

Section 8

SALMON HARVEST

Because of the critical status of some salmon stocks and the need to realize the benefits of changes in hydropower system operations and other restoration efforts, the number of salmon harvested must be further limited to allow a sufficient number of adult fish to return to spawn. In addition, the status of some populations is unknown. Until more information is available for these fish populations, conservative harvest strategies are needed. Those salmon that return, called the “escapement,” must do so in large enough numbers to rebuild the populations, not just to sustain current low numbers.

Control of harvest, therefore, is a critical component in building a long-term, sustained increase in runs. That simple concept is the only thing that is simple about harvest. Harvest control is complicated by the fact that regulations fall under a number of jurisdictions, that there are mixed-stock fisheries and that the demand for harvestable salmon generally exceeds the supply.

Harvest has been shaped by decades of negotiations between the United States and Canada and by extensive litigation that has involved ocean, inriver, treaty and non-treaty fisheries.

A 1985 treaty between the United States and Canada provides for international management of stocks that migrate through the waters of both nations. The Pacific Salmon Commission, formed under that treaty, makes recommendations to both nations on the conduct of salmon fisheries. The treaty reduced interceptions of salmon returning to Northwest rivers. Stocks of chinook salmon, particularly upper river bright fall chinook from the Columbia River, benefited from the overall ceiling on chinook harvested in Canadian and Alaskan fisheries.

Importantly, the interception of Columbia River salmon by British Columbia is directly related to the interception of salmon of Canadian origin in

U.S. fisheries (Alaska and Washington). Further reductions in the Canadian interception of Columbia River stocks will require northern Washington and Alaska fisheries to reduce interception of Canadian salmon stocks. Parties to the treaty met in 1994 to discuss revisions. An opportunity to further reduce the interceptions of weak stocks of Columbia River chinook salmon was lost due to a failure to agree on mutual reductions.

The Pacific Fishery Management Council manages salmon fisheries from three to 200 miles off the coast. State regulations that extend to three miles offshore must be consistent with Pacific Fishery Management Council regulations. Since 1980, commercial and recreational fisheries have been constrained in both season length and allowable harvest. Salmon seasons off Alaska are regulated by the State of Alaska and must be consistent with Pacific Salmon Commission recommendations.

The Columbia River Fish Management Plan, developed as part of the agreement reached under *U.S. v. Oregon*, established a process that the Columbia River Treaty tribes and state management agencies use to regulate tribal and non-tribal fisheries in the river. The state of Idaho, the Shoshone-Bannock Tribes and others are not signatories to this agreement. The plan sets specific goals, timetables and methods for cooperative management of salmon and steelhead stocks, including both natural and hatchery fish production and allocation of harvests.

The Columbia River Compact is the forum used to set commercial fishing regulations in the river. Congress ratified the agreement between Oregon and Washington for the regulation, preservation and protection of fish in waters over which the states share jurisdiction. The state of Idaho and the Indian tribes are not members of this compact. While the individual states set their own

sport fishing regulations for the river, these regulations must complement previous agreements for conservation and allocation of other fisheries.

All the tribal governments involved in salmon and steelhead harvest have regulations to control and manage the harvest in tribal commercial, ceremonial and subsistence fisheries. These regulations are coordinated with state regulations and must also be consistent with conservation and allocation agreements.

In this harvest section, the Council makes no claim to regulatory authority. It clearly recognizes the fishery managers' jurisdiction and tribal treaty rights, and no measure is intended to affect or modify these rights. The Council also acknowledges that there has been substantial progress in harvest management over several decades, and that declines in harvest levels have come at considerable economic cost to tribal, coastal and inland communities.

Nevertheless, additional measures are necessary if the region is to meet its long-term goal of biological diversity by rebuilding weak runs and if it is to provide sustainable and adequate harvest levels for tribal, sport and commercial fisheries.

One of the major challenges harvest managers face is that the fisheries in both the ocean and mainstem Columbia River are mostly mixed-stock fisheries (see Section 8.3 for additional discussion of mixed-stock fisheries).

Another difficult and related problem is that there are more demands for salmon for harvest than there are harvestable fish. The fishing capability of commercial fleets is much larger than necessary to take the harvestable surplus of salmon each year. The recreational fishery also has grown over the years and is capable of harvesting large numbers of salmon. The large demand for salmon to harvest puts a great deal of pressure on the management systems to deliver the maximum number of fish for harvest. Inadequate information and budgets, and the variable nature of salmon, the environment and the fishing fleets -- all make it extremely difficult to precisely manage harvest impacts on weak stocks.

In the Columbia River Basin, the problem associated with mixed-stock fisheries results partially from operation of an increasing number of

hatcheries. The mixed-stock fishery problem cannot be resolved without implementing a harvest management program that coordinates harvest of production from different areas and also is consistent with both hatchery and natural production. The solution also requires the development and implementation of complementary programs to increase the productivity and survival of wild and naturally spawning stocks throughout their life cycle. It is the Council's belief that progress in improved stock identification and in technology that permits selective fisheries has the potential for allowing greater harvest of strong stocks and greater protection of weak ones. Regional fisheries interests are particularly urged to press for additional gains in both areas.

The Council has developed measures in this section that call for:

- Development of a program that will help fishery managers identify weak stocks so that they can be afforded better protection in mixed-stock fisheries.
- Improvements in data bases and models used to evaluate and estimate fishery impacts.
- Ongoing review and revision of sport and commercial fishing regulations in areas where weak stocks are found.
- More complete accounting of salmon harvest in general and, in particular, as a bycatch in fisheries for other species.
- Improved law enforcement to reduce illegal taking of salmon, and public education programs that explain the impacts of illegal or wasteful fisheries.
- Development of marking and alternative capture technology that will allow unmarked wild and naturally spawning salmon to be released safely.
- Development of terminal (known stock) harvest opportunities in the Columbia River

and tributaries to allow harvest of stronger stocks while minimizing impacts on weak ones.

The Council believes the measures in this section can and should be implemented by the Pacific Salmon Commission, Pacific Fishery Management Council, Columbia River Compact and other existing state and tribal management entities.

The Council also believes that the state of Idaho and the appropriate Columbia River Basin tribes, if they believe their membership is appropriate, should be included in the Columbia River Compact.

8.1 DEVELOP HARVEST GOALS AND ESCAPEMENT OBJECTIVES

8.1A Management Goals and Escapement Objectives

Fishery Managers

8.1A.1 Expedite the development and/or re-evaluation of management goals¹ and spawning escapement objectives.² Harvest should be managed to meet rebuilding targets (see Section 4.3), recognizing the statistical quality of the run forecast and the uncertainties associated with escapement objectives. Failure to establish and manage for spawning escapement objectives will jeopardize Council support

¹ Management goals specify the management intent for the stock and the number of fish needed to fulfill this intent. Management goals also define the population management units that may be evolutionarily significant units, stocks or collections of stocks.

² Escapement objectives specify the number of fish, either as a single number or a range, required to spawn to fulfill the biological requirements of the population management unit and achieve the management goal over the long term. Escapement objectives should incorporate the concepts of minimum viable population and effective population size and accommodate the uncertainty and variability in biological productivity and environmental conditions.

for future funding of production and habitat measures in the Council's program.

- 8.1A.2 Revise the Columbia River Fish Management Plan to provide explicit protection for Snake River chinook and sockeye salmon populations.
- 8.1A.3 Revise the Pacific Fishery Management Council's Salmon Plan to specifically account for needs of listed salmon in the Columbia River.

8.1B Rebuilding Schedules

Fishery Managers

8.1B.1 Develop and/or review and revise, as necessary, escapement objectives and rebuilding schedules as stated in Sections 4.3 and 8.1A.1. Harvest managers should especially consider how existing harvest management and legal agreements can be modified to assist with achievement of the rebuilding targets. The development of rebuilding schedules for weak stocks will require the identification and annual achievement of survival targets at a number of stages throughout the life cycle of specific weak stocks.

All Parties

8.1B.2 Assist in the development of rebuilding schedules that consider all sources of mortality.

8.1C Consultation

Fishery Managers

8.1C.1 Consult with the Council during April of each year on the consistency of harvest management with the rebuilding schedules and escapement objectives of the fish and wildlife program. The consultation will address:

- the extent to which exploitation rates, escapement objectives and management goals were achieved during the previous year's harvest season;
- the extent to which proposed regulations for the coming season are expected to achieve exploitation rates, escapement objectives and management goals; and
- a status report on management goals, escapement objectives and rebuilding schedules for weak stocks.

8.2 ADOPT EXPLOITATION RATES AND REGIMES

While there is need to reduce harvest to facilitate rebuilding in the short term, there is also an urgency to move forward with salmon marking programs and to develop selective fishing gear and terminal harvest opportunities to increase harvest over the long term while protecting weak stocks of salmon. Fishery managers should look for ways of providing incentives to further reduce harvest and accelerate the shift to selective fisheries. This section provides managers with targets, but does not prescribe means to achieve them. The management agencies should have maximum flexibility to be creative and work with various fishing interests to come up with workable harvest strategies that will meet not only escapement objectives, but also existing and future Indian treaty requirements and non-treaty allocation, economic and social objectives.

Fishery managers should adopt more conservative and adaptive approaches in developing harvest management strategies recognizing the statistical quality of the data and variability of the environment, the fish populations and the seasonal distribution of fishing effort.

8.2A Harvest Management

Management of harvest depends heavily on the ability to forecast the number of fish available to each fishery for a given season. Managers have developed various methods for making these forecasts. However, because of the number of complex factors that determine the population size of any geographic point and the amount of available information, the accuracy of these forecasts is relatively poor. The amount of information, and consequently the accuracy of the forecast, improves as fish approach the spawning ground. Fisheries in the Columbia River are managed with more reliable information on population size than are fisheries in the ocean, for example.

Conversely, the first opportunity to harvest fish occurs furthest away from the spawning ground. The first fisheries, in the ocean, are managed with the least information on fish abundance, while the later fisheries are managed with greater precision. Managers rely on the ability to successively restrict later fisheries to correct for errors in the management of early fisheries.

If the errors in the forecasts are such that the early fisheries harvest at too high a rate for the actual population size, then the in-river fisheries are more heavily restricted. If the errors in the forecast are large enough, it also happens that the spawning escapement suffers and insufficient fish return after harvest to meet spawning goals.

An example of this in the Columbia River is fall chinook. Columbia River fall chinook are harvested in ocean fisheries off the coasts from Alaska to Oregon. Regulations for these fisheries are usually set in the spring prior to the summer harvest season. These regulations are based in part on abundance predictions for various key populations in the areas of the fisheries. The predictions are based on historical information and expectations of year class strength. The fish that remain after harvest enter the Columbia River in August. At this time, managers have an idea of the abundance based on the success of the ocean fisheries. As a result, the Columbia River Indian and non-Indian harvest is set. If the ocean harvest

success was not as expected the previous spring, then in river seasons are necessarily restricted. The lower-river, non-Indian fishery occurs first. Prior to the Indian fishery in zone 6, managers have a relatively precise idea of the population size based on dam counts at Bonneville and the success of the ocean and lower river fisheries. If necessary, the Indian fishery might have to be further restricted. The result is that the fishery where managers have the best information on acceptable exploitation rates, the tribal fishery in zone 6, is the most restricted, while the fishery for which managers have the least information, the ocean fishery, is the least restricted. Especially in recent years, managers have overestimated the population size early in the year. The result is either conflict over the management of inside fisheries or the reduction of escapement.

The Council urges that an alternative is to apportion the degree of restriction of harvest based on the amount of information available to manage each fishery. In this case, the ocean fishery would be managed more conservatively to allow for likely error in the forecasts. As the information on abundance improves closer to the spawning grounds, the exploitation rates could be set with increasing precision. Most importantly, the burden of management error is shifted from the resource and its escapement needs, to the managers and harvesters. The result should be more accurate management and a greater probability of meeting escapement needs.

Fishery Managers

- 8.2A.1 Adopt a management approach that more adequately spreads the risk of imprecision and error in predicted run size. Enact more conservative harvest limits on fisheries furthest from the spawning grounds for which information is less adequate.
- 8.2A.2 Implement harvest regimes that protect critical brood stock as part of a comprehensive effort to rebuild specific weak runs. Harvest reductions are of particular importance to protect weak

stocks currently in the ocean. Manage harvest as outlined here to help meet escapement and management objectives.

- 8.2A.3 Document how exploitation rates were calculated and develop a standard for expressing exploitation rates that can be used for assessing impacts on future fisheries. Select an appropriate base period for the calculation of historical exploitation rates as a standard to which future exploitation rates can be compared. This information should be made available as part of the unified report called for in this section.

8.2B Sockeye

Fishery Managers

- 8.2B.1 Manage the fisheries to allow only limited tribal ceremonial and subsistence sockeye harvest below the confluence of the Snake and Columbia rivers to facilitate ongoing emergency efforts to rebuild the Snake River population. Commercial fisheries should not be allowed below the confluence until the Snake River sockeye run is rebuilt to a level where the population could support some incidental harvest without jeopardizing rebuilding efforts. The Council also understands that the *U.S. v. Oregon* parties are committed to rebuilding these runs and, when appropriate, will use the *U.S. v. Oregon* Management Plan's emergency modification provisions to assist rebuilding. Relevant parties should consult on the potential to target commercial sockeye fisheries in the Columbia River above the confluence of the Snake River, while respecting tribal treaty rights.

8.2C Fall Chinook

Fishery Managers

8.2C.1 Snake River fall chinook have been harvested in numbers too high to allow rebuilding even with a reduction of human-induced mortality at other life stages. In the base period 1984-1990, exploitation rates ranged from 62 percent to 74 percent (averaging 69 percent). Fisheries affecting Snake River fall chinook should be managed to provide harvest at an exploitation rate no greater than 50 percent. These fisheries include those falling under the jurisdiction of the Pacific Salmon Commission and Pacific Fishery Management Council, as well as fisheries within the Columbia River Basin.

8.2C.2 The Council strongly urges that fisheries affecting Snake River fall chinook be further reduced below the specified 50 - percent exploitation rate using the measures described below and calls upon fishery managers to aggressively implement these actions. The Council will closely monitor rebuilding of the fall chinook runs and harvest constraints to ensure that harvest constraints are contributing their appropriate share to rebuilding.

8.2C.3 Establish annually an exploitation rate schedule lower than 50 percent in the near term, over all fisheries affecting Snake River fall chinook. The allowable exploitation rate in any given year should be directly linked to measures of recent productivity and recent and projected escapement. The schedule should aim to restore runs consistent with the Council goal to levels that can sustain spawning escapement objectives and healthy fisheries.

8.2C.4 The Council urges the appropriate state and federal entities to seek significant and immediate reductions in Canadian exploitation rates for Snake River fall chinook through the Pacific Salmon

Commission process. Fishery managers will need to work closely with the Pacific Salmon Commission and the Pacific Fishery Management Council to achieve the needed adjustments in ocean harvest of stocks of concern.

8.2C.5 Continue closure of ocean salmon fisheries, which began in 1994, in Pacific Fishery Management Council's area of jurisdiction, as needed to protect severely depressed Snake River fall chinook. Call on Canada and Alaska to implement similar closures in fisheries intercepting Snake River fall chinook.

8.2D Spring Chinook

Fishery Managers

8.2D.1 The Council recognizes the efforts of the fishery managers and harvesters to reduce the catch of upriver spring chinook that began in 1976. Relevant parties should continue to manage the Columbia River harvest of spring chinook according to *U.S. v. Oregon*, after it is appropriately modified as detailed in 8.1A.2. Keep impacts of the non-treaty inriver fisheries at about 4 percent of the upriver run, the 1987-1991 average.

8.2D.2 Intensify monitoring of ocean fisheries to ensure that exploitation rates are as low as believed and that incidental harvest remains low, about 2 percent or less of the upriver run. Include information on spring chinook exploitation rates in the unified report detailed below.

8.2E Summer Chinook

Fishery Managers

8.2E.1 The Council recognizes that there have been no commercial target fisheries for summer chinook since 1964, and that the tribal ceremonial and subsistence and non-treaty incidental catches of summer chinook have been fewer than 1,000 and 100 fish each year, respectively, since the mid-1980s. Continue to manage for this level of impact until the populations rebuild sufficiently to allow a higher incidental exploitation rate. Subsequently, manage the Columbia River harvest of summer chinook according to *U.S. v. Oregon*.

and become available; and 4) promote sound management, conservation and protection of the resource. Oregon and Washington should retire any permits bought out under this program, and no substitute permits should be issued in their stead.

Fishery Managers

8.2F.3 Reduce harvest level proportionately from that achieved under Sections 8.2B through 8.2E, above. To determine the level of reduction, use historical catch over a specific time or other criteria as the managers deem effective, feasible and fair (for example, use the average documented landings for the previous five-year period).

8.2F Voluntary Harvest Reduction For All Fisheries

Bonneville, Fishery Managers and Commercial Fishers

8.2F.1 Design and implement a “fish bank” program (similar to a farm bank where farmers are paid not to farm) to temporarily reduce harvest by leasing available fishing permits and/or licenses.

Washington, Oregon, Bonneville and Regional Utilities

8.2F.2 Develop and fund a voluntary commercial fishing permit buy-back program for non-treaty Columbia River commercial fisheries. The program should be limited to two to four years. The goals of the program are generally to: 1) reduce fishing capacity on the river; 2) respond to dislocations resulting from more restrictive harvest regulation; 3) encourage shifting to selective and/or terminal harvest practices using improved marking and selective harvest technologies as they are identified

Bonneville

8.2F.4 Develop a compensation plan including criteria for qualifying for and continuing in the program. Continue the program through 1995. Review its effectiveness annually with the Council.

8.2F.5 Fund the planning and implementation of the program upon Council approval.

Fishery Managers

8.2F.6 Using the *U.S. v. Oregon* or other appropriate harvest management forum, design and implement by January 1, 1996 harvest strategies that will allow weak stocks saved specifically through reductions in fishing capacity or intensity to “pass through” inriver fisheries to the spawning grounds.

8.3 DEVELOP ALTERNATIVE HARVEST OPPORTUNITIES

One of the major challenges harvest managers face is that there are mostly mixed-stock fisheries in the mainstem Columbia River, as well as in the ocean. This means fishers harvest a mixture of hatchery-produced and naturally produced stocks from many different areas of origin. Hatchery-produced fish generally can withstand a higher exploitation rate than most naturally produced fish. However, fishers in mixed-stock fisheries are generally unable to harvest specific stocks selectively. Thus, naturally produced stocks and weaker hatchery stocks are often harvested at rates appropriate for stronger stocks. The result is over-fishing of weaker stocks.

To allow harvest of stronger stocks, some incidental take of weaker stocks is inevitable in most fisheries. Fishery managers use the best available data to estimate incidental harvest under different fishing regimes. Fishing seasons and quotas are then set on the basis of acceptable impacts on weaker stocks.

To speed the rate at which weak stocks rebuild and to provide opportunities to harvest stronger stocks over the long term in the Columbia River, it is essential that development and evaluation of live-catch fishing technologies and known-stock fisheries be started immediately. Opportunities for selective harvest in ocean fisheries are more limited and will depend on better knowledge of the distribution of various stocks in the ocean (see Section 8.4).

8.3A Live-Catch Technology and Known-Stock Fisheries

Bonneville and Appropriate Federal Agencies

- 8.3A.1 To the extent practical, the Council supports enhancement activities geared toward stocks that contribute to adequately managed fisheries. This policy is intended to protect ratepayers from investing in major capital construction facilities that contribute to fisheries where there is harvest at levels exceeding those in this program or where the release of fish would aggravate mixed-stock fishery problems.
- 8.3A.2 Fund the fishery managers and fishers to develop and implement plans to evaluate the feasibility of live-catch fishing technologies and known-stock fisheries by 1995. Include a detailed analysis of incentives to encourage known-stock fisheries, including direct subsidies for known-stock fisheries in lieu of -- not in addition to -- mixed-stock harvest in the mainstem Columbia River. Consult with the Council prior to implementation and annually on progress.
- 8.3A.3 Share the cost on a 50/50 or other mutually agreed basis for the needed research and model development to improve accuracy and precision.

8.3B Selective Harvest Technologies

This measure develops and evaluates capture technologies to increase harvest of abundant fish stocks and minimize effects on depleted salmon stocks. The gear should minimize mortality of fish that are to be released.

Bonneville

- 8.3B.1 Fund pilot projects to demonstrate the feasibility of various methods to selectively harvest abundant stocks while conserving weak stocks. This effort should provide for participation by harvesters in the development of new methods and address such questions as public acceptance of the proposed technology, number and location of possible fishing sites, legislative changes needed to apply the proposed technology and the means of selecting harvesters for participation in the fishery.

8.3C Terminal Harvest Fisheries

This measure calls for identification and development of terminal fishing opportunities to harvest abundant stocks while minimizing the incidental harvest of weak stocks.

Bonneville

- 8.3C.1 Fund a study to evaluate potential terminal fishery sites and opportunities. This study should include: general requirements for developing those sites (e.g., construction of acclimation/release facilities for hatchery smolts so that adult salmon would return to the area for harvest); the potential number of harvesters that might be accommodated; type of gear to be used; and other relevant information needed to determine the feasibility and magnitude of the program, including experimental release of fish.

8.3C.2 Devise and carry out a joint strategy to create terminal fisheries operations able to meet all operating costs and repay a portion of capital invested from assessments on increases in fishers' harvest income. The strategy should address: means of accumulating the capital investment necessary to upgrade and expand operations in Youngs Bay and elsewhere; identification of further site opportunities for terminal fisheries and testing feasibility; performance of the underlying economic analysis (costs, projected returns, level of boat assessment required, other income sources) needed to support federal and state investments; and benefits realized in the form of reduced harvest pressure on weak Columbia River salmon stocks. Report to the Council by December 31, 1995, on actions taken and investment capital committed to at least one terminal fishery project of significance.

8.4 STOCK IDENTIFICATION

8.4A Expand Genetic Stock Identification Sampling

Fishery Managers

8.4A.1 Develop and implement an expanded genetic stock identification program for monitoring inriver and ocean fisheries as needs are identified. Review the proposed program with the Council by June 30, 1995, prior to implementation.

Bonneville, States and Appropriate Federal Agencies

8.4A.2 Ratepayers, states and the federal government should share the cost on an equal or other mutually agreed basis for

expanding the program to achieve the desired level of information needed.

8.4B Improve Genetic Stock Identification Data Base

Fishery Managers

8.4B.1 Determine the need for further development of a genetic stock identification data base for Columbia River stocks. Evaluate the potential for using DNA "fingerprinting" and other methods to identify chinook, coho, chum, sockeye and steelhead stocks in the Columbia River Basin. Review findings and recommendations with the Council by June 30, 1995.

Bonneville

8.4B.2 Fund the genetic stock identification program upon Council approval.

8.4C Marking Hatchery Salmon

The inability to easily identify hatchery fish exacerbates several problems. For example, concerns have been raised that stray hatchery fish may interbreed with wild and naturally spawning stocks, or with other hatchery stocks, with detrimental genetic impacts. To protect Snake River fall chinook, which have been listed as threatened under the Endangered Species Act, it has been proposed that all fall chinook released from hatcheries with histories of significant straying be marked. In addition, it is not generally possible to distinguish hatchery salmon from wild and naturally spawning salmon in mixed-stock fisheries. Finally, because not all hatchery salmon are marked, data on migration patterns, contribution to fisheries and other biological traits that, if known, could be used to improve survival, are limited.

Marking all hatchery salmon has the potential to help solve these problems, making it possible to

identify stray hatchery fish and remove them from wild and naturally spawning populations and from other hatchery brood stocks, to harvest hatchery fish selectively, affording some protection to naturally spawning stocks, and allowing better data to be gathered on characteristics of hatchery stocks. However, some important concerns need to be addressed. For example, marking fish is believed to decrease their survival, perhaps considerably. In addition, conflicts with use of the fin clip to identify coded-wire tagged fish need to be resolved.

Fishery Managers

8.4C.1 Continue to identify and report to the Council concerning hatcheries known to have relatively high rates of straying, whose strays are believed to be a threat to the integrity of wild and naturally spawning or hatchery stocks. Identify, if possible, an acceptable mark for fish from these hatcheries that complements existing marking programs.

Bonneville

8.4C.2 Continue to fund a program to mark all salmon from hatcheries having high stray rates, using the mark determined by fishery management agencies to be acceptable for this purpose, and to evaluate the effectiveness of such marking.

8.4C.3 Fund fishery managers to coordinate with appropriate technical experts to determine the feasibility of marking all hatchery salmon. Scope the marking program and identify alternative uses for the information obtained. The marking program should minimize mortalities caused by marking and meet the following criteria: 1) the mark should be applied without handling individual fish or causing significant stress; 2) the mark should endure throughout the life cycle of the fish; 3) the mark should be

readable without killing the fish bearing the mark; and 4) the methods should be inexpensive enough to permit the marking, sampling and processing of a representative sample of recovered marks at a reasonable cost. Conduct this evaluation in conjunction with the evaluation in measure 8.4C.1, above. Specifically, the information should provide answers to questions needed to resolve conflicts between hatchery programs and goals for wild and naturally spawning fish stocks, and improve hatchery fish survival. Report to the Council by February 1, 1995.

8.4C.4 Share funding of externally marking Willamette River spring chinook to allow identification of adults upon return to the Willamette Basin. Such marking will allow differential harvest of underutilized hatchery fish and identification of the current population size of wild and naturally spawning spring chinook in the basin.

Bonneville and Fishery Managers

8.4C.5 Mark all hatchery-reared chinook by 1995 to facilitate selective harvest in the future, pursuant to findings from the marking feasibility called for in 8.4C.3.

8.4D Improve Stock Abundance Prediction Methods

Fishery Managers

8.4D.1 Develop expanded marking and catch sampling programs as required for ocean and inriver fisheries where Columbia River weak stocks are caught. By May 1, 1995, review with the Council the magnitude and cost-effectiveness of any expansion in the existing marking and catch sampling programs prior to implementation.

Bonneville and Appropriate Federal Agencies

- 8.4D.2 Share the cost on a 50/50 or other mutually agreed basis for expanding marking and sampling programs to improve precision of additional coverage.

Fishery Managers

- 8.4D.3 Identify and implement research and model refinements needed to improve pre-season and in-season estimates of abundance and fishery impacts. Report on the planned work to the Council by January 1, 1996 prior to implementation.

Bonneville and U.S. Department of Commerce

- 8.4D.4 Share the cost on a 50/50 or other mutually agreed basis for the needed research and model development to improve accuracy and precision.

8.4E Assess Genetic Implications of Harvest

Harvest strategies affect not only the quantity of salmon reaching the spawning ground, they can also affect the genetic composition of the surviving fish. The age of maturation is inheritable in salmon, and many, if not most, fisheries are size selective, i.e., larger and older fish are targeted. The result is that fewer adults from older age classes will make up the spawning population.

This has two interrelated effects. Not only are some genetic components of the population eliminated through time, but productivity decreases because smaller fish have fewer eggs. Sustainable salmon populations and fisheries require that fishing strategies and escapement objectives provide comprehensive protection to the salmon populations as genetic resources. The fishery managers need to determine how this might be accomplished. In the interim, exploitation rates should be conservative.

Appropriate Federal Agencies

- 8.4E.1 Fund the necessary studies, including, but not limited to, literature search, simulation modeling, and monitoring and evaluation of proposed fishing strategies, in order to

pursue the goal of reducing genetic impacts of harvest.

8.5 PURSUE OTHER HARVEST MEASURES

8.5A Review Sport Fishing Regulations

State Fishery Agencies

- 8.5A.1 Re-examine sport fishing regulations, including trout fishing regulations, in weak stock areas and adopt catch-and-release regulations, closures or other measures as needed to protect depressed populations. Periodically review changes in sport fishing regulations with the Council.

8.5B Account for Incidental Harvest of Salmon

Pacific Fishery Management Council and North Pacific Fishery Management Council

- 8.5B.1 Report to the Northwest Power Planning Council on the incidental harvest of Columbia River salmon in other fisheries under their respective jurisdictions. Review with the Power Council the magnitude of the interceptions and potential for limiting or reducing such interceptions, including the use of guidelines for incidental harvest in those fisheries. Incidental catches should be estimated and the number of salmon caught applied toward the appropriate salmon harvest quota.
- 8.5B.2 Report on the number and weight by species of catches that are returned to the water or otherwise disposed of in commercial fisheries. As part of the report, make proposals to reduce such waste where it is having adverse effects

on Columbia River populations of salmon and steelhead.

they deem their membership appropriate, in the Columbia River Compact.

8.5C Law Enforcement and Public Education on Impacts of Illegal or Wasteful Fisheries

Tribal, State and Federal Government Agencies, Including the Departments of State and Commerce, as well as Other Public and Private Parties

8.5C.1 Use all available authorities to put a rapid end to all high seas drift-net fisheries. The Council commends Congress for its prompt ratification of the United Nations resolution calling for an immediate, general abandonment of drift netting.

Bonneville and Appropriate Tribal, State and Federal Enforcement Agencies

8.5C.2 Develop and implement an expanded enforcement program to provide additional protection to Columbia River salmon and steelhead with an emphasis on weak stocks throughout their life cycle. The program should include an educational component for the public. Fund the needed program, and review accomplishments and scope of the program annually with the Council.

8.5D Inclusion of Idaho and Indian Tribes in Columbia River Compact

States and Congress

8.5D.1 Enact legislation to include Idaho and appropriate Columbia River Basin tribes, if

8.5E Unified Reporting of Harvest Data

Reporting of commercial and sport salmon harvest, as well as dam passage information and spawning surveys, is scattered among a variety of jurisdictions. This information is needed by the Council, all of the involved agencies and tribes, and the public, all of whom must expend substantial effort to gather the information each year.

Pacific States Marine Fisheries Commission

8.5E.1 Prepare and circulate a unified report by June 1 of each year on harvest and escapement of various salmon and steelhead stocks in the Columbia Basin. Utilize the Coordinated Information System in preparing the report.

National Marine Fisheries Service

8.5E.2 Fund the development, printing and distribution of the Unified Harvest Report.

8.5F U.S. and Canada Pacific Salmon Treaty

While the absolute number of Snake River fall chinook taken by Canadian ocean fisheries is small because the population is depressed, it represents a large proportion of the population and the number of Snake River fall chinook harvested. About 40 percent of the ocean harvest of Snake River fall chinook is estimated to be taken in Canadian fisheries. The fisheries also catch large numbers of Washington Coastal and Puget Sound coho that are from stocks that are generally depressed.

The treaty placed a ceiling on relevant Alaskan and Canadian chinook fisheries. That particular portion of the treaty expired in 1992, and chinook

provisions to the Treaty have been negotiated on an annual basis ever since. The negotiations have been proceeding on two tracks. One track deals with management and conservation issues (e.g., chinook harvest ceiling). The second track concerns the equity issue (balancing salmon interceptions so that the country of origin receives the benefits from rebuilding and enhancement efforts).

The Canadian government has made it clear from the very beginning that progress on the management and conservation issues cannot occur without progress on the equity issue. They believe they are entitled by the treaty to reap the benefits of their fisheries restoration efforts in Canada.

It is generally believed that resolution of the equity issue is going to require the involvement of the Department of State and other senior Administration officials because state-level U.S. negotiators have not been able to agree on harvest reductions in U.S. fisheries. Until those hard decisions are made, Canada can continue to harvest Columbia River and Washington coastal and Puget Sound stocks, perhaps at levels above the ceiling provided in the expired annex of the treaty.

The conservation and equity questions can not be separated. A reduction in the Canadian interception of U.S. weak stocks will be tied to reductions in harvest by U.S. fisheries on robust Canadian stocks. Some of the Canadian stocks being intercepted by U.S. fisheries, such as the Fraser River sockeye, are actually increasing in abundance.

Council

8.5F.1 Consult with the Administration in Washington, D.C. on possible steps to resolve the conservation and equity issues.

8.5F.2 Inform the U.S. State Department that status quo or increasing exploitation rates in Canadian salmon fisheries catching Columbia River fish negates many of the sacrifices and investments being made in the Columbia River Basin restoration efforts. In addition, the federal government trust responsibility for the Columbia River Indian Treaty Tribes is not being met. An important part of the Indian treaties guaranteed tribal fishing rights. For the tribes and other non-treaty fishers in Washington and Oregon, fishing was almost non-existent in 1994 and is likely to remain at very low levels for the foreseeable future.

U.S. State Department

8.5F.3 Intensify efforts in the government-to-government discussions with Canada to resolve the equity issue. Assemble a meaningful equity package for negotiations with Canada. Seek to achieve an agreement on equity and conservation prior to the next harvest season.

Council

8.5F.4 Absent further reductions in harvest in Canadian fisheries, call on the fishery managers to make further reductions in domestic fisheries.

8.5F.5 Consult with fishery managers to see if there are opportunities to increase the production of other stocks to provide a buffer to Snake River stocks in the intercepting fisheries, assuming that harvest ceilings are retained.

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