Testimony of James J. Anderson

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Before The

U.S. House of Representatives

Committee on Resources

September 2, 1998

Pasco, Washington

I wish to thank the House Resource Committee for the opportunity to appear at this hearing. I am an Associate Professor in the School of Fisheries at the University of Washington and have been involved with Columbia research for over a decade. My group and I have developed models for fish passage through the hydrosystem and for harvest management. I am currently a member of PATH, which is a group of scientist tasked with quantitatively evaluating proposed fish recovery strategies including increased smolt transportation and breaching the lower Snake River dams. In these studies I have worked extensively with National Marine Fisheries Service scientists and managers.

My specific comments concern the NMFS flow targets as an Endangered Species Act management tool. I also note my thoughts and observations on how science has been used in ESA salmon management. Simply put NMFS has justified many actions in terms of their qualitative benefits. Because of the increasing complexity of ESA management, the benefits of actions must be put in terms of the numbers of fish and the costs of the actions.

The Two Cultures At NMFS

NMFS has two cultures, a scientific culture responsible for basic and applied research on fish and their ecosystem and a management culture responsible for regulating commercial fisheries and recently for implementing the ESA for salmon. Most of my experience has been with the NMFS scientists and I have high regard for their integrity, dedication and abilities to conduct scientific research in the charged atmosphere of endangered species issues. NMFS scientists have decades of experience with salmon and their continued involvement is essential to insure that endangered species are recovered. NMFS managers have an even more demanding task. Balancing the social and economic factors affected by the ESA is a difficult job because of the political constraints and limitations of the science that often is unable to provide clear explanations and conclusions. I believe that for effective management the two cultures must be integrated and work together.

Management Lags Science

The relationship of NMFS science and management is critical to the success and failure of the ESA implementation. A well-known observation in fisheries is that management lags science, sometimes by a decade. Management is not unaware of the recent scientific results, but in the fast moving political arena it is often difficult to resolve the scientific uncertainties to the point that they can be incorporated into management. Consequentially managers typically favor past ideas in making decisions. This is not a surprise considering that management must balance public perceptions as well as the scientific information, and in this regard, the public often takes views derived from their desire for a particular outcome. They often select or reject a scientific result according to whether or not it supports their belief. Managers of ESA resources can not take this approach.

Acceptance of scientific principles is a slow process so it is natural to focus on old beliefs in making decisions. But it is essential for that managers educate the public on the relevance of recent scientific work. NMFS has not always done this. In any case, fisheries managers must not ignore the new research, nor fail to resolve the conflicting claims. It is in this regard that ESA salmon managers need to use the available science and especially for the interim decisions involved with the daily allocation of water resources.

Flow Targets

I will focus on the flow policy of NMFS. A decade ago many fish biologists believed that the Snake River salmon decline was mainly the result of increased fish travel time through the hydrosystem. It was thought that by increasing flow to mimic the predam flows the fish would return to the predam levels. Improved survival studies and model results indicate that a strong increase in fish returns from flow increases is not possible. The current estimate of the impact of flow on spring chinook is a hundred times less than was previously believed. The flow augmentation program may produce a 1% increase in runs, far less than the 1000% needed to recover the spring chinook from its present level.

In developing the Biological Opinion for dam operations in 1995, and again for the mid Columbia stocks in 1998, NMFS did not incorporate the quantitative estimates that challenge the efficacy of flow as a fish recovery action. NMFS, in both instances, called for flow targets during the smolt migration and based the justification on circumstantial and largely outdated evidence. Nowhere in the analyses were quantitative estimates provided. It appears that the underlying NMFS belief was that, although a flow survival relationship can not be demonstrated, it is likely that one exists and therefore it is worth increasing flows to obtain an unspecified benefit in survival.

The recent analysis conducted by PATH has found no evidence that increased flows will significantly increase spring chinook returns, neither directly through improved hydrosystem passage nor indirectly through an unspecified relationship between river flow and post hydrosystem survival. For the subyearling fall chinook migrants the studies do show a relationship between survival and a number of river properties including, temperature, flow, water turbidity and the timing of the migration. My recent analysis of the fall chinook data suggests a relationship between fall chinook smolt survival and fish size. Furthermore, if the operative factor is fish size, then flow augmentation, which may cool the water and initiate early migration, could reduce fish size and decrease survival.

The important point here is that, although flow correlates with survival in some years, a correlation is not evidence that increases in flow within a year will improve survival. Flow could be beneficial or detrimental; we simply do not know its affect at this time.

Under these results, no flow survival in spring chinook and uncertainty for fall chinook, NMFS made a policy decision to strongly manage flow, irrespective of proof that it benefits fish. In addition, the flow targets are hydraulically impossible to achieve in below average water years. Furthermore, NMFS has been inflexible in reevaluating the flow targets in light of the new information and it has not aggressively pursued a resolution of the scientific claims on the impacts of flow.

Water Withdrawal Policy

To support the flow targets NMFS imposed a moratorium on new water withdrawals in the Columbia and Snake River basins. Where and when water is withdrawn is clearly important to the level of impact it has on fish. A water withdrawal above spawning grounds may impact egg survival but the same withdrawal in the mainstem will have virtually no impact on smolt survival. The NMFS policy does not distinguish these differences. It is inflexible to the individual needs of water users and the varying impact of water on fish. This failure to quantify individual actions will not work in the long term where demands for salmon restoration increasingly confront the demands for water. Since the demands for both will only increase it is essential to quantitatively assess the impacts of withdrawals on a case by case basis using the best available models and data.

Putting Numbers On Actions

For two decades now regional fish recovery actions have been justified on the grounds that they appear to benefit to fish. There has been few quantitative assessments of the actions, few peer reviews of the claims, and little flexibility in allocating resources. Although the region, through groups such as PATH, is now attempting to put numbers and probabilities on the impact of actions, only a limited number of issues are being addressed. Issues, such as the evaluation of the flow targets and water withdrawal moratoriums, are not being addressed.

I believe that the atmosphere of distrust and adversity in managing threatened and endangered salmon is to some degree, because managers have failed to quantify results and challenge unsupportable claims on the benefits or detriments of actions. Instead of addressing issues in terms of the numerical cost and benefits and ranking actions by their effectiveness NMFS has used inflexible targets and moratoriums. These qualitative and largely intuitive approaches to management encourages fish advocates to misuse the scientific information and push for unrealistic demands and it forces water users into resolving issues through the courts and governmental intervention.

Supplemental sheet

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Topical Outline:

My specific comments concern the NMFS flow targets as an Endangered Species Act management tool. I also note my thoughts and observations on how science has been used in ESA salmon management.

Simply put NMFS has justified many actions in terms of their qualitative benefits. Because of the increasing complexity of ESA management, the benefits of actions must be put in terms of the numbers of fish and the costs of the actions.

A well-known observation in fisheries is that management lags science, sometimes by a decade. ESA salmon managers need to use the available science and especially for the interim decisions involved with the daily allocation of water resources.

The science indicates no flow survival in spring chinook and uncertainty for fall chinook. NMFS policy to strongly manage flow is without proof that it benefits fish.

To support the flow targets NMFS imposed a moratorium on new water withdrawals in the Columbia and Snake River basins. The NMFS policy does not distinguish differences in where and when water is withdrawn. Not all withdrawals affect fish.

NMFS has used inflexible targets and moratoriums. These qualitative and largely intuitive approaches to management encourages fish advocates to misuse the scientific information and push for unrealistic demands and it forces water users into resolving issues through the courts and governmental intervention.