

Section 4

SALMON GOAL AND FRAMEWORK

To be effective, the fish and wildlife program must be more than a collection of measures.

Individual efforts must be coordinated, and measures must be integrated into an overall plan designed to achieve specific goals and objectives.

To achieve this coordination, the salmon and steelhead sections of this program do three things:

First, the program is focused and organized around a framework. This framework consists of an overall goal (of doubling salmon and steelhead runs without loss of biological diversity) and rebuilding targets for Snake River salmon populations. The program also provides a process for developing additional rebuilding targets, salmon and steelhead rebuilding schedules, survival targets and performance standards to track change for individual measures. The goal and rebuilding targets, along with the other program measures, should guide the region toward salmon and steelhead rebuilding, while important work is done to complete the framework.

Second, the program establishes a coordinated implementation process (see Section 3) in which implementing agencies, working through the Bonneville Power Administration's implementation planning process, can systematize and prioritize the implementation of program measures. Recognizing that the Council is a planning and oversight entity, not an implementing entity, action on program measures will be managed by implementing agencies, not the Council. The Council will monitor and comment on this process, offer help where requested, and may, through additional program amendments, establish new measures or priorities.

Third, reflecting the Council's longstanding commitment to adaptive management, the program establishes a process to monitor and evaluate program implementation in a way that adds systematically to the region's knowledge of salmon and steelhead recovery (see Section 3).

During the 1994 amendment process, the Council solicited further recommendations, regarding framework elements but few were received. Following the decision in *NRIC v. Northwest Power Planning Council*, the Council sought further advice from the fish and wildlife managers on the analytical framework. This resulted in a proposal from the managers, which the Council circulated for comment. While the resulting comment was valuable, it was not possible to complete the framework on the basis of the comments. The Council will continue to work with the fish and wildlife managers and others to develop the elements of the framework, and will consider amendments to the program when that work is more fully developed.

The Council appreciates the preliminary efforts of the fishery managers to further define biological objectives and other framework elements reflected in the recent submission by the Columbia Basin Fish and Wildlife Authority. The Council looks forward to additional refinements that are anticipated in the spring of 1995 and thereafter. The Authority's submission noted the importance of a program that has as its biological objective the assured protection and restoration of the productivity of the fish and wildlife resource and produces measurable results. It called for a fishery resource that is viable, sustainable and biologically diverse in the long term and can meet tribal, commercial and recreational harvest needs.

The Authority also pulled together a number of threads throughout the program and identified biological objectives that provide for survival improvements and production improvements. Juvenile survival improvement strategies outlined by the Authority for the tributaries, mainstem and estuary include: maintaining stream and riparian habitat programs; minimizing travel times, bypass losses, predation and delay at projects; and

maximizing fish passage efficiencies. For the adult segment of the salmon life cycle in the ocean and the Columbia River, the Authority suggested survival improvements that include: increasing adult migration rates and minimizing delays; managing straying; maintaining resting pools and spawning gravel; meeting escapement goals; meeting recruit/survival ratios; minimizing by-catch; and managing harvest. To improve production, the Authority noted the importance of meeting broodstock needs; managing interactions with naturally spawning fish; conducting hatchery audits; maximizing improved release strategies and natural habitat releases; and meeting escapement and seeding targets.

Taken together, these objectives and strategies are reflected in the statements of biological purpose in this program and, with the Authority's expressed commitment to work with the Council, will provide important direction for the continued efforts to flesh out the overall program framework.

The following Section 4.0 is a largely unchanged version of Appendix A of the Strategy for Salmon. It has been brought into the body of the program to reflect the importance the Council places on framework development. Pending further work on the framework, in addition to the

rebuilding targets adopted in 1992, the Council adopted recommendations for biological and operational objectives for the mainstem and other parts of the program where such objectives were clearly based on the recommendations the Council received.

4.0 Components of the Program Framework

The program framework provides the structure for the fish and wildlife program. It includes the overall program goal, rebuilding targets for identified populations, and schedules to achieve the rebuilding targets. The framework also provides the biological objectives for the program. Biological objectives describe biological change needed to rebuild individual populations. Measures are evaluated against these objectives to identify the strategy that will achieve the objective for the least cost. Finally, performance standards provide readily measurable indices of biological and physical change expected from the measures. The relationship between these elements forms a hierarchy as depicted in the following diagram:

The components of the program framework are linked by a series of facts and assumptions that provide the rationale for the measures in the Council's program. For the most part, these assumptions have been implicit. As such, the program is difficult to evaluate. Inconsistencies among measures are difficult to identify. The Council believes that the conceptual foundation for the program should be explicit so that inconsistencies and scientific weaknesses can be identified. The Council has begun this process by identifying critical hypotheses associated with mainstem passage (Section 5.0E). In addition, the Council has called on the Independent Scientific Group to develop an overall conceptual foundation for the program (Section 5.0F).

4.0A Program Goals

The program goals set the direction and scope of the program and provide the philosophy that guides the Council's selection of measures. Examples include goals to maintain and enhance stock diversity, restore weak runs and double overall salmon production. Collectively, the other elements of the program are expected to make significant progress toward or accomplish the goals.

4.0B Rebuilding Targets and Schedules

Rebuilding targets provide the management intent and the numeric goals for the population. Rebuilding schedules describe and refer to specific populations and incorporate the idea of stock conservation units, minimum sustainable population size, compatibility with other stocks and expected variability. Rebuilding schedules are based on the biological needs of the fish, management goals and the projected effectiveness of actions. Because of the number of conditions affecting population size that are outside the control of this program, it may be necessary to state rebuilding schedules in terms of the probability of reaching a numeric target within the schedule given achievement of the biological objectives. Rebuilding targets are

dynamic elements that will likely change as knowledge increases and techniques are improved.

4.0C Biological Objectives

Biological objectives describe the biological characteristics needed to achieve the rebuilding targets and, ultimately, the overall program goal. They also are intended to provide a standard against which to compare alternative measures under Section 839b(h)(6)(C) of the Northwest Power Act. Biological objectives should be independent of the measures and should not constrain the Council to a single course of action.

Development of biological objectives must be based on a sound technical and analytical foundation that incorporates all phases of the life cycle of salmon and steelhead. Because our scientific information is imperfect, the biological objectives should not be considered immutable standards, but instead should be viewed within the context of the Council's adaptive management approach and will be refined as knowledge improves.

4.0D Performance Standards

The effectiveness of actions is often uncertain or depends on other actions. It will be important for the Council and the region to track measures in a timely manner. Performance standards for each action or set of actions should provide an easily measurable index that relates to the type of biological or physical change intended. Performance standards provide a point of reference against which to monitor change, and units of measure to define change. They are not intended to state or limit obligations or to resolve technical uncertainties.

4.0E Measures

Program measures are specific actions to be undertaken to contribute to achieving biological objectives and rebuilding schedules. When monitoring shows a program measure is not performing adequately, the measure should be

modified or replaced. Measures must stand or fall on the basis of their demonstrated contribution toward the biological objectives.

4.1 SALMON AND STEELHEAD GOAL: DOUBLE SALMON AND STEELHEAD RUNS WITHOUT LOSS OF BIOLOGICAL DIVERSITY¹

In crafting the overall goal of this salmon rebuilding strategy, the Council is faced with the challenge of balancing the need to increase the number of fish in the Columbia, maintain and enhance biological diversity, and preserve wild and naturally spawning populations.

The production of salmon and steelhead in the basin prior to development has been estimated at 10 million to 16 million fish. Today's total production of salmon and steelhead amounts to fewer than 2.5 million fish. Between 5 million and 11 million fish are estimated to have been lost due to development of the hydroelectric system. Thus, significant change in the system is required. To address the loss due to hydroelectric development, the Council set a numeric target for the 1987 program -- doubling of salmon and steelhead production in the Columbia Basin. In the 1994 amendment process, based on the recommendation of the Columbia River Inter-Tribal Fish Commission, the Council adopted four systemwide sub-goals based on the Northwest Power Act's call to protect, mitigate and enhance salmon and steelhead affected by the development and operation of the hydropower system: The first goal is to halt declines in the populations and rebuild populations to a biologically sustainable level by the year 2000. The second goal is to further rebuild populations by 2030 to a level that will support commercial and sport harvest and contribute to the Council's interim goal of doubling the abundance of

salmon and steelhead in the basin. The third of these goals is, by 2194, to rebuild populations beyond the level in the previous goals to a level that will protect, mitigate and enhance fish and wildlife affected by the operation and development of the Columbia Basin hydroelectric system. The fourth goal is to accomplish these rebuilding efforts without loss of biological diversity.

While numeric increases in salmon populations are needed, they must be tempered by the understanding that the Council wants increases that can be sustained over the long term. The importance of this was recognized by the Council in the 1987 program. Rebuilding was not to be driven inexorably toward a numeric goal, but was to be tempered by the assessment of genetic impacts, use of a mix of production methods and emphasize the area above Bonneville Dam.

Concern for biological diversity and preservation of wild and naturally spawning stocks has been heightened by the listing of several Snake River salmon populations as endangered under the Endangered Species Act, and the identification of numerous other weak populations. There is increasing concern that preservation of the diversity of populations and biological traits present in the Columbia Basin may be essential to maintain increased fish numbers on a sustained basis.

Unfortunately, these two resource values -- increased numbers and biological diversity -- often appear to be incompatible. On the one hand, measures to increase population size in the short term can decrease biological diversity. On the other, measures to conserve biological diversity may limit the region's ability to achieve short-term gains in production. Sustainable increases in numbers, however, will require a healthy, biologically diverse resource that can be productive and accommodate environmental variability.

The Council sees its role as planning for the restoration of a healthy, productive resource throughout the accessible range of habitat in the Columbia Basin. To do this on a sustained basis will require actions directed not only at increasing the number of fish, but also actions to conserve biological diversity and increase the productivity of natural stocks. Increased numbers and the conservation of biological diversity are not

¹Biological diversity means the variety and variability among living organisms and the ecological complexes in which they occur.

incompatible. They are both key to the conservation of the resource and fulfillment of the obligations of the Northwest Power Act. A productive and biologically diverse population is essential to increased production that can be sustained over the long term.

4.1A Salmon and Steelhead Rebuilding Principles

The Council has adopted as part of its overall goal the doubling of the total number of adult salmon and steelhead in the Columbia Basin as fast as possible without further loss of biological diversity among or within anadromous and resident fish populations.

The doubling goal applies to the basin as a whole. It may not be possible or desirable to double the populations of all species in all subbasins. Specific means and locations for increasing production will be identified in future planning.

The time needed to double the runs will depend on a number of factors, including the program policies for mainstem survival, harvest management and fish production, and on further assessment of production opportunities. The Council recognizes that any action has the potential for causing some genetic change in the population. In establishing biodiversity as part of its goal, the Council states its desire to avoid adverse genetic change to the maximum extent practicable, to consider genetic impacts as important criteria for selection of measures, and to monitor changes in genetic and life history diversity as measures are implemented. This does not preclude carefully designed, controlled and monitored supplementation programs.

Except where human-induced habitat changes have produced increases in some species to the detriment of salmon and steelhead (for example, squawfish), efforts to meet these goals for salmon and steelhead should not occur at the expense of other native species and wildlife. Because most of the loss of salmon and steelhead production as a result of hydroelectric development has occurred above Bonneville Dam, the Council will continue to focus its efforts on this area.

The Council recognizes that achieving its goal will require actions on all fronts over many life cycles of salmon and steelhead. In the short term, it will require increased attention to the need to conserve biological diversity and halt the decline in many populations. This may occur at the expense of actions that might provide greater short-term increases in numbers, but could possibly jeopardize the biological health of the resource in the long term. It will require increases in mainstem passage survival, improved habitat and production practices, and diligent management of harvest.

To help focus efforts toward this goal, six principles should be used to evaluate activities in subregional planning (see Section 3.1D) and other program processes:

1. Priority should be given to activities that aim to rebuild weak upriver populations, including populations listed under the Endangered Species Act.
2. Program activities should pose no appreciable risk to biological diversity among or within fish populations (including resident fish), with the exception of principle number five, below. The best available data and assessment tools should be used to evaluate biological risk before determining whether to proceed, and activities should be followed-up with monitoring and evaluation.
3. The region should approach habitat and production activities from a total-watershed perspective, not as activities that occur in isolation from land and water conditions in watersheds. Special priority should be given to projects that are part of model watersheds or other coordinated watershed programs, especially those with local community involvement.
4. While the bulk of the region's attention is currently focused on threatened and endangered stocks, it is important not to lose sight of this region's obligations to fulfill Indian treaties and provide fish for Indian and non-Indian harvesters. Investments and adjustments should be made to provide harvest opportunities in

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- tributaries or other areas and to facilitate rebuilding weak populations.
5. Consistent with the Council's adaptive management policy, priority should be given to activities that address critical uncertainties and/or test important hypotheses. Activities should be designed as experiments so that the results fill in the region's understanding of salmon and their survival requirements. Even a measure that poses risks for a population may be acceptable if the potential learning benefits are high enough.
 6. Because of concerns over the basin's salmon carrying capacity, the effects of hatchery-produced fish on those that spawn in streams, and the cost of hatcheries, new salmon production facilities generally should not be constructed unless it is clear that the need for fish cannot be met with existing facilities, or a new facility would be a better way to achieve the program's goals.

The subregional process (Section 3.1D) should generate important information on the costs and biological effectiveness of habitat and production measures. This information will contribute to the independent evaluation of program cost-effectiveness by the Independent Scientific Group (Section 3.2B), and be reflected in the annual implementation work plan (Section 3.1B.2).

All of these principles reflect important concerns, but for at least the next five years, the preponderance of the ratepayers' investment should be directed to rebuilding weak stocks. Both the potential biological value of weak stocks and the requirements of the Endangered Species Act suggest that the path to doubling must begin with weak populations.

This weak-stock priority includes populations listed under the Endangered Species Act, but is not limited to these populations. The Northwest Power Act calls for a long-term approach to fish and wildlife mitigation, not simply a reaction to immediate problems. Treaties with Indian tribes and with Canada call for the United States' best

efforts to rebuild these populations to self-sustaining, harvestable levels. The Council is committed to this cooperative effort. Moreover, there are many weak salmon populations not listed under the Endangered Species Act. It is in the region's interest to take forceful steps to strengthen these populations before it becomes necessary to list them. Limiting ratepayer investments to threatened or endangered species in these circumstances is simply an invitation for new Endangered Species Act petitions.

While the preponderance of the ratepayers' investments should be directed to weak stocks, weak stocks should not be the exclusive focus of the program. Over the past decades, Indian tribes and other harvesters have given up harvest on species after species, and that disturbing trend appears to be continuing. For tribal fishing rights to have meaning, there must be enough fish in the rivers to allow a reasonable harvest. Upriver fishers are entitled to salmon populations that are more than museum specimens. In the long term, as weak stocks are rebuilt, harvest opportunities may be expanded throughout the basin, consistent with rebuilding targets. In the short term, the region should also make investments and adjustments to provide harvest opportunities in tributaries or other areas where there will be no significant negative effect on weak populations.

4.1B Basis for the Salmon and Steelhead Goal

The Northwest Power Act directs the Council to develop a Columbia River Basin Fish and Wildlife Program to protect, mitigate and enhance fish and wildlife "affected by the development, operation and management" of the hydropower system in the basin. Essential to this definition is an understanding of the extent to which salmon and steelhead have been affected by the hydropower system. In 1985, the Council began gathering information on the extent and causes of the declining numbers of salmon and steelhead in the basin. In 1985 and 1986, the public reviewed and debated the nature and limitations of that information. (The results of the Council's efforts

have been published in a separate volume entitled, *Compilation of Information on Salmon and Steelhead Losses in the Columbia River Basin*, document number 87-15A.)

After compiling information on salmon and steelhead losses, the Council solicited extensive public comment on the contribution of the hydropower system to declines in run sizes. Based on the losses information and on public comment, the Council identified alternative ways to estimate the portion of total losses that could be attributed to hydropower. (These alternatives are described in a separate volume entitled, *Numerical Estimates of Hydropower-Related Losses*, document number 87-15B.)

Following is a summary of the Council's analysis of: 1) losses from all causes, and 2) losses related to development and operation of the hydropower system. (For further analysis, refer to Council documents 87-15A and 87-15B.)

- **Estimate of losses from all causes:** After an intensive review of the available data to make an informed judgment, the Council reached the following broad conclusions regarding salmon and steelhead losses.

Estimates of the average annual adult salmon and steelhead runs before development in the basin (dating to the mid-19th century) range from about 10 million to 16 million fish. In contrast, the average annual run size now is about 2.5 million adult fish. These estimates indicate a net basinwide decline in run size of about 7 million to 14 million adult fish due to a range of causes including fishing, logging, mining, grazing, agriculture, irrigation, pollution and urban development, as well as hydropower development and operation.

Salmon and steelhead habitat in the entire basin has decreased from about 14,700 river miles before 1850 to about 10,100 river miles in 1976, a loss of about 30 percent. Salmon and steelhead habitat in

the Columbia River Basin above Bonneville Dam has decreased from about 11,700 river miles before 1850 to about 7,600 river miles in 1976, about a 35-percent loss.

The greatest salmon and steelhead losses occurred in the Columbia and Snake river drainages above Bonneville Dam. The three main factors responsible for these losses are loss of habitat, mortality of adult and juvenile fish passing through mainstem dams and reservoirs, and mixed-stock fisheries. Habitat losses, as described above, have been extensive. Passage mortality has been estimated to average 15 percent to 30 percent of downstream migrants per dam and 5 to 10 percent of upstream migrants per dam. Recent analyses suggest that reservoir mortality in upriver reservoirs and at upriver projects could be lower in some instances. Nonetheless, passage mortality has enormous effects on upriver runs.

Cumulative juvenile passage mortality for fish migrating downstream past nine dams has been estimated to be 77 percent to 96 percent, depending on the volume and timing of streamflows. Cumulative adult passage mortality for fish passing nine dams upstream to spawning areas has been estimated to be 37 percent to 61 percent.²

In some mixed-stock fisheries, upriver wild and natural stocks, already weakened by habitat and passage losses, commingle with abundant lower-river hatchery stocks. Because fisheries generally do not distinguish among stocks in mixed-stock

² These juvenile and adult mortality rates assume downstream mortality rates of 15 percent to 30 percent per dam and upstream mortality rates of 5 percent to 10 percent per dam. These rates do not include higher survival levels that may be attainable by further improvements in bypass and transportation.

fisheries, all stocks present may be harvested at the same rate. In the past, harvest rates in mixed-stock fisheries generally were set to ensure adequate returns of hatchery fish, rather than to protect wild and natural runs.

Past efforts to mitigate the effects of development have had major implications for the salmon and steelhead fisheries. First, a series of fishing regulations contributed to a shift from inriver fishing to ocean fishing. Ocean fisheries (including those in Canada and Alaska) have accounted for up to 73 percent of the total Columbia River Basin chinook harvested in some years. Second, large-scale hatcheries were constructed. The majority of hatchery fish originally were raised and released in the lower river, supporting the expansion of the lower-river and ocean fisheries and resulting in increased harvest of already depleted wild and upriver stocks.

Historical records show that Columbia River Basin Indian tribes relied extensively on salmon and steelhead. Because most of the tribes are located in the upper portion of the basin, the decline in numbers of fish, combined with the shift of fish production from the upper to lower basin, had an incalculable impact on tribal economies, cultures and religions.

- **Estimate of hydropower-related losses:** The Council developed several methods for estimating hydropower-related losses. Using these methods, the Council estimated that declines in run size due to hydropower development and operation range from about 5 million to 11 million adult fish. This compares with the total decline from all causes of about 7 million to 14 million adult fish. The Council recognizes that data are limited and that other approaches to calculating losses may

be possible, but it anticipates that all reasonable approaches would result in loss estimates in this range.

Cannery records support the reasonableness of the 5 million to 11 million range. Canneries on the lower Columbia River kept records of the number of salmon and steelhead delivered by fishermen. The maximum catch, according to these records, occurred in the 1880 to 1920 period and was about 8.8 million fish annually. Anthropological information for this period suggests that the Indians caught an additional 0.9 million fish and that non-Indian settlers in the upper portions of the Columbia Basin probably harvested a similar number. Thus, one reasonable estimate of the historical maximum catch in the Columbia Basin is about 10.5 million fish. Assuming that four out of every five fish were caught, the total run size can be estimated at about 13 million fish. Given the current run size of 2.5 million fish, this would mean that the salmon and steelhead run size has declined by more than 10 million from all causes. Of that 10 million, about 8 million can be attributed to the hydropower system. That 8 million includes 4 million salmon and steelhead that were produced in the areas blocked by Chief Joseph and Hells Canyon dams. Losses caused by mainstem hydropower operation (assuming that 15 percent of downstream migrants are killed at each mainstem dam) account for the decline of the other 4 million fish. (Documents 87-15A and 87-15B provide additional background information.)

The present runs of about 2.5 million adult fish would have to be increased by 5 million to reach the low end of the range of estimated hydropower-related losses. Such an increase may not be feasible because biological, socio-economic and other limits on fish production may prevent such rebuilding. Increases in the salmon and

steelhead runs will come through specific program measures consistent with system policies and planning. If 5 million more adult fish are produced as a result of this program, the Council may review its analysis of the hydropower ratepayers' share for protecting, mitigating and enhancing salmon and steelhead to judge whether the range can be narrowed.

The estimated range is stated in terms of a net loss or reduction in run size. It does not take into account the accumulation of hydropower-related losses of salmon and steelhead year by year since hydropower development started. Such cumulative losses would be far greater than 5 million to 11 million adult fish.

4.1C Doubling Goal Performance Standards

The doubling goal is based on the average number of adult salmon and steelhead in the Columbia River Basin from 1977 to 1981, the five years prior to the Council's adoption of its first Columbia River Basin Fish and Wildlife Program. That five-year average has been estimated to be 2.5 million salmon. Today's numbers should be obtained by combining the number of adult salmon and steelhead of all species counted at Bonneville Dam, the number of fish spawning below Bonneville Dam and the estimated number of salmon caught in the ocean and in rivers below Bonneville Dam. The program monitoring report (Section 3.2A) should provide an annual accounting of production relative to this performance standard.

4.1D Biological Diversity Performance Standard

The performance standard will be the existing level of biological diversity. Existing biological diversity will be defined by a list of base-line populations against which populations will be compared annually. The natural processes of

extinction and speciation will result in variation around the base line over time. New knowledge also may indicate the need for revision in the base-line list of populations.

Implementing Agencies and Fishery Managers

4.1D.1 To establish the biodiversity base line, the Council calls on participants in the implementation planning process to convene an appropriate group of experts from the fishery agencies, tribes and elsewhere to provide recommendations for the population list. A final recommended list of populations should be submitted to the Council by June 30, 1995. The program monitoring report (Section 3.2A) should provide the annual list of populations and include a qualitative, and if possible, quantitative assessment of status and conditions for each population. The annual review also will include recommendations to modify the population list on the basis of new information.

4.2 SALMON AND STEELHEAD RESEARCH AND EVALUATION

4.2A Guiding Principles for the Columbia River Basin Salmon and Steelhead Research Program

- Salmon and steelhead research under this program is expected to be designed to reduce scientific uncertainty and increase knowledge to achieve the salmon and steelhead goal and policies of this program.
- Research priorities are expected to reflect a systemwide analysis of the major

uncertainties and problems associated with increasing runs in a biologically sound manner.

- Funding of research by Bonneville and the Corps should be consistent with the critical uncertainties identified in Section 3.2C.
- Knowledge gained as a result of the research program is to be reviewed and evaluated in a central policy forum and made available in a timely manner to policy-makers, resource managers, biologists, hydroelectric project operators and regulators, and other interested parties.
- The fish and wildlife agencies and tribes should participate in development and oversight of the research program.
- Bonneville and the project operators and regulators are expected to provide the funding and resources necessary to implement the research program.
- Research funded by Bonneville and the Corps under this program is expected to be coordinated with research funded by other entities to ensure efficient use of funds and maximum return on research investments.

4.3 REBUILDING TARGETS, PERFORMANCE STANDARDS AND MONITORING

4.3A Snake River Chinook Rebuilding Elements

The Council has introduced the program framework to structure and focus program measures. Work on the framework elements as well as coordinated development and refinement of

analytical tools will continue. These tools will help analyze additional actions and, equally important, help identify information needs. This will help the Council establish new program biological goals, measures and performance standards and review those that already exist. Key purposes of further analytical development and Council action are to establish clear links between rebuilding targets and performance standards and measures needed to accomplish the targets and to clarify the relationship between flow, river velocity and survival.

A major part of the framework is the rebuilding plans for each Snake River chinook population. Because of pending decisions on regional initiatives, the Council is unable at this time to establish all the elements of rebuilding plans. These decisions should be made as rapidly as feasible. The Council calls on participants in the implementation process to work with the Council to develop recommendations for the rebuilding plans in time to contribute to the process of deciding on these regional initiatives. After the decisions are made, the Council will adopt rebuilding plans for identified Snake River chinook populations. These will include rebuilding targets and schedules. This process is not intended to substitute for expeditious action on the rebuilding measures already adopted in these amendments.

The Council sets rebuilding targets for wild and naturally spawning Snake River salmon populations above Lower Granite Dam as follows: annual averages of 50,000 adult spring chinook, 20,000 adult summer chinook and 1,000 adult fall chinook. These represent ambitious targets, but targets the Council believes are achievable in the long term. Relative to the estimated 1991 returns of wild and naturally spawning fish, they will require more than an order of magnitude increase in numbers. Although the targets call for a strong recovery from the current situation, they will not restore these populations to their condition prior to development of the basin's hydroelectric system. The key component for achieving this rebuilding target is increasing the percent of smolts that survive to return as adults. Survival improvements of this magnitude will require aggressive implementation of all measures in the program.

Rebuilding targets do not quantify any party's obligation under the Northwest Power Act. Rebuilding targets represent the Council's judgment of ambitious, interim population sizes that achieve the Council's goal and can be achieved by carrying out the mix of measures called for in this program. The feasibility of achieving these targets with measures in the program was checked using the best analytical computer models available.

The Council supports rebuilding Snake River salmon populations to productive, fishable levels as rapidly as possible within program goals. The Council recognizes that immediate measures are not enough to achieve an adequate level of rebuilding or the management goals of the State of Idaho and will continue to seek greater rebuilding.

Implementing Agencies and Fishery Managers

4.3A.1 Working with the Council, begin to develop rebuilding plans for identified population management units. The plans should include the elements of a rebuilding plan identified in Section 4.0, including definition of the population management unit, management goal, rebuilding target, survival targets, rebuilding schedule and performance standards. The Council views this as a limited effort that should draw on the information developed in system planning, new information developed since then (including information on genetic needs and weak stocks) and the coordinated analytical methods process (Section 3.2F). As much as possible, rebuilding plans should reflect and incorporate the subbasin plans developed as part of the 1987 program. A schedule and work plan for development of the rebuilding plans should be submitted to the Council by June 30, 1995. Recommendations on the rebuilding plans for Snake River populations should be submitted to the Council by September 1, 1995. Recommendations for other populations should be submitted to the

Council as soon as possible and not later than January 15, 1996.

Bonneville

4.3A.2 Fund travel and reasonable expenses of the fishery managers necessary to develop these recommendations.

4.3B Development of Performance Standards

The effectiveness of actions is often uncertain and depends on other actions. It will be important for the Council and the region to track measures in a timely manner. Performance standards for each action or set of actions should provide an easily measurable index that relates to the type of biological or physical change intended.

Performance standards are intended to provide a point of reference against which to monitor change and units of measure to define change. They are not intended to state or limit obligations or to resolve technical uncertainties.

Performance standards will take a variety of forms. In some cases, they will specify changes in survival when these are measurable; in others, they may relate to physical or qualitative changes, or to accomplishing certain tasks within certain time frames. However, it is the Council's intention that performance standards relate to actual biological results (e.g., improvements in survival) whenever feasible, and not just to factors that relate inferentially to biological change.

At the same time, performance standards must be measurable on a timely basis and relate directly to the biological change intended by the measure. Performance standards should be linked to the rebuilding schedules and survival targets, and reflect changes needed to meet the biological objectives. They are not intended to be rigid and inflexible, but should respond to new knowledge. As information improves, better performance standards may become apparent.

Implementing Agencies and Fishery Managers

4.3B.1 Solicit input from the following groups to develop additional performance standards: Fish Passage Advisory Committee, Fish Transportation Oversight Team, Integrated Hatchery Operations Team, Regional Assessment of Supplementation Project and the Technical Advisory Committee of the Columbia River Compact.

Recommendations for additional performance standards for individual measures or logical groupings of measures should be developed through the implementation process. Participants in the process should solicit input from other appropriate groups or individuals. Each group should review program measures appropriate to its area of expertise and provide recommendations for performance standards. A final list of recommendations should be submitted to the Council by July 1, 1995. Performance standards should reflect program measures and survival targets. The Council will review and act on these recommendations to provide a final set of performance standards.

4.3C Population Monitoring

While dam counts of salmon will provide important, timely information on progress toward rebuilding runs, they combine several possibly diverse populations of spring, summer and fall chinook above Lower Granite. In so doing, important information about the status of these individual populations can be lost. At the same time, it may be prohibitive, both in terms of money and effort, to closely monitor every potentially distinct portion of this larger population. Monitoring activities themselves also have the potential for causing salmon losses within weak populations.

For these reasons, the Council intends to establish a limited number of indicator populations that will be the focus of intensive monitoring. The genetic stock identification project described in Section 8.4 may indicate that revision of these indicator populations is needed in the future. The

purpose of indicator population monitoring is not only to provide detailed stock status information on these particular populations, but also to provide basic life history and survival information that will be applicable to all populations within the larger population. This will provide the Council with a clearer picture of the factors limiting natural populations and permit refinement of the program over time.

Fishery Managers

4.3C.1 Develop and submit to the Council:

- A limited set of populations that can serve as indicators of wild and naturally spawning salmon populations. These can include hatchery stocks if necessary to provide harvest rates for wild and naturally spawning populations. The indicator stocks selection should be closely coordinated with and take advantage of existing monitoring and research efforts, including actions conducted under the U.S./Canada Pacific Salmon Treaty. The proposal should be submitted to the Council by December 31, 1995.
- A proposal for a coordinated program to monitor key indicator populations of wild and naturally spawning populations of salmon. Hatchery populations should be included when they can form appropriate indices of harvest, for example, on wild and naturally occurring populations. This monitoring program should conform to data needs and reporting formats developed through the coordinated information system.
- A proposal to develop needed technology for monitoring of wild and naturally spawning populations and efficient and timely transfer of information to the coordinated information system. This should include development of Passive Integrated Transponder (PIT) tag

detectors to monitor juvenile and adult populations and mobile counting weirs.

- A proposal for the use of video counting technology for population monitoring at mainstem dams and at tributary dams and weirs.

Council

4.3C.2 Facilitate the development of the above monitoring elements. Council staff should review the proposals as they are developed and make recommendations to the Council regarding their value to the program monitoring effort. The Council will review the proposals and give appropriate direction to the implementing agencies regarding their development.

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