***American Fisheries Society***
***Oregon Chapter***
***PO Box 722***
***Corvallis, OR 97339***

02 February 2001

Mr. Lance Kruzic
National Marine Fisheries Service
525 N.E. Oregon Street, Suite 510
Portland, Oregon 97232

**Comments on the Upper Willamette Spring Chinook Fisheries Management and Evaluation Plan (FMEP)**

Dear Mr. Kruzic:

I want to thank you again for extending us the opportunity to review the draft of the Fisheries Management and Evaluation Plan (FMEP) that the Oregon Department of Fish and Wildlife (ODFW) has prepared for freshwater fisheries affecting Upper Willamette River Chinook Salmon. As you know, the Oregon Chapter of the American Fisheries Society (Chapter), the state's largest professional organization of fisheries and aquatic scientists, is dedicated to assuring development and dissemination of sound scientific information to inform public decision-making. To that end, we assembled a review team of experts on Willamette Basin salmon, fisheries management, conservation planning, and modeling. This team examined the draft FMEP and a computer model underlying much of the plan. Their assembled comments, presented herein, have been reviewed and approved by the Executive Committee of the Chapter.

Although scheduling difficulties prevented us from completing as thorough a review as we would have liked, it is our hope that comments captured here will be helpful to the National Marine Fisheries Service (NMFS), ODFW, and the public. Given that this is a first-of-its-kind document with considerable implications related to the Endangered Species Act (ESA), the Oregon Plan, and salmon recovery in Oregon, we are hopeful that issues we raise will be explored more fully by NMFS and the group of scientists who have prepared ODFW's FMEP. We would greatly appreciate either a written response to these comments and/or the continuing opportunity to participate in the discussion and finalization of this plan.

The review comments focus on two primary aspects of the draft FMEP. The first aspect is how well the FMEP incorporates accepted conservation principles and meets expectations for salmon recovery. The comments also focus on whether the data and modeling presented in the FMEP support the conclusion that 20% short-term (in 2001) and 15% long-term (in 2002 and beyond) mortality rates in freshwater fisheries will "promote the conservation and recovery of all listed spring chinook populations in the Willamette River Basin."

## REVIEW COMMENTS

The FMEP document reflects a substantial effort by ODFW to better understand the impacts of fisheries it manages. We agree that the idea of shifting toward a marks-only fishery on hatchery salmon appears to be a good one and note that this reflects that once again the fishing community is being asked to step forward and do their part in the salmon recovery effort. We also agree that there is strong need for better monitoring of the Willamette Basin's natural populations of spring chinook. However, our reviewers raise a number of issues or questions about the document that we consider very important. These include:

- how to judge that the FMEP will fit within an ecologically based recovery plan when one has not yet been developed for these fish;
- how efforts to address factors other than fishery-related mortality will combine with the FMEP to meet conservation objectives related to the ESA and the Oregon Plan for Salmon and Watersheds; and,
- whether the management program reflected by the FMEP is more strongly focused on maintaining fishing opportunities than on species recovery.

We know that our reviewers are asking questions that are complex and difficult to answer. However, it is also clear that without addressing these questions we in Oregon and the region may not resolve the types of problems that have historically been impediments to salmon recovery.

In general, the FMEP appears to leave unanswered the question of cumulative impacts of human activities on Upper Willamette River Chinook Salmon and what overall approach will be taken to remove or reduce these impacts to recover the fish. While this may be the result of expectations that such concerns will be covered in other planning documents, this separation from the broader context creates the possibility that fishery management outlined in an FMEP such as this may not be consistent with actions to be taken in other areas of human influence on the survival of salmon.

Although not explicitly stated, this FMEP seems to assume that recovering ESA-listed spring chinook in the Willamette Basin is primarily an issue of protecting the vestigial run of wild spring chinook in the McKenzie River from overfishing. While important, this focus may set an inadequate context for the long-term recovery of the species. The focus may be inadequate because other human-caused factors are affecting these fish throughout most of their life cycles, and because restoring salmon populations in other watersheds (e.g., Clackamas, Molalla, Calapooia, North Santiam, Little North Santiam, etc.) may be every bit as important to long-term species persistence. At present, salmon in Willamette Basin watersheds other than the McKenzie may be those most vulnerable to the impacts of fishery management.

### <u>Conservation Principles and Salmon Recovery</u>

Our review found little evidence that the FMEP is an integrated element within a long-term, ecosystem-based recovery strategy for Upper Willamette River Chinook Salmon. We found little discussion in the FMEP of whether the plan is consistent with or incorporates the findings

of numerous independent reviews of fishery/hatchery management or other issues associated with salmon recovery in the region. Similarly, the FMEP does not clearly state how it has incorporated recent Biological Opinions issued by NMFS, recovery standards that have been set by your agency, or relevant findings of the Independent Multi-disciplinary Science Team (from the Oregon Plan). These elements may be present in some portions of the FMEP, but on balance this was not clear to our reviewers.

We recognize that some of these weaknesses may be inherent in a process that was initiated to address fish management activities without a full understanding of how difficult it might become to incorporate or account for larger issues relating to cumulative impacts and ecosystem recovery. However, our review of the FMEP makes clear that this approach creates difficulties because documents such as this influence public perceptions and may be establishing the conceptual groundwork and building public support for a fishery/hatchery program with significant implications for the recovery of Upper Willamette River Chinook Salmon without fully understanding what those implications are.

Therefore, the FMEP should be revised, as soon as is practical, to delineate how it will meld with other efforts being made toward salmon recovery. Without explicit delineation of how an FMEP such as this supports other recovery efforts for its respective ESU of grouped salmon populations, the public may never understand tradeoffs being made by resource managers (fishery/hatchery managers, land managers, hydroelectric operators, urban planners, or others). Informed public decision-making on these issues is critical to fostering a much needed dialogue on the choices we are all making in our salmon recovery efforts.

With this in mind, we hope that NMFS will provide fishery managers and other planners the necessary guidance on how an ecosystem context should be incorporated into planning documents. In addition, we hope that NMFS will provide guidance on how to establish explicit linkages to recovery plans developed by Technical Review Teams or others. We recommend that the guidance be structured around the Viable Salmonid Population (VSP) framework your agency (McElhany, et al. 2000) developed for assessing the status and recovery of ESUs. The basic elements of that framework are outlined in Table 1, and were used by our reviewers as a partial basis for concluding that the FMEP lacks adequate ecosystem context.

Some of the FMEPs apparent inconsistencies identified by our Chapter reviewers and examples of where it would have been appropriate incorporate an ecosystem approach and the VSP framework are presented below:

- **The FMEP does not fully account for the connection between marks-only fisheries, large-scale hatchery programs, and fish sorting done at existing dams to help prevent hatchery fish from straying into the spawning grounds of some natural populations of spring chinook.** All three of these factors are very clearly part of the same fish management program, and each will have impacts on natural populations of spring chinook in the Willamette Basin, but the FMEP focuses almost entirely on mortality directly associated with the marks-only fisheries.

- **The main body of the FMEP document repeatedly asserts that population viability analyses contained in an appendix are "conservative" for the ESU but it is not clear to our reviewers that this is an accurate characterization of the analysis.** While the appendix contains a Ricker-based modeling exercise related to hypothetical fishery impacts on the McKenzie River's wild spring chinook population, the FMEP itself we believe incorrectly characterizes this as a viability analysis of the entire ESU. Our reviewers agree that the McKenzie population is probably the largest, strongest, and perhaps most viable of the naturally spawning populations within the ESU. However, they are unsure of the scientific basis for treating this population as a surrogate for the entire ESU when analyzing long-term viability. They are similarly unsure of the basis for an unstated assumption that activities in the Willamette Basin other than those related to fishing are not going to add to the risk burden already experienced by the ESU.

- **The FMEP lacks the spatial context of a meaningful, long-term recovery plan for Upper Willamette River Chinook.** Implemented as described, the FMEP could become an impediment to the restoration of ESA-listed spring chinook in many streams already classified as Critical Habitat by the National Marine Fisheries Service. It does not account for the importance of the spatial structure and diversity of spring chinook populations within the Willamette River Basin. The FMEP also fails to address the effects that stray hatchery fish (which may be highly abundant due to the magnitude of the anticipated hatchery program that will support the marks-only fishery) might have on salmon populations linked to areas where hatchery fish are not excluded. Similarly, in analyses and in degrees of protection afforded from fisheries, the FMEP implies that several natural populations of spring chinook outside the McKenzie River watershed may not be of high importance for long-term viability. To our knowledge, no analysis upon which such a conclusion could be drawn has been conducted.

- **For the 2001 fishing season, the FMEP proposes a 20% fishery mortality rate for wild spring chinook otherwise returning to spawn in the McKenzie River watershed above Leaburg Dam, and even higher rates for fish returning to watersheds where extinctions of native populations are assumed but not proven.** If they still exist, and the FMEP makes clear that monitoring has been weak, vestigial populations of wild spring chinook in other watersheds would likely be more sensitive to fishery impacts than the one that spawns above Leaburg Dam. Such populations would likely be important to the long-term viability of the ESU. Regardless, the model-based viability analyses of the McKenzie population suggest that a 15% fishery mortality rate is a "safe" threshold level for the McKenzie population, not 20%.

## Viability Modeling

The FMEP is structured around a Ricker-based viability analysis for wild spring chinook that spawn in the McKenzie River watershed above Leaburg Dam. A description of this model and the results of the analysis are contained in an appendix to the FMEP (referred to earlier in our comments). Chapter reviewers found the model to be user-friendly. The life-cycle approach is powerful, but difficult to implement compared to simpler trend analyses that are typically used

for population viability assessments (PVAs). Fully developed, life-cycle models can be used to examine the importance of population structure, hatchery interactions, and the influence of habitat at different stages of the life-cycle. In fact, future FMEPs may want to include two types of PVA; a trend analysis to establish the severity of the immediate situation and a life-cycle model to help identify risk factors and potential restoration activities. However, the reviewers found it premature to consider the new model well enough developed to be an adequate basis for FMEP decision-making. Modelers on our review team have developed preliminary answers to eight questions (Table 2) related to the new model's structure, performance, validation, and reliability. Included in these answers, which we are in the process of trying to work through with the models developers, are suggestions that the model should not have been used as it has been within the FMEP without prior independent evaluation.

In simple terms, the viability analyses incorporated into the FMEP are driven by an untested model with underlying data that at this point should be characterized as uncertain. As such, we have serious concerns about whether existing model output should be considered a reliable basis for judging what level of fishery-induced mortality will be consistent with the conservation and recovery of ESA-listed spring chinook populations in the Willamette River Basin. While we recognize that fishery managers are beginning to use mortality thresholds of about 15% for the region's marks-only fisheries, it does not seem appropriate to assume that this is a "safe" level simply because of output from the current model.

Thank you again for the opportunity to comment on this important document. We believe that making sure the analysis and planning that it represents are objective and carefully structured will be important as the region moves forward with salmon recovery efforts. Feel free to contact me at 503-872-2763 if you have any questions about our comments.

Sincerely,

Denny Lassuy, President
Oregon Chapter of the AFS

**Citation:**

McElhany, P., M.H. Ruckelshaus, M.J. Ford, T.C. Wainwright, and E.P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. U.S. Dept. Commerce, NOAA Tech Memo NMFS-NWFSC-42. 158p.

**Attachments:** Table 1, Table 2, Miscellaneous Detailed Comments

**Table 1. Guidelines for viable salmonid populations and the recovery of Evolutionarily Significant Units (ESUs) that the Oregon Chapter of the American Fisheries Society used to help frame it review of the Upper Willamette Spring Chinook FMEP. Source: McElhany et al. (2000).**

## *GUIDELINES FOR VIABLE SALMONID POPULATIONS*

**Viable population size**

- A population should be large enough to have a high probability of surviving environmental variation of the patterns and magnitudes observed in the past and expected in the future
- A population should have sufficient abundance for compensatory processes to provide resilience to environmental and anthropogenic perturbation
- A population should be sufficiently large to maintain its genetic diversity over the long term
- A population should be sufficiently abundant to provide important ecological functions throughout its lifecycle
- Population status evaluation should take uncertainty regarding abundance into account

**Critical population size**

- A population would be critically low if depensatory processes are likely to reduce it below replacement
- A population would be critically low if it is at risk from inbreeding depression or fixation of deleterious mutations
- A population would be critically low in abundance when productivity variation due to demographic stochasticity becomes a substantial source of risk
- Population status evaluations should take uncertainty regarding abundance into account

**Population growth rate and related parameters**

- A populations natural productivity should be sufficient to maintain its abundance above the viable level
- A Viable Salmonid Population that includes naturally spawning hatchery fish should exhibit sufficient productivity from naturally-produced spawners to maintain population abundance at or above viability thresholds in the absence of hatchery subsidy
- A Viable Salmonid Population should exhibit sufficient productivity during freshwater life-history stages to maintain its abundance at or above viable thresholds – even during poor ocean conditions
- A Viable Salmonid Population should not exhibit sustained declines in abundance that span multiple generations and affect multiple brood-year cycles
- A Viable Salmonid Population should not exhibit trends or shifts in traits that portend declines in population growth rate.
- Population status evaluations should take into account uncertainty in estimates of population growth rate and productivity-related parameters.
- Evaluations of status should take into account uncertainty about ESU-level processes

**Spatial structure**

- Habitat patches should not be destroyed faster than they are naturally created
- Natural rates of straying among sub-populations should not be substantially increased or decreased by human actions
- Some habitat patches should be maintained that appear to be suitable or marginally suitable, but contain no fish
- Source sub-populations should be maintained
- Analyses of population spatial processes should take uncertainty into account

**Diversity**

- Human-caused factors such as habitat changes, harvest pressures, artificial propagation, and exotic species introductions should not substantially alter variation in traits such as run timing, age structure, size, fecundity, morphology, behavior, and molecular genetic characteristics
- Natural processes of dispersal should be maintained. Human-caused factors should not substantially alter the rate of gene flow among populations
- Natural processes that cause ecological variation should be maintained.
- Population status evaluations should take uncertainty about requisite levels of diversity into account

## *GUIDELINES FOR ESU VIABILITY*

- ESUs should contain multiple populations
- Some populations in an ESU should be geographically widespread
- Some populations in an ESU should be geographically close to each other
- Populations in an ESU should not all share common catastrophic risks
- Populations in an ESU that display diverse life-histories and phenotypes should be maintained
- Some component populations of an ESU should exceed Viable Salmonid Population guidelines

**Table 2. Key questions used to guide the Oregon Chapter of the American Fisheries Society's review of modeling work and associated data that underpin the Upper Willamette Spring Chinook FMEP.**

- Is the model's structure adequate to serve the purposes for which it will be used?
- What characteristics of the simulated system have been left out or simplified, and how might this affect model output?
- How do model structure and behavior compare to other, similar models?
- How are uncertainties and error incorporated into the analysis, and how do the results depend on uncertainties and assumptions?
- Are parameter definitions and the values of parameters used in the model justified?
- Does the model produce expected behaviors (or unexpected ones)?
- Does the model respond appropriately and usefully to simulated management actions or policies?
- How does the analysis relate to the problem as it is identified, and the conclusions drawn?

**Review of the Upper Willamette River Chinook Salmon FMEP**
**General Observations & Miscellaneous Detailed Comments**

## Observations

The move to a selective fishery is a positive step and shows that once again, the angling community seems to be the one that carries the burden of recovery efforts. Perhaps this is because fishery impacts are direct and most easily understood, while effects from habitat alterations and hatcheries are often indirect. So although this plan is a commendable step toward reducing impacts on wild spring chinook in the Willamette, other equally important measures are needed to insure their continued existence.

At what point is this or some other plan going integrate things at the ecosystem-recovery level? If each plan (hatchery, habitat, fishery, etc.) is developed independent of the other, claims only a small effect, and is monitored in isolation, then there is no acknowledgment that the listed species must live in a multi-spatial environment exposed to numerous, cumulative effects. A recovery plan must address all issues in concert – no action can be evaluated or monitored in isolation of other actions. This may become a systemic problem in the current process for developing FMEPs and possibly other types of plans as well.

In general, this plan leaves unanswered the question: what is the cumulative impact of activities on spring chinook? This plan addresses a single activity, freshwater fisheries, yet other effects are present (ocean fisheries, habitat alterations, hatcheries, etc.) and unaccounted.

At present, the continued existence of Willamette Basin spring chinook rests largely with a single population in the McKenzie River. Re-establishment or recovery of other populations should be a top priority for long-term recovery of the species. Recovery should emphasize populations that have relatively easy access to habitat (e.g. Clackamas, Mollala, Calapooia) before taking measures that have a greater uncertainty and face large-scale technological questions such as passage above dams – especially since the reservoirs have inundated much historic spawning and rearing habitat. In this light, even small effects can prevent recovery of small populations.

## Comments applicable to specific statements or sections of the FMEP

- Page 2 – "Only spring chinook salmon that are adipose fin-clipped will be allowed to be retained beginning in 2002 and thereafter." What is the technical basis upon which someone has decided that wild fish returning to the system in 2001 require less protection than fish returning after 2001? As we understand it, the fishery program being proposed will include full fisheries (i.e., no required releases of unmarked fish) in some Willamette River tributaries. Has it really been determined that these tributaries have no wild fish? If not, has someone determined that these populations are less important to the viability of the ESU? It seems that full fisheries in some of the tributaries will cause mortality substantially higher than 20% for any vestigial runs that remain, and that these runs might be those most vulnerable to added mortality.

- Page 3 - Performance indicators include spawning area redd counts in North Santiam, and supplemental indicators such as spawning ground counts in McKenzie and Clackamas rivers. The usefulness of indicators depends on consistent sampling through time. Is there a commitment for funding to adequately conduct the necessary surveys?

- Page 3 - Counts of chinook salmon at North Fork Dam may not accurately estimate the trend of successful spawners in the upper basin, and supplemental spawning surveys may be important. ODFW surveys indicated the estimated number of spawners in the basin in 1996-99 was consistently less than 60% of the number of adults counted at North Fork Dam and varied from 44-60%.

- Page 4 - "no hatchery fish have been outplanted in the upper McKenzie since 1990;" while this may be true for smolt outplants, excess fry and fingerlings have been put into reservoirs in the upper basin in addition to surplus adults. Chinook migrants have been documented leaving the reservoir into the upper river and it is not known whether or not these fish are competing with wild juveniles.

- Page 4 - The removal of strays will occur in only a few locations (North Santiam at Bennett Dam, North Fork Clackamas, McKenzie at Leaburg), only if the traps are operated full-time, and only if modifications are made to traps in North Santiam and McKenzie. How will trapping and handling wild adults affect their behavior or survival?

- Page 5 - Although the marking program calls for for 100% marking, even a small percentage of fish released with no clip or poor clips could result in a substantial number of hatchery fish returning without an external mark, especially when numbers of wild fish are small compared to numbers of returning hatchery adults.

- Page 5 - Although selective fisheries will reduce the number of hatchery fish that could potentially stray to natural production areas, other measures could also achieve this objective, notably by reducing or eliminating some releases of hatchery fish, or by directing their release to locations where returning hatchery fish can be removed after they have had a chance to be caught by anglers. Hatcheries in the Willamette basin usually have surpluses of returning adults and it is unlikely that selective fisheries will greatly reduce this. Recently, surplus hatchery fish have been transported to release sites above reservoirs. Some fish from these releases leave the reservoirs and migrate into the natural production areas, and effects on wild fish are unknown. Any release should be part of an overall recovery strategy with clear objectives (such as reestablishing fish into historic habitat) that address all aspects of life history (rearing, downstream migration, passage of returning adults). A continual release of surplus hatchery adults into such areas is not a recovery strategy, it is merely an expanded hatchery program.

- Pages 12, 15 - Fish stocking strategies above the dams have changed, especially where ODFW has been trucking adult hatchery spring chinook to historic natural habitats. Since 1993, on both the South Fork McKenzie above Cougar Dam and the Middle Fork Willamette above Hills Creek Dam, ODFW has released up to as many as 1000 adult spring chinook in a given year. Above both dams the juvenile offspring of these adults are rearing to the smolt stage and a percentage of juveniles are passing through regulating outlets or turbines as unmarked offspring of hatchery fish. Some of these fish have begun returning as jacks, so it is clear that the progeny of the hatchery fish are surviving to the ocean, in the ocean, and adding to the numbers of fish being counted as "wild."

- Page 15 - It is not known if only a remnant population exists in Molalla because of habitat degradation and hatchery fish. The other, potentially overriding effect on the small populations in the upper Willamette basin (Molalla, Little North Santiam, Calapooia) is high rates of harvest in the past. At past rates of overall harvest (ocean, Columbia River, lower Willamette, plus the generally unaccounted harvest above Willamette Falls), it is unlikely small populations of fish in these streams would have been able to sustain themselves (see Cramer et al. 1996 for estimates of harvest). It is important not to write off these populations on the basis of other factors such as habitat, which is probably on an improving trend line since the intensive timber harvest of the past.

- Page 16 - "small fishery impact rates proposed also will not reduce population sizes to levels where spatial effects are exacerbated:" However, this type of fishery effect probably occurred in the past and streams with very small populations are the legacy of these harvests. Therefore, the spatial structure of the population has been diminished, in large part because of fishery harvests. As stated earlier, spatial structure above the falls is presently limited in large part to the McKenzie population. A flaw in the plan is that it focuses largely on factors that are perceived to be affected by the fishery without addressing cumulative effects of other factors, particularly habitat and hatchery programs. We recognize that this may reflect a flaw in the way the planning process has been structured.

- The plan also appears to assume little effect because it is deals only with the larger populations instead of dealing with a goal of recovering the spatial structure.

- Page 18 – The presence of unmarked hatchery fish has confounded estimates of abundance of wild fish (in Molalla, S. Santiam, Middle Fork). First, little work has been conducted in the Molalla, so confounding effects are academic. Secondly, estimates of wild fish have been confounded everywhere in the basin by presence of unmarked hatchery fish, not just in these streams. Therefore, wild fish abundance in streams such as the Clackamas and McKenzie rivers are really estimates around which there are no confidence levels. The plan does not explicitly acknowledge the uncertainty of these numbers nor does it discuss the underlying assumptions of estimating wild fish numbers.

- Page 22 - As pointed out earlier, counts at North Fork Dam are not estimates of successful spawners since ODFW has been estimated that just 40-60% of these fish actually survive to spawn.

- Page 22 – Regarding the assumed escapement levels of naturally produced fish - what are the assumptions here; is it based on a mark:unmarked ratio at dam and a ratio of marked:unmarked returning to hatchery?

- Page 22 - Juvenile production estimates. Again, what are the assumptions here that make these a production index? What are year-to-year effects of flow variations, percentage of time the juvenile trapping facility is operational, etc.?

- Page 25 - 15% or less impacts. This is just for the freshwater fishery. What about ocean, what of the pre-spawning mortality, etc.? Again, the analysis looks at only one factor (freshwater harvest) in isolation of other factors so that, by itself, 15% doesn't look so bad, but what are the cumulative effects?

- Page 29 - Effects of the fishery appear to be based on fisheries occurring where hatchery fish comprise 80+% of the run. How would the effects change if wild populations increased or hatchery fish decreased so that hatchery fish comprised 50% of the run?

- Page 38 – There is acknowledgment that ocean harvest is expected to increase; how does this affect overall chances for recovery?

- Page 38 - Remove hatchery fish at Leaburg Dam. Assumes that the dam is modified to handle the fish, assumes that funding is provided to run this 7d/week, and assumes that handling all fish will have minimal effect on the wild fish.