the recommendations of CRITFC, with some specifics unique to ODFW: Provide spill to achieve 80 percent FPE at each Snake project from April 15 to July 31 "within guidelines of the state's water quality agencies," and provide spill at each Columbia project May 1 to August 31 "as specified in the 1994 DFOP." Also, install "as expeditiously as possible" flip-lips at Lower Granite, Little Goose and Lower Monumental (two outer bays), Ice Harbor (all bays), McNary (four outer bays), John Day and The Dalles (all bays) and Bonneville (two outer bays). Design and test spillway/stilling basin modifications to further reduce dissolved gas levels, and design and test structural and fish behavioral methods to increase efficiency of spillways and spill.

Draft: Options 2 and 3, Spill, provided for spill to achieve an 80 percent FPE at both Snake projects (April 15 to July 31) and Columbia projects (May 1 to August 31) (Option 5, Spill, is similar but not specific in dates.) For the Snake these reflect ODFW's recommendation. With regard to the gas measures, see Options 2 and 3, Spill, and the proposed new Section 5.7C.2 (in the general Section 5 amendments).

Findings: The Council adopted the recommendation for spill to achieve the recommended fish passage efficiency objectives subject to state water quality standards. The Council also adopted the recommendation for gas abatement structures; flip lips; tests of spillway/stilling basin modifications, and other structural and behavioral methods to increase the efficiency of spillways and spill. See the discussion of the spill recommendations and comments in the findings on CRITFC's recommendation above.

Program Section(s): 5.8A.11, 5.8A.12, 5.7C (spill/gas abatement measures)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-11

Recommendation: Idaho's spill and gas abatement recommendations resembled those of CRITFC and ODFW: Implement a spill program to achieve 80 percent FPE through all projects for both yearling and subyearling migrants, consistent with dissolved gas measures also recommended. Dissolved gas level concerns are based on out-of-date research and do not reflect actual in-river conditions, so fishery managers should develop a spill management and monitoring program to provide safe passage conditions for juveniles and adults; this program will provide the basis for all spill operations. The Corps is to monitor fish conditions for signs of gas bubble trauma in coordination with the Fish Passage Center and in accordance with the spill management and monitoring program. The Corps is to consult with fishery managers to determine whether spill should be reduced due to dissolved gas levels.

To operate projects more efficiently, reduce turbine passage and reduce supersaturation, by April 15, 1996: (1) all turbines must operate at 1 percent of peak efficiency; (2) no unscreened units or units with inoperable screens may operate during migration season (March 1 to December 31); (3) install flip lips where they do not now exist; including Ice Harbor by January 1996; (4) the Ice Harbor bypass system must be completed by January 1996; and (5) investigate new spillway, tainter gate and stilling basin designs to prevent increasing dissolved gas levels. BPA to fund spill management and monitoring program; monitoring will include gas supersaturation and its effects on salmon and steelhead passing through dam turbines, collection and

bypass systems, spillways, adult ladders, and other mechanisms, “particularly in connection with mainstem reservoir drawdowns.”

Draft: The various spill and gas amendments (and proposals to operate turbines at 1 percent of peak efficiency) were noted in connection with recommendations above. Idaho’s recommendation was covered in Option 3, Spill and Turbine Operation, and proposed new Section 5.7C.2 (in general Section 5 amendments).

Findings: The Council adopted the recommendation, as described above.

Program Section(s): 5.8A.11, 5.8A.12, 5.7C (spill/gas abatement measures)
Source: Natural Resources Defense Council, et al.; Idaho Rivers United
Recommendation No.: 5-4, 5-6

Recommendation: NRDC’s recommendation corresponded to those of the tribes and agencies: The Corps should provide spill to attain 80 percent FPE for all juvenile migrants. The Fish Passage Center is to develop, and Corps is to implement, a monitoring program for ambient supersaturation levels, symptoms of gas bubble trauma, and systemwide gas and other effects of spill. The Corps should manage spill in close cooperation with the Fish Passage Center to ensure appropriate responses to monitoring information. “Gas-bubble” data is to be considered along with data on temperature, exposure time, passage conditions, and comparative risks of other means of passage. The objective is to minimize harmful effects of gas-bubble trauma on adults and juveniles without increasing relative risks in dam passage.

By April 1995 the Corps should design and install prototype surface-oriented collectors at The Dalles and Lower Granite, and prototype baffles on the spillway gates at Lower Granite, and operate and monitor them to improve spill efficiency, control nitrogen supersaturation and increase FPE. Prototype devices at Lower Granite must be able to operate at near spillway crest. The Corps is to initiate planning for expedited installation of these at all mainstem dams based on 1995 and 1996 monitoring results. Also, the Corps is to complete installation of flip lips and other devices to control supersaturation at all mainstem dams on an expedited schedule, and to test prototypes of “other experimental devices” on an expedited schedule.

Draft: Option 5, Spill (Options 2 and 3, Spill, are similar), and proposed new Section 5.7C.2 addressed this recommendation.

Findings: The Council adopted the recommendation, for the reasons discussed above. However, the Council endorses spill as a means of passage only until better means are available for passage of juvenile migrants past the dams.

Program Section(s): 5.8B (Mid-Columbia passage)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: By 1996, the Mid-Columbia PUDs, with fishery agencies and tribal consultation, should complete structural analysis of all mainstem fishways. Provide for immediate structural corrections and point and non-point pollution source correction where needed.

CRITFC also recommended a number of actions at the Mid-Columbia projects as part of the proposed PIES II program funded by the Corps, with consultation and item approval by fishery agencies and tribes:

(a) Rocky Reach: By 1995 install prototype surface flow system; immediately investigate installation of a sluiceway at units 1-4; repair/modify spillway so “spillbays closest to turbine units can operate”; by 1996 install dissolved gas abatement structures (Chelan County PUD, Sections 5.8B.4, 5.8B.6).

(b) Rock Island: Cease current screen program; avoid operation of powerhouse I; investigate systems to alleviate dissolved gas (Chelan County PUD, Sections 5.8B.5, 5.8B.6).

(c) Priest Rapids and Wanapum: By 1996 install prototype surface flow system; investigate and if feasible install spillway deflectors or other systems to alleviate dissolved gas, particularly at Wanapum (Grant County PUD, Sections 5.8B.7 to 5.8B.10).

Draft: Option 4, Bypass, and proposed new Section 6.1G reflected this recommendation.

Comments: At Rocky Reach, Chelan reported that it has tested turbine intake screens and determined they are ineffective. It is testing a surface collection system and will install it if and when prototype tests show it to be effective. Chelan also stated that CRITFC’s recommendation for changes in spillway operations are not supported by studies they cite. At Rock Island, Chelan will conduct prototype testing of a juvenile fish screening and bypass system by 1995. The testing plan is being done with the blessing of the Rock Island Coordinating Committee of which CRITFC is a member, according to Chelan, and therefore it is inconsistent for CRITFC to propose that screen development cease while endorsing the plan of the committee.

Findings: The Council adopted the recommendation (in a renumbered Section 5.6B), except with regard to Rock Island Dam. At Rock Island, a prototype test is called for in the FERC settlement agreement that CRITFC helped negotiate, and the test is scheduled for 1995. Once the test is conducted, all parties will be in a better position to evaluate whether the screening program should be abandoned. In the meantime, the PUD says that it is already avoiding operation of the first powerhouse. The Council suggests that the Rock Island Coordinating Committee would be the best forum to discuss these issues initially. The Council rejects this aspect of the recommendation on the ground that it would be a less effective way to protect, mitigate and enhance fish and wildlife than the program measure, 16 USC § 839b(h)(7)(C).

Program Section(s): 5.8B.4 (complete installation of bypass screens/Rocky Reach)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: Delete end of last sentence in Section 5.8B.4, which calls for Chelan County PUD to evaluate and install as an alternative a bypass system “similar to the surface water downstream passage sluiceways at The Dalles and Ice Harbor dams: PNUCC intends this change to leave Chelan free to consider some sort of Wells-type surface collection system as an alternative.

Draft: The recommendation was addressed in Option 1, Public Utility District Bypass, and Option 2, Mid-Columbia Dam Passage.

Findings: The Council adopted this recommendation (in a section renumbered 5.6B.3).

Program Section(s): New 5.8B.11 (complete installation of bypass screens/
Grant County PUD)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: New Section 5.8B.11 calls for Grant County PUD to explore “promising new approaches to fish bypass technology, including the use of surface collection systems.” If research results “indicate high efficiency” compared to screen modifications and show no reason to preclude use of a new technique, use surface collection instead of turbine intake screens.

Draft: The recommendation was addressed in Option 1, Public Utility District Bypass, and Option 2, Mid-Columbia Dam Passage.

Findings: The Council adopted this recommendation, at Section 5.6B.10.

SECTION 5.9: REDUCE PREDATION⁶

Program Section(s): 5.9 (reduce predation)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: PNUCC recommended significant and lengthy additions to the predation section, including a change in the title of Section 5.9 (and thus a partial shift in focus) to Reduce Predation “and Competition.” The changes are highlighted by recommended edits to the introductory text, and in the substantive measures. The section in the 1994 program began by noting that hydropower development has resulted in a favorable environment for salmon predators. PNUCC recommended revising this to state that “[h]ydropower development, introduction of non-native species, development of some hatchery programs, and greatly increased numbers of seals and seal lions as a result of protection of the Marine Mammals Act, have resulted in an increase in the adverse effects of predation and competition on salmon.” PNUCC also proposed a new sentence at the end of the first paragraph, after the discussion of predation conditions, that noted that the introduction of non-native species and “certain hatchery management practices” have led to increased competition for weak runs. Proposed substantive changes encompassed performance standards and substantive measures for squawfish, shad, other non-native fishes, steelhead, trout, birds, and marine mammals.

Draft: Option 1, Predation and Competition reflected the recommendation. Option 2, Predation and Competition, proposed a scaled-down version of the same.

Comments: PNUCC urged the Council to follow the NMFS Recovery Team recommendations, which this recommendation reflected. The Douglas County PUD and PNGC supported the recommendation. Chelan County PUD supported increased predator control for fish, birds and mammals; but did not believe the predator program should get bogged down in a great deal of unnecessary research.

⁶ **Note:** This section of the original 1994 Fish and Wildlife Program -- concerning predation -- has been renumbered Section 5.7 in the amended program.

The Corps of Engineers said that predation control should continue as long as research shows that it is increasing survival to adult returns; competition and predation, especially from introduced species and marine mammals, are major factors affecting survival of some stocks. The Corps supported additional studies to gather scientific information on predation and competition but believed that some problems are so severe that they warranted immediate management action. They also supported the use of volitional releases at hatcheries to lessen the impact of massive outmigrations of hatchery fish on wild fish. The Corps suggested that prior to eliminating shad above Bonneville we needed to understand the ecology of the shad and the implications for other species of its elimination.

Idaho Department of Fish and Game said it is unaware of evidence that reducing predation by 50 percent is feasible (PNUCC's recommendation). In 1993, the squawfish program fell far short of this level.

Finding: The Council adopted the recommendation, renumbered as Section 5.7. In response to Idaho Fish and Game's comment, the Council intends the 50 percent reduction in squawfish consumption as an objective. It is a high target, but monitoring and evaluation should tell us whether this is possible.

Program Section(s): 5.9A.1, 5.9B.1 (squawfish performance standard/control actions)
Source: ODFW
Recommendation No.: 5-8

Recommendation: Revise to call for harvest of predator-sized squawfish to achieve an exploitation goal of 10-20 percent; evaluate biological effectiveness; continue to explore different technologies to remove squawfish and increase efficiency of existing technologies.

Draft: Not addressed in a proposed amendment. Option 1, Predation and Competition, and its reduced counterpart in Option 2, included measures for evaluating the effectiveness of the squawfish program and for exploring new and better methods for squawfish removal. Both called for a reduction in the squawfish population "greater than 20 percent," which was more than ODFW called for.

Finding: The Council amended the program to call for more than a 20 percent reduction in the squawfish population, Section 5.7A.1, an increase from the prior program, and the ancillary or indirect measurement of exploitation rates, Section 5.7B.3. The Council intends the 50 percent reduction in squawfish consumption as an objective. It is a high target, but monitoring and evaluation should tell us whether this is possible. If achievable, a 50 percent reduction should be more effective protection, mitigation and enhancement of fish and wildlife than ODFW's recommendation, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): 5.9B (bypass system release sites)
Source: ODFW
Recommendation No.: 5-8

Recommendation: Revise to call for testing and installation of bypass outfall structures that allow for release in different locations, re-location of bypass outfalls to areas of lower predation, and implementation of project operations that reduce predation below bypass outfalls.

Draft: This recommendation was reflected in three places in the draft rule -- in Option 2, Predation and Competition, as part of a revised Section 5.9B; in Option 2, Bypass, as a proposed revision to Section 5.8A.3; and in proposed revisions to Section 5.8A.3 in the general Section 5 amendments. In comments, the Corps of Engineers said that moving bypass outfalls to avoid predators is probably not a long-term solution as predators are likely to respond to shifts in location of the prey base. The Corps suggested the use of short-haul transportation and alternate release strategies rather than moving bypass outfalls.

Finding: The Council adopted the recommendation in Section 5.6A.3, calling both for general consideration of relocating bypass outfalls and specifically for the relocation by 1998 of the outfall at Bonneville Dam. Whether or not this is an effective strategy will be addressed in testing and evaluation.

SECTION 5.10: TRANSPORTATION⁷

Program Section(s): 5.10 (transportation)
Source: CRITFC, ODFW, Natural Resources Defense Council, et al.; Idaho Rivers United
Recommendation No.: 5-2, 5-8, 5-4, 5-6

Recommendation: CRITFC recommended ceasing all transportation of juvenile salmonids. ODFW agreed, adding: "Modify transport and other facilities to allow full-flow bypass and off-line juvenile sampling." NRDC and Idaho Rivers also recommending ceasing the transportation of juvenile salmonids, adding that the fish agencies and tribes may call for transportation "on a one-time basis due to special river conditions beyond human control."

Draft: Option 4, Transportation, was based on CRITFC's recommendation, and thus generally reflected ODFW's as well, although the proposed amendment did not include the additional language from ODFW noted above. Option 5, Transportation, was based on the NRDC/Idaho Rivers recommendation.

Comments:

Some commenters were broadly supportive of the recommendation to end transportation, including CRITFC and the Save Our Wild Salmon coalition.

Others said that transportation is a necessary, but temporary, expedient. Washington Department of Fish and Wildlife commented that notwithstanding the fact that Snake River runs have continued to decline in spite of the transportation of the majority of outmigrating smolts in most years, transportation improvements should be pursued and evaluated as a potential component of a long-term strategy. Fishery managers should devise an experimental program limited to Lower Granite and Little Goose dams: tagged fish should be released for inriver migration as well as transport survival; provide for higher levels of transportation under low-flow conditions; and highest priority for marking and evaluation should be given to studies aimed at analyzing adult returns. In the short-term, transportation of summer migrants should continue under guidelines proposed by fishery managers; experimental in-river releases should be allowed to develop comparative

⁷ Note: This section of the original 1994 Fish and Wildlife Program -- concerning transportation -- has been renumbered Section 5.8 in the amended program.

survival information against transported summer migrants. These experiments may have to rely primarily on Lyons Ferry hatchery production.

Idaho Fish and Game urged the Council to emphasize in-river migration over transportation, which should be used only as a last resort. IDFG said that the CRITFC recommendation, included in Option 4, is too rigid in calling for a complete ban. Whether to use transportation should be decided by fish managers, and Option 2's spread-the-risk approach is a good policy. IDFG also said that the Corps should immediately install a fish separator at Lower Granite; otherwise, the proposed transportation improvements will not yield meaningful improvements in smolt survival. Idaho also provided a significant amount of documentation and references on what it believes is the best available science on transportation. CBFWA commented that the fish managers should decide when to stop transportation, with the long term objective of complete elimination of transportation. CBFWA provided extensive comments on transportation research and reports to justify its scientific position on transportation and to rebut the arguments of those favoring transportation, discussing the behavioral, physiological and genetic impacts of transportation; the relationship to fish disease; homing impairment; impacts from holding fish; and the flaws inherent in the design and conduct of much transportation research. The Shoshone-Bannock Tribes said that transportation of salmon should be used only as a temporary measure until the dams are fixed.

William Stelle, Regional Director of NMFS, said that NMFS supports continued transportation and an evaluation of transportation survival. The UCUTs disagreed with the CRITFC/CBFWA opinion on transportation, saying that transportation is useful under low flow conditions; may be prudent to reduce use of transportation in normal or high flow years.

Other commenters were broadly supportive of the transportation program, e.g., Columbia County, Oregon, Commissioner Dale Heimuller, Port of Portland and City of Irrigon. BPA fully supported transportation as part of an overall salmon recovery effort, on the grounds that, in BPA's view, research shows transported fish nearly always return at a higher rate than inriver migrants. BPA also commented that the regional debate over juvenile fish transportation may dictate some spread-the-risk efforts, but it is imperative that we first evaluate the possible adverse effects associated with "spreading the risk," particularly given the biological information on the benefits of transportation. PNUCC urged maximum transportation, while incorporating the results of on-going research, stating that the use of transportation was recommended by the Snake River Recovery Team and the Mundy 1994 peer review. PNUCC also urged the following improvements in the transportation program: make collection more efficient; acquire new barges to facilitate direct loading; test new release strategies and sites; and develop improved exit portals from barges to reduce stress and predation. PNGC's comments were similar, as were comments of the Columbia River Alliance, which also urged installation of a juvenile salmon collector at Lower Granite Dam. The CRA stated that share-the-risk practices for increased inriver passage should be used only in average to near-average water conditions.

The DSIs contended that the best available science overwhelmingly favors continued reliance on transportation to improve survival of migrating juvenile salmon. The DSIs supported operational measures that maximize the use of transportation at all flow levels. Reducing passage mortality to the natural juvenile migration mortality level -- which may well be achieved through the transportation program alone -- would discharge the Council's job of offsetting mortality arising from the mainstem projects. Chelan County PUD said that research shows that barging still needs improvement to reduce the effects of stress and to improve survival from release to ocean. Chelan recommended reduced loading densities; intensified efforts to separate chinook from steelhead; experimentation with alternative release strategies; and intensified evaluation of transportation versus in-river migration through the lower river. Chelan did not support termination of

transportation from McNary because it has shown substantial benefit to subyearling chinook from the mid-Columbia and Hanford reach.

The Corps of Engineers favored continued use of transportation as described in Option 1, saying that there is no scientific evidence that would support leaving more fish in the river, as suggested by a spread the risk approach. "Minimizing transportation would be counterproductive to the Council's goal of doubling fish runs and the requirements placed on federal agencies under the Endangered Species Act (ESA)." According to the Corps, no data demonstrates adverse impacts from transportation in the areas of adult homing or selective mortality to certain populations; indeed, taking such a position would be in direct conflict with the data for steelhead, fall Chinook, and spring Chinook. "In contrast to the CBFWA report which correlated the decline in the Snake River with the reliance on transportation, it is entirely possible that the only reason there are Snake River stocks now is because of the transportation program." The Corps added that transportation should be maximized for all species until survival from in-river migration can be raised to a level above that provided by transportation; unless in-river survival can be elevated above transport survival for all species under all flow conditions, transport should continue for species where it provides higher survival; and transport cannot be stopped because it is a condition of the National Marine Fisheries Service's Biological Opinion for ESA-listed stocks.

With regard to proposed improvements in transportation, while the Corps supported the use of additional barges if needed, it said that such barges must be specifically designed for transporting fish and are not available for leasing. Additionally, the Corps stated that if there is no difference in truck survival vs. barge survival, the additional expense of increased barging cannot be justified. The Corps was equivocal about noise reduction, saying at one point that research has demonstrated that noise level reduction in barges is unnecessary, and at another point that "[f]urther investigation of noise reduction and alternate designs and construction materials is recommended for the SCS Phase II study."

Mark Reller, State of Montana representative, noted that the Council needs to consider whether the elimination of transportation might decrease the overall survival of steelhead.

Finding: In the mainstem hypotheses rulemaking process, the Council extensively reviewed the scientific and policy debate over the biological value of the juvenile transportation program. Section 5.0E, Mainstem Hypotheses, and the Response to Comments for this particular rulemaking, which contains the response to comments for the mainstem hypotheses rulemaking, explain in detail the Council's review of this issue. The Council agrees that transportation is not a substitute for changes in the river, and that transportation decisions should be made by the fish managers. However, in view of the ongoing scientific debate over the merits of transportation, and the differing views of the fish and wildlife managers shown in the comments, the Council does not conclude that transportation necessarily has no benefits. Rather, the Council believes that it would better complement the activities of the fish and wildlife agencies and Indian tribes by not attempting to resolve this debate as a matter of policy, and instead supporting a spread-the-risk evaluation of transportation versus in-river methods without impeding substantial improvements in in-river passage or transportation. The Council concluded that these measures are a more effective way to protect, mitigate and enhance fish and wildlife than the CRITFC, ODFW, NRDC and Idaho Rivers recommendations, 16 U.S.C. § 839b(h)(7)(C). Provisions adopted by the Council concerning the operation of the transportation program are discussed in the findings immediately below on IDFG's transportation recommendation (5-12), while provisions calling for improvements in the transportation program so long as it continues are discussed below in the findings on PNUCC's substantive recommendation (5-1).

Program Section(s): 5.10 (transportation)
Source: Idaho Department of Fish and Game
Recommendation No.: 5-12

Recommendation: Idaho presented a slightly different transportation recommendation, calling for the deletion of Section 5.10, including all subsections, replacing it with a limited transportation program that began by noting the significant uncertainties regarding the benefits of transportation and stating that the evidence indicates “current transportation methods may have a negative impact on stock fitness” and that 15 years of aggressive transportation has failed to halt decline. Transportation can neither substitute for good in-river conditions or effectively mitigate for bad. Thus, Council must emphasize in-river migration over transportation. The fishery managers, through the Fish Passage Advisory Committee, are best able to decide when and where to transport; transportation is to be based on in-season monitoring of flows and conducted in accordance with a Salmon Transportation Plan prepared annually by FPAC, in coordination with NMFS and Corps.

Idaho recommended a set of conditions to govern transportation: No transportation of yearling chinook migrants except in “emergency situations;” transportation of subyearling migrants may occur in Snake after subyearling migrants are 10 percent of daily total chinook collection at Lower Granite for three consecutive days; subyearling transportation not to occur in Columbia until subyearling migrants are 80 percent of daily total chinook collection at McNary for three consecutive days. Idaho also recommended immediate installation of a new separator at Lower Granite to separate juvenile salmon from juvenile steelhead to permit juvenile salmon to bypass transportation and continue in-river migration.

Draft: The recommendation was included in Option 3, Transportation.

Finding: The Council adopted the recommendation in substance, renumbered to Section 5.8, although not in every detail and not including the ban on yearling migrant transportation except in emergency conditions. The Council adopted changes that agree that transportation is not a substitute for changes in the river, and that transportation decisions should be made by the fish managers. The Council also adopted the proposed terms and conditions for subyearling migration, subject to consultation with NMFS, Section 5.8A.1. In view of the ongoing scientific debate over the merits of transportation, and the differing views of the fish and wildlife managers shown in the comments, the Council did not attempt to specify in every situation the terms and conditions under which transportation should occur, except to call for such decisions to be made in the context of a spread-the-risk evaluation of transportation versus in-river methods. The Council also called for NMFS to develop and ensure implementation of its own evaluation program. See Sections 5.0, 5.8A.2 to 5.8A.4. At the same time, the Council recognizes that an evaluation program has the potential for adversely affecting depressed fish populations through marking and handling stress. The Council calls for NMFS to minimize these impacts and to minimize the number of fish marked, especially in years in which the number of outmigrating fish is unusually low. A separator at Lower Granite Dam will not be necessary if drawdown is implemented. The Council believes that this approach as a whole best complements the activities of the fish and wildlife agencies and the tribes, and helps ensure that the best available scientific knowledge is brought to bear on this question. In these respects, the Council concluded that the adopted measures are a more effective way to protect, mitigate and enhance fish and wildlife than the recommendation, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): 5.10 (transportation)
Source: PNUCC

Recommendation No.: 5-1

Recommendation: PNUCC proposed amendments to much of Section 5.10, with the intent of improving and supporting the use of transportation in line with the recommendations of the NMFS Recovery Team. PNUCC also sought a different rhetorical stance by the Council. The position PNUCC would have the Council take is best highlighted in the changes PNUCC proposed to the introductory text to Section 5.10, which would have been altered greatly (compared to minor changes PNUCC recommended to implementing measures). PNUCC would have deleted all but the first paragraph and replaced it with three new ones, emphasizing that transportation in the near-term provides the best hope for listed species and weak-stock recovery; plays an important role in mix of techniques to decrease mortality, especially as an alternative to in-river migration in “deleterious” river conditions; and significantly increases survival over inriver migration in low flow years, despite efforts to enhance passage conditions.

PNUCC’s text revisions also stated that “the benefits for some species exposed to certain flow conditions remain unquantified;” benefits appear to vary widely among species, between collection points and in different passage conditions; steelhead and fall chinook (“at least in the Columbia”) seem to be benefit the most; “benefits for spring and summer chinook and sockeye are less clear;” and “most scientists who have examined the issue believe that transportation can increase fish survival under some conditions. For these reasons, “data are necessary to properly manage and implement transportation measures.”

Ultimately, however, PNUCC would emphasize that a “functional, comprehensive transportation program exists that has proven beneficial” to juvenile migrants. The Fish Transportation Oversight Team (FTOT), to be comprised of biologists from the Corps, NMFS and IDFG is to amend the existing program “to incorporate improvements based on peer reviewed scientific literature; in particular, the recommendations of the Snake River Salmon Recovery Team.” Monitor, review, and conduct an annual testing program to measure effectiveness of program and "modify if new data warrants.”

Draft: While Option 1 was based partly on PNUCC’s recommendation for continued transportation, it did not incorporate the recommendation for wholesale changes in the introductory text. The introductory text revisions in Option 2, Transportation, are intended to reflect the uncertainties with transportation, a spread-the-risk policy and an adaptive management experiment to evaluate transportation, and did not reflect PNUCC’s views. Comments on transportation were discussed in connection with the CRITFC, ODFW, NRDC recommendations, above. Note that the Corps commented that FTOT no longer exists, replaced by other management entities.

Finding: The Council rejected the recommendation. The Council concluded that the adopted recommendations better complement the existing and future activities of the fish and wildlife agencies and Indian tribes, 16 U.S.C. § 839b(h)(6)(A), better ensure that the best available scientific knowledge is brought to bear on this question, 16 U.S.C. § 839b(h)(6)(B), and accordingly will more effectively protect, mitigate and enhance fish and wildlife than this recommendation, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): 5.10A.1 to 5.10A.3, 5.10A.5, 5.10A.7 to 5.10A.10 (transportation)
Source: PNUCC
Recommendation No.: 5-1

Recommendation: PNUCC proposed amendments to eight of the twelve subsections to Section 5.10. The changes were not extensive, and are summarized here:

Section 5.10A.1: Revise Section 5.10A.1 to call for “FTOT” (not the “Fishery Managers”) to transport “during conditions when the available scientific evidence indicates that the transportation benefit ratio is 1:1 or greater” (more specific than present call to transport when scientific evidence indicates survival to adult will be greater with transportation than without).

Section 5.10A.2: Revise only to the extent that it will be “FTOT” not “Fishery Managers” that will provide test fish and participate in transportation evaluation.

Section 5.10A.3: Revise to add NMFS and delete tribes from the list of entities that comprise FTOT, and delete requirement that FTOT submit annual guidelines and report to FOEC (just to Council).

44

Section 5.10A.5: Delete last two sentences concerning coordination of transportation research with the Fish Passage Development and Evaluation Program and the call for a report to the Council in 1993 of an outline of transportation evaluation. Add a sentence to state that transportation evaluation “should include the testing of release strategies and locations” below Bonneville.

Section 5.10A.7: Revise this section to call for the Corps to fund transport expenses in accordance with provisions developed by “FTOT and the Snake River Recovery Team” (not “fish and wildlife agencies and the tribes”). Also add that the Corps is to “acquire additional barges immediately” to facilitate “direct loading to barges” from the bypass systems and “tests of transported smolt release strategies and locations.”

Section 5.10A.8: Add to the fall chinook transportation evaluation that the Corps should investigate “design changes to the barges’ exit portals to minimize smolt stress and predation during and after release.” State explicitly that the evaluation is to be used to modify and improve the transportation program.

Section 5.10A.9: Add to this list of actions to be taken to improve transportation facilities and operations: (a) an evaluation of the “usefulness of surface collection systems” for “safer transportation;” (b) an explicit statement that release operations should be improved by dispersing fish “at varied locations below Bonneville Dam and near the estuary;” and, (c) use survival rates through reservoirs and past dams to “determine whether collection from the dams or from a new facility at the head of Lower Granite Reservoir is the most effective path to follow.” The one-time call for a status report to the Council on transportation improvements is turned into an annual reporting requirement.

Section 5.10A.10: Revise to delete the use of the term “preliminary” to describe the evaluations called for in this section, and change the one-time report to an annual report. Also, delete most of the net pen evaluation language and revise to call for an evaluation of the feasibility and benefits of net pens “in conjunction with, or in lieu of, existing barges.”

Draft: Some of these recommendations were proposed in the draft amendments. The two transportation amendments in Option 1, both titled Transportation, called for an investigation of design changes in barge exits, an evaluation of the possibility and benefits of reducing noise in the barges, the acquisition of enough barges to allow for direct loading, a maximum holding time in the barges of 12 hours, and an evaluation of different smolt release strategies. Option 2, Adaptive Management Introduction, described the Council’s transportation hypothesis for experimental study and an outline of needed improvements in transportation.

Option 2, Transportation (two different amendments with this name) further described the nature of the controversy over transportation, the nature of the spread-the-risk transportation policy, and the various improvements needed in the transportation system, which were similar to or repeated from the Option 1 amendments. The remaining aspects of the recommendation were not proposed in the draft.

Finding: As the Corps pointed out in its comments, FTOT no longer exists, and so the first three recommendations are moot. Regarding the recommendation for an evaluation of the usefulness of surface collection systems for safer transportation, the Council adopted measures to develop surface bypass systems in Section 5.6 of the program. Sections 5.8A.5 to 5.8A.7 call for improved facilities and operations, and thereby covers many of PNUCC's concern and specific recommendations for improvement, while also respecting that the fish managers will make judgments regarding the extent to which surface bypass systems will be used for transportation. The recommendation to use survival rates through reservoirs and past dams to "determine whether collection from the dams or from a new facility at the head of Lower Granite Reservoir is the most effective path to follow," should be appropriately addressed by the spread-the-risk evaluation. The Council deleted the language in Section 5.8A.2 (former Section 5.10A.5) as recommended, and called for a spread-the-risk transportation evaluation. The program already includes measures to explore alternative release sites below Bonneville Dam, Section 5.8A.6. The Council adopted the recommendation to investigate design changes to barge exit portals, in the same section.

Regarding the suggested revision to former Section 5.10A.1 to call for transport "during conditions when the available scientific evidence indicates that the transportation benefit ratio is 1:1 or greater," the Council concluded that it would more effectively complement the activities of the fish and wildlife agencies and Indian tribes by leaving such transportation judgments to them, within the context of a spread-the-risk evaluation,

16 U.S.C. § 839b(h)(6)(A), (7)(B). The Council did not call for an expansion of the existing net pen provision, but did continue the current evaluation. Additional information will need to be obtained on this concept before widespread use is in order. Based on materials submitted in the FERC proceeding for the Priest Rapids project, it does not appear that more widespread use of net pen transportation complements the activities of the fish and wildlife agencies and Indian tribes, 16 U.S.C. § 839b(h)(6)(A), and so the existing measure is a more effective way to protect, mitigate and enhance fish and wildlife than the recommendation, 16 U.S.C. § 839b(h)(7)(C). The Council did not adopt the recommendation that the Corps "acquire additional barges immediately" to facilitate "direct loading to barges" from the bypass systems and "tests of transported smolt release strategies and locations." The spread-the-risk strategy should reduce the need for additional barges even with measures to decrease loading densities, and additional barges may not be needed. The Council called instead simply for the Corps to take whatever steps are needed to permit direct loading. In this respect, the adopted measure is less costly than the recommended measure, 16 U.S.C. § 839b(h)(6)(C), and therefore a more effective way to protect, mitigate and enhance fish and wildlife than the recommendation, 16 U.S.C. § 839b(h)(7)(C).

Program Section(s): 5.10 (transportation)
Source: Corps of Engineers
Recommendation No.: 5-1

Recommendation: The Corps recommended a number of minor changes to the transportation sections, which are summarized together here:

Sections 5.10A.2, 5.10A.5: Revise to encourage fishery managers to provide test fish for “research to establish current inriver survival and current transport survival levels.”

Section 5.10A.4: Revise to note that FTOT annual work plan process has been incorporated into Corps’ Fish Passage Plan and is now titled “Corps of Engineers Juvenile Fish Transportation Plan.”

Sections 5.10A.8 to 5.10A.10: Revise to reflect evaluations and schedules in SCS Phase I draft report concerning improvements in transportation facilities and operations, including new barges, barge chillers, reducing barge loading densities, shading holding raceways, dispersed release strategies, upstream juvenile fish collection facilities, use of net pens, etc. Call for final SCS Phase I report by scheduled date of October 1994. Call for 9 to 11 additional barges to achieve direct loading as recommended by Recovery Team and NMFS.

Section 5.10A.8: Revise to note that information indicates further evaluation of barge refrigeration should be a low priority. Also revise to note that Corps has evaluated use of barges for fall chinook, that trucking stress and mortality rates should be reevaluated, and to state that it is unreasonable to barge fall chinook unless trucking stress and mortality are found to be significantly higher than barging mortality.

Section 5.10A.10: Revise to call for further consideration of net pen and upstream collection concepts. Delete call for further consideration of pipelines and canals.

Draft: See analysis of PNUCC’s transportation recommendation above.

Finding: See analysis of PNUCC’s transportation recommendation above.

Program Section(s): 5.10A.10(2) (smolt transportation channel)
Source: Fish Passage, Inc.
Recommendation No.: 5-13

Recommendation: Boylan Pipeline. Section 5.10A.10(2) calls on the Corps to study the feasibility of an alternate stream channel or pipeline for smolt transport. Fish Passage, Inc. stated that it was not seeking to amend this section, but rather that a study of its proposed Boylan Pipeline would implement this measure.

Draft: Proposed revisions to Section 5.10A.10 called for expedited testing and evaluation of a pipeline idea. In comment, the Corps of Engineers, which has preliminarily evaluated the pipeline concept, stated that a submerged pipeline was not supported by scientific information.

Finding: The Council deleted the measure calling for evaluation of the pipeline concept, finding it to be unsupported by the best available scientific knowledge, 16 U.S.C. §§ 839b(h)(6)(B), (7)(B).

SECTION 6: ADULT SALMON MIGRATION

Program Section(s): 6 (introductory text)
Source: PNUCC

Recommendation No.: 6-1

Recommendation: The last sentence of the third paragraph of the introductory text to Section 6 states that reducing passage mortality “could increase significantly the number of adult salmon available for harvest and production.” PNUCC would alter this to say that reducing passage mortality “could increase significantly adult salmon escapement.”

Draft: This recommendation was incorporated into the draft by revising the sentence to state that reducing passage mortality could increase significantly the number of adult salmon available for “harvest and escapement.”

Finding: The Council adopted the recommendation.

Program Section(s): 6 (introductory text)
Source: PNUCC
Recommendation No.: 6-1

Recommendation: Evaluate the impact of marine mammal and harvest related injuries. PNUCC recommended adding a paragraph at the end of the introductory text to Section 6 stating: "Furthermore, the increase in marine mammal wounds observed in migrating adults requires evaluation to determine their contribution to adult loss between dams and their contribution to the incidence of disease at passage facilities. The incidence of harvest related injuries also needs to be evaluated to identify the relationship between harvest and adult loss between dams, and disease observed at passage facilities." PNUCC also recommended a substantive change to Section 6.1B.4, which this language reflected.

Draft: The draft did not propose this language in section 6, but addressed it in section 5.9.

Finding: The substance of this recommendation is addressed below, in connection with the recommendation for Section 6.1B.4.

Program Section(s): 6.1A.1 (mainstem operations and facilities/adult passage)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Study the effects of increased spill for juveniles on adult passage and develop methods for modifying adult passage facilities to compensate.

Draft: Proposed in the draft amendments as a new Section 6.1B.4.

Finding: The Council adopted the recommendation at Section 6.1B.4, changing only the implementing agency, from the Corps to NMFS.

Program Section(s): 6.1A.4 (mainstem operations and facilities/adult passage)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Section 6.1A.4 describes projects to upgrade adult passage facilities. Add to the list, from System Configuration Study (SCS), Phase I Draft Report: (1) additional ladders at Lower Granite and Little Goose; (2) increasing attraction water for fish ladder collection channels and entrances; (3) adult collection channel modifications at McNary; and (4) adult channel extensions at Lower Granite.

Draft: Proposed as additions to Section 6.1A.4.

Finding: The Council adopted the recommendation, and added a reference to the fish passage committee created in Section 5.3B.14.

Program Section(s): 6.1A.5 (mainstem operations and facilities/adult passage)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 6.1A.5 to delete the reference to “two additional” biologists to inspect juvenile and adult fishways. Inspections will be performed by lead and assistant biologist based at Lower Monumental and by other project staff.

Draft: Included as proposed revision to Section 6.1A.5.

Finding: The Council adopted the recommendation, and revised the measure to call for “an adequate number of trained staff.”

Program Section(s): 6.1A (mainstem operations and facilities/adult passage)
Source: Idaho Rivers United
Recommendation No.: 5-6

Recommendation: Ice Harbor adult trap and haul with drawdown. As a measure associated with its proposal for a spillway-crest drawdown of the four lower Snake reservoirs in 1995, Idaho Rivers proposed that by 1995 adults be trapped and transported from just below Ice Harbor to a release near Lewiston above Lower Granite Dam. The Corps would design and install the necessary facilities and conduct the trap and haul operation pursuant to protocols developed by the fishery agencies and tribes and in consultation and cooperation with those agencies and tribes.

Draft: The recommendation was included in Option 5, Trap & Haul Adult Migrants.

Finding: The Council addressed this recommendation in the findings in Section 5.5 responding to Idaho Rivers’ drawdown recommendation. As noted there, the Council concluded that the risks of adult transportation, or trap-and-haul, especially the important Tucannon run, outweigh the potential benefits of emergency drawdown. The fishery managers also did not support the trap-and-haul recommendation.

Program Section(s): 6.1A (mainstem operations and facilities/adult passage)
Source: ODFW
Recommendation No.: 5-8

Recommendation: To minimize delays in adult migration and to enhance survival of adults at projects and in reservoirs, ODFW recommended that (1) all fishways be operated according to criteria in DFOP; (2) all turbines be operated within 1 percent of peak operating efficiency during entire migration period; (3) eliminate power peaking and zero-flow operations; (4) operate spillways and turbines to enhance passage; (5) reduce fish ladder water temperatures; (6) install additional fish ladders; (7) install additional auxiliary water systems for attraction flow and improve entrances/exits of ladder systems.

Draft: This recommendation was included in Options 2 through 4, Turbine Operation and in proposed revisions to Section 6.1A.1, with two deviations. First, the proposed language called for fishways to be

operated according to “agreed-upon criteria,” not according to DFOP criteria. Second, the proposed amendment called for the Corps to “minimize” power peaking, not eliminate it.

Comments: CBFWA supported the ODFW recommendation. Comments concerning the 1 percent efficiency were summarized above, in the findings on this issue in Section 5.8. Douglas County PUD did not specifically oppose this recommendation, but it did oppose a CRITFC recommendation that would have established ramping rates for flow fluctuations and drastically restricted peaking capabilities, contending that recommendations such as these were not supported by data as to their benefits yet could severely impact load following capabilities.

Finding: The Council adopted almost all of this recommendation in either Sections 5.6D (1 percent peak efficiency; see the discussion in findings above under former Section 5.8) or 6.1A, retaining the two modifications from the draft. First, instead of calling for reference to DFOP criteria, the Council called in Sections 5.3B.14, 5.3B.15 and 6.1A.1 for a fish passage committee and existing technical groups to work with fishery managers and project operators to evaluate and develop agreed-upon passage standards and criteria. The DFOP criteria and the Corps’ Fish Passage criteria are virtually identical and extremely technical. The Council finds that it would be better for a group of technical experts to help the fish managers and project operators resolve the technical issues on operating criteria, and in this respect the Council did not adopt this recommendation, as a less effective way to protect, mitigate and enhance fish and wildlife, 16 USC § 839b(h)(7)(C). Second, with regard to peaking, the Council called for an evaluation of minimizing power peaking operations, rather than eliminating them. As the region’s power system is currently configured, eliminating hydropower peaking capability would have enormous impacts. The Council cannot approve such a measure now, and still assure the region an adequate, efficient, economical and reliable power supply, 16 USC § 839b(h)(5). However, an evaluation of this concept may lead to better understanding of constraints and opportunities for minimizing the effects of flow fluctuations on salmon. The Council rejected the recommendation to implement such rates now, because the Council could not adopt it and still assure the region an adequate, efficient, economical and reliable power supply.

Program Section(s): 6.1A (mainstem operations and facilities/adult passage)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: Reduce use of power peaking and establish appropriate ramping rates for daily flow fluctuations at mainstem Columbia and Snake River dams. No more than 10 percent reduction or increase in total flow per 24 hour period. Beneficial impacts on adult passage are one justification.

Draft: This recommendation was in the proposed revision to Section 6.1A.1 and in Option 4, Constraints on Flow Variation (as a proposed revision to Section 5.1D).

Finding: The Council addressed this recommendation above with regard to Section 6.1A.1 and in the findings for Section 5.1D.4 (ramping rates).

Program Section(s): 6.1A (mainstem operations and facilities/adult passage)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: Inspect and modify adult fishways to conform to criteria in DFOP. The Corps will fund the tribes and fishery agencies' "frequent independent inspection and monitoring of adult fishways." The Corps should fund CRITFC "to complete development of an automated counting system capable of real time monitoring of adult passage at all mainstem dams on a 24 hour basis."

Draft: The recommendation was incorporated in various proposed amendments. Proposed Section 6.1A.2 called for the Corps to complete by the end of 1996 an evaluation of all mainstem adult passage facilities and then to make facility improvements as necessary. (Proposed Section 6.1G called separately for the Corps and the Mid-Columbia PUDs to complete a structural analysis of all mainstem fishways by 1996 and to make any needed immediate corrections to structural elements such as diffuser gratings and orifices.). Proposed revisions to Section 6.1A.1 called for the Corps to operate fishways according to "agreed-upon criteria," although not according to DFOP criteria. Proposed revisions to Section 6.1A.5 called on the Corps to regularly inspect the adult and juvenile passage facilities on a frequent basis (and not for the Corps to fund the fish agencies and tribes to do this).

With regard to "an automated counting system" ("such as video counting" according to CRITFC's explanation attached to their recommendation), existing Section 6.1B.5 called for a feasibility study by the end of 1993 from the Corps and BPA on the use of video counting or other automatic counting systems at adult facilities. The Corps proposed to change the date for the report to 1997. Appendix D, Proposed Amendment No. 64 (CRITFC wanted a full evaluation by 1995 in another recommendation). On the other hand, a proposed addition to Section 4.3C.1 called for the fish managers to submit to the Council by the end of 1994 a "proposal for the use of video counting technology for population monitoring at mainstem dams and at tributary dams and weirs." CRITFC recommended passive monitoring systems wherever possible; in that light note also the proposed revision to Section 6.1B.6, based on a PNUCC recommendation, that called on BPA and the Corps to install if feasible adult PIT-tag detectors in adult passage facilities at all mainstem dams.

CBFWA supported CRITFC's automatic video counting recommendation. The Corps of Engineers did not, stating that the automatic video counting of adults as recommended and developed by CRITFC is not considered adequate by the Corps or WDFW to replace manual counting and that further development is needed.

Finding: The Council largely adopted this recommendation in Section 6.1A and 6.1B. As noted in the finding on ODFW's recommendation above, instead of calling for reference to DFOP criteria, the Council called for a fish passage committee and existing technical groups to work with fishery managers and project operators to develop criteria. The DFOP criteria and the Corps' Fish Passage criteria are virtually identical and extremely technical. The Council finds that it would be more effective for the fish passage committee and existing technical groups to help the fish managers and project operators to resolve these technical issues, 16 USC § 839b(h)(7)(C). The Council left the video counting evaluation measure essentially intact, Section 6.1B.5, because the evaluation the Council calls for in the program has not yet been submitted, and so the Council cannot yet determine whether such monitoring would be effective, 16 USC §§ 839b(h)(5), (7)(C). The Council notes, however that the Corps criticizes this technology while failing to conduct the evaluation to determine whether the technology would be effective. The Council encourages the Corps to submit the evaluation report as soon as possible.

Program Section(s): 6.1A, 6.1E (mainstem and Mid-Columbia adult passage facilities)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: CRITFC recommended a number of shorter-term and longer-term measures to improve the adult passage facilities and their operations. The short term measures: By 1996 the Corps and Mid-Columbia PUDs, with fishery agency and tribal consultation, will complete structural analysis of all adult fishways. Provide for immediate structural correction and point and non-point pollution source correction where needed. [This last recommendation apparently duplicated a recommendation made in another section of CRITFC's mainstem recommendations package: By 1995 the Corps should resolve all water quality problems at Portland District projects identified in PIES. At same time initiate a similar comprehensive review of passage facilities in Walla Walla District projects, correcting water quality problems by 1996.] Include in this analysis a comprehensive evaluation of impact of juvenile bypass systems on adult fall back.

As a long-term measure, the Corps is to secure funding for a "PIES II Program" which will provide funding for the following:

(a) Bonneville Dam: By 1997 correct all adult fishway modifications and improvements identified in PIES I.

(b) Lower Monumental, Little Goose, and Lower Granite: By 1995 complete modifications to lower adult fishway entrances to meet an 8 foot or greater depth criteria.

(c) Priest Rapids, Wanapum, Rock Island, Rocky Reach, and Wells: By 1996 (1995 at Priest Rapids), correct all adult fishway deficiencies, including additional pumps at Rock Island and hydraulic problems in junction pools at Wells and Rocky Reach.

Draft: With regard to the fishway analysis, see the proposed revisions to Section 6.1A.2 and proposed new Section 6.1G. For the long-term measures, a proposed addition to Section 6.1A.4 called on the Corps to complete adult fishway modifications and improvements at Bonneville by 1997. No proposed amendment called on the Corps to take precisely the action recommended at Lower Monumental and Little Goose, but a proposed addition to Section 6.1A.1 called on the Corps to operate all existing fishways according to criteria and to "improve entrances and exits of existing ladders," and a proposed addition to Section 6.1A.4 called on the Corps to "construct adult collection channel extensions at Lower Granite and Little Goose dams by 1998. The recommendations concerning the mid-Columbia dams are at Sections 6.1E.2, 6.1E.3, 6.1E.4, 6.1E.5.

Comments: Chelan County PUD said that proposed measures for adult fishways call for the correction of deficiencies at PUD dams that have not yet been defined; Chelan cites a NMFS report of adult passage which indicated successful passage at all PUD dams; nothing in the report recommends additional pumps at Rock Island Dam. Douglas County PUD said that recent adult passage studies in mid-Columbia indicate excellent adult passage conditions. The PUD cited a 1994 NMFS study soon to be finalized, which indicates no significant adult passage problems at Wells or other mid-Columbia projects. Douglas is unaware of any adult fishway deficiencies or hydraulic problems in the junction pools at Wells, and strongly objects to inclusion of proposals specific to Wells project not raised first with District through process stipulated in Wells Settlement Agreement.

Finding: The Council largely adopted the recommendation in Sections 6.1A, 6.1E and 6.1G, adding in connection with the Mid-Columbia projects that this work should be coordinated through the appropriate coordinating committees in the FERC settlement processes. The Council approved (in Section 6.1A.4) construction of adult collection channel extensions after a review of their need by a fish passage committee described in the program at Section 5.3B.14.

Program Section(s): 6.1B.4 (adult salmon research)
Source: PNUCC
Recommendation No.: 6-1

Recommendation: Existing Section 6.1B.4 directs the Corps, BPA and Fishery Managers to identify, address and report on the causes of interdam adult losses, “including those not caused by dams.” PNUCC would change the quoted language to say “including marine mammal wounds, injuries related to harvest, and other factors unrelated to dams.” This section asks for a report in January 1994; PNUCC would extend the reporting date for an unspecified time.

Draft: The draft did not propose this language in Section 6, but addressed it in Section 5.9. Section 6.1B.4, which calls for a study of the cause of adult losses between dams, was inadvertently omitted from the draft amendments.

Finding: The Council adopted this recommendation, in that Sections 5.7B.28, 5.7B.29, 5.7B.31 and 5.7B.32 call for investigation of marine mammal predation on salmon, the incidence of removal of salmon from fishing gear, and studies to validate causes of scarring and size and species preference. Section 6.1B.7 already calls for studies of fish diseases associated with passage facilities. Former Section 6.1B.4, concerning the evaluation of inter-dam losses, was restored in the final document as Section 6.1B.8. The Council agrees that the reporting date should be extended in accordance with the lower Columbia River adult passage studies.

Program Section(s): 6.1B.6 (adult salmon research/adult PIT-tag detectors)
Source: PNUCC
Recommendation No.: 6-1

Recommendation: Revise Section 6.1B.6 to state not that BPA will continue research and development of adult PIT-tag detectors, but instead that some unnamed entity or entities (the caption identifying Bonneville as the implementing entity is shown crossed-out) is to “[i]nstall” such detectors “as soon as technically feasible.”

Draft: The proposed revision to Section 6.1B.6 called on BPA and the Corps, based on the PNUCC recommendation, to install if feasible adult PIT-tag detectors in adult passage facilities at all mainstem dams as soon as possible.

Finding: The Council adopted the revision it proposed in its draft, at Section 6.1B.6. The Council calls for the National Marine Fisheries Service to be included as an implementer of this measure, and calls for its implementation “as soon as possible,” which in substance is the same as the recommended language. Section 5.0F.13 also calls for an evaluation of the merits of adult PIT-tag detectors.

Program Section(s): 6.1B.6 (adult salmon research/adult PIT-tag detectors)
Source: PNUCC
Recommendation No.: 6-1

Recommendation: PNUCC would delete the portion of Section 6.1B.6 stating that research on adult PIT-tag detectors should include “consideration of the capability of removing selected fish stocks for transportation.” No explanation was given for this proposed change.

Draft: The recommendation was not included in the draft.

Finding: The Council rejected the recommendation because in the future the region may need the capability to selectively remove adult fish. The recommendation would not protect, mitigate and enhance fish, 16 USC §§ 839b(h)(5), (7)(A).

Program Section(s): 6.1B, 6.1D.7 (adult salmon research)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise various sections of Section 6.1B and Section 6.1D.7 to reflect:

(1) FPDEP Index of Projected Fish Research (March 1994).

(2) From SCS Phase I Draft Report, promote research particularly in three areas: (a) mortality levels of adult fish passing through turbines, (b) possible modifications to adult fish ladders, such as shad barriers, and (c) water temperature control. With regard to temperatures, revise Section 6.1B.2, which calls for the evaluation of potential methods to decrease water temperatures. Given the Corps’ data showing consistent temperatures upstream, downstream and in ladders, specifically study whether lowered water temperatures in ladders might produce temperature gradient, delaying migration or causing mortality.

(3) Revise Sections 6.1B.3 and 6.1D.7 to state that Snake River adult fish passage study (report was due December 1993) will extend until at least summer 1995 and final report and recommendations not expected before end of 1995.

(4) Revise Section 6.1B.5 to continue research on use of video-based counting. Completion date for research and development is not known.

Draft: Proposed new Section 6.1G called for a comprehensive evaluation of the impact of the juvenile bypass system on adults who fall back, which could include an evaluation of adult fish turbine mortality. New Section 5.8A.15 [now Section 5.6A.14] called on the Corps and others to study the mechanisms of fish mortality in turbines, which could include the issue of adult mortality. Proposed additions to Section 6.1A.1 and 6.1A.4 called for various improvements, general and specific, structural and operational, in adult fish ladders, which could encompass an evaluation of shad barriers.

A proposed addition to Section 6.1A.1, in response to an ODFW recommendation, called for the Corps, in consultation with fish agencies and tribes, to evaluate and reduce fish ladder water temperatures. Meanwhile, in Appendix D, Proposed Amendment No. 123 incorporated the Corps’ recommendation to

modify Section 6.1B.4 to call for the Corps to continue evaluating temperature matters in the adult fish ladders, particularly at the Snake projects, and to “[i]nvestigate whether lowered water temperature in the ladders would create a temperature gradient, delaying adult migration or causing mortality.”

Appendix D, Proposed Amendment Nos. 123 and 124 extended the date for the Snake River adult passage studies to December 1997 to December 1997. And, Appendix D, Proposed Amendment No. 64 extended the date for the Corps report on video counting technology to 1997.

Finding: The Council adopted these recommendations, with date changes.

Program Section(s): 6.1C.2 (improve flows for naturally spawning fall chinook)
Source: PNUCC
Recommendation No.: 6-1

Recommendation: Delete Section 6.1C.2, which calls for the fish and wildlife agencies, tribes, and Grant County PUD to evaluate and report on the effectiveness of the Vernita Bar flow plan at Priest Rapids Dam. PNUCC recommends this deletion because “Priest Rapids is a private facility and is a FERC responsibility.”

Draft: Not included in the draft amendments.

Finding: The PUD is subject to FERC jurisdiction. FERC, in turn, is required to comply with the terms of 16 U.S.C. § 839b(h)(11)(A)(ii). It is therefore appropriate to include such measures in the program.

Program Section(s): 6.1C, 6.1D (Snake River fall chinook flows and temperatures)
Source: CRITFC
Recommendation No.: 5-2

Recommendation: As noted in the Section 5 discussion, CRITFC’s recommended flow regime includes flows for adult fall chinook. CRITFC recommended late season flow measures for the Snake, some that benefit both late migrating juveniles and returning adults, and some that are intended specifically for adults. These measures included:

(a) From Dworshak, 1.0 million acre feet July through September, in 1995-98.

(b) From Brownlee, in 1995, 50,000 acre feet in August and 100,000 acre feet in September; in 1996; 100,000 acre feet in August and 100,000 acre feet in September; in 1997 and 1998, 140,000 acre feet in August and 100,000 acre feet f in September. These volumes are to be shaped by the Fishery Managers, no refill, pass inflow. Draft in October for Hells Canyon Complex fall chinook plan.

(c) From the Upper Snake, in 1995, 1.427 million acre feet from April through September; in 1996-98, 1.927 million acre feet. The volume from the Upper Snake “should be shaped to benefit juvenile migrations, allowing use of Dworshak water supplies for temperature abatement, specifically targeted for adult fall chinook and steelhead.”

In addition, for the lower Columbia CRITFC recommended a minimum flow of 120 kcfs at The Dalles Dam during September to decrease migration time for end of sub-yearling migration through lower Columbia and “to reduce delay, inter-dam loss and increase spawning for adult fall chinook and steelhead.”

Draft: The flow augmentation volumes were in Option 4, Additional Flow and Velocity (DFOP), and Additional Brownlee Water. A proposed addition to Section 5.1A.2 (in the general Section 5 amendments), called generally on the FOEC “[i]n resolving conflicts, carefully consider the value of retaining cold water in the Dworshak project to help control temperatures for Snake River fall chinook returning adults.” Option 4, Water Temperature Reduction, called specifically for the retention of at least 400,000 acre feet in Dworshak for temperature control, as a revision to Section 5.1A concerning FOEC operations. CRITFC did not recommend this or any other particular volume to be retained in Dworshak for temperature control. A proposed revision to Section 6.1D.1 -- reflecting the workings of the NMFS Biological Opinion -- provided that only if Dworshak is above elevation of 1520 feet at the end of July can its use for temperature control be considered by the FOEC, while Section 5.2B.2 allows for the drafting of Dworshak to that elevation by the end of July if needed to meet the summer flow target.

Finding: This recommendation is addressed in the findings on Section 5.2 and the former Section 5.3 (now Section 5.4). The Council adopted the recommendation for additional drafts from Brownlee, for an additional million acre-feet, and for the September flow target at The Dalles in that section. The Council accepts the need to continue evaluation of temperature control for fall chinook, and the possible use of Dworshak for that purpose, but leaves to the fish managers and the Fish Operations Executive Committee discussions about whether to shift water from spring to summer to late summer for this and other purposes.

Program Section(s): 6.1D.1, 6.1D.4 (Snake River fall chinook temperature control/
Dworshak draft)
Source: ODFW
Recommendation No.: 5-8

Recommendation: ODFW recommended that to “[m]inimize delay and enhance survival of adults in reservoirs,” the Council should call for the Corps and fish managers to “[r]elease and evaluate cool water releases from Dworshak Reservoir.”

Draft: With regard to flow augmentation and cool water releases to benefit adult fall chinook, see immediately above. Note that the draft amendments did not alter the temperature control evaluation called for in Section 6.1D.4, which already seems to be responsive to ODFW’s recommendation. In Appendix D, Proposed Amendment No. 122, the Corps proposed to change the date for the report on the temperature control study to December 1994.

Finding: With regard to flow augmentation and cool water releases to benefit adult fall chinook, see immediately above.

Program Section(s): 6.1C, 6.1D (Snake River fall chinook flows)
Source: Natural Resources Defense Council
Recommendation No.: 5-4

Recommendation: From 1996 on, Idaho Power should provide from Brownlee 100,000 acre feet in August and again in September, shaped by Fishery Managers, with inflow passed through and no refill. Other portions of their proposal (to be discussed in detail in the outline for Section 5 recommendations) may be generally relevant to adult fall chinook, but are not specifically related to the timing of the fall return and so will not be mentioned here.

Draft: The recommendation was addressed in Option 4, Additional Brownlee Water.

Finding: The Council adopted the recommendation, as discussed in the findings on Section 5.2, above.

Program Section(s): 6.1D.1 (Snake River fall chinook temperature control/Dworshak draft)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Given high kokanee losses and gas supersaturation levels above 120 percent due to July Dworshak releases, revise Section 6.1D.1 to expedite study and implementation of remedial measures, if such releases are going to continue. Note and expedite schedule of BPA-funded studies of deterrents to kokanee entrainment.

Finding: Deferred to the resident fish amendment process scheduled to begin in January 1995.

Program Section(s): 6.1D.2 (Snake River temperatures)
Source: PNUCC
Recommendation No.: 6-1

Recommendation: Delete Section 6.1D.2, which asks "Relevant Parties" to pursue funding for recreational and commercial facility modifications to allow Dworshak to operate at the reduced levels that result from August and September fall chinook temperature releases. PNUCC recommended this deletion as part of its overall concern that the Council should not be mitigating for mitigation.

Draft: The draft did not address this recommendation.

Finding: The Council believes that mitigating such impacts may properly be considered part of the cost of such measures. The question is not whether such impacts may be mitigated, but whether, under Section 4(h)(6)(C), there is a less costly way to achieve the biological objective to which Dworshak releases are directed.

Program Section(s): 6.1D.4 (Snake River fall chinook temperature control/evaluation)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: Revise Section 6.1D.4 to note that report of evaluation of cool water releases from Dworshak and Hells Canyon Complex will be submitted December 1994, not 1993.

Draft: The recommendation was included in Appendix D, Proposed Amendment No. 122.

Finding: The Council adopted the recommendation.

SECTION 7: COORDINATED SALMON PRODUCTION AND HABITAT

Program Section(s): 7.1, 7.2, 7.3A to 7.3B.3, 7.4A (coordinate habitat and production processes; improve existing hatchery production; supplementation plans; new production initiatives)
Source: CRITFC
Recommendation No.: 7-3

Recommendation: The Columbia River Inter-Tribal Fish Commission (CRITFC) proposed to delete these sections -- the bulk of the program's production measures -- and replace them with CRITFC's detailed Tribal Restoration Plan/Subbasin Plans. The subbasin plans call for the implementation of specific production and habitat measures in the Wind, Little White Salmon, Big White Salmon, Klickitat, Hood, Deschutes, Umatilla, Mid-Columbia, Walla Walla, Yakima, Wenatchee, Entiat, Methow, Okanogan, Snake Mainstem, Tucannon, Clearwater, Salmon, Grande Ronde, Imnaha, and Lower Columbia and Snake River subbasins. (During the comment period CRITFC submitted a John Day River subbasin plan that had been left out of the recommendation.) CRITFC proposed that Bonneville Power Administration (BPA) fund the subbasin projects specified, which in general called for "the construction of acclimation and adult trapping facilities, habitat restoration, protection and enhancement, and the outplanting of juvenile salmon." Production facilities using artificial propagation were to be consistent with the supplementation section of the Integrated System Plan.

The Council received a number of public comments in support of the subbasin planning approach, especially within the subregional process, but not necessarily in support of CRITFC's recommended subbasin plans. Of most importance, while the Columbia Basin Fish and Wildlife Authority (CBFWA) agreed with CRITFC that most of the production initiatives should take place within the subbasin planning process, CBFWA was not, however, ready to agree completely with CRITFC's proposed subbasin plans in the Tribal Restoration Plan. CBFWA believed existing subbasin plans should be reviewed and updated, with a priority on weak fish populations and incorporating the Policies and Procedures Implementation Plan developed by the Integrated Hatchery Operations Team. Implementation plans and schedules should be developed in the next year, with subbasins that have weak stocks receiving immediate attention. CBFWA stated that the revised subbasin plans will be submitted to the Council and BPA for funding. The whole subbasin planning process is to shift into the subregional process when that process is established. Because the plans will address supplementation, artificial production and natural stock protection, CBFWA concurred with CRITFC's recommendation deleting the sections from the program that CRITFC recommended be deleted. CBFWA also supported the proposed changes in the subregional process proposed in Section 3.1D.

CRITFC's own comments did not contest CBFWA's position on this issue, stating only that it would defer to any specific production and habitat comments of the Yakama Nation and the Confederated Tribes of the Umatilla Reservation. The Umatilla Tribes did not in the end submit any comments. The Yakama Nation did comment, but did not contest CBFWA's position, either. The Yakama Nation commented instead that the agencies and tribes should be given high deference "within the subregional teams in recommending projects for implementation;" that the list in Section 3.1D.1 of the guidelines or criteria for qualifying project recommendations in the subregional process should be deleted (CBFWA did not delete this section in its comments, and neither had CRITFC in its recommendation); and that fish and wildlife managers should be responsible for setting the conditions under which projects are selected and implemented.

The Upper Columbia United Tribes (UCUTs) did support the adoption of CRITFC's restoration plan as recommended, which was the only comment of unqualified support. The Shoshone-Bannock Tribes criticized portions of CRITFC's subbasin plan for the Salmon subbasin, and favored instead the use of the subregional process to update, review, coordinate, revise, and implement the subbasin plans. The Washington Department of Fish and Wildlife (WDFW) supported the CBFWA comments, especially the idea of focusing on an implementation process starting from the subbasin plans. The Idaho Department of Fish and Game (IDFG) submitted its own Anadromous Fish Management Plan, which incorporated a subbasin plan approach based also on the ISP system planning effort and also incorporating supplementation activities, but IDFG's view of the elements of the subbasin plans did not necessarily correspond to CRITFC's. BPA saw the restoration plan as incomplete, but a good starting place for rebuilding efforts with various conditions. The Corps of Engineers did not provide extensive comments on CRITFC's subbasin plans, but did state that the Integrated System Plan provides adequate production goals at this time and that the Council should adopt those goals and measures and shift the Council's focus to habitat, harvest and ocean survival.

Others commenters rejected the Columbia Basin Tribal Restoration Plan, usually because the plan would significantly increase hatchery supplementation throughout the Columbia Basin (Pacific Northwest Generating Cooperative (PNGC), Douglas County PUD, Chelan County PUD) and because it did not provide for peer review or coordination with other fishery management agencies (Douglas County PUD, Chelan County PUD). Chelan County PUD also opposed the Tribal because it was inconsistent with hatchery reprogramming and supplementation strategies currently endorsed by the Mid-Columbia coordinating committee and the Rock Island Coordinating Committee, and Chelan suggested changes in the subregional process, in that the Council should direct the implementors to include on each subregional team local representation by hydro operators and land management agencies to assure that annual work plans are feasible and receive local cooperation. PNGC proposed instead the appointment of an independent scientific group to evaluate all supplementation and production initiatives, in essence superseding or overseeing the results of the subbasin planning process.

Oregon Trout also wanted the Council to establish an independent scientific group to review all production, supplementation and hatchery proposals and require NEPA review of all new production proposals. While Oregon Trout did not specifically comment on CRITFC's subbasin plans, it did comment that it was opposed to supplementation at any level beyond narrow experiments, while CRITFC's restoration plan in essence took supplementation from the experimental to the implementation stage. Oregon Trout recommended instead that to guide future production and supplementation decisions, the Council and the fishery managers needed to develop new management plan(s) based on well-defined conservation management units and information on biological diversity within those units, and include a process for an independent audit of implementation. Oregon Trout submitted with its comments dozens of scientific reports, papers and journal articles concerning the inter-related issues of production, supplementation, the adverse

impacts of production activities on wild fish, and the preservation of genetic resources. Similar but less extensive comments either opposed to or only cautiously supportive of supplementation as an experimental program came from the Columbia River Alliance and the Okanogan Resource Council.

NMFS did not comment directly on the subbasin plans. NMFS did indicate to the Council that NMFS will take a very cautious approach to the use of supplementation and other artificial production methods to try to increase weak stock numbers, calling for "further research to determine whether controlled propagation programs can increase natural production population abundance." NMFS production policy is focused more on ending the adverse effects of artificial production on wild populations and genetic resources than on the use of supplementation to increase the numbers of naturally spawning fish.

Finding: On this record, and after careful consideration, the Council partially adopted CRITFC's subbasin plan recommendation, as modified by CBFWA in its comments. The Council has adopted in Section 7.0 CRITFC's recommendation to use the subbasin plans and the Tribal Restoration Plan as the foundation for the region's fish and wildlife program, especially all production and habitat matters. The Council called for the fish managers to expeditiously update the subbasin plans in 1995 and submit them to the Council for review and approval. The Council also called on the fish managers, while the process of updating took its course, to develop immediate action plans for production and habitat measures that require prompt implementation in 1995 and 1996. The Council did not adopt the specific subbasin plans in CRITFC's Tribal Restoration Plan, as the Council understood from CBFWA's comments, and agrees with CBFWA, that the subbasin plans should be updated and implemented with the acceptance of all the fish managers for each subbasin, not just the CRITFC tribes. Thus the Council's decision to call for revision of the subbasin plans, rather than adopting now the CRITFC plans better complements the existing and future activities of the fish agencies and tribes, 16 U.S.C. § 839(h)(6)(A). CRITFC is concerned about the delay in the updating and implementation of the subbasin plans, and the Council is, too. The Council is committed to updating and implementing the subbasin plans quickly, and it set the dates for submitting the updated plans to the Council with the intent that the quick action CRITFC desires will occur. The scope of the updating should reflect the limited amount of time available and the importance of meeting the submission date in order to secure timely implementation.

The action plans and the subbasin plan updates are to be based on CRITFC's Tribal Restoration Plan, the Integrated System Plan and other information. The subregional process, once it is developed and operating, will be the forum for continued review and revision of the subbasin plans. The Council also revised Section 3.1D, Subregional Process, Section 7.3A, Regional Assessment of Supplementation, and Section 7.3B, Final Planning and Implementation of Proposed Additional High Priority Supplementation Experiments to correspond to the increased focus on the subbasin plan process.

The Council did not adopt CRITFC's recommendation to delete most of Sections 7.1 through 7.4. CBFWA explained that the subbasin plans and the implementation actions will contain the necessary justifications, requirements, and responses to concerns about supplementation activities, artificial production, and genetic resource and natural stock protection. The Council agrees that the subbasin plans and planning process should if possible incorporate and subsume these concerns and provisions. But subbasin plans that can be implemented have not yet been developed, and the subbasin plan revision process has not even yet begun. Until the subbasin plan revision process has actually internalized these provisions and policies and has produced subbasin plans and action plans that can be implemented under present circumstances, the Council believes it would not be prudent to delete the substantive production provisions from the program. Section 7.1 primarily addresses how to conserve genetic diversity and wild and natural populations while rebuilding weak stocks. Section 7.2 contains a number of measures to improve existing hatchery production, which had been identified as one of the significant problems in the petitions to list Snake River chinook as endangered species.

Section 7.3 outlines a framework and process for developing and implementing supplementation plans. Finally, Section 7.4A establishes guidelines for identifying, evaluating, and implementing new production initiatives. These sections support the principles set forth in the program's goal and the general biological objectives expressed throughout the production section and other parts of the program. The Phase Two and Three record for the Strategy for Salmon was filled with recommendations, comments, and independent scientific analyses concerning the need for a revolution in production policies and actions to protect and promote genetic diversity and natural and wild populations. The provisions at issue were developed to respond to those concerns. It is too soon to delete them, even under the knowledge that the subbasin planning process will address these concerns, requirements and policies. To delete these provisions would mean a program that is less effective at present in protecting, mitigating, and enhancing the survival of fish. 16 U.S.C. § 839(h)(5), (7)(C). The Council will be willing to revisit this issue as the subbasin plans are revised, reviewed and implemented.

Program Section(s): 7.1B (evaluation of carrying capacity)
Source: CRITFC
Recommendation No.: 5-2
Source: PNUCC
Recommendation No: 7-4

Recommendations: CRITFC recommended an immediate assessment of the remaining and potential estuary habitat. It also called generally for actions to protect estuary wetlands and habitat, for the development and implementation of methods to restore and create a diversity of habitat, especially through "restoration of habitat structure such as large woody debris" and "sustained peaking flows which drive river and estuarine process such as hydraulic geometry and nutrient transport." CRITFC called for actions to reestablish the "tidal prism" without causing significant flooding of developed areas and for an evaluation of all proposals for hydro-development, water withdrawals, navigation projects and shoreline development for impacts on estuary ecology.

PNUCC recommended a few specific elements of an estuarine and near shore analysis, as an addition to Section 7.1B.1. PNUCC recommended that the evaluation "identify residency time of juvenile salmonids, and their level of smoltification. Management measures to protect and improve estuary habitat as well as increase the productivity of the estuary should also be identified." PNUCC also recommended development of a "monitoring program to identify optimal timing for residency in the estuary and the near shore environment."

CBFWA incorporated CRITFC's recommendation and some of PNUCC's language in its comments. CBFWA stressed the need to evaluate the ecological interactions between non-native fishes, which have thrived as a result of habitat and flow changes caused by reservoir storage and the hydroelectric system (e.g., shad), and salmon carrying capacity and limiting factors.

Finding: The Council adopted PNUCC's recommendation, and it adopted CRITFC's recommendation, although not CRITFC's specific language. The main changes are revisions to Section 7.1A (former Section 7.1B). This section as revised calls for an evaluation of estuary, plume and near shore estuary habitat ecology, salmon survival, carrying capacity and limiting factors (along with an evaluation of the same things in the tributaries, mainstem and marine areas). This analysis is to include, among other things, "an evaluation of the effects of the alteration and timing of the ocean plume as caused by the construction and operation of the hydroelectric system," and the analysis is to "identify residency time of juvenile salmonids, and their level of smoltification." "Management measures to protect and improve estuary habitat as well as

increase the productivity of the estuary should also be identified.” The section retains the existing language calling for the evaluation to include recommendations for “management responses to fluctuating estuary and ocean conditions.” The analysis should also “propose a monitoring program to identify optimal timing for residency in the estuary and the near shore environment.”

New Section 7.1A.3 calls for Oregon, Washington and the federal government to “identify management measures,” “based on existing information” that can be “implemented immediately to provide better protection and improve estuarine productivity.” These measures are to “[i]nclude identification of seasonal water volume needs in the estuary for fish and wildlife,” with a report to the Council by mid-1995 “on opportunities, needed actions, timeframe and funding sources to implement recommendations.” Revised Section 7.1A.4 calls on the same group to “[e]xplore the expanding scope of the Columbia River Estuary Bi-State Study to include all of the Columbia River Basin. If feasible, this would be more effective in addressing comprehensively all interrelated water quality and quantity aspects of the basin. Also, explore the feasibility of participation of the Columbia Basin in the Environmental Protection Agency national estuaries of significance program.” New Section 7.1A.5 calls on the Council to “[b]egin rulemaking in winter 1995 to identify measures aimed at improving estuary conditions and survival for salmon and steelhead. Review results of the Columbia River Estuary Bi-State Study as well as other pertinent information to develop these measures.”

The Council also adopted a new provision, Section 5.4D.2, which is responsive to this recommendation and to another CRITFC recommendation. Section 5.6D.2 calls for a Mainstem Estuarine Habitat Restoration Analysis, which includes a basinwide comprehensive hydrologic, hydraulic geometry and biological analysis to determine appropriate flow duration and magnitude needed to reestablish critical mainstem and estuarine floodplain habitat. Finally, also of some relevance to this recommendation is a revision to Section 7.8J.2 that calls on NMFS to fund an evaluation of water withdrawals, depletions and return flows on the natural hydrograph and to compare the magnitude of these effects to the magnitude of effects caused by upstream storage. NMFS is then to develop hydrographs of the Columbia and Snake mainstems, analyze the cumulative effects of future withdrawals and recommend measures in response.

Program Section(s): 7.1I.1, 7.1J, 7.1J.1 (adjust total number of hatchery fish to stay within basin carrying capacity; production planning)
Source: PNUCC
Recommendation No.: 7-4

Recommendation: In line with PNUCC’s recommendation to eliminate mixed-stock fisheries and replace them with terminal fisheries, analyzed in the findings on Section 8 below, PNUCC recommended revising these three sections in the 1994 program in various ways to reduce production designated for harvest augmentation by 50 percent and to reprogram production to support tributary and terminal fisheries and not mixed-stock fisheries. PNUCC also recommended revising Section 7.1J.1 to call for “the opening of the Production Advisory Committee of the Columbia River Management Plan to all interested parties, and to then develop an Integrated Hatchery Production Plan. The plan will coordinate basin-wide production, and address levels of production, species mix, stock selection, return timing and location for release. In addition, the plan will account for fisheries contribution, economic benefits, elimination of mixed-stocks, and the creation of terminal and tributary fisheries.”

The Council received a few public comments calling for the reduction of hatchery production designated for harvest augmentation (e.g., from the DSIs). PNUCC added in its comments that harvest

measures and hatchery production must be linked, with hatchery reprogramming “to support only natural escapement and terminal fisheries.” Both the Columbia River Alliance and Okanogan Resource Council commented that expenditures for hatcheries should be eliminated except where it can be demonstrated that hatchery or supplementation practices do not directly or indirectly cause disease, competition problems or harvest practices that will cause incidental catch of wild stocks. Agencies and tribes and others, such as the Northwest Forest Resource Council, noted, however, that artificial production of some sort may be the only way to make up for the loss of a large amount of the historical habitat production base, regardless of mainstem system losses. Artificial production will continue in some form, and the challenge of overcoming the problems caused by past hatchery practices requires concerted fisheries management efforts today to use hatchery production programs that are complementary to wild fish populations.

Finding: The Council adopted a subbasin approach to production in Section 7.0 which is to be supportive of enhancement activities geared towards stocks that contribute to adequately managed fisheries (see Section 8.3A.1). The updating of subbasin plans should include many of the elements specified by PNUCC in its proposed production plan, including considerations of reprogramming hatchery facilities to benefit wild and natural stocks. But the Council did not adopt PNUCC’s recommendation to the extent that it focused on reducing hatchery production that contributes to mixed stock fisheries. The findings in Section 8 explain why the Council could not adopt PNUCC’s recommendation to completely eliminate mixed-stock fisheries. In addition, the Council recognizes the commitment of the parties to the *U.S. v. Oregon* litigation to rebuild upriver runs partly through prudent use of production planning . Restricting hatchery production by an arbitrary 50 percent with an intent simply to reduce harvest does not complement the activities of the federal and state fish and wildlife agencies and Indian tribes, 16 U.S.C. § 839(h)(6)(A), and may be in conflict with the legal rights of Indian tribes in the region whose treaty harvest rights have been defined in *U.S. v. Oregon*, 16 U.S.C. § 839(h)(6)(D).

Program Section(s): 7.4D (captive brood stocks)
Source: Pacific Rim International
Recommendation No.: 7-11

Recommendation: Revise Section 7.4D to call for BPA to immediately begin funding private captive breeding programs.

The fish agencies and tribes have a captive broodstock program for Snake River sockeye and are considering development of a program for Snake River fall chinook. The Yakama Indian Nation provided general comments on the agency and tribal program, stating that the Yakama Nation supported careful monitoring of captive broodstock efforts and that the Snake River fall chinook population should not be included in a biologically risky captive broodstock experiment at this time, as captive broodstock programs should be reserved as a “last gasp” strategy to maintain a population.

Finding: As noted above, the fish managers have a captive broodstock program for Snake River sockeye and are considering development of a program for Snake River fall chinook, as recognized in Sections 7.4D, 7.5A and 7.5B. The Council is not in a position to call for the funding of private captive broodstock programs, as to do so would not complement the activities of the fish agencies and tribes, 16 U.S.C. § 839(h)(6)(A). The Council recommends that the PRI direct its recommendation for funding for private programs to the fish agencies, especially to NMFS.

Program Section(s): New 7.4J.4 (production initiatives)
Source: Yakama Indian Nation
Recommendation No.: 7-10

Recommendation: The Yakama Nation recommended adding a Section 7.4J.4 calling on BPA to fund the Department of Energy and Yakama Nation to recommend and evaluate options for using the K-Basins on the Hanford Nuclear Reservation for the artificial propagation of fall chinook, coho and sturgeon.

The Yakama Nation submitted comments restating their support for this measure. Additional comments in support came from the Richland, Washington, office of the U.S. Department of Energy, from the Westinghouse Hanford Company, and from two individuals who are employees of the company and work in support of DOE's Hanford Economic Transition program (B.N. Anderson/D.I. Herborn). These comments added further information on the program and successes so far.

Findings: Adopted as new Sections 7.4J.4 and 7.4J.5.

Program Section(s): 7.4 (production initiatives)
Source: Corps of Engineers
Recommendation No.: 5-3

Recommendation: The Corps of Engineers recommended an evaluation and possible changes in the "John Day Mitigation Hatchery program" proposed in 1992, including releasing hatchery fish above McNary rather than current release below Bonneville, based on a letter from the Oregon Department of Fish and Wildlife.

Finding: The Council did not adopt this recommendation, as various sections in the program, such as Section 7.4J.1, already allow for consideration of release above McNary Dam. The Corps may pursue this matter as part of program implementation.

Program Section(s): 7.5G (Pacific lamprey)
Source: CRITFC
Recommendation No.: 7-9

Recommendation: CRITFC recommended adding language to Section 7.5G [now Section 7.5F] calling on the BPA, the Corps and the Bureau of Reclamation to fund research "to determine passage, habitat, and life history issues that limit lamprey recovery" and to fund "recovery actions recommended by lamprey passage, habitat, and life history research studies."

Finding: Adopted as a revision to Section 7.5F.

Program Section(s): 7.6 (habitat goals, policies and objectives)
Source: CRITFC

Recommendation No.: 7-2**Recommendation:**

CRITFC recommended substantially revising Section 7.6 with new introductory language, a new habitat program goal (existing Section 7.6 had objectives but no specifically stated, single, habitat goal), and revised or new habitat objectives, policies and performance standards (renamed “watershed objectives” in later CBFWA comments). CRITFC’s deletions included Section 7.6D, which called for BPA to develop a priority funding process by December 1992. CRITFC replaced this section with a discussion of ratepayer funding and BPA funding procedures in the introductory text.

In general, CRITFC called for more detailed, specific and restrictive policies, objectives and standards than are now in the Council’s program. The proposed program goal called for the program “to achieve and sustain levels of habitat and species productivity as a means of fully mitigating fish losses caused by construction and operation of the federal and non-federal hydroelectric system.” The proposed introductory text focused primarily on justifying this program goal, by describing the historic progression of habitat degradation throughout the basin, the present serious problems with populations and habitat, the importance of drastic efforts at habitat restoration and improvement in meeting rebuilding schedules, the general nature of the habitat measures and standards called for, the propriety under the Power Act of using ratepayer funds to pay for a significant portion of the habitat improvements, and more.

Five habitat objectives were listed: (1) ensure that all human activities in a subbasin are coordinated in a comprehensive watershed management program; (2) maintain habitat at least at its current level of quality and abundance; improve degraded habitat; increase habitat quantity by improving access to areas within historic range; (3) promote adoption of and compliance with biologically-based habitat performance standards set by the Council or with state water quality standards, whichever are more stringent, and promote the adoption of these standards into state and federal land and water management plans; (4) implement habitat protection and restoration activities designed to comply with the new performance standards; and (5) institute a comprehensive program of monitoring, data collection, analysis, reporting and adaptive management.

Twelve habitat policies were listed: (1) improve coordination of land and water activities, encouraging local coordination and cooperation, especially the participation of private parties with public land and resources managers; (2) develop and implement procedures to ensure compliance with habitat objectives and with relevant federal, state, local and tribal laws and regulations; (3) give highest priority to prevention of fish habitat degradation regardless of current quality; in habitat restoration, give priority to areas not meeting the new performance standards or state water quality standards where one or more weak stocks exist or there are significant opportunities for expansion; (4) recommend that all national forest plans and BLM land management plans include quantitative fish habitat objectives that ensure consistency with the Council’s performance standards and with rebuilding goals and schedules developed by the Council and in the *U.S. v. Oregon* litigation; (5) Council, in consultation with and giving due weight to the fish agencies and tribes, will determine whether Forest Service and BLM plans are consistent with habitat objectives and performance standards and state water quality standards and will recommend actions to resolve inconsistencies; (6) to assure that Forest Service and BLM management actions are consistent with habitat objectives, etc., recommend that Forest Service and BLM conduct thorough environmental analyses for all land disturbing activities and conduct post-project habitat, population and water quality monitoring; (7) to be eligible for project funding under the Council’s Fish and Wildlife Program, Forest Service and BLM must require that land management activities support and not undermine benefits of habitat protection or enhancement projects; (8)

annually review Forest Service and BLM land management activities, with the federal agencies collecting and reporting specified data necessary for the review; the Council in consultation with fish agencies and tribes will recommend actions to Forest Service and BLM to assure consistency; (9) recommend that Oregon Water Resources Department, the Idaho Department of Water Resources, and the Washington Department of Ecology halt further issuance of consumptive water rights unless a finding can be made, in consultation with fish agencies and tribes, that existing instream flows meet anadromous fish needs for all life-stages; same agencies should investigate options for increasing minimum stream flows, particularly water conservation and improved watershed management; (10) all relevant agencies provide elevated funding for implementation of this program, with cost and effort sharing; (11) encourage the involvement of volunteers and educational institutions in cooperative habitat enhancement projects and watershed management; and (12) develop a program for stream channel restoration, emphasizing non-structural methods and establishing and using native plant nurseries.

CRITFC then recommended a set of minimum performance standards, in a new Section 7.6D. The introductory text to the new Section 7.6D and Section 7.6D.4, contained general standards and admonitions concerning land management activities, best management practices, and efforts not to allow further degradation of good or bad quality streams. These general statements included, among other things, recognition of the integrated nature of watersheds and cumulative watershed impacts; the necessity to protect and restore not just fish-bearing streams, but also related small perennial, intermittent, and non-fish-bearing streams; establishment of riparian and floodplain reserves so that “natural ecological functions . . . can naturally re-emerge,” rather than rely on structural and other mitigation efforts; and coordination of all activities in a watershed with the potential to generate sediment.

The proposed minimum performance standards then included “Biologically-based habitat standards”:

- (1) surface fine sediment less than 20 percent in spawning habitat, with no increases in fine sediment levels;
- (2) cobble embeddedness less than 30 percent in rearing habitat, with no increases in cobble embeddedness;
- (3) no disturbance of soil or vegetation until these standards are met; any increase in fine sediment or cobble embeddedness (even if the area meets the 20 percent or 30 percent standards) triggers the same prohibition;
- (4) no increase in sediment delivery;
- (5) establish riparian reserves (“no vegetation removal or soil disturbance within a distance equal to one site potential tree height to 300 feet of floodplain edge”); focus on reducing impacts within riparian reserves;
- (6) “provide consistent long-term source of large woody debris via establishment of riparian reserves”;
- (7) maintain greater than 90 percent of streambanks in stable condition; if less, suspend riparian grazing, vegetation removal and road construction;
- (8) fully protect floodplains by means of riparian reserves; remove floodplain impacts, such as roads and mining operations; prohibit and remove riprap and similar channel controls; ensure channel maintenance with adequate annual instream flows;
- (9) try to maintain water temperatures below 60 degrees; no increases in water temperatures; no removal of stream shading; when temperatures exceed 60 degrees, suspend upstream riparian grazing and begin other efforts at control;
- (10) in interim, enforce existing water quality standards; rapidly revise standards to adequately protect salmonids;
- (11) eliminate transport of toxic chemicals along salmon streams and storage of toxics in watersheds with salmon habitat; and
- (12) suspend approvals for new surface or groundwater withdrawals; study and where necessary obtain additional water to increase instream flows.

“Land management performance standards” included (1) no vegetation or soil disturbance “within a minimum of one site potential, old growth tree height from the outer edge of the floodplain;” (2) in more sensitive areas (“where additional risk of degradation is untenable”), no vegetation or soil disturbance within a minimum of 300 feet from the edge of the floodplain; (3) obliterate, relocate, re-vegetate, and/or upgrade roads in riparian zones; (4) no further road construction “until the majority of watersheds have had measurable improvement”; (5) no entry in existing roadless areas until “vast bulk of watersheds” show measurable

improvement; (6) temporarily suspend riparian grazing along or upstream of areas not meeting standards; suspend any on-going grazing where habitat data is unavailable; and (7) immediately screen unscreened diversions; cease diversions until screened; conduct on-going inspections of screens; meter all diversions for approach velocity. Finally when developing performance standards, do not use “approaches based on ‘range of natural variability.’”

Sections 7.6D.1 to 7.6D.3 then established an updated process whereby the various local watershed managers, in consultation with the Council, land managers, and fish agencies and tribes, are to develop more comprehensive and specific sets of habitat performance standards for each watershed that are at least as stringent as the minimum performance standards. The Council is to review proposed performance standards “for consistency with the Council’s baseline set of standards and the goal of fully meeting the biological requirements of native fish species and fully supporting the productive capability of the stream for native fish species.”

Draft amendments

The Council’s draft amendments reflected much of what CRITFC recommended, with some modifications. The areas in which the draft modified the CRITFC recommendation are as follows:

The draft amendments did not include the revisions to the introductory text of Section 7.6 as recommended by CRITFC or the new habitat goal recommended by CRITFC. Draft revisions to Section 7.8A were intended to reflect CRITFC’s various recommendations calling on the Forest Service and the BLM to manage consistent with the proposed habitat standards. Otherwise, the habitat objectives and policies were not revised as recommended by CRITFC, partly on the grounds that much of the recommended language was already covered by existing language.

Concerning the habitat performance standards, the draft amendments did not include many of the general standards and objectives for land and habitat management that CRITFC recommended. One exception was the proposed addition of a sentence to Section 7.6C.5 stating that “[i]n addition, where possible, manage riparian and floodplain areas to promote the protection and re-establishment of natural ecological functions and, thereby, protect and improve salmon and steelhead habitat.” This is similar to, but not the same as, or as direct and specific as, one of CRITFC’s recommended revisions to land management, which called for the “[e]stablishment of riparian and floodplain reserves throughout entire anadromous stream systems (extending to headwaters) so that all natural ecological functions (e.g., pool formation and maintenance, large woody debris recruitment, bank protection by rooted vegetation, and creation and operation of wetlands and off-channel habitats) can naturally re-emerge and exert their influence in restoring habitat diversity and quality.”

CRITFC had recommended a performance standard development, review and implementation process whereby local watershed managers, etc., developed more comprehensive and specific performance standards at least as stringent as the standards to be established in the Council’s program. The Council was then to review standards developed “for consistency with the Council’s baseline set of standards and the goal of fully meeting the biological requirements of native fish species and fully supporting the productive capability of the stream for native fish species.” The process set forth in the proposed revisions to Sections 7.6C.1, 7.6C.2, 7.6C.3, 7.6C.4, and 7.6C.5 was similar, though not quite the same. It called for local watershed managers and others to develop and adopt habitat performance standards. These locally-adopted standards were to be “consistent, in terms of biological consequences,” with the standards developed by the Council, and the local managers are to explain to the Council the “biological rationale” for any “departures from the approach and standards provided” in the Council’s program.”

With regard to the performance standards themselves, the Council's intent was to substantially incorporate in the draft CRITFC's recommended standards, with some modifications that reflected both the Council's lack of authority to be a direct management or planning authority in this area and the Council's view that the focus in habitat planning and management should be on the subbasin planning and local collaborative watershed processes, and the habitat standards and measures to be developed within these processes. The most important task for the Council is to provide biologically-based habitat objectives for the subbasin and watershed planning processes, and then to allow the planners to decide how best to implement these objectives or adopt watershed specific objectives that are biologically equivalent. To note the comparison between the recommendation and the draft:

- CRITFC called for sediment levels "less than" 20 percent. The proposed standard called for sediment levels "no greater than" 20 percent. The proposed standards did incorporate the cobble embeddedness standard precisely as recommended.
- CRITFC recommended no increase in sediment delivery or cobble embeddedness anywhere, even where the percentage standard is being met. The proposed amendment called for no increase in sediment input "[i]n subbasins currently limited by sediment problems."
- CRITFC recommended prescriptive management directions when standards are not meant. Thus CRITFC recommended that when the sediment or cobble embeddedness standards are violated or when any increase in sediment or cobble embeddedness occurs, certain management responses should occur: no further ground disturbance or vegetation removal, suspension of on-going activities, and initiation of active restoration, such as road obliteration and re-vegetation. The proposed standards did not include these specific management directives. Rather, the proposed amendments recommended that roads should be reduced as necessary to meet sediment and other water quality standards and that riparian grazing should be temporarily suspended alongside or upstream of areas that do not meet habitat standards as necessary to meet compliance.
- CRITFC recommended the creation of "riparian reserves," which they defined in the habitat standards as "no vegetation removal or soil disturbance within a distance equal to one site potential tree height to 300 feet of floodplain edge." In their land management standards they defined the reserves slightly differently, calling for no vegetation removal or soil disturbance within "a minimum of one site potential, old growth tree height from the outer edge of the floodplain along all streams" and, "[i]n more sensitive situations where additional risk of degradation is untenable, there should be no vegetation removal or soil disturbance within a minimum of 300 feet from the edge of the floodplain along all streams." Then, CRITFC linked various standards, such as pools, large woody debris, channel complexity, etc., to the adoption of these reserves. The proposed standards called for the establishment of "riparian areas," in which vegetation removal or soil disturbance will not be allowed. Along fish-bearing streams the riparian areas are to be "on each side of the stream equal to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greater." The two descriptions appeared to call for riparian zones that were functionally the same in size. The proposed language allowed for smaller riparian zones along other types of streams. CRITFC did not make this distinction. The proposed amendments did not fully subsume other issues and standards into the "riparian areas" standard in the way that CRITFC did, proposing to retain numerical objectives for pool frequency, for example.

- With regard to bank stability, CRITFC recommended maintaining “greater than” 90 percent of streambanks in stable condition. The proposed standard was slightly revised to call for maintaining “at least” 90 percent of streambanks in stable condition.
- CRITFC recommended a channel complexity standard in which floodplains are “fully protected via riparian reserves and channel forming flows by obtaining adequate in-stream flows.” The proposed amendments did not precisely replicate this recommendation, having instead the “riparian areas” noted above, no specific tie between the riparian areas and channel morphology, no general standard on in-stream flows, and a specific, numerical “stream morphology” standard.
- As part of its channel complexity standard, CRITFC recommended a prohibition on “channelization/channel armoring (riprap) and to “[r]emove riprap.” The proposed standards did not include this recommendation, and a proposed revision to Section 7.8D.1 called for the “[u]se of non-structural methods as the first choice for protecting and improving riparian areas and streambeds,” which was not as stringent as CRITFC wanted.
- With regard to water temperatures, CRITFC recommended an objective of less than 60 degrees in spawning and rearing habitat, no increases in water temperatures, and management actions (suspend grazing, road obliteration, riparian planting) whenever temperatures exceed 60 degrees. The proposed amendments called for a summer temperature standard of less than 68 degrees, and they did not include a general prohibition on increases in temperature. The proposed standards did not include the specific management response recommended, but they did state that roads should be reduced as necessary to meet sediment and other water quality standards and that riparian grazing should be temporarily suspended alongside or upstream of areas that do not meet habitat standards as necessary to meet compliance.
- With regard to general water quality, CRITFC recommended meeting state and federal water quality standards as an interim minimum, while water quality standards are developed necessary to adequately protect salmonids. Also, CRITFC recommended eliminating the transport or storage of toxic chemicals in certain areas. The proposed standards called for compliance with existing state and federal water quality standards, with no specific call for developing better standards.

Comments on the recommendation and the draft amendments

CBFWA

CBFWA’s comments accepted much of what the Council proposed, including some of the modifications the Council made in CRITFC’s recommendation. CBFWA also altered some of the Council’s proposed language, partly to recover some of CRITFC’s original language and partly to suggest new language. Besides some general editing, CBFWA’s changes in the Council’s draft rule were as follows: With regard to what the Council then called Habitat Objectives, the rewrite of Section 7.6A.2 reflected the fishery manager opinion that it was not necessary to prioritize the types of actions; protection and enhancement are needed for all stocks; access to inaccessible habitat should be provided when and if it is feasible.

With regard to the Council’s Habitat Policies, CBFWA moved all the language on the federal land managers into one section. The new section reflected the policies the fishery managers felt that the federal land management agencies should be held to. The CBFWA re-write of Section 7.6B.7 reflected CRITFC’s

recommendation that priority should not have to be given to projects that have been integrated into broader watershed improvement efforts or to promote agreements with private landowners.

With regard to the Habitat Performance Standards in Section 7.6C, CBFWA changed the term to “Habitat Objectives,” while the specific “Watershed Health Performance Standards” recommended by CRITFC and mostly set forth by the Council were incorporated with very minor modifications and renamed “Watershed Objectives.” CBFWA emphasized, as CRITFC did, the need for specific but more simplified and unified habitat objectives that do not need to be modified locally. CBFWA noted that PACFISH standards and guidelines have been used but modified to add greater protection and improvement of anadromous fish habitat.

Also, CBFWA revised Section 7.6C.2 expands the provision calling for land managers to institute a program to monitor progress in achieving the watershed objectives. Other changes in many provisions added monitoring and evaluation language.

Other comments

Extensive public comment split over the recommendation to have the Council adopt the stricter performance standards/objectives, and the prescriptive means of enforcing the standards. The Council’s proposed amendments (or the even more strict CRITFC recommendation) were supported by CBFWA, CRITFC, the Yakama Nation, WDFW (although it wanted to keep the name “performance standard”), Oregon DEQ and the Corps of Engineers.

The Council also received sometimes quite lengthy comments in opposition or of concern. Perhaps most notably, IDFG questioned whether there should be a single set of habitat standards applicable throughout the range of anadromous fish which occupy a wide range of environments. IDFG illustrated this concern by noting that pool riffle ratios in two minimally disturbed and quite productive watersheds in the Clearwater National Forest were closer to 20:80 than to the 50:50 ratio considered to reflect undisturbed conditions; few reaches exist with ratios as high as 50:50. IDFG also stated that in some areas natural conditions are well below the standards the Council would establish, and the condition of different watersheds can vary substantially depending on the characteristics of the different geomorphic provinces in which the watersheds are located. To provide more detail and concerns about the potential problems of a single set of standards, IDFG attached as an appendix the State of Idaho’s comments on the Forest Service/BLM’s PACFISH process. IDFG suggested that a better approach would be to establish riparian management goals, standards, and guidelines based on the geomorphic and climatic characteristics of a watershed, so that the land management agency or the private owner could then conduct a watershed analysis to establish riparian reserves, riparian objectives, and the management practices that would allow achievement of appropriate objectives.

The Oregon Department of Forestry had similar comments: ODF was concerned that the uniform application of specific performance standards might not be practical or able to be implemented on all lands. Any performance standards recommended by the Council should also recognize that federal and non-federal lands should provide different standards for providing habitat. Standards also need to be flexible in terms of differences between regions and between watersheds and stream reaches in a watershed; for example, with the draft amendments proposing large woody debris standards, the whole region or each subregion might end up with a single minimum standard that may be effective for certain stream sizes, ineffective for large streams, and excessive for very small fish-bearing streams. ODF suggested using an approach similar to ODF’s new 1994 Forest Practice Rules, which address riparian aquatic and water quality protection by considering all functions holistically and yet without one set or even a multiple set of specific performance standards that are

to fit every stream. The rules focus instead on streamside vegetation, for example, as opposed to an approach that emphasizes only one or two discrete functions (i.e., woody debris or shade). This avoids the need to develop multiple performance levels relative to shade, woody debris, pool frequency, etc. ODF submitted a copy of its draft analysis and explanation for its new rules, "The Oregon Forest Practices Act Water Protection Rules: The science, policy considerations, and logic behind the rules" (September 1994).

With regard to the land management performance standards especially, ODF suggested incorporating additional explanation to address the possible conflicts and agreements between the proposed performance standards and existing agency policy standards and rules. ODF also suggested that urban areas should be included and recognized for their contribution to habitat needs. Finally ODF was concerned about the eastside forest timber harvest performance standard, stating that precluding the cutting of any 150-year-old and older live standing dominant or co-dominant ponderosa pine does not consider stand specific needs nor does it recognize the multiple uses of different ownerships.

The Oregon Water Resources Department stated simply that several of the performance standards would be difficult to implement, especially where they preclude activities having any impact, and that the Council should consider "no net loss" provisions in lieu of absolute prohibitions.

Timber and forest resource companies submitted comments very similar to ODF's and to each other, including comments from Boise Cascade, Associated Oregon Loggers, and the Northwest Forest Resource Council. The latter group began by stating that the Council offered no evidence to support the position that significant habitat degradation continues to occur throughout the Columbia Basin, requiring a more onerous set of performance standards. The proposed objectives and standards could undermine existing economic uses of land and water resources, without biological gain. NFRC also stated that it was inappropriate to apply performance standards derived primarily from westside federal forests and the FEMAT/PACFISH processes to lands on the eastside, given the broad and complex geologic area and various land uses. It suggested that the Council adopt more technically defensible standards that address individual stream conditions and public processes seeking to define and reach specific desirable future conditions, rather than generic standards. The existing language of Section 7.6 was much preferred compared to the proposed revisions, as technically more defensible than the FEMAT/PACFISH habitat features proposed. NFRC called the riparian reserves prescriptions for disaster. Road standards proposed had no scientific basis; road building standards and other associated mitigation measures have been significantly strengthened in forest plans and should be given time to demonstrate their ability to meet the desired objectives. And the proposed measure of prohibiting harvest of trees greater than 20 inches in diameter had no scientific basis, because age, size and species restrictions on timber harvesting have no direct cause and effect relationship to riparian and aquatic habitat function. Riparian timber screens as currently applied on National Forests on the Eastside have been counterproductive to goals seeking to restore forest health. With regard to streambed and channel standards and measures, NFRC recommended using conservatively applied structural methods to protect and improve riparian areas and streambeds in order to provide interim benefits for fish.

In sum, NFRC commented that the Council should not limit its alternatives to the range of PACFISH riparian management objectives and should instead use an open public scoping process (e.g., as in the Eastside Ecosystem Management Project) to explore alternatives to PACFISH standards and guidelines; "Council should respect this process and not circumvent the law (e.g. NEPA) by urging the agencies to limit the range of alternatives." On private lands, the Council should emphasize cooperation more than indicated in the draft rule in order to yield significantly greater benefits on private lands than could be achieved on federal forest lands.

Boise Cascade adopted by reference the comments of the Northwest Forest Resource Council and added a few of its own. Boise Cascade expressed both legal and scientific concerns about the Council's proposed habitat standards and other habitat provisions. The proposed habitat standards in Section 7.6 do "not appear to be within the legal authority of the Council." They were sufficiently controversial that the Council should present these kind of standards and policies separate from a rulemaking focused on an anadromous fish plan involving hydroelectric projects. The Council's focus should be mainstem survival, not on the relatively minor issues originating from aquatic and riparian habitat conditions on forest lands. The Council ignored local planning groups, state agencies, landowners, and certain ESA mandated site-specific recovery plans in the development of the draft amendments; if such input were attained the Council "could provide recommendations for positive practices rather than punitive standards." Boise Cascade questioned the scientific validity of the Council's numerical standards for in-channel and other habitat conditions and the chances of success. It also stated that the Council should delete the performance standards for timber harvest, forest roads, and livestock grazing. Boise Cascade echoed the comments from the Oregon Department of Forestry that a better approach and source of principles could be found in the Oregon Forest Practices Act.

To summarize other comments more briefly, the Chelan County PUD objected to the biological origin and legal standing of the proposed standards, and questioned the legal validity and enforcement potential of the minimum setback requirements, logging prohibitions and other measures, since local or state requirements may take precedence. The Wallowa County, Oregon, Chamber of Commerce opposed the proposed habitat performance standards and land management restrictions that would flow from these standards. The Chamber supported instead Oregon's new riparian standards. The Council should remove references to or use of PACFISH guidelines and standards as not appropriate; confine its efforts to hydro-related matters; roads are not Council's job, nor are off-site efforts; there is no connection between timber harvest as currently practiced and habitat concerns or proposed standards and regulations on forestry; site-specific plans and actions based on local input, such as watershed plans, are the appropriate process and Council should support those strongly as the habitat portions of the program. Lengthy comments similar to all of the above and adding much particular detail about one watershed came from the Board of Directors of the Grand Ronde Model Watershed Program and from the Wallowa County representatives on that Board. Their main conclusion was that the Council needed to state more clearly that these are interim standards to be replaced by locally developed standards, that performance standards must be developed locally, based on local information, and should be guidelines or objectives and not standards. The Columbia River Alliance resubmitted the Phase Three comments of the Northwest Irrigation Utilities that opposed the involvement of the Council in the implementation of habitat programs and in the establishment of prescriptive habitat standards or directives. The CRA favored instead a cooperative approach calling on the fishery managers and the BPA to join with the local agencies and land owners in a coordinated, cooperative process to develop land management guidelines and cost-shared habitat improvement projects. And the Resource Organization on Timber Supply (ROOTS), of Lewiston commented that the habitat standards and measures called for by CRITFC in this recommendation and in the subbasin plans were not necessary and should not be adopted, as they are based on logging and road building standards of the past, while current timber harvest practices on federal and on private lands under current forest practices regulations and concepts do not harm riparian habitat.

BPA added that the concept of habitat standards has considerable merit and should be pursued, but that there are problems with the standards proposed in the amendments. The list is incomplete, for one, (flows are missing, for example). BPA particularly noted that a big problem with the proposed standards is that they really were management directives that went beyond standards. BPA concluded that there needs to be interagency coordination of this work, including the documentation of existing habitat conditions. BPA would delete the proposed habitat and land management performance standards/objectives in lieu of BPA's proposal for a new Section 7.6C.1, which calls on land managers, including private landowners, to convene by April 30,

1995, to develop “Watershed Health Habitat Performance Standards and Land Management Directives.” BPA would also delete Section 7.6C.4, which establishes a schedule for land management agencies and tribes to provide the Council with habitat performance standards. Instead BPA prefers a different schedule that calls for reporting progress on developing, not completing, performance standards.

Finally, the Forest Service briefly and generally commented that it supported the establishment of biological objectives tied to performance standards, noting that the Forest Service and BLM are developing various riparian management objectives, standards, etc. in the PACFISH process (and in the President’s Forest Plan), which “once adopted . . . will establish interim management direction, including performance standards, for Federal lands.” The Forest Service stated that it is critical to coordinate development of the Council’s objectives and standards with these processes. The Forest Service did not specifically comment on the watershed and land management standards recommended by CRITFC and proposed in Council’s draft.

Finding: The Council substantially adopted CRITFC’s recommendation, with some modifications, in a revised Section 7.6 introduction; the revision of and addition to what was Section 7.6A (habitat objectives) into Section 7.6A, Habitat Goal; a slightly revised Section 7.6B, Habitat Policies; a new Section 7.6C, Coordinated Habitat Planning; a major revision of what was Section 7.6C (habitat performance standards) into Section 7.6D, Habitat Objectives; the deletion of what was Appendix B to the original 1994 program (reference habitat performance standards); and the creation of a new Appendix A, Habitat Recommendations. To reiterate from above, the modifications primarily reflect the reality of the Council’s limited role in land and riparian habitat

management, and, more important, the Council’s belief that the subbasin planning and local collaborative watershed planning processes are the best forums for addressing habitat issues.

The Council modified its draft provisions to correspond more closely to what CRITFC recommended and CBFWA suggested in its comments. For some examples: CBFWA rewrote much of the introductory text that begins Section 7.6 to reflect CRITFC’s recommended language on habitat problems and needs. The Council incorporated this language. The Council adopted a habitat program goal in Section 7.6A, which, while not precisely what CRITFC recommended (and CBFWA did not include CRITFC’s goal), did state the overall goal to “protect and improve habitat conditions to ensure compatibility with the biological needs of salmon, steelhead and other fish and wildlife species.” Revisions to Section 7.6D (former Section 7.6C), along with other revisions to Section 7.8A, strengthened the Council’s call on the federal land managers to act consistent with the Council’s habitat goal, policies and objectives and to monitor, report and address inconsistencies. And with regard to the specific objective on water temperatures, the Council closed the gap with the CRITFC recommendation by altering the draft objective to “[a]ttempt to maintain temperatures in historically usable spawning and rearing habitat at less than 60 degrees F. Under all circumstances, do not exceed 68 degrees F throughout each watershed.” Section 7.6D (water quality).

The centerpiece of CRITFC’s recommendation was the set of tough, specific watershed objectives -- sediment, cobble embeddedness, bank stability, water temperature and the like. The Council has accepted CRITFC’s and CBFWA’s judgment on the expected biological value of these objectives. See Section 7.6D. As public and private land managers work hard over the next decade to try to restore riparian and streambed habitat, the Council believes they should aim to achieve these objectives or be able to demonstrate why a different approach is equally effective. Local watershed managers and subbasin planners are free to develop locally-specific approaches, standards and objectives -- in fact, the Council encourages them to do so, in cooperative watershed and subbasin planning forums. But the locally developed standards should provide

biological benefits that are functionally equivalent to what the general objectives are intended to achieve, and the Council expects the local managers to report the biological rationale for standards and approaches that differ from the Council's objectives. (See Sections 7.6C, 7.6D (introduction), and 7.8A.) A number of the comments indicated reasonable concerns about some of the proposed land management objectives, especially the timber harvest objective. The Council believed on this record that it would be more effective to state that the "objectives" for these types of land activities (timber harvest, new road construction, etc.) should be to meet the watershed objectives of sediment, water temperature, etc. Section 7.6D. The Council has also incorporated CBFWA's habitat program introductory language and stated a habitat program goal to "protect and improve habitat conditions to ensure compatibility with the biological needs of salmon, steelhead and other fish and wildlife species."

The Council characterized CRITFC's prescriptive management directions as recommendations for actions that collaborative watershed and subbasin planners and land managers should consider when the objectives are not met, and the Council placed these recommendations in Appendix A. This is consistent with the Council's legal role with regard to land management activities that affect habitat -- the Council can recommend and guide but has no management, funding or other authority. It is also consistent with the Council's view of who the most appropriate and effective entities are to make these decisions. Some of the objectives themselves were modified in minor ways with this limitation on the Council's authority in mind. For example, while the Council adopted an objective describing riparian areas in which managers should take special care, the Council did not adopt the recommendation to call these areas riparian reserves and forbid any soil disturbance or vegetation removal. The Council believes its approach is more consistent with its legal authority and will be more effective than to adopt a directive that is ignored. 16 U.S.C. § 839b(h)(7)(C).

CBFWA and other groups submitted comments that suggested further substantive amendments to the habitat section of the program which had neither been recommended nor proposed by the Council and subject to public review and comment. The Council was unable to consider incorporating these suggestions into the program during this administrative process without violating its obligations under the Northwest Power Act and the Administrative Procedures Act to provide an opportunity for notice and public comment on substantive changes to the program.

Program Section(s): 7.1E, 7.6C, 7.7B, 7.8A, 7.8C, 7.8D, 7.8E, 7.10A.5
Source: Forest Service
Recommendation No.: 7-6

The Forest Service recommended a number of changes to these sections to reflect the Forest Service's on-going environmental analyses and planning and management initiatives, as described below:

Section 7.1E.2 (wild and naturally spawning population policy)

Recommendation: The Forest Service recommended revising this section to reference the upcoming NMFS recovery plan. The Forest Service also commented with regard to this section (and others) that the Council needs to be aware that the Forest Service plans to incorporate PACFISH directives into the Eastside and Upper Columbia River Basin EISs and, for those forests not covered by these EISs, to follow aquatic strategies outlined in the Record of Decision for the President's Forest Plan to manage anadromous fish watersheds within the range of the northern spotted owl.

Finding: The Council revised Sections 7.1D.1 and 7.1D.2 (former Sections 7.1E.1 and 7.1E.2) to note that among the factors to be considered in developing and implementing the wild and natural spawning population program are “[r]ecovery plans and other products developed under the Endangered Species Act for Columbia River Basin species.” Note also that Section 7.8A has been revised to include references to the policies, objectives and standards in PACFISH, the President’s Forest Plan and the other planning, management, and environmental study initiatives as factors for implementation in land management, along with the policies, objectives and standards developed by the Council.

Section 7.6C.1 (habitat performance standards)

Recommendation: The Forest Service recommended review by the Council of the “riparian management objectives” the Forest Service has developed for managing riparian/anadromous fish habitat for consistency with the Council’s performance standards and other portions of the program. The Forest Service did not specifically recommend amendment of the program for this purpose. The Forest Service stated that its standards, which were not submitted with this recommendation, address stream temperatures, large woody debris, stream bank stability, bank angles and other issues and included a “monitoring protocol” to measure the effectiveness of the objectives.

Finding: This was not a recommendation requiring amendment of the program, as it asked only for the Council staff to review the Forest Service’s riparian management objectives for consistency with the Council’s program. The Council has revised the portion of the program containing the habitat goal, policies and objectives in response to a CRITFC recommendation, as described above, and thus the Forest Service may wish to review these amendments before requesting Council review of its objectives.

Sections 7.8A.1 to 7.8A5 (implement state, federal and tribal habitat improvements)

Recommendation: The Forest Service recommended a number of changes to the following sections to incorporate the Forest Service’s on-going environmental analyses and planning and management initiatives.

Section 7.8A.1 (Anadromous Fish Habitat Policy implementation). The Forest Service recommended revising this section to call for continued implementation of the Columbia River Basin Anadromous Fish Habitat Policy and Implementation Guide (signed January 1991), and stating that key elements of the Anadromous Fish Habitat Policy will be incorporated in and implemented through the President’s Forest Plan (northern spotted owl forests) or PACFISH (non-northern spotted owl forests).

Section 7.8A.2 (recovery actions where standards not met). The Forest Service recommended that this section be rewritten to reflect and call for the Forest Service, through the Columbia River Basin Assessment and Eastside and Upper Columbia River Basin EISs, to “identify fish restoration measures and Forest health concerns and develop strategies to enhance the aquatic habitats for the production of anadromous fish and reduce the impacts of catastrophic disease infestations that may infect threatened salmon and steelhead habitat.”

Section 7.8A.3 (review land management plans). The Forest Service recommended that this section be revised to reflect and call for the Forest Service, through the Eastside and Upper Columbia River Basin EISs, to “evaluate and develop [in the land management plans] a range of alternatives that display PACFISH riparian management objectives (performance standards).”

Section 7.8A.4 [now Section 7.8A.5] (livestock management plans). The Forest Service recommended that the Council call for the Forest Service to continue to improve livestock management and to update livestock management plans, including, through the Eastside and Upper Columbia River Basin EISs, the incorporation of PACFISH riparian management objectives, standards, and guides.

Section 7.8A.5 [now Section 7.8A.6] (annual report). The Forest Service recommended that this section be revised to call for the Forest Service to report to the Council annually “the effectiveness of Federal land management actions to maintain and restore salmon and steelhead habitats within the Columbia River Basin on Federal lands.”

Finding: The Council largely adopted these recommendations, although not in the form and language submitted by the Forest Service. The Council amended Section 7.8A to include references to the policies, objectives and standards in PACFISH, the President’s Forest Plan and the Forest Service’s other planning, management and environmental study initiatives as factors to be considered (along with the goal, policies and objectives called for by the Council) in the revision of land management and livestock management plans and in the implementation of land management decisions. The Council did not adopt the Forest Service’s precise revisions (which both added and deleted language) because the effect would have been to exclude the BLM planning and management process and to delete substantive areas of the program calling on the land managers to design activities to at least maintain the quality and quantity of existing habitat and to seek means to accelerate the implementation of the Anadromous Fish Habitat Plan. Adopting the Forest Service’s precise recommendations thus would not complement the activities of the fish agencies and tribes and would be less effective than the amendments adopted in protecting, mitigating, and enhancing fish and wildlife. 16 U.S.C § 839(h)(6)(A), (7)(B), (C).

Program Section(s): New 7.8D.2 (standards for streambanks and streambeds)

Source: CRITFC

Recommendation No.: 7-1

Recommendation: CRITFC recommended adding a provision calling on BPA to “fund tribes to develop native plant nurseries for use in restoration of watershed plant diversity.”

The draft rule incorporated this recommendation with modifications, particularly enlarging the funding obligation to “Bonneville, Tribes and Federal, State, and Private Agencies” and not restricting nursery development to tribes alone. CBFWA did not alter this language in its comments. The Corps of Engineers supported the need for additional native plant nurseries.

Howard Jaeger of the Washington Association Conservation District’s Plant & Materials Center submitted a memorandum in response to a consultation request from Council Member Bottiger, in which Jaeger noted that the non-profit center he is associated with (and which has links to other, similar non-profit groups, centers and nurseries in the region) have the precise mission of producing conservation and native plant materials in support of conservation programs for conserving soil, improving water quality and enhancing fish and wildlife habitat. Council Member Bottiger reported receiving information of this type from others, who indicated that there was an existing source of a supply of native plant materials, and from low-cost non-profit organizations, and that these sources simply need to be supported and utilized better.

Finding: The Council adopted this recommendation with a minor modification. Section 7.8D.2 calls on BPA “to evaluate the adequacy and capacity of existing native plant nurseries to supply plant materials for use in protecting and improving riparian and other habitat.” BPA is to submit that evaluation to the Council by June 30, 1995. If the existing supplies are found to be inadequate, then BPA, the tribes, federal and state agencies and others are to bring the existing nurseries up to capacity and, as needed, fund the development of additional nurseries. CRITFC justified the need for native plant materials in its recommendation, but did not describe the number of existing sources or explain that these do not have the ability to meet the need. If it is true that low cost sources of sufficient native plant materials exist for the extensive purposes that the fish managers and land managers have in mind to restore watershed plant diversity, then using those sources rather than funding new sources could be the least cost alternative for achieving the same end, 16 U.S.C § 839(h)(6)(C), (7)(B). The Council expects to be notified quickly whether sufficient sources really do exist, and if not, it expects additional nurseries to be funded consistent with CRITFC’s recommendation.

Program Section(s): 7.8F (water regulation -- water spreading)
Source: WaterWatch of Oregon
Recommendation No.: 7-5

Recommendation: WaterWatch proposed a new Section 7.8F.3 calling for the Bureau of Reclamation to “identify and resolve” water spreading activities at reclamation projects” and take “all steps required by federal and state law” to reallocate that water for instream uses. If water spreaders seek official approval of unauthorized uses, approve “only if environmental impacts are fully mitigated.”

The draft rule modified WaterWatch’s recommendation to call for the Bureau to identify, quantify and value all instances of water spreading and then “[p]ropose alternative approaches for addressing this issue including alternatives that provide incentives for water conservation, that would make water available for instream uses, and that recognize whether instream needs are satisfied.”

WaterWatch submitted further comments and information and continued to support its more stringent recommendation calling more directly for all water spreading to stop and for that water to be dedicated to instream flows. Others supported WaterWatch, including the Confederated Tribes of the Umatilla Reservation, CBFWA, CRITFC, Save Our Wild Salmon, American Rivers and Oregon Trout.

Other commenters opposed any significant Council action on water spreading (e.g., the Oregon Water Coalition and the Oregon Water Resources Congress) and/or advised caution in relying on water spreading as a solution to in-stream flow problems (Oregon Water Resources Congress, Oregon Water Resources Department and Bureau of Reclamation). The Oregon Water Resources Congress, for example, commented that if the Council decides to include a water spreading measure in the program, the Council must ensure that consideration is given to a host of factors, including the protection of existing rights, providing for conservation incentives (which is reportedly the source of some of the spread water), promoting instream uses, and mitigating environmental impacts. The Idaho Water Resources Department was similarly concerned with protecting private water rights under Idaho water law, and noted that simply ending an instance of water spreading upstream does not guarantee that the water can be dedicated to lower river salmon flows because Idaho has no authority to curtail the valid water rights of downstream rights holders. The Bureau of Reclamation’s own comments particularly focused on this point -- the Bureau did not believe there will be a significant firm yield of water from investigations into water spreading, if only given the difficulty under state water law in dedicating the water saved and stored in Bureau reservoirs to salmon flows rather than to water rights held on the remaining eligible land base.

Finding: As Section 7.8F.3, the Council adopted the language proposed in the draft, which represents a modified version of WaterWatch's recommendation. The Council understands the need and desire to end what appears to be in many instances illegal consumptive uses of water and to be able to rededicate as much of that water as possible to instream uses. The problem is in how to ensure that any of this water is dedicated to instream flows, given the realities of the state water law of prior appropriation (which the Bureau must act consistent with under the Reclamation Act and which the Council must respect under the Power Act) in over appropriated, arid basins, and given the Council's lack of authority in this area, 16 U.S.C. § 839g(h). This situation is too uncertain simply to direct that water formerly spread be dedicated to instream flows; junior right holders may simply appropriate the water downstream and the legal means to stop them may be lacking. Changes in state or federal law and/or cooperative agreements among private water users, the Bureau and the states will likely be necessary at least in part to allow some or all of this water to pass in-stream. The Council sees more value at this point in stating an objective of dedicating as much of this water as possible to instream uses and urging the Bureau and the states to determine how this can be done. The Council also adopted Section 7.8H.4 urging the states to evaluate adopting statutes or regulations that call for water conservation programs with a goal of 25 percent more water conservation efficiency regionwide. All or a substantial portion of the conserved water is to be dedicated to instream uses. The Council has concluded that these measures would be a more effective way to free up some of this water to protect, mitigate and enhance fish than the recommended language from WaterWatch. 16 U.S.C § 839(h)(7)(C).

Program Section(s): 7.8F (water regulation -- water quality monitoring/
dredging assessment)
Source: CRITFC
Recommendation No.: 5-2

Recommendations: CRITFC recommended two water quality measures that were grouped together in Section 7.8F. First, CRITFC recommended that the Corps of Engineers fund in 1995 "a network of water quality monitoring stations" in the Snake and lower Columbia "capable of instantaneous telemetry." Second, the Corps, with fish agency and tribal consultation and approval, is to fund a comprehensive assessment of all existing and planned dredging activities in the Columbia and Snake mainstems.

CBFWA supported both recommendations in its comments. The only other responsive comment came from the Port of Portland, which was of the opinion that the recommendation for a comprehensive dredging assessment by January 1996 needed more time for evaluation, primarily because water quality studies need to be coordinated and this proposal might very well duplicate studies now under way.

Finding: Adopted as new Sections 7.8F.4 [inadvertently repeated in modified form at Section 5.6C.3] and 7.8F.5. The Council expects the Corps and the fish managers to take into consideration the Port of Portland's concerns when they design the dredging assessment.

Program Section(s): New 7.8G.4 and 7.8G.5 (water leasing pilot projects)
Source: Environmental Defense Fund
Recommendation No.: 7-7
Source: Bureau of Reclamation

Recommendation No.: 7-8

Recommendation: The Environmental Defense Fund (EDF) and the Bureau of Reclamation both recommended that the Council call for the Bureau of Reclamation to implement a water leasing and transfer pilot program for instream flow enhancement in the Yakima subbasin. EDF specified that the Bureau is to fund 3/4 and BPA 1/4 of the pilot program; the Bureau stated that the Bureau, the BPA and “other relevant parties” would share responsibility for implementing the pilot program. According to the Bureau, the “goal” of the pilot program would be to deliver “at least 50 cubic feet per second of additional instream flows at the Parker gauging station for a six week period during each of three pilot-program water years.”

In the draft rule the Council proposed not only the Yakima basin pilot project, but also three other pilot projects in the Snake River basin to be identified by the Bureau and BPA working with the states. The Bureau questioned the three additional programs. The Bureau recommended a program in the Yakima basin because it was part of the Bureau’s on-going water conservation demonstration project and because Washington had modified state law to allow for this leasing program. Since 1991, the Bureau and others have in general been trying to rent, lease or buy water in the Snake Basin under existing Idaho and Oregon water law, and so the Bureau was unclear what the new program provision adds to these efforts.

Finding: The Council adopted and added to these recommendations. New Sections 7.8G.4 and 7.8G.5 call for four water leasing and transfer pilot programs, one in the Yakima subbasin and three in the subbasins of the Snake River, to be identified by the Bureau and BPA working with the states. The cost share for the Yakima project is as recommended by EDF. Different cost share formulas apply to the other projects, recognizing the varying impacts of hydropower developments in different parts of the basin. The Council decided not to state particular flow improvements goal for these projects, stating only that the parties to these pilot program are to “[i]dentify goals for each demonstration project in cubic feet per second of additional instream flows measured at specific points at certain times of the year.” The Council is aware of and supports the various efforts of the Bureau and others to obtain water from willing sellers (including lessors) in the Snake basin. In fact the Council has sufficient hopes in the promise of these efforts to call in Section 5.2A.3 for the Bureau and Idaho to provide one million acre-feet of additional water from the upper Snake basin by 1998 through willing buyer/seller transactions and other means. The Council intends by the water leasing pilot programs to further encourage and facilitate, not supplant, these efforts -- to provide support for an additional arrangement or institutional structure to help bring some of this water to the leasing market.

Program Section(s): 7.9A.1, 7.9A.3 to 7.9A.6, 7.10A.6, 7.10E, 7.10I
Source: Corps of Engineers
Recommendation No.: 5-3

The Corps of Engineers recommended a number of relatively minor changes to Sections 7.9 and 7.10 that were partially adopted, as follows:

Section 7.9A.1 (Willamette subbasin/Detroit Dam)

Recommendation: The Corps recommended that Section 7.9A.1 be revised to note that the feasibility study for installation of devices to control temperature of water discharged from Detroit Dam will not be completed by the specified time (March 1996). The Corps’ present efforts are focused on a similar study at Cougar and Blue River dams called for by Section 7.9A.2 and which should be completed by the

specified date (April 1995). Information obtained in Cougar/Blue River study should be useful for evaluation of Detroit Dam and other projects.

Finding: This recommendation called for a change in a report date, not for a substantive measure to protect, mitigate and enhance fish. Because the date set for reporting is still a year and a half in the future, the Council prefers to leave the date as set in hopes that the Corps will find a way to complete the study at least by sometime in 1996. The Council requests that the Corps inform the Council sometime in 1995 about the probable date for completion of this study.

Sections 7.9A.3 to 7.9A.6 (Willamette subbasin/minimum flow analysis and agreement)

Recommendation: The Corps recommended revision of these sections to note that yearly flows for the Willamette River are developed in consultation with ODFW and OWRD and that feasibility studies for developing minimum flows for the Willamette have not begun, although reconnaissance studies have been completed. (Note that in the public comments, WaterWatch stated its support for the language in Section 7.9A calling for use of stored water for minimum flows in Willamette basin.)

Finding: The Council accepted this recommendation by revising Section 7.9A.6 calling for the Corps, the Bureau and the Fishery Managers to “meet minimum flows established annually by the state natural resource agencies in consultation with the Corps of Engineers while permanent flow guidelines for the Willamette are being developed. In setting minimum flows, consider needs for water volume in the estuary for fish and wildlife.”

Section 7.10A.6 (mainstem diversion screening projects)

Recommendation: The existing Section 7.10A.6 called on the Corps of Engineers to periodically inspect the diversion screens in the mainstem Columbia and Snake Rivers. The Corps of Engineers recommended that Section 7.10A.6 be revised to note that the states are funded by BPA to inspect the diversion screens, not the Corps, and that states report defective screens to the Corps, which is involved in the modification process only through its permitting authority. The Corps stated that it does not fund repairs, the upgrading of existing screens or the installation of new screens.

The draft amendments incorporated this recommendation. CBFWA partially opposed the revision. CBFWA agreed that the state anadromous fish screen programs, which are familiar with fish screen criteria, should conduct the inspections. But CBFWA noted that because a Corps Section 10/404 permit is needed to install an intake in the mainstem, and adequate fish screening must be a condition of these permits, the Corps has the ultimate legal responsibility to periodically monitor project actions to determine if the fish screens are adequate to protect juvenile salmon, as required by the permit conditions. Thus the Corps should be the entity that funds the diversion screen inspections and makes the ultimate determinations as to whether screens are in place and operating correctly and whether and when repairs and modifications are required.

Finding: Given CBFWA’s comments, the Council decided to revise this section (Section 7.10A.6) only to call for the Corps to fund the screen inspections, instead of calling for the Corps to perform the inspections. Revising the section further at this point, on this information, might leave the inspection program without an ultimately responsible entity, which would be less effective than the revised language in protecting fish. If the Corps desires to pursue this point, it should return to the Council with additional information indicating why BPA is or should be the funding source, and not the Corps, for the diversion screen inspection

program in the mainstem, and, more important, why the Corps does not have the ultimate legal responsibility to ensure that diversion owners have installed screens that operate adequately.

Sections 7.10E (Green Peter Dam) and 7.10I (Foster Dam)

Recommendation: The Corps asked that Section 7.10E.1 be revised to note that the Corps has requested funding for a study to determine the effect of fluctuating flows at Green Peter Dam on steelhead runs in South and Middle Santiam Rivers, and that Section 7.10I.1 be revised to note that the Corps has requested funding to investigate alternative methods of providing adequate downstream fish passage at Foster Dam.

Finding: The existing language calls on the Corps to conduct these evaluations. There is no need to amend the sections to note the Corps' progress in requesting funding.

Program Section(s): 7.10B (Condit Dam)
Source: PacifiCorp
Recommendation No.: 7-12

Recommendation: PacifiCorp recommended revising the introductory text of Section 7.10B and the implementing measure Section 7.10B.1 to call for PacifiCorp to fund independent studies for three years "to resolve critical uncertainties associated with the proposed reintroduction of anadromous fish into the White Salmon River above Condit Dam." If upon completion of the study NMFS and FWS prescribe passage at Condit, PacifiCorp is to fund construction and annual operation and maintenance for the upstream and downstream passage facilities. If passage is not prescribed, PacifiCorp will fund "anadromous fish enhancement activities" developed in an agreement between PacifiCorp, NMFS, USFWS, the Washington Department of Fish and Wildlife and the Yakama Indian Nation. While the three-year study is in progress, WDFW and the Yakama Nation are to "conduct a public process" to revise the subbasin plans for the White Salmon, Wind, Little White Salmon and Klickitat subbasins to reflect on-going studies and the developments associated with the *U.S. v. Oregon* settlement, the ESA process, and the Council's fish and wildlife program.

PacifiCorp's reasons for this recommendation were partly explained in the revisions it proposed for Section 7.10B. These text amendments described the FERC relicensing procedure for Condit Dam; noted that NMFS and USFWS have the right to insist in that proceeding that PacifiCorp install fish passage facilities; and outlined the dispute between PacifiCorp and the various agencies over whether fish passage at Condit would actually help achieve the management objectives in the White Salmon River Subbasin Plan, an issue the various studies are intended to resolve.

The draft contained four alternative approaches for revising Section 7.10B on Condit Dam. Two alternatives reflected the views of the agencies and tribes, calling for passage facilities or dam removal. Alternative 3 was intended to reflect, although not mirror, PacifiCorp's recommendation, calling for further consultations with fishery managers to determine an agreed-to approach to passage. It did not correspond precisely to PacifiCorp's recommendation. The fourth was the existing program language, calling for passage.

PacifiCorp submitted comments noting that none of the alternatives precisely matched the recommendation and attached the recommendation again. PacifiCorp emphasized that it was not necessarily opposing fish passage at the dam, simply that there was a need to fund short-term research to analyze the

critical uncertainties surrounding salmon reintroduction and a need to resolve this issue within the context of revising the White Salmon River subbasin plan and developing a plan for restoring White Salmon River fisheries. A short-term study with a deferred passage decision was appropriate “because there are currently no fishery objectives for the White Salmon and adjacent basins.” PacifiCorp also submitted to the Council an analysis just produced by the Forest Service and submitted to FERC. This report contained the preliminary findings of the Forest Service under Sections 7(a) and 7(b) of the Wild and Scenic Rivers Act for the Condit Dam relicensing. The Forest Service stated that it was unable to determine on the current information whether providing for passage at Condit and thus the reintroduction of anadromous fish above Condit Dam would adversely affect the resident rainbow trout fishery in the White Salmon above Condit Dam. Forest Service requested this issue be part of the FERC DEIS.

Some commenters supported PacifiCorp’s position of additional study to determine if reintroduction was a wise decision. These included Oregon Trout, the White Salmon River Steelheaders, the Oregon Water Coalition, PNGC, and the Pacific Northwest Waterways Association. The comments of Oregon Trout and the White Salmon River Steelheaders were the most extensive, and they corresponded roughly to what PacifiCorp’s independent consultant had stated -- salmon passage could be supported if it could be demonstrated that native salmon from the subbasin were being reintroduced to an area of historic access, rather than the new introduction of a species that was never present and might adversely affect resident fish. Further evaluation was needed to resolve this uncertainty.

Many more commenters, including the fish agencies and tribes, supported the position that the agencies and tribes have taken since the early 1980’s calling for passage or dam removal and opposing additional study based on their view that it has been demonstrated that salmon once occupied this area and could be and should be properly reintroduced. The Council’s record includes comments submitted in direct response to the Council’s proposed program language and copies of comments or license conditions submitted to FERC and copied to the Council. These include comments and conditions from NMFS, CBFWA, the UCUTs, the Yakama Nation, Pacific Fishery Management Council, a coalition of environmental groups led by American Rivers, Friends of the White Salmon River -Trout Lake Chapter, American Whitewater Affiliation, Don Wilner and R.S. Hinton & Assoc. NMFS confirmed its official position is passage or dam removal as called for in its FERC comments.

Finding: The Council’s revised program language notes that FERC is preparing an environmental analysis and will probably prepare an EIS as part of the Condit relicensing proceedings. The EA/EIS and the comments and conditions submitted by the fish managers and others “will provide a basis for determining the optimum means for providing anadromous fish access to historic range on the White Salmon River.” The Council’s language recognizes that FERC will make that decision in consultation with the fish agencies and tribes. The Council does not believe further study beyond this EIS is warranted as it would at the least not complement the activities of the fish agencies and tribes, 16 U.S.C § 839(h)(6)(A), (7)(B).

SECTION 8: SALMON HARVEST

Program Section(s): 8, 8.1, 8.2, 8.3, 8.4, 8.5
Source: PNUCC
Recommendation No.: 8-1

The Pacific Northwest Utilities Conference Committee (PNUCC) recommended a set of specific amendments to Section 8 that would call for: (1) the use of the Snake River Salmon Recovery Team's recommended escapement objectives; (2) the elimination of mixed-stock fisheries and the promotion of terminal fisheries, known-stock fisheries and other fisheries where the harvest of weak stocks can be prevented; (3) improvements in the techniques for estimating adult returns; (4) improvements in the reporting of harvest data; and (5) reductions in the ocean harvest of Canadian fish by Washington fishers to obtain corresponding reduction in the harvest of Columbia River fish by Canadian fishers. The Council adopted some of these recommended amendments, although the Council did not usually adopt PNUCC's specific language, and rejected others, as described below:

Use Recovery Team's recommended escapement objectives.

Recommendation: PNUCC recommended that the Council call for the fishery managers to use the escapement objectives recommended by the Recovery Team in lieu of the program's call for the fishery managers to develop management goals, rebuilding schedules and escapement objectives for use in managing harvest. More specifically, PNUCC recommended these changes:

Section 8.1A.1 (management goals and escapement objectives). PNUCC recommended deleting the language calling for the fishery managers to develop management goals and escapement objectives, replacing it with the directive to "[u]se escapement goals established by the Recovery Team." Second, PNUCC recommended replacing the language calling for harvest to be managed "to meet rebuilding targets," with language calling for harvest to be managed "to exceed escapement objectives." PNUCC would also delete the caveat or qualifier in that sentence concerning "the uncertainties associated with escapement objectives." Third, PNUCC recommended altering the last sentence to state that a failure to manage for spawning escapement objectives "will" [not "could"] jeopardize Council support for future funding of production and habitat measures.

Section 8.1B (rebuilding schedules). PNUCC recommended deleting all of Section 8.1B, concerning the fishery managers' development, review, and revision of escapement objectives and rebuilding schedules.

Section 8.1C.1 (consultation). PNUCC recommended editing this section to state that the fishery managers are to consult with the Council yearly concerning the consistency of harvest management and harvest rates with the established escapement objectives, eliminating references to "management goals" and "rebuilding schedules."

Section 8.2A.1 (harvest management). Edit this section to call for fishery managers to "[m]anage fisheries to provide escapement that allows for the weakest stocks to rebuild and exceed escapement goals."

A few public comments supported the idea of adopting the Recovery Team's escapement objectives into the program, most notably from the Corps of Engineers. Harvest comments received from the state and federal fishery agencies and tribes -- from the Columbia Basin Fish & Wildlife Authority (CBFWA, the coalition of all the basin's federal and state fishery agencies and tribes), the Columbia River Inter-Tribal Fish Commission (CRITFC, representing the four lower Columbia treaty fisheries tribes), the Yakama Indian Nation, the Oregon Department of Fish and Wildlife (ODFW), the Washington Department of Fish and Game (WDFW), Idaho Department of Fish & Game (IDFG), and the Pacific Fishery Management Council (PFMC)

-- did not expressly comment on the use of the Recovery Team's escapement objectives. The agencies and tribes' objection to the use of the Recovery Team's escapement objectives can be inferred, however, from the fact that CBFWA's proposed program re-write, which CBFWA submitted as a comment, retained the existing language in the program, from other comments from agencies and tribes as to how they planned to manage or approach the issue of fisheries, which did not include use of the Recovery Team's objectives. Even more important is the fact that the agencies and tribes objected to a number of Council initiatives in the management of harvest because these are, in CBFWA's view, provisions that "contravene the statutory management and operational responsibilities of the fishery management agencies" and are inconsistent with the tribes' treaty fishing rights. The agencies and tribes expressed a clear preference for resolving harvest issues through the *U.S. v. Oregon* framework and, as noted by PFMC in its comments, by following what NMFS eventually develops as part of the Snake River Recovery Plan. The Bonneville Power Administration (BPA) commented that it agreed with the Council that stock-specific management goals and escapement objectives should be established for each stock, without reference to the Recovery Team's recommended objectives.

Finding: On this record, the Council rejected PNUCC's recommendation to adopt the Recovery Team's escapement objectives as not complementing the activities of federal and state fish and wildlife agencies and appropriate Indian tribes. 16 U.S.C. § 839b(h)(6)(A). The Recovery Team's recommendations have been reported to NMFS and to the agencies and tribes generally, and NMFS and the others will decide whether and how to incorporate these objectives in the recovery plan and in the *U.S. v. Oregon* harvest management process. The Council continues to call in Section 8.1A.1 for the fishery managers to develop and submit to the Council escapement objectives, which the Council understands may be developed as part of the general biological framework for the program called for in Section 4. The Council did adopt PNUCC's recommendation for revising Section 8.1A.1 to state that a failure to manage for escapement objectives, when developed, "will" [not "could"] jeopardize Council support for future funding of production and habitat measures.

Eliminate mixed-stock fisheries; promote terminal fisheries, known-stock fisheries and other fisheries where the harvest of weak stocks can be prevented.

Recommendation: PNUCC recommended a number of specific amendments that add up to a call for an end to mixed-stock fisheries, a shift to terminal fisheries and other types of fisheries to prevent harvest of weak stocks, and other steps in the direction of more restrictive harvest management to protect weak stocks:

Section 8 (salmon harvest) and Section 8.2 (adopt harvest rates and regimes). PNUCC recommended editorial changes to the introductory text to Section 8 as a whole and to Section 8.2 to reflect the substantive changes it also recommended, including calling for a "complete moratorium on all ocean and mainstem mixed-stock fisheries until such time that all weak stocks are fully recovered and exceeding escapement goals."

Section 8.2A (harvest management). PNUCC recommended replacing Section 8.2A.1, which concerns harvest management regimes and harvest reductions, with language calling for the fishery managers to "[w]ork to eliminate mixed-stock fisheries, shifting harvest to tributary and terminal harvest areas that do not impact weak stocks (see Section 8.3). Manage fisheries to provide escapement that allows for the weakest stocks to rebuild and exceed escapement goals."

Section 8.2B through 8.2F (harvest management -- sockeye, fall chinook, spring chinook, summer chinook, voluntary harvest reduction for all fisheries). Consistent with its call for the elimination of mixed-stock fisheries, PNUCC also recommended deletion of all of these sections, which concern how to manage existing fisheries to protect these weak stocks.

Section 8.3 (improve harvest management). PNUCC recommended altering and greatly expanding the introductory text to Section 8.3. The proposed language emphasizes PNUCC's call for the elimination of mixed-stock fisheries and the promotion of terminal fisheries, including specific language about problems associated with the ocean troll, Columbia River gill-net, mainstem sport, and treaty mixed-stock fisheries, and recommending that treaty fisheries should be limited to terminal areas and to "Ceremonial and Subsistence platform dip-net fisheries" in the mainstem.

8.3A (harvest planning). PNUCC recommended minor changes to Section 8.3A.1 and 8.3A.2 to state clearly that BPA should fund the efforts of tribal and state fishery managers to develop and implement live-catch techniques and known-stock fisheries and to state that the Council supports the "re-programming of" enhancement activities that are geared toward stocks that contribute to "terminal fisheries" (not "adequately controlled fisheries").

Section 8.3B.1 (development of alternative capture technologies) and Section 8.3C.1 (terminal harvest fisheries). PNUCC recommended minor changes to these two sections to (1) call for "a" pilot project (not "pilot projects") to evaluate methods for selectively harvesting abundant stocks while conserving weak stocks, and to limit participation in this effort to "tribal" harvesters (not all harvesters); and (2) to call for BPA to "[c]ontinue to fund the study" of terminal fishery sites, with a further call to "develop," and not just "evaluate" these sites, and also adding a sentence to call for the development of a "business plan to make terminal fisheries self supporting, and identify hatchery production for re-programming."

Public comment received by the Council included comments advocating more severe limits on harvest (Columbia County, Oregon, Commissioner Dale Heimuller); more aggressive action by the Council to oppose or eliminate all mixed-stock fisheries (Upper Columbia United Tribes or UCUTs, Douglas County PUD); support for a Council-proposed option to reduce the fall chinook exploitation rate to 35 percent, derived from a Recovery Team recommendation (UCUTs, PNGC, PNUCC); in-river commercial harvest only of marked hatchery fish (Pacific Northwest Waterways Assn.); elimination of all in-river commercial harvest which incidentally takes Snake River chinook, especially lower river gill-netting (Columbia River Alliance); the targeting of harvest on productive stocks while minimizing impacts on weak stocks (Save Our Wild Salmon); commercial and sport harvest that is restricted to what is biologically prudent to maintain a genetically diverse naturally spawning population (PNGC); no harvest of listed species until adequate escapement is established to restore populations (Corps of Engineers); an aggressive schedule to switch mixed-stock fisheries to selective live-catch and terminal fisheries, harvest measures tied to reprogrammed hatchery production "to support only natural escapement and terminal fisheries," and an accounting for incidental salmon catch in non-salmon fisheries, (PNUCC); a reduction in harvest rates and implementation of selective fishing techniques to protect weak stocks (Direct Service Industries or DSIs); the preservation of genetic diversity and limits on mixed stocked fisheries weak stock harvest as the Council's coordinating philosophy, including acknowledgment by the Council that the Endangered Species Act is now the major driver of harvest management (BPA). The Council also received comments in support of the continued development of terminal fisheries in general or specific terminal fishery projects (e.g., Rep. Elizabeth Furse, PNUCC, BPA).

On the other hand, the Council received comments objecting to proposals to ban lower river gillnet fishing (Salmon for All); objecting to the Council's call for reductions in the fall chinook harvest rate and to the

Council's support for continued closures of ocean fisheries (PFMC, Washington Trollers Assn.); objecting generally to further reductions in ocean harvest and in-river gillnet harvest, coupled with information or remarks concerning how greatly reduced these fisheries already are, their minimal impact on listed populations, and a comparison of the minimal impact of present harvest rates on weak populations with the greater impact of other human activities throughout the life-cycle (Northwest Gillnetters, Pacific Coast Federation of Fishermen's Association, Pacific States Marine Fisheries Commission, Washington Trollers Assn., ODFW). The Yakama Indian Nation emphasized that selective fisheries are not an effective tool for rebuilding populations, given the already minimal impact of fisheries. And the Council also received comments recognizing that the Council's role, as opposed to NMFS' specific goal under the ESA, is to rebuild healthy and numerous salmon populations over the long-term precisely so these populations can support thriving and traditional (if possible) tribal and non-tribal fisheries that contribute once again to a healthy salmon economy and culture in the region (e.g., Save Our Wild Salmon, DSIs, CBFWA). Most important, the Council received comments from nearly a consensus of the fishery managers (all but the UCUTs) objecting to Council proposals calling for further harvest restrictions, to the proposed 35 percent fall chinook exploitation rate, and to the closure of fisheries as an improper intervention by the Council that, as noted above, "contravenes the statutory management and operational responsibilities of the fishery management agencies," interferes with treaty fishing rights, and interferes in the proper resolution of harvest issues by NMFS in its recovery plan and by the sovereign parties to the *U.S. v. Oregon* litigation. These comments emphasized that the fishery managers should make the decisions on whether further restrictions were needed on particular fisheries and on harvest rates, including fall chinook harvest (CBFWA, CRITFC, Yakama Indian Nation, WDFW, IDFG, PFMC).

Finding: Based on this record, the Council did adopt a portion of PNUCC's recommendation. The Council continues to encourage the development of terminal fisheries wherever possible, primarily in Section 8.3C and adding a new Section 8.3C.2 calling for a joint strategy to create viable terminal fishery operations. The Council also recognized a need for and recommended more cautious and conservative harvest management to protect the weakest stocks, especially in those fisheries where the least is known about the impacts of the fishery and about how to manage to avoid impacts. The Council also supported only those production activities that contribute to adequately managed fisheries and do not aggravate mixed stock fishery problems. And, the Council called for efforts to reduce the harvest on non-targeted species. See the added language in the introduction to Section 8, in the introduction to Section 8.2, in Section 8.3A.2 and the new Sections 8.4E and 8.5B.

The Council continues to recognize that its provisions on harvest are only recommendations, however, and that the fishery managers have the full authority to determine the nature and extent of fisheries. The fisheries managers did not support PNUCC's recommendation to eliminate mixed stock fisheries. Thus the Council rejected this part of PNUCC's recommendation as not complementing the activities of the federal and state fish and wildlife agencies and Indian tribes, as those activities include managing the harvest of fish, 16 U.S.C. § 839b(h)(6)(A)(7), and as being in conflict with the legal rights of Indian tribes in the region, whose treaty harvest rights have been defined by the federal court in *U.S. v. Oregon* to include mixed-stock harvest, 16 U.S.C. § 839b(h)(6)(D). The Council continues to support the development of selective harvest methods, Section 8.3B, but rejected the recommendation to limit funding only to "a" sole project limited to tribal harvesters, as less effective than the adopted provisions for the protection, mitigation, and enhancement of fish and wildlife, 16 U.S.C. § 839b(h)(7)(C). More such projects increase the chances of increasing the protection, mitigation and enhancement of the runs.

Improvements in the techniques for estimating adult returns.

Recommendation: Section 8.4C (improve stock abundance prediction method). PNUCC recommended revising the title and content of Section 8.4C in order to “Improve Stock Abundance Prediction Methods.” PNUCC recommended the deletion of the existing language in Section 8.4C.1, which called for the Fishery Managers to develop expanded marking and catch sampling programs, replacing it with a call to “[i]dentify data needs and develop research plans to provide information and develop models needed to improve predictions of adult returns to the Columbia River.” The proposed text noted existing problems in predicting adult returns, especially the variables influencing ocean survival; an over-prediction for upriver spring chinook in 1994, which led to excessive commercial gill-net and mainstem sport fishery harvests; the adverse impact of this event on the treaty fisheries, which were forced to curtail harvest to compensate; and the corresponding need to improve prediction methods to “account for other factors that effect the survival of salmon.” PNUCC also recommended a minor corresponding change to Section 8.4C.2 to call for BPA and the fishery managers to share the cost of expanded marking and sampling “and other” programs that are “needed” to achieve the desired level and precision of “the new prediction methodology.” PNUCC also recommended an editorial change to the introduction to Section 8 to reflect these amendments.

Finding: The Council revised the introductory language of Section 8 and Section 8.2A and added provisions to former Section 8.4C (now Section 8.4D) that incorporated in modified fashion PNUCC’s recommendation to develop better data and prediction methods, coupled with a call for a more conservative approach to harvest management where the uncertainties are greatest. The title of Section 8.4D was altered as PNUCC recommended. Section 8.4D.1 (former 8.4C.1) was not revised as PNUCC recommended; instead, a new Section 8.4D.3 calls on the fishery managers to “[i]dentify and implement research and model refinements needed to improve preseason and inseason estimates of abundance and fishery impacts,” with costs to be shared between BPA and the federal government.

Improvements in the reporting of harvest data.

Recommendation: Section 8.5E (unified reporting of harvest data). PNUCC recommended an addition to Section 8.5E to make sure that harvest data is included in the Coordinated Information System (CIS) data base.

Finding: The Council revised Section 8.5E.1 to call for the PSMFC to use the CIS in the preparation of an annual unified harvest report. The Council also revised the introduction to Section 8 to recognize the need for improved data bases to estimate fishery impacts.

Reductions in the ocean harvest of Canadian fish by Washington fishers to obtain corresponding reduction in the harvest of Columbia River fish by Canadian fishers.

Recommendation: Section 8 (salmon harvest). PNUCC recommended changes to the introductory text of Section 8 that would have the Council recognize that inequities had developed in the U.S and Canadian ocean salmon fisheries and that the Washington fishers must reduce their harvest of salmon from Canadian rivers before Canada would agree to reduce the harvest by Canadian fishers of weak Columbia stocks, primarily fall chinook.

Finding: The Council’s proposed rule incorporated PNUCC’s recommendation in modified form in the introductory text to Section 8 and in a new Section 8.5F that discussed issues related to the harvest dispute between the United States and Canada and the re-negotiation of the Pacific Salmon Treaty. In the public comment, the PFMC supported reductions in Canadian fisheries “which currently have by far the highest

impact on Snake River fall chinook of any ocean fisheries.” CBFWA in general agreed with the Council’s approach and language, although it recommended deletions and modifications that in its view placed too great a burden on the U.S. negotiators or that contravened the authority of the fishery agencies and tribes. The Council modified the provisions in the Section 8 introduction and in Section 8.5F to reflect in part CBFWA’s concerns, but those sections continue to incorporate PNUCC’s recommendation.

Program Section(s): New 8.3C.2 (treaty fishing access sites)
Source: Bureau of Indian Affairs
Recommendation No.: 8-2

Recommendation: The BIA recommended a new Section 8.3C.2 to “provide for additional Treaty Fishing Access Sites along the Columbia River, in support of the goals of P.L. 100-581.” Tribal fishers encounter competition with downstream fisheries, recreational fishers, wind surfers, and others for river access as a result of dislocation from their original fishing grounds. This law directs the Corps of Engineers to acquire and construct Treaty Fishing Access Sites along the Columbia River; the Corps’ various efforts to implement the law are at various stages of progress. The BPA interpreted this recommendation as a call to the BPA to fund or provide these access sites (it does not seem that this was BIA’s intent), and objected to the recommendation as not being a measure to protect, mitigate and enhance fish.

Finding: The Council rejected this recommendation not because the Council objects to this work, but because this is not a measure for the protection, mitigation, and enhancement of fish survival, 16 U.S.C. § 839b(h)(5), and because this recommendation can and should be more appropriately addressed in other forums.

SECTION 10: RESIDENT FISH

Program Section(s): 5, 10.3A, 10.3B
Source: Montana Department of Fish, Wildlife and Parks and the Confederated Salish and Kootenai Tribes

Recommendation: In the summer of 1994, the Montana Department of Fish, Wildlife and Parks (MDFWP) and the Confederated Salish and Kootenai Tribes submitted refined integrated rule curves for the operation of Hungry Horse and Libby dams as called for by Sections 10.3A.3 and 10.3B.2. These curves were developed over the last seven years to incorporate the needs of resident fish, above and below these projects, into project operations. Because implementation of these curves has consequences for salmon and steelhead flows, as well as for the production of electricity, the Council decided to consider the integrated rule curves during the anadromous fish rulemaking and the recommending entities agreed.

In comments, MDFWP stated that it is imperative that the integrated rule curves for Libby and Hungry Horse be adopted as part of this process. The Confederated Salish and Kootenai Tribes called for the adoption and implementation of rule curves to protect resident fish in Libby and Hungry Horse reservoirs. CBFWA included the integrated rules curves in its comments and asked the Council to adopt them in this process. CBFWA also stated that the members of CBFWA would be meeting in an attempt to resolve

apparent conflicts between the recommendations of upper- and lower-river members and would report to the Council in February or March 1995.

Montana Governor Racicot, Flathead Lakers, USFWS, Kootenai International Coalition, Flathead Basin Commission, Lincoln County (Montana) Economic Development Council, Western Montana Electric G & T, Lincoln County Commissioners, Montana Board of County Commissioners, and Jim Abbott (Member of Canadian Parliament) supported the adoption of the rule curves.

The Corps of Engineers supported adopting the integrated rule curves, but noted that it will not implement the curves for Libby Dam until completion of an evaluation of the effects of drawdown restrictions on flood control and was satisfied that there was a sufficient justification for new rule curves.

The Bureau of Reclamation stated that it was not prepared to implement rule curves until completion of a number of processes, including the System Operation Review and litigation over ESA-listed stocks. The Bureau also stated that the language apparently gives the Council, MDFWP and CSKT veto over power drafts and that such a change in project control requires Congressional authorization. Also, the proposed 60-day notice requirement (for exceeding drafting limits) is too long to provide flexibility needed for emergency power and flood control operations.

BPA stated that operating Hungry Horse and Libby dams at higher levels would degrade the power system. BPA's analysis indicated that there would be reliability problems during a period of severe winter weather if these projects were operated to their upper rule curves. According to BPA, while operating headwater projects to upper rule curves on a monthly basis otherwise appears feasible, it costs an average of \$93 million in low runoff years.

James Litchfield, a consultant working for the Montana Council office, concluded that the Council and Bonneville analyses of the curves were reasonable given existing knowledge. The Montana Power Company stressed need for further refinement and analysis of these specific rule curves and other alternatives before implementation, including a "20/40/60 case" that would reduce the resident fish protection and power impacts of the proposed curves. Ponderay Newsprint Company recommended that the Hungry Horse and Libby measures be addressed through the System Operation Review process and that further analysis was needed before any action should be taken to adopt them.

Finding: The Council adopted the integrated rule curves as recommended. Analyses by MDFWP, CSKT and the Council indicate that these curves are needed to protect, mitigate and enhance resident fish affected by the operation of Montana reservoirs. Commentors concerns about project authorizations and emergency operations can and should be addressed in implementation of the new operating rules. The Council encourages the fish managers and others to submit appropriate information as it becomes available regarding the coordination of upstream and downstream activities to ensure that program measures, including this measure, addressing anadromous fish, resident fish and wildlife are consistent. The Council analyzed and understood the power and cost impacts of the rule curves, and the Council has addressed BPA's reliability concerns. See the discussion/findings in the program Section 1.8, the Section 5 introduction and its findings, and Appendices B and C (the hydropower costs and impacts analysis and the AEERPS analysis).

Program Section(s): 5, 10.6E
Source: Idaho Department of Fish and Game

In March 1994, the Idaho Department of Fish and Game submitted a scope of work developed in consultation with the fish managers, Bonneville, the Corps, the Council and others, for a study to address key questions relating to the spawning and recruitment of kokanee in Lake Pend Oreille. The Council called for development of this statement as part of the resident fish and wildlife rulemaking in 1993. During public review and comment on the statement of work, NMFS indicated that it supported the portion of the proposal that would hold Lake Pend Oreille 5 feet higher in the winter because this would provide higher flows in the spring which would benefit the outmigration of juvenile salmon and steelhead. Because implementation of higher winter lake levels has consequences for salmon and steelhead flows, as well as for the production of electricity and kokanee production, the Council decided to consider this reservoir operation recommendation during the anadromous fish rulemaking, and the recommending IDFG agreed.

CBFWA supported the Lake Pend Oreille study, subject to the 1995 report they will provide on upstream-downstream issues. The Corps of Engineers noted that one possible consequence of the proposed measure might be an increase in warmwater fish in the Pend Oreille River and that this might increase the chances of entrainment of those fish through the dam, and hence into Washington state. The Corps pointed out that the Corps and Bonneville are considering the operation described in the measure and that the necessary NEPA documentation is undergoing public review as part of the SOR process. Baseline studies necessary to implement the measure are being carried out this winter.

The UCUTs opposed the Pend Oreille reservoir level/kokanee study and asked that it be deferred while other alternatives are studied, such as an alternative proposed by UCUTs and by Eastern Washington Council Office. The Ponderay Newsprint Company generally agreed with these comments.

Cominco, a British Columbia company that owns the Waneta hydroproject on the Pend Oreille river below Lake Pend Oreille, stated a concern about the proposed changes in operations which would change lower river flow regimes. It noted the effect of the higher winter lake level would be to decrease flows when Waneta has generating capacity and increase spring flows when Waneta is spilling excess water. This has a potential to reduce electricity production by 100 giga-watt hours at a cost of \$2.5 million. BC Hydro states that limiting drawdown at Lake Pend Oreille would adversely affect energy production at BC Hydro's Seven Mile product and its right to generation at Waneta and that the proposal should be submitted to International Joint Commission for consideration.

Finding: The Council adopted measures that address salmon flows and kokanee in Lake Pend Oreille. These measures recognize that investigation of methods to enhance kokanee can occur in tandem with changes in the operation of the lake to benefit the migration of juvenile salmon and steelhead lower in the Columbia River Basin. For this reason, the Council has called for a five-year study to investigate means for enhancing kokanee. The first three years of the study will evaluate the effects of holding Lake Pend Oreille 5 feet higher in the winter. Other aspects of the study include those proposed by Idaho Department of Fish and Game, the Upper Columbia United Tribes and the Eastern Washington Council Office, and include investigation of the effects of the higher lake level on warm water species and entrainment. The Council is encouraged that the completion of the necessary NEPA documentation and baseline studies is occurring in a manner that is timely to begin the study in fall 1995. The Council is aware of the financial consequences of this study and fully considered these consequences in reaching a decision. Finally, the Council encourages the fish managers and others to submit appropriate information as it becomes available regarding the coordination of upstream and downstream activities to ensure that program measures which address anadromous fish, resident fish and wildlife are consistent.

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