Exhibit E.2.d
Supplemental Public Comment 2
September 2000

INDEPENDENT MULTIDISCIPLINARY SCIENCE TEAM (IMST)

State of Oregon

John Buckhouse
Wayne Elmore
Stan Gregory
Kathleen Kavanagh
James Lichatowich
Logan Norris, Chair
William Pearcy

September 6, 2000

Kay Brown
Oregon Department of Fish & Wildlife
2501 SW First Avenue
Portland, OR 97207

Dear Kay,

The IMST has examined the management of salmon harvest under the Oregon Plan for Salmon and Watersheds. Numerous assessments, including the Oregon Plan (1997), have concluded that historical harvest rates have been too high and have contributed to the decline of OCN coho salmon. Harvest management, therefore, is a critical element of the Oregon Plan for Salmon and Watersheds.

The IMST report on harvest management of OCN coho salmon includes important information about the regional process that establishes harvest levels. This report is in its final stages of preparation but will not be completed prior to the time when material is needed for the PFMC meeting in Sacramento.

We are using this letter to convey to the Oregon Department of Fish and Wildlife specific information on harvest level establishment that we feel needs to be included in the PFMC process. In this letter, we will provide only those conclusions and recommendations that are related to the PFMC process. It is our recommendation that this information and the specific recommendations made below be part of the position of ODFW as they represent the State of Oregon to PFMC.

General Findings

Recent severe declines in coho salmon make all management decisions critical for the survival of remaining stocks. Major advances have been made in regulation of harvest and monitoring of salmon harvest in Oregon since the mid-1980s. Reductions of harvest impacts under Amendment 13 have been substantial and have been essential to prevent extinction of coho salmon stocks along the Oregon Coast and lower Columbia River.

Several analytical tools and monitoring programs have strengthened salmon management in Oregon. In particular, the life-cycle model and spawner monitoring surveys are scientifically rigorous and represent some of the most advanced salmon management tools in North America.

Habitat degradation and over-harvest are two of the major factors in the long-term decline of OCN coho salmon. Poor ocean conditions in recent years have limited population responses to decreasing levels of salmon harvest. Habitat restoration and sound harvest management will strongly influence the rate at which salmon populations recover when climate-related conditions for ocean survival improve.

The State of Oregon and PFMC have not explicitly defined recovery of depressed salmon stocks and criteria for evaluating recovery. The various efforts to restore salmon may be disconnected and less effective until such explicit perspectives have been articulated. The IMST strongly encourages the development of a program that integrates life cycle modeling with the monitoring of salmon populations, habitat, and harvest. The goal is to synthesize information to strengthen the current policy framework and fishery management programs to meet the criteria for recovery.

Because OCN coho salmon stocks have declined to such low numbers and spawners have not replaced themselves in recent years, we are continuing to recommend adjusting fisheries impacts to the lowest levels possible. The IMST strongly endorses the development of critical conservation measures to be added to the harvest impact matrix of Amendment 13. We view the development of conservative measures for both axes of the harvest matrix as essential. In addition, indicators of extreme conditions may be needed as practical limits when severe conditions are observed. An example would be estimates of the percent of survey sites for which zero spawners were observed in any given year. These indicators would be consistent with Minimum Sustainable Escapement approaches recommended by the National Research Council in its review of management of Pacific salmon.

The Year 2000 Review of Amendment 13 of the Pacific Fisheries Management Council offers an opportunity for the State of Oregon to evaluate management directions and future directions for salmon harvest management.

Specific Conclusions and Recommendations

The upcoming IMST report on harvest management will focus on the influence of harvest management on stocks of wild coho salmon in Oregon. The report identifies five specific science questions. Two of these are particularly relevant to the PFMC process.

Question 1: How has harvest management affected status of stocks? Are current harvest policies likely to contribute to rebuilding salmon stocks under the Oregon Plan for Salmon and Watersheds?

Conclusions

Past harvest practices clearly have over-harvested OCN coho salmon stocks and have contributed to the population declines that led to listing under ESA. Since 1994, harvest

impacts have been reduced dramatically from impacts that ranged from 30%-90% prior to 1990 to 8-13% since 1994.

Modeling results predict that rapid rebuilding of OCN stocks under Amendment 13 will not occur if the ocean survival rates of the late 1990's continue, regardless of harvest impacts. However, the life cycle model predicts that populations would decline at a lower rate without any source of harvest, either directed or indirect (ODFW-NMFS 1998). At low marine survival rates, elimination or reduction of human-caused sources of mortality could reduce probability of extinction or possibly allow modest recovery and would increase the rate of recovery under higher ocean survival rates. However, under poor ocean conditions, significant recovery may not be possible even with minimal harvest impacts (ODFW-NMFS 1998) because escapement of OCN coho salmon is too low. In recent years, spawners have not replaced themselves. Management actions have not improved conditions after adoption of Amendment 13. Improved escapement is essential for a rapid recovery of OCN coho, and control of fishing mortality is the best available tool for achieving improved escapements and more rapid "recovery" of these stocks. Setting minimum sustainable escapement levels could improve probabilities of recovery.

Widespread spawning distributions of coho salmon populations are needed to minimize risks of extinctions when the region shifts from climate regimes that are favorable for survival to conditions that result in low rates of ocean survival (see IMST Recovery Report). Management criteria should be linked to monitoring results for the proportion of all habitats or monitored stream reaches that are occupied by spawners. This measure is a critical index for the recovery of OCN stocks.

At recent low population numbers and lack of replacement of stocks and stock aggregates, fishery impacts on OCN coho salmon are very uncertain. Knowledge of population dynamics for coho salmon at extremely low populations is technically weak because of the lack of research on these conditions. Strongly conservative management criteria and explicit definition of "extremely low populations" (e.g., 10% of fully seeding high quality habitats) are needed in such conditions.

Current management includes irregular and relatively haphazard distribution of carcasses with no link to priorities or expected outcomes. Successful management of carcasses under the Oregon Plan will require explicit experimental measurement of the responses of salmon at all life stages to additional food resources from carcasses.

These conclusions are particularly relevant to the PFMC process, and on that basis we make the following recommendations:

Recommendations

1. The IMST recommends that ODFW advocate that new criteria be incorporated into the matrix of Amendment 13 to include "very low" OCN coho salmon parent spawner abundance and "very low" marine survival.

This will strengthen the criteria designed for protection or recovery of populations under extreme conditions. Under these conditions, no directed coho fisheries should be allowed and fishery related impacts should be reduced to the lowest levels possible.

2. The IMST recommends that ODFW advocate the applicability of (a) the minimum sustainable escapement (MSE) concept to augment the use of (b) the number of OCN ocean recruits in setting harvest impacts.

   This could provide a safeguard against loss of stocks during periods of low freshwater or ocean survival. The National Research Council (1996) recommends this methodology to minimize extinction risks of a population or metapopulation and to enhance recovery. Because spawner abundances have been extremely low and recruitment for all three recent brood years (1995, 1996, 1997) has been below replacement, fishery impacts should be as close to zero as possible until established signs of recovery are observed.

3. The IMST recommends that ODFW advocate that decisions to change harvest levels incorporate elements of stock abundance over longer periods of time and include consideration of the spatial distribution of stocks.

   The timeframe and spatial distribution of OCN coho salmon stocks is a critical aspect of measuring recovery. Harvest policies should be revised to require responses over sufficient time to indicate real population trends. We offer the following criteria as possible examples to be incorporated into the decision process whereby harvest levels are changed.

   Criterion 1. Stock Abundance. Stock abundance has achieved a defined minimum sustainable escapement before harvest impacts can exceed 10-13%.

   Criterion 2. Duration of Recovery. Stocks have achieved greater than 1:1 spawner-to-spawner replacement for each brood year over at least three brood cycles.

   Criterion 3. Spatial Distribution. Stocks have achieved two consecutive generations of recovery (spawning recruits/parental adult of >1.5) with seeding above level 2 (75% seeding of available habitat).

4. The IMST recommends that ODFW advocate initiation of a scientific review of the Fisheries Regulation Analysis Model (FRAM) used to estimate harvest impact on OCN stocks components.

   Such a review might be incorporated into the Year 2000 review of Amendment 13.

5. The IMST recommends that ODFW advocate adherence to the policy that links decisions on ocean harvest to the status of the weakest stock component.

   Oregon currently adheres to this requirement, but pressures to allow fishing by sport or commercial fishermen create challenges for following this policy.

6. The IMST recommends that ODFW advocate determining the relationship between the response of salmon juveniles and their food webs to carcass abundance.

   Criteria should be developed that consider the impacts of harvest management on carcass abundance and distribution. Strategies for stock recovery need to recognize the role of food resources and carcasses in production of smolts in freshwater habitats. As an example, management criteria could identify minimum numbers of spawners per mile of stream to provide the food base necessary to support young salmon.

Question 2: Are estimates of mortality from non-retention fisheries accurate and does this source of mortality affect recovery of salmon?

Conclusions

Current estimates of mortality from non-retention fisheries are highly variable, subject to substantial uncertainty, and cannot be characterized as accurate. Experimental methods are limited and subject to many sources of error. Even low incidental mortality rates of OCN coho salmon could significantly slow recovery for depressed stocks. Scientific review of hook and release mortalities should be an on-going process, as environmental conditions change.

Recommendations

7. The IMST recommends that ODFW support PFMC review of hook & release.

   This is a key factor for impact analysis of fisheries. Analysis of hook & release mortality should continue after 2000 because uncertainty is high and ocean conditions are highly variable.

8. The IMST recommends that ODFW advocate determination of the degree to which plausible extremes in mortality and in spatial and temporal variation can influence the risk of extinction.

   Hooking mortality and encounter rates are variable, and sensitivity analysis can help evaluate their impact on probability of extinction. Highly sensitive parameters should be strengthened by monitoring, especially by double-index tagging.

Question 3: Are models used for exploring management questions about Oregon coho salmon scientifically rigorous? Are these models effectively integrated into management and policy analysis and decision-making?
Conclusions

The life cycle models developed by ODFW and NMFS (Nickelson and Lawson) are rigorous, but are not being used to their full potential. This model can be strengthened, and additional models can be developed to provide the ability to confirm model performance and identify areas of uncertainty.

Several features of the model and information base that could be improved in future model development and applications are 1) scarce data, 2) aggregated functions that should be articulated separately, and 3) incorporation of variability (locally and regionally; short term and long term) into model projections. Currently modeling by PFMC and ODFW uses a static view of future landscape conditions. Restoration of freshwater habitats and future disturbance processes are not considered. Current analyses are dynamic in terms of ocean conditions and fish populations, but they treat watersheds and freshwater habitat as fixed and unchanging.

Coordinated analysis of harvest management, monitoring, model applications, and risk assessment would create a more scientifically sound decision-making context for salmon harvest management and allow management to adapt and improve more quickly. Unfortunately we do not find a concrete link between the operation of the model, the monitoring program and the development of harvest management policy. The efforts in SRS monitoring system, basin habitat surveys, life cycle monitoring sites, and life-cycle models would be strengthened if they were integrated into an on-going program of assessment and integration of information and future stock projections.

Recommendations

9. The IMST recommends that ODFW advocate that PFMC use an explicit analytical process that incorporates monitoring results, harvest records, and the life-history model as part of the decision process for harvest levels.

   This analysis should link spawner surveys, habitat surveys, marine survival or impacts and model projections. It should also be spatially explicit to the greatest degree allowed by the data and model structure.

10. The IMST recommends that ODFW advocate that PFMC incorporate dynamic and changing landscape conditions in the analytical process to reflect potential habitat restoration, human-related degradation, and natural disturbances.

    Use of dynamic conditions for both ocean and freshwater environments will provide more realistic projections of future population trends and risks of

extinction. Such integration also recognizes regional goals to protect and restore watershed conditions along the Pacific Coast.

We hope this information will be helpful as ODFW represents the State of Oregon to the PFMC. By copy of this letter we are notifying Director Greer, ODFW Commissioners and PFMC of the IMST scientific recommendations in this matter.

Sincerely yours,

Logan A. Norris
Chair, IMST

cc: Director Jim Greer, ODFW
ODFW Commissioners
Don McIsaac, PFMC
Roy Hemmingway, Manager, Oregon Plan
IMST