Testimony of Dr. Bruce Leaman, Executive Director,
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Introduction

Good afternoon Mr. Chairman and members of the Commission. I would like to thank the Commission for the opportunity to comment on the topic of Science and Policy in Fisheries Management. I offer my brief thoughts and observations on only a limited portion of the issues of science and policy. There are myriad issues in this topic and my fellow panelists will undoubtedly cover many aspects that I do not consider. My testimony includes thoughts accruing over more than twenty-five years as a scientist and manager of marine fisheries.

The management of fisheries, particularly that of the marine fisheries, is under intense scrutiny in recent years, probably more so than in any previous time. The collapse of some historically high-yielding commercial fisheries as well as those for minor species has focused scientific and public attention on the performance of fisheries management. It is important that these problems in management are analyzed and that the shortcomings of either scientific understanding or harvest policy are addressed. However, as a corollary to this process, it is equally important that we focus attention on those situations where management has been successful. In the northeast Pacific Ocean, there are a number of healthy marine stocks with a long history of management. Many of these management programs have been in place for thirty years and one, that for Pacific halibut, has been in place for almost eighty years. The successes of these programs have some common features, one of which is the close integration of science and the development of management policy.

There are at least two major ways in which science must interface with policy in fisheries management.

1. **Policy development**
   Science must provide the basic understanding of stock behavior, as well as the predictive tools and framework necessary for the development of harvest policies.

   This development invokes an understanding of species' biology and population dynamics, as well as the influence of environmental changes on them. Science must also provide the simulation/investigative framework that allows policy makers to examine the potential impacts of their decisions. While assurance of conservation is paramount in yield recommendations from science, harvest policies will legitimately address the Optimum Yield provisions specified in the Magnusson-Stevens Act. Decision makers will require the ability to assure this conservation while developing harvest policies for these other goals. Therefore, scientific expertise is required not only in the biological but also in the broader economic and social realms.

2. **Policy implementation**
   Science must be capable of describing the present and future status of resources with precision sufficient for effective implementation and evaluation of harvest policy.

   This means that assessments must be capable of detecting the impacts of harvest policy decisions. If they cannot, then the evaluation and modification of harvest policy will be equally impossible. This may present a formidable challenge for species where knowledge or data gaps exist. Assessment methodologies that require large amounts of detailed data to achieve the needed precision in understanding stock status may be precluded in the earlier stages of fisheries. Implementation of appropriate harvest policies in such instances must recognize this restriction.

While development and implementation of policy are vital to successful management, I would like to concentrate on a broader aspect of science in the governance of fisheries, one that appears to be overlooked in many programs.

Gaining the Consent of those Governed

A basic democratic tenet is that effective government rests on the consent of the governed. Fisheries management, in the context that it is governance, has generally not expended sufficient effort at gaining this consent. Historical fisheries management has more often been based more on dictate than on a sense of shared endeavor. While such top-down management can achieve some policy goals, it often creates a framework that is less capable of detecting biological changes and less capable of substantial alterations in its operating characteristics. Scientific investigation will be internalized and be capable of detecting changes only to the extent of agency commitments to data collections. Decision making will tend to be restricted and centralized. Such a system may not have the consent but, more importantly, it will not utilize the resources and capabilities of those governed.

What is the role of science in gaining this consent?

Developing the scientific basis for stock management can utilize a framework to make fisheries management a shared endeavor. For fisheries management to be effective, it must:

- be based on sound science and be robust to mis-specification of population dynamics processes;
- incorporate a scientific feedback loop with stakeholders;
- respect and incorporate the observations, opinions, intelligence and commitment of stakeholders.

The first of the above elements describes the fundamental character of scientific investigation and precautionary management. We need to conduct high-quality science and we need to be cautious when we have insufficient knowledge or uncertainty about

system behavior. This first element has traditionally been the exclusive purview of the scientist. That isolation or segregation should change, particularly because we need the capability of detecting and understanding whether we have mis-specified stock dynamics when developing harvest policy.

The latter two elements provide both the opportunity and the responsibility in generating the sense of shared endeavor in fisheries management.

Creating Scientific Feedback and Mutual Respect

Resource stakeholders, and harvesters in particular, are extraordinarily creative. They are highly-skilled problem solvers, astute observers of specific events, and have an inherent sense of the scientific method in examining issues. Their approach to answering questions is often as structured and rigorous as any experiment designed by agency scientists. Their sensitivity to environmental changes may be higher and more rapid than that of fishery biologists. Harvesters may have their myths about biological processes but fishery scientists are no less prone to invoking their own myths. We need a mutual recognition and respect for this characteristic.

We should be taking advantage of this expertise on a regular basis and develop a true feedback loop for scientific investigation. The design of research to address fishery management issues does not normally invoke the participation of harvesters. Such feedback as exists presently does so at the reactive stage, e.g., when experiments or investigations are completed and the resulting regulations may already be promulgated, rather than at the formative stages. In such situations, harvesters perceive correctly that it is too late for change in a conceptual sense and, given the responsiveness of most of our fishery management activities, it is also too late in an operational sense. The result is disagreement and conflict.

Such conflict has little possibility of resolution at this output stage because there is no framework for examining disagreements in a rigorous manner. Investigations have already been designed, conducted, and analyzed. Disagreements on experimental design or execution devolve into a 'Yes it is/No it's not' scenario. Both protagonists believe they are right, or at least that the other is wrong, but they cannot address the contentious issues about specific investigations effectively because the opportunity to do so exists only in the past.

Harvesters will believe that fisheries management can work if they understand and believe in the science upon which it is based. This means that they must be involved in the design and conduct of investigations and experiments, not just in the review of their results. If we are to achieve this goal, we must be prepared for a much greater investment of time in scientific cooperation with harvesters. We should also recognize that a great deal of the time we spend at the output stage in trying to convince stakeholders that fishery management decisions are correct, is time that could be spent more profitably in jointly designing and executing research to which stakeholders can commit their support.

The second element in making fishery management a shared endeavor is respecting the contributions and commitments of stakeholders to the process. There is a slowly-growing body of studies around the world wherein stakeholders and scientists are defining new paradigms for the conduct of research on stock dynamics. A common facet of these studies is the recognition that all parties contribute knowledge and elements of value. More importantly, all parties are committed to examining their beliefs within an objective framework. It can be a time-consuming and frustrating process because it requires accommodation of alternate and opposing views. However, it is ultimately superior to a *post facto* review of results generated by a process that was not a shared endeavor. It is also superior because it generates a mutual respect that improves other interactions.

We need to respect the value of the elements that stakeholders bring to the process of scientific investigation. In particular, fishery management agencies need to regain the trust of stakeholders. While harvesters must recognize that the provision of information about their activities is the cost required by the public for use of the public resource, fishery management agencies should be judicious in the choice of which data elements are required and ensure that these data are employed in the process of management. Fishery management should also be open to consideration of new forms of data management and ownership, to the extent that they enhance management and enforcement capabilities.

In the context of recommendations to the Commission concerning the interface of science and policy, I believe we can develop more effective management policies if we improve the process of generating scientific advice. To this end, I recommend that you endorse a more inclusive and comprehensive process for the planning and conduct of scientific investigations by federal agencies. I also recommend that you endorse governance structures, such as dedicated access privileges, that provide the incentives for individual stakeholders to participate in such research. I believe that these are important positive initiatives in helping federal agencies avoid the present litigious alternatives to addressing resource management issues.