



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Sustainable Fisheries Division  
7600 Sand Point Way N.E., Bldg. #1  
Seattle, Washington 98115-0070

APR 27 2001

1514-04-020

MEMORANDUM FOR: Donna Darm, Acting Regional Administrator

FROM:   
William L. Robinson  
Assistant Regional Administrator  
Sustainable Fisheries Division

SUBJECT: Joint State Tribal Resource Management Plan  
Provided by the Washington Department of Fish  
and Wildlife and the Puget Sound Tribes For  
Salmon Fisheries Affecting Puget Sound Chinook  
Salmon Under Limit 6 of the 4(d) Rule -  
DETERMINATION MEMORANDUM

TRACKING NUMBER: NWR/4d/2001/002

**ISSUE**

The Washington Department of Fish and Wildlife (WDFW) and Puget Sound Treaty Tribes [hereafter referred to as "Co-managers"], pursuant to their authorities under U.S. v Washington, provided a joint Resource Management Plan (RMP) for Puget Sound and Washington ocean salmon fisheries that will affect listed Puget Sound chinook salmon, *Puget Sound Comprehensive Chinook Management Plan: Harvest Management Component*. The National Marine Fisheries Service (NMFS) has reviewed the RMP and determined that it adequately addresses the requirements of Limit 6 of the Endangered Species Act (ESA) 4(d) rule (65 FR 42422, July 10, 2000; 50 CFR 223.203(b)(6)).

**RECOMMENDATION**

NMFS' Sustainable Fisheries Division (NMFS-SFD) evaluated the RMP provided by the WDFW and Puget Sound Treaty Tribes and finds that it adequately addresses all of the requirements specified under Limit 6 of the 4(d) Rule, including the criteria for Fishery Management and Evaluation Plans (FMEP) in Limit 4 of that rule. NMFS and the Co-managers recognize that there is a need for much more information regarding the affected ESU. For this reason, NMFS-SFD recommends that the application of Limit 6 of the ESA 4(d) rule to the RMP be in effect from May 1, 2001 through



April 30, 2003. Prior to the end of that period, NMFS will evaluate all of the information obtained and determine whether to extend the application of Limit 6 of the ESA 4(d) Rule to the RMP. The additional information required is contained in the Implementation Terms at the end of this memo. NMFS-SFD recommends that the Regional Administrator make a determination that Limit 6 of the ESA 4(d) rule apply to the implementation of the RMP for May 1, 2001 through April 30, 2003 with consideration for extension.

### **BACKGROUND**

NMFS issued a final ESA 4(d) Rule adopting regulations necessary and advisable to conserve Puget Sound chinook salmon (65 FR 42422, July 10, 2000). This ESA 4(d) Rule applies the take prohibitions of section 9(a)(1) of the ESA, and also prescribes specific circumstances when the prohibitions will not apply which are known as ESA 4(d) limits. The Co-managers, pursuant to U.S. v Washington have developed a RMP for Puget Sound salmon fisheries which will affect listed Puget Sound chinook salmon. NMFS is evaluating the RMP for application under Limit 6 of the ESA 4(d) Rule.

To briefly summarize the RMP, the Co-managers propose to constrain their fisheries with exploitation rate ceilings and escapement thresholds designed to promote the conservation and recovery of listed chinook populations in Puget Sound. Although the RMP focuses on Puget Sound and Washington ocean salmon fisheries, fisheries-related mortality throughout the migratory range of Puget Sound chinook - from Oregon to Southeast Alaska is included in these objectives. The RMP takes into account all Puget Sound chinook populations in setting these objectives.

Maximum exploitation rates and minimum escapement thresholds are used to constrain harvest within limits appropriate to the productivity of each management unit. Where data are available, exploitation rate objectives have been established for management units designed to result in: 1) escapements falling below critical levels no more than 5 percentage points more frequently than would occur with no fishing; and, 2) an 80% probability of exceeding a viable level within 25 years. These objectives are generally consistent with population standards NMFS used in previous consultations on harvest actions affecting listed Puget Sound chinook salmon (NMFS 1999, NMFS 2000a). The underlying rationale and methods for development of NMFS' population standards is described in more detail in the NMFS document, *RAP*:

*A Risk Assessment Procedure for Evaluating Harvest Mortality on Pacific Salmonids* (NMFS 2000b). Where data were currently insufficient to derive exploitation rate objectives consistent with these criteria, the RMP constrains exploitation rates at or below those of recent years, a period during which escapements have generally stabilized. Exploitation rates on populations comprising the majority of natural production in Puget Sound have decreased by 30-50% in recent years (1991-1994 Brood Years<sup>1</sup>) when compared with the earlier period (1977-1993 Brood Years).

The RMP includes a comprehensive monitoring and evaluation plan to assess fishing-related impacts to hatchery and naturally spawning chinook, the abundance of hatchery and naturally spawning fish for each of the identified management units, the effectiveness of the fishing regimes and general approach, and regulatory compliance. This information will be used annually to assess whether impacts to listed fish are as expected, and to revise the plan as appropriate. In addition, information from the monitoring programs will be used to refine existing management objectives and develop exploitation rate objectives for those management units where data are current unavailable.

## DISCUSSION

### *Controversial Issues*

The exploitation rates defined in the RMP may be controversial. Specifically, some may argue that they are too high. However, the approach used to derive exploitation rate objectives is inherently conservative in that it requires high probabilities of survival and recovery and takes into account data and environmental uncertainty. The proposed exploitation rates are generally consistent with the population standards NMFS has used in previous consultations on harvest actions affecting the Puget Sound chinook ESU. The exploitation rates in the RMP and associated technical tools, e.g., simulation models, age structure analysis, represent the best available scientific information. Additional work is on-going to better define the sensitivity of the exploitation rate approach to uncertainties in environmental conditions and biological parameter estimates. The

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<sup>1</sup> Brood year exploitation rates reflect the fishing-related mortality on an entire brood cycle, i.e., the length of time for all progeny from a particular year to return to spawn and die. In general, chinook have a 5 year brood cycle, although Puget Sound chinook mature primarily at ages 3 and 4. For example, the 1994 brood year exploitation rate would reflect fishing-related mortalities through 1999. It usually takes a year to collect and process the data, so 2000 data would not be available until mid-2001.

periodic plan reviews and annual evaluation called for in the RMP will allow incorporation of new information and revision of management objectives should populations not respond as expected. Much of this new information may also come from the Puget Sound and Olympic Peninsula Technical Recovery Team (TRT) which is scheduled to complete its tasks by December of 2002.

There may be concern about populations falling below their low abundance thresholds, i.e., that the exploitation rates defined by Appendix C of the RMP may not be sufficiently protective. The low abundance thresholds are conservative, often significantly higher than those associated with NMFS' population standards for Puget Sound, or Viable Salmonid Population (VSP) guidelines (McElhaney *et al.* 2000). Escapements for many depressed stocks have stabilized in recent years under similar exploitation rates, providing empirical evidence that the reduced rates are having their intended effect. Additionally, the Co-managers have committed to consider additional actions when application of the RMP, including Appendix C, is not sufficiently protective in a given year, and such additional actions would significantly benefit the stocks. Those actions include time and area restrictions, and species non-retention regulations. The effectiveness of those additional measures will be carefully monitored and evaluated by NMFS and the Co-managers.

The appropriate exploitation rates and which to chinook salmon populations they apply is dependent on the population structure of the Puget Sound ESU. The TRT has not completed its determination of population structure for the Puget Sound chinook salmon ESU, although it is expected to finish its work soon. The population designations reflected in the RMP are based on the Salmon and Steelhead Stock Inventory and Assessment (SASSI) (WDF *et al.* 1993) which identified populations based on differences in biological characteristics, genetic similarity, life history traits and geographic separation. Until that assessment is completed, SASSI stocks likely represent the greatest level of potential stratification (M. Ruckelshaus, NWFSC/NMFS, pers. com. to S. Bishop, NMFS, January 30, 2001). By using populations as described in SASSI, NMFS can be reasonably certain that no populations that may be important to the ESU have been overlooked.

#### *Public Review and Comment*

NMFS published notice of its proposed evaluation and recommended determination on the RMP for public review and comment on March

5, 2001 (66 FR 13293). The comment period closed on March 26, 2001. NMFS has reviewed the pertinent comments received and discussed the substantive issues with the Co-managers. None of the comments raised controversial issues. Several of the comments were addressed in NMFS' final Evaluation and Recommended Determination document (see attached), but no changes were required of the RMP.

The following organizations and citizens submitted comments to NMFS on its proposed evaluation and recommended determination on the RMP: Washington Trout (WT), the Washington Association of REALTORS (WAR), the Building Industry Association of Washington (BIAW), and one private citizen. Similar comments have been combined where appropriate. Only those comments related to NMFS' proposed evaluation and recommended determination are addressed below.

Comment 1: Several comments spoke to the legality of the listing itself, the 4(d) Rule, the treatment of hatchery fish under the ESA, and the allowance of direct take.

Response: NMFS understands the concerns of the commenters on these issues, but they are not relevant to the Evaluation itself. NMFS has addressed these issues in its response to public comment on the proposed 4(d) Rule, the decision to list, and in various NMFS technical documents and reports.

Comment 2: Two commenters stated that they were denied the opportunity to provide meaningful comment on the Evaluation because of 1) difficulty in locating the Evaluation on the website and 2) the availability of the Evaluation but not the RMP itself.

Response: The website address for NMFS Northwest Region as well as the telephone number and email address of the NMFS contact person were included in the Federal Register Notice (FRN). When the FRN was first published, NMFS received several calls and e-mails from reviewers asking for assistance in locating and printing the Evaluation. The difficulties were found to be a combination of software and web design problems which NMFS fixed and improved by the second day of notification. The FRN also listed the same contact information in order to obtain further information on the RMP. The RMP was, in fact, provided to several reviewers on request. The timeliness in which the problems were solved, the availability of NMFS staff to assist reviewers, and the availability of the RMP when requested

resulted in no substantial effect on the opportunity to review and comment.

Comment 3: Commenters expressed concern 1) about a two year approval of the RMP despite acknowledged data uncertainties, asserting that the RMP fails to meet the requirements of the 4(d) rule, and 2) it constituted an inconsistency in the treatment of fishery activities vs habitat activities.

Response: Limit 6 of the 4(d) Rule requires that NMFS determine that 1) the RMP addresses the criteria as referenced in either Limit 4 or 5, and 2) that the RMP does not appreciably reduce the likelihood of survival and recovery. NMFS has determined that the Puget Sound chinook RMP does adequately address each of the criteria as referenced in Limit 4, and that it would not appreciably reduce the survival and recovery of the Puget Sound chinook ESU. The ESA requires that in making that decision, NMFS must use the best available scientific information. However, NMFS recognizes that there will be some uncertainty associated with whatever information is available, and considers the degree of uncertainty when making its decisions. To address these uncertainties, the data analyses incorporated variability around the productivity and capacity stock-recruit parameters, survival variables and management error (NMFS 2000b, WDFW/PSTT 2001). In making its decision on the RMP, NMFS determined that the data uncertainties did not represent a significant risk in the short term to the ESU, and that the benefits to the ESU in immediate implementation of the plan outweighed the risks represented by the uncertainty in the data. NMFS believes the two-year time limit is an adequate amount of time to address the data uncertainties without increased risk to the ESU, and that it corresponds with the current schedule for completion of the tasks assigned to the TRT, including establishment of recovery goals.

The 4(d) Rule does not specify the duration that take limits must be applied for activities approved under any of the Limits in the 4(d) Rule. This approach is consistent with the implementation of other sections of the ESA. For example, both the section 7 biological opinions and section 10 permits that NMFS has issued have varied from single year to multi-year duration. Therefore, the two-year application of take limits for the RMP and the treatment of data uncertainty do not represent inconsistency in treatment among the activities considered under the 4(d) Rule.

Comment 4: One commenter expressed concern about a lack of viable thresholds for several of the populations where natural

production occurs.

Response: The RMP identified viable thresholds for all of the management units where established natural production occurs, and for all populations for which the Co-managers believed data were sufficient. Where the Co-managers believed data were insufficient to define viable thresholds for individual populations, populations were aggregated and a viable threshold was determined for the management unit as a whole. This is consistent with the 4(d) Rule which allows populations to be aggregated into management units "when dictated by information scarcity." (4(d) Rule FMEP Criteria 1). NMFS derived viable thresholds for several populations where the Co-managers felt the data were insufficient, and determined that the RMP objectives for the management unit were sufficiently protective of the individual populations, and the ESU as a whole. However, NMFS does not believe the original Evaluation was clear on this point and has revised it to clarify this information.

Comment 5: Two of the commenters expressed concern that the Evaluation inadequately addresses the lack of recovery goals and management objectives for productivity in the RMP.

Response: The 4(d) Rule does not require that a RMP include recovery goals. This is taken up in the separate recovery planning process. The 4(d) Rule does require that the viable and critical thresholds be consistent with the concepts in the Viable Salmon Populations document (McElhaney *et al.* 2000). There is very limited direct information on the current capacity and productivity of most chinook systems in Puget Sound to define explicit objectives for productivity. However, information on productivity and capacity can be inferred by deriving population dynamic relationships for management units and populations based on available escapement, survival and age data. Productivity and capacity are components within the formulas used to derive several of the management objectives in the RMP, and all of NMFS' RER standards. In areas where this information was not available, the RMP escapement and exploitation rate management objectives used escapement goals adopted in the Puget Sound Salmon Management Plan that were based on information from the 1960s and 1970s. NMFS evaluated these escapement goals against its own population standards and VSP guidance. These older goals are probably conservative in that they likely overestimate the current capacity and productivity of the chinook habitat when compared with current habitat condition. Using this approach, NMFS concluded the objectives in the RMP were consistent with the

concepts in the VSP document as required by the 4(d) Rule criteria.

Comment 6: One commenter expressed concern that the Evaluation did not adequately address the impacts of fishing on spatial structure since the RMP did not define take targets for spatial structure. It suggested there should be impact studies of fishing actions on the spatial structure of chinook salmon populations.

Response: Providing adequate spatial structure for salmonid populations requires that the habitat is of sufficient quality and quantity, that is connected, and that the timing and characteristics of the salmon themselves provide for the use of the available habitat. Fishing activities can affect the return timing and biological characteristics of the fish (age, size, sex), and in some cases the pattern of spawning. Generally this occurs when a certain segment of the population is disproportionately harvested over a period of time. However, as stated in the Evaluation, there is currently no information to indicate that fisheries are having deleterious effects on specific segments of the populations, and certainly not to the ESU as a whole. For example, NMFS status review (Myers et al. 1998) did not note any trends in size, weight, fecundity or other life history traits for Puget Sound chinook that might be a result of fishing activities. NMFS sees no reason to change its conclusion on this issue, however, NMFS agrees with the commenter that the potential effects of fishing activities on spatial structure should continue to be monitored and evaluated for shifts in run or spawning timing, or biological characteristics attributable to fishing activities. This was included in the implementation terms accompanying the final determination.

Evaluating spatial structure at the ESU level, NMFS concluded that the management units represent the full complement of the natural chinook populations within Puget Sound and include all principal life history traits (spring, summer and fall runs).

Comment 7: One of the commenters expressed concern about the quality of the coded wire tag (CWT) data underlying the derivations of the RERs and their connection to the MSY escapement goals established in the Puget Sound Salmon Management Plan (PSSMP).

Response: The MSY-based RERs in the RMP use current information on spawning escapement, age structure and survival. They are not

based on the PSSMP escapement goals. At this time, CWT data provide the best available information to estimate survival rates by age and mortality rates by fishery. Wild stock tagging in Puget Sound has been tried in several areas, but the resulting mortality has been high, and there have not been enough wild juveniles captured to result in sufficient tag recoveries to estimate fishery contribution with confidence. However, where both wild and hatchery stocks of the same outmigrant type have been tagged successfully, significant differences in distribution or exploitation rate between the two groups have not been detected. The simulation models used to assess the RERs incorporated uncertainty. Until more direct estimates are available, this represents the best available scientific information. Management performance will be evaluated annually and the management objectives will be revised as significant new information becomes available.

Comment 8: Commenters expressed concern about the magnitude of the exploitation rate and escapement threshold objectives, especially relative to the PSSMP escapement goals.

Response: For the purposes of evaluating the RMP under the requirements of the 4(d) Rule, it is not appropriate to comment on the objectives of the RMP relative to those in other management plans. NMFS evaluated the RMP management objectives against its independently derived population standards and the guidelines provided by the VSP document. NMFS guidelines and standards were developed through a thorough review of the ecological, conservation and salmonid literature (McElhaney *et al.* 2000) or through independent analysis of spawner-recruit relationships based on the best available estimates of escapement, hatchery contribution to escapement, natural production and survival. Acknowledging data uncertainties, NMFS' analysis incorporated variability in capacity, productivity, management error and survival (NMFS 2000b). NMFS concluded that the RMP objectives are consistent with NMFS guidelines.

Comment 9: One commenter questioned the need for exploitation rate objectives for Category 2 populations and the inclusion of the Hoko River chinook in the RMP

Response: One of the 4(d) Rule criteria is to establish escapement or exploitation rate objectives for each of the populations or management units within the ESU. It is up to the state and tribal parties as to how to structure these objectives. Exploitation rate objectives for Category 2 populations were

included in the RMP provided to NMFS for review and evaluation consistent with that criterion. NMFS believes that it is important to establish management objectives for these populations since they may play an important role in recovery. Hatchery contribution to the natural escapement of these populations is probably significant, however, information on the amount of contribution is limited for most of these systems. As more information becomes available on stray rates, and the hatchery and harvest programs are successfully integrated, the management objectives may be revised and refined to better reflect the natural production of the systems.

The harvest management component of the Comprehensive Chinook Management Plan was provided to NMFS for evaluation as an RMP under Limit 6 of the 4(d) Rule. However, it was developed as part of a larger planning effort by the Co-managers, unrelated to ESA, that encompasses the western Strait of Juan de Fuca, where the Hoko River is located, as well as the rest of Puget Sound. The Hoko River chinook population is not part of the ESU, and NMFS did not include it in its evaluation of the RMP under Limit 6 of the 4(d) Rule.

Comment 10: Two commenters expressed concern about the inclusion of hatchery fish in determining whether escapement thresholds have been achieved.

Response: The composition of escapement thresholds is described in Table 1 of the Evaluation. Escapement thresholds are defined in terms of natural origin recruits (NORs) for six of the ten management units managed for natural production. Three of the remaining four of these management units use hatchery production to maintain and rebuild the associated chinook populations. In areas with significant hatchery production, it is currently difficult or impossible to distinguish between hatchery-origin and wild-origin fish on the spawning grounds. Mass-marking programs have been or will be implemented for most hatcheries releasing chinook in Puget Sound, allowing separation of returning hatchery and natural origin adults. However, marked adults will not return for several years. In addition, there are not currently hatchery contribution guidelines in place for the proportion of hatchery fish on the spawning grounds. Both the Hatchery and Genetic Management Plans (HGMPs) which NMFS is in the process of developing with the Co-managers, and ultimately the recovery plan for Puget Sound chinook will address this issue. When this information is available, management objectives may be revised, as per the evaluation requirements of the RMP.

Comment 11: One commenter expressed confusion over the terms used to describe escapement threshold and exploitation rate objectives in the Evaluation, and asked for more specificity on the actions that would be taken should escapements fall below the thresholds.

Response: NMFS acknowledges the use of the different terms in the Evaluation may have been confusing and has revised the Evaluation to clarify the definition and use of these terms. Long-term abundance and low abundance thresholds are terms the state and tribal Co-managers use in the RMP to describe lower and upper escapement objectives for fisheries management. Critical and viable thresholds are terms used by NMFS in its 4(d) Rule and in the VSP document for ESA purposes. NMFS evaluates the long-term and low abundance management objectives provided in the RMP against its guidelines for critical and viable thresholds to see whether the RMP thresholds used for a variety of fishery management objectives, meet the requirements under ESA. The exploitation rate objectives are in terms of brood year exploitation rates.

Examples of the types of fishery actions that would be taken should escapements fall below their lower abundance thresholds are captured in section H of the Evaluation, and in Appendices A and C of the RMP. The actions taken must be appropriate to the circumstance and will vary depending on the population, distribution of fishery mortality and the cause of the failure to meet the escapement objectives. A generic, one-size-fits-all response is rarely the most beneficial to either the resource or fishery objectives. Fishery closures and restrictions are among the actions listed in the RMP, and increasingly among the actions the Co-managers have voluntarily taken in recent years in response to declines in chinook abundance.

Comment 12: One commenter disagreed with NMFS' statement that an exploitation rate rather than a fixed-escapement goal approach would result in rebuilding of Puget Sound chinook populations. The commenter uses an example from the Snohomish system to support its position.

Response: The comments reflect a misunderstanding of the analyses used to derive the objectives in the RMP and the implementation of those objectives. The exploitation rates are designed to provide an 80% probability of exceeding the upper escapement threshold (the viable or long-term escapement threshold) within 25 years, starting from the existing levels of spawning escapement. In other words, resulting in a high

probability of rebuilding chinook populations to viable escapement levels, not merely meeting the critical or low-abundance escapement thresholds as asserted by the commenter. This approach is designed such that the upper escapement level will increase as habitat capacity improves, a way to integrate harvest with other recovery and restoration actions. In effect, this provision guards against inappropriately increasing exploitation rates when habitat capacity or productivity increases. The exploitation rates are maximum rates that fisheries may be managed below, but cannot be exceeded. In fact, managers have consistently set annual exploitation rates below exploitation rate objectives over the last several years. If management units and populations do not rebuild as expected, the RMP contains provisions to revise exploitation rates if the data evaluation shows that fishery activities are impeding rebuilding.

Some of the information the commenter uses to support its assertion is erroneous. The 1996 Puget Sound run size of Snohomish summer/fall chinook wild adults was approximately 5,200 rather than the 8,000 originally reported. The revised estimate was based on the results of an otolith marking study that enables managers to better distinguish between hatchery and wild spawners. With a run size of 5,200, the spawning escapement of 5,250 would not have been achieved even with closure of all fisheries in Puget Sound. The exploitation rate in southern U.S. fisheries was very low, estimated to be less than 10%. With this correction, the data appear to support the contention of the Evaluation that exploitation rates have contributed to higher escapement in years of higher return. In both 1996 and 1998, the post-season return was higher than preseason expectations, the exploitation rates remained very low, and the escapements were correspondingly higher. In 1996, the preseason run size expectation was 4,200, the post-season return was 5,200, and the escapement was 4,851. In 1998, the preseason terminal run size was expected to be 5,600, the post-season return was 6,400, and the escapement was 6,304. Based on this information, NMFS sees no need to change its evaluation of the RMP.

Comment 13: The commenter stated that the Evaluation does not address what it perceived are inconsistencies with the Magnuson-Stevens Act policies regarding overfishing and the use of biological reference points.

Response: NMFS' evaluation of an RMP must conclude that it is consistent with the requirements of the ESA as defined by Limit 6 of the 4(d) Rule for Puget Sound chinook. It does not involve

procedures under the Magnuson-Stevens Act. Stocks listed under the ESA is one of three exceptions to the application of the general overfishing criteria under Amendment 14 to the Pacific Coast Salmon Plan (FMP) (PFMC 2000). Instead, fishery actions are automatically required to be consistent with the jeopardy standards and recovery objectives for listed stocks. As explained in the FMP, the jeopardy standards and recovery plans developed by NMFS for listed populations are considered interim rebuilding plans. Although NMFS' jeopardy standards and recovery plans may not by themselves recover listed populations to historical MSY levels within ten years, they are sufficient to stabilize populations until freshwater habitats and their dependent populations can be restored and estimates of MSY developed consistent with recovered habitat conditions. As species are delisted, the Pacific Fisheries Management Council will establish conservation objectives with subsequent overfishing criteria and manage to maintain the stocks at or above MSY levels (PFMC 2000).

Comment 14: One commenter stated that the Evaluation failed to adequately address the uncertainty in fisheries management models, and failed to consider the effect of fishing on life history traits such as body size and age structure.

Response: NMFS agrees that having finer resolution fishery impact models is desirable, but is often limited by the level of available information. The commenter appears to suggest that the current fishery models are not fishery, time or stock specific, nor do they contain information on maturation rates, age or stock distribution. In fact, the Fisheries Regulation and Assessment Model (FRAM) used in fishery planning assesses stock-specific fishing mortality by time step (3-month blocks), fishery (catch area by general gear type) and age (ages 2-5). The model estimates stock-specific mortality using age-specific exploitation rates, maturation rates by size category, and stock distribution data, based on CWT recoveries. The model developed by the WDFW in the early 1970's to which WT refers, was a pioneering effort in harvest management models. However, it was developed prior to the advent of the CWT data system and the stock specific data on catch composition and stock distribution that it provides. The current models, including FRAM, are significant improvements over the initial WDFW effort due to both increased knowledge and greater computing power.

WT relied on information for California chinook populations to infer the same effects on Puget Sound chinook. However, although

NMFS concurs that fishing activities may select for body size, and may therefore have an indirect effect on age structure, NMFS status review (Myers et al. 1998) did not note any trends in size, weight, fecundity or other life history traits for Puget Sound chinook that might be a result of fishing activities. If, however, deleterious effects are detected, the RMP commits to taking the appropriate measures such as gear modification or adoption of size limits (see element H of NMFS Evaluation). The RMP identifies the need to conduct analysis of harvest regulations for existence of size or sex selectivity and the extent of the potential impact. Therefore, NMFS does not agree with the commenter's assessment and sees no need to revise its conclusion.

Comment 15: One commenter suggested that without more detail on the parameters and assumptions made in the simulation modeling, it could not verify the Evaluation's conclusion that the RMP was sufficiently risk averse.

Response: As part of its evaluation, NMFS compared the RMP objectives with its own population standards and viability guidelines for the Puget Sound chinook ESU. The approach and assumptions for the derivation of these standards can be found in two previous biological opinions: the 2000-2001 Pacific Fisheries Management Council and Puget Sound fisheries (NMFS 2000a), and the implementation of the 1999 Pacific Salmon Treaty agreement (NMFS 1999); and the document entitled, Viable Salmonid Populations (McElhaney et al. 2000). The first two documents are available on the NMFS Northwest Region website and the VSP document is available on the NMFS Northwest Fisheries Science Center website. Any of the three documents is also available on request.

Comment 16: WT suggests that by managing many units simultaneously for extinction probabilities, the overall extinction probability for the ESU will be greater than the extinction probability for any individual population.

Response: NMFS disagrees with WT's conclusion for several reasons. First, WT's formula assumes that the population dynamics of the 21 Puget Sound chinook populations are independent. In fact, population abundance is highly correlated. Second, WT fails to take into account the function of lower abundance thresholds in reducing extinction probabilities. The simulation models used to derive the exploitation rate objectives assumed that the rates would be applied at all abundance levels,

when, in fact, fisheries will be further constrained when abundance falls below the low abundance thresholds. Finally, WT fails to note that the lower abundance thresholds against which the exploitation rates are derived are generally higher than quasi-extinction thresholds used in formal viability assessment. Therefore, the derivation of the management objectives does not involve assessment of absolute extinction probabilities, but rather probabilities of declining below a level significantly higher than extinction, and, in fact, in most cases, significantly higher than VSP critical abundance thresholds, for each population.

#### *Evaluation of RMP under the 4(d) rule*

Attached is NMFS' evaluation of whether the RMP meets all of the requirements specified under Limit 6 of the ESA 4(d) Rule, including the criteria for FMEPs under Limit 4 of the ESA 4(d) Rule. NMFS-SFD determined that the RMP for Puget Sound chinook provided by WDFW and the Puget Sound Treaty Tribes adequately addresses all of the requirements in Limit 6 of the ESA 4(d) Rule. NMFS-SFD recommends that application of the take limits be limited to a period of two years, from May 1, 2001 through April 30, 2003 for the reasons discussed earlier (see Recommendation section).

#### *Implementation Terms*

As discussed above, NMFS and the Co-managers recognize that there is a need for much more information regarding the affected ESU, especially in the near term. NMFS believes the following implementation terms are vital and highly relevant to providing this information. The determination that Limit 6 of the ESA 4(d) Rule applies to activities under the RMP is scheduled to expire after April 30, of 2003. Prior to April 30, 2003, NMFS will decide whether and for how long to extend application of Limit 6 of the ESA 4(d) Rule to the RMP. The decision will be based on progress in completing the following implementation terms and the revision of the RMP as appropriate to incorporate this and other relevant information, e.g., the results of monitoring and evaluation programs, and TRT work products and recommendations.

The TRT has been tasked with various assignments related to recovery planning for the Puget Sound chinook salmon ESU. These include population delineation, recommendations on the roles of various populations in recovery, identification of early recovery actions, and establishment of delisting criteria. The Co-managers

shall incorporate this TRT information as appropriate in the RMP as it becomes available.

- (1) The TRT is in the process of determining the population structure of Puget Sound chinook and making recommendations about the roles of individual populations in the recovery of the Puget Sound chinook salmon ESU. NMFS will evaluate the RMP relative to this population delineation. In addition, NMFS will re-evaluate the RMP's management objectives and approach of the RMP upon the TRT's completion of these tasks. Should NMFS' assessment indicate that a population essential to the viability of the ESU is not adequately protected by the RMP, the Co-managers shall amend the plan as necessary to afford that protection.
- (2) Pending completion of the TRT tasks in (1) above, the Skagit summer/fall chinook management unit shall be managed through April of 2003 as described in Table 6 and the Skagit management unit profile in Appendix A of the RMP. This includes management for a 52% exploitation rate ceiling as measured by the Fisheries Regulation and Assessment Model (FRAM), and further management actions consistent with Appendix C of the RMP, should either the Skagit summer/fall management unit or any of its stock components fall below its low abundance threshold. The management objectives and approach shall be re-evaluated by NMFS and the Co-managers and revised as appropriate upon the TRT's completion of these tasks.
- (3) Over the next two years, the Puget Sound Treaty Tribes and WDFW shall refine Rebuilding Exploitation Rates (RERs) for Nooksack early, Skagit spring, Stillaguamish, Snohomish, and Green River chinook management units and their associated populations, consistent with the TRT recommendations. To aid in this effort, NMFS will provide technical assistance to the Co-managers to complete this task.
- (4) Over the next two years, WDFW and the Puget Sound Treaty Tribes shall begin development of RERs for additional Category 1 and 2 populations for which data are available, or to identify what additional data are needed. To aid in this effort, NMFS will provide technical assistance to the Co-managers to complete this task.
- (5) WDFW and the affected Puget Sound Treaty Tribes shall work together with NMFS to better define the fishery actions to be taken when the escapement of the naturally spawning

component of the Skokomish chinook management unit falls below 1,200.

- (6) Exploitation rates and spawning escapement objectives in the RMP have been set to facilitate rebuilding toward recovery levels. The RMP also states that the Co-managers "...may agree to take further harvest management measures if analysis demonstrates that additional management action will contribute significantly to stock recovery in concert with other specific habitat and enhancement actions." In its evaluation of the RMP, NMFS assumed, that in most years, fisheries would meet the exploitation rates and escapement thresholds described in Table 6. However, in some years, low abundances for some stocks may trigger additional management actions, as described in Appendix C of the RMP. NMFS assumed that the Co-manager's commitment to application of Appendix C would result in exploitation rates similar to those in Table C-1, or in escapements above the low abundance thresholds, and, on this basis, determined the RMP to be sufficiently protective of listed populations. During the next two years, if exploitation rates on management units are forecast to result in escapements that fall below their low abundance threshold, or if exploitation rates are expected to exceed the ranges estimated in Table C-1 of Appendix C of the RMP, the Co-managers shall meet and confer with NMFS regarding what additional harvest actions, if any, may be warranted.
- (7) RMP fisheries are managed to achieve the management objectives described in Table 6 and Table C-1 of the RMP. The Green River, Lake Washington, Skokomish, Mid-Hood Canal and Nisqually management units are managed for escapement goal objectives, as well as exploitation rate objectives. In some cases, abundances in the near future are expected to be sufficient to meet or exceed their low abundance thresholds, but would not achieve their escapement goal objectives, e.g., Lake Washington. For these management units, the management unit profiles in Appendix A include an expected range of exploitation rates. During the next two years, if estimated impacts are predicted to exceed the expected ranges described in the management unit profiles of the RMP, the co-managers shall meet and confer with NMFS regarding what additional harvest actions, if any, may be warranted.
- (8) The annual Co-managers Fishery Management Plan shall provide a comprehensive summary of treaty and non-treaty salmon fisheries in Puget Sound and the Washington coast. The

fishing arrangements contained within this document are based on pre-season expectations and, in some instances, may be modified on the basis of information obtained in-season and by agreement of the state and tribes. The Co-managers shall notify NMFS when in-season actions are expected to deviate significantly from the pre-season plan. The notification shall include a description of the change, an assessment of the anticipated fishing mortality resulting from the change, and an explanation of how impacts of the action(s) maintain consistency with the RMP. For those areas managed under inseason updates, the Co-managers shall notify NMFS of the results of each update, the actions taken, and an explanation of how the impacts of the actions maintain consistency with the RMP.

- (9) The Co-managers shall continue catch, coded-wire tag, effort and biological sampling in Washington fisheries to meet or exceed the target levels described in the RMP.
- (10) In many areas, the current methods of escapement estimation were not designed to provide absolute estimates of total spawning population size, but rather to indicate trends in, or indices of spawning abundance. With changes in the use of escapement estimates, the Co-managers shall reassess and revise the approach to escapement estimation to provide information necessary and consistent with the objectives, implementation and evaluation of the RMP. The Co-managers, in conjunction with ongoing Pacific Salmon Commission efforts, shall review escapement estimation and survey methodologies for Puget Sound chinook, and shall develop recommendations for revisions to the existing methods to provide estimates of i) total spawning population size and precision of the estimates; ii) the contribution of hatchery origin fish to natural escapement; iii) the contribution of natural origin fish to hatchery rack returns; and, iv) the age structure of natural escapement and hatchery returns, for each Puget Sound chinook population. The Co-managers shall provide a progress report on the reassessment and revision of escapement estimation and survey methods, including preliminary recommendations, by January 15, 2003.
- (11) The Co-managers, in cooperation with NMFS, shall revise modeling tools used in domestic fisheries planning, e.g., FRAM, as appropriate to calculate and report exploitation rates and escapements for all management units and populations, consistent with the RMP objectives in Table 6 and Appendix A, and for any additional objectives developed over the next two years.

- (12) Validation of the FRAM has been completed for 1983-1996. The FRAM validation, in combination with work of the PSC Chinook Technical Committee, provides valuable information for evaluating management performance. For example, this information was used to estimate management error included in RER derivations for Puget Sound chinook. The Co-managers shall complete FRAM validations for years 1997-2000, and more recent years if needed information is available. The Co-managers shall complete the validations prior to April 30, 2003.
- (13) A significant component of the annual post-season report described in Appendix F of the RMP is the assessment of exploitation rates. The use of non-retention in both commercial and recreational fisheries is becoming more prevalent in fisheries management, as a way to decrease impacts on stocks of concern and/or increase fishing opportunity. The exploitation rate assessment shall include estimates of mortality in the non-retention fisheries and a description of the methods used in the estimation.
- (14) The monitoring and evaluation measures identified in the RMP shall assess the catch of listed fish, fishery mortality, the abundance of hatchery and listed fish originating from Puget Sound, and angler compliance. The Co-managers, in cooperation with NMFS, shall use this information annually to assess whether impacts to listed fish are as expected. As described in section V (Application) and Appendix F of the RMP, each year, the Co-managers shall provide a report that includes at least a summary of the previous year's management expectations, run size and spawning escapement by management unit and population, where appropriate, and estimated fishery impacts for each management unit, and results of in-season management activities. Postseason evaluation of management shall be based on the most direct estimates of mortality available, e.g., coded wire tags. This report shall be provided to NMFS' Fisheries Management Branch in Seattle, Washington by mid-February of each year.
- (15) Depending on the accuracy required from biological sampling, more sampling effort may be required than has previously been expended on gathering basic biological data to determine age and sex composition. State and tribal technical staffs are currently focusing attention on the design and implementation of these studies. The Co-managers shall include a progress report and recommendations on sampling design and implementation in the post-season

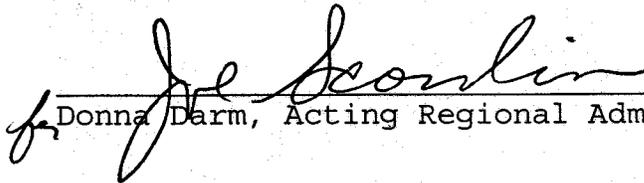
report for the 2002-2003 fishing season. To aid in this effort, NMFS may offer technical assistance as requested.

- (16) NMFS received several comments from the public expressing concern about the limited evaluation of the effect of fishing activities on spatial structure and biological characteristics of chinook populations, e.g., size, sex, age. In the RMP, the Co-managers identified the need to conduct analyses of harvest regulations for existence of size or sex selectivity and the extent of the potential impact, as one of several tasks "... necessary to improving the framework over the next two to five years." (WDFW/PSTT 2001). The Co-managers shall provide a report describing the data required, the information that is lacking, and the design and implementation of such an analysis. The report shall be included in the post-season report for the 2002-2003 fishing season. To aid in this effort, NMFS may offer technical assistance as requested.

#### **SUMMARY**

NMFS-SFD concludes that the RMP for Puget Sound chinook provided by WDFW and the Puget Sound Treaty Tribes adequately addresses all of the requirements for a RMP under Limit 6 of the ESA 4(d) Rule and will not appreciably reduce the likelihood of survival and recovery of the Puget Sound chinook ESU. To further evaluate new information and the impacts of the RMP, NMFS-SFD recommends that this limit determination be in effect from May 1, 2001 through April 30, 2003. At the end of that period, NMFS will consider whether to extend this finding of application of Limit 6 of the ESA 4(d) Rule to the RMP. NMFS-SFD recommends that Limit 6 of the ESA 4(d) rule apply to the implementation of the RMP, provided that it is implemented in accordance with the implementation terms described above.

- 1 I have determined that the Puget Sound chinook RMP will not appreciably reduce the likelihood of survival and recovery of the Puget Sound chinook ESU provided that it is implemented in accordance with the section on Implementation Terms, described above.

  
\_\_\_\_\_  
Donna Darm, Acting Regional Administrator

4/27/01  
Date

2. I have determined that the Puget Sound chinook RMP will appreciably reduce the likelihood of survival and recovery of the Puget Sound chinook ESU.

\_\_\_\_\_  
Donna Darm, Acting Regional Administrator

\_\_\_\_\_  
Date

**Attachments**

Attachment 1: Evaluation and Determination Document

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