

MARINE MAMMAL COMMISSION
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16 April 2003

Mr. John H. Dunnigan
Director, Office of Sustainable Fisheries
Room 13362
1315 East-West Highway
Silver Spring, MD 20910

Dear Mr. Dunnigan:

On 14 February 2003 the National Marine Fisheries Service published in the *Federal Register* an advanced notice of proposed rulemaking and request for comments regarding revision of national standard 1 guidelines for U.S. fisheries. National standard 1 states that “Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.” Overfishing has been highlighted as a significant threat to marine ecosystems in a number of recent documents (e.g., Dayton *et al.*, 2002; Mangel *et al.*, 1996; U.S. Federal Agencies with ocean-related programs, 1998). These documents suggest and provide evidence that fisheries management in this and other countries have routinely led to overfishing of target species and unacceptable consequences to non-target stocks and ecosystems. For that reason, it is important that we consider at a very fundamental level how we will approach the management of fisheries in the future. A thoughtful review of national standard 1 seems like a good place to start. With that in mind, the Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, provides the following comments on the guidelines for national standard 1 (50 CFR §600.310).

Preventing Ecosystem Overfishing

The concept of optimum yield is intended to maximize long-term or sustainable catch while preventing unacceptable adverse consequences of fishing. Unacceptable adverse consequences may occur to the target stock itself, and the terms “overfishing” and “overfished” are intended to address such effects. However, the definition of optimum yield also recognizes that unacceptable adverse effects also may involve social, economic, and ecological considerations. These are not addressed by the current definitions of overfishing and overfished.

As a result, the guidelines do not specify how economic, social, or ecological considerations should be incorporated into fisheries management or insure that any reductions in catch will be sufficient to address them. With regard to ecological considerations, such specifications are important because the rate of removal of fish biomass and the amount removed may be tolerable for

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the fished stock but may have unacceptable adverse effects on other elements of the fished ecosystems (e.g., predators, competitors, prey). Such effects have been referred to as “ecosystem overfishing” and are consistent with concerns identified in legislation pertaining to marine resource management including the Marine Mammal Protection Act, the Endangered Species Act, and the Magnuson-Stevens Fishery Conservation Management Act.

Broadening the definitions of “overfishing” and “overfished” to avoid excessive ecosystem effects will be a challenge. Resource managers have sought to implement ecosystem-based management for several decades with considerable progress in developing principles but little progress implementing them. Nonetheless, a number of conceptually simple steps can and should be taken to move in that direction. The definitions of overfished and overfishing should be expanded to acknowledge the possibility of significant adverse ecological or ecosystem-related effects. Managers should identify non-target species that may be affected directly (e.g., bycatch) or indirectly (e.g., loss of prey) by fishing on the target stock. When significant adverse effects may occur, the status and trends of those non-target species should be assessed and monitored, and the potential effects should be investigated. Appropriate modifications of the fisheries should be considered when such effects are reasonably likely to occur or are confirmed. Although these steps have been taken for a number of fisheries, they are not taken in a consistent, systematic, and rigorous fashion or as a matter of course, as they would be in a pro-active ecosystem-based approach to fisheries management. For that reason, the Marine Mammal Commission recommends that the National Marine Fisheries Service broaden the definitions of overfished and overfishing to account for adverse effects from ecosystem overfishing, and develop management procedures that require consistent, rigorous, and systematic evaluation of its potential adverse effects.

Optimum Yield, MSY, and the $F_{40\%}$ Harvest Management Strategy

Optimum yield (16 U.S.C. 1802 §3(28)(B)) is “prescribed on the basis of MSY [maximum sustainable yield] from the fishery....” MSY-based management is fundamentally a single-species approach that is based on the stock-recruitment dynamics of the target stock irrespective of fishery effects on other species. For the majority of fish stocks taken in U.S. fisheries, the true nature of the stock-recruitment relation is unknown and is therefore estimated using a proxy. Although the MSY-based approach might be considered reasonable in a single-species context, it may not be reasonable in an ecosystem context because it is founded on a number of significant but untested assumptions.

In an ecosystem context, the most significant assumption may be that a fishery may reduce the target stock by as much as 60 to 80 percent of its expected level in the absence of fishing without significant adverse effects on ecologically-related species. For marine mammals that depend on the target stock for prey, this assumption may affect their foraging efficiency and success and, ultimately, their probability of survival and reproduction. Adverse effects are likely exacerbated when multiple prey stocks are fished, further limiting the foraging opportunities for marine mammals.

Another important assumption is that the MSY level or a suitable proxy can be reliably determined. The stock level producing the maximum sustainable yield is unknown for the majority of stocks fished in U.S. waters. The use of a proxy based on a percentage of the pristine level may

be unreliable if the estimated pristine level itself is uncertain. This would be particularly problematic if the estimated pristine level declined as a function of fishing, such as from decreased recruitment. In 1981 the estimated pristine level for pollock in Shelikof Strait (Gulf of Alaska) was 2.786 million metric tons (mmt), 40 percent of which would be 1.114 mmt. In 2002 the estimated pristine level for the entire Gulf was 0.612 mmt with a 40-percent proxy of 0.245 mmt. The assumption made in current fisheries management is that the differences in these estimated pristine levels and MSY proxies are due to natural changes outside the control and influence of fisheries management. An alternative hypothesis is that fishing has contributed significantly to the reduction of the stock and the estimated pristine level in 2002 is not really pristine, but rather a function of both natural and fishing-related factors operating over the past several decades. If, as is generally the case, the fishery management approach does not include adequate controls or other mechanisms to distinguish natural and fishery effects, then the result may be a tautology where it is not possible to test the alternative hypothesis about fishery effects. If the 1981 estimate were also representative of the true pristine level in 2002 (the expected level had there been no fishing) then fishing in 2002 would have reduced the stock to less than 9 percent of its pristine level, which may have significant adverse consequences for the stock and the ecosystem.

These and other assumptions are fundamental to the current single-species approach to fisheries management under national standard 1 and may result in significant effects on other elements of marine ecosystems, including marine mammals. For that reason the Marine Mammal Commission recommends that the Service review the theoretical framework for setting of catch levels, identify the major assumptions inherent in that framework, establish experimental methods (e.g., no-fishing control regions) to test those assumptions and, until they have been validated, manage the fisheries in a more precautionary manner.

Changing Environmental Conditions

The Service's *Federal Register* notice indicated that management intended to achieve national standard 1 is confounded by changing environmental conditions (which may include those caused by fisheries), and mechanisms to address those changes may be needed. Although changing environmental conditions may have significant implications for fisheries management, the existing scientific/management regime often is not capable of distinguishing changes that occur naturally from those that occur as a result of fishing. The distinction has important implications for efforts to protect marine ecosystems from undesirable effects of human activities.

The inability to distinguish between natural and fishery-related changes may lead to two types of management error. If natural changes are mistakenly attributed to fishing, then fishing may be limited or constrained unnecessarily. If fishery effects are mistakenly assumed to be natural, then fished stocks and the ecosystems of which they are a part may be adversely affected in a manner and to an extent inconsistent with the goal of conserving component parts of marine ecosystems. The relative significance of fishery versus natural effects has long been debated. Little progress has been made in the development and implementation of fishery management approaches that can discriminate adverse fishery effects from natural effects and reduce the probability of such errors.

When faced with such errors, the management approach taken is often determined politically by choosing between fishing and ecosystem conservation. We believe that ecosystems are best served when the burden of identifying potential resource impacts falls on those proposing to exploit the resources. Further, the scientific/management regime should be attempting to eliminate such uncertainties by finding better ways of distinguishing between natural and fishery-related changes and reducing the probability and consequences of either type of error. For that reason, the Marine Mammal Commission recommends that the Service review its science/management regime to identify and implement mechanisms that can be used to distinguish natural and fishery-related changes. Such mechanisms may include marine protected areas or no-fishing zones to serve as fishing controls and reductions in harvest rates to moderate or mitigate adverse fishing effects.

Fishing Species Complexes

The Service's *Federal Register* notice indicated that management intended to achieve national standard 1 may be facilitated by grouping individual species for which there is insufficient information into management groups. The pooling of individual species would effectively change the management unit and could result in less protection and more risk for individual species. When species complexes are fished, those species with smaller abundance or biomass, greater fisheries mortality, and lower reproductive capacity may be at greater risk from fishing at an intolerable rate (overfishing) or from excessive reduction in stock size (overfished) unless the entire species complex is fished at a rate and to a level suitable for the most vulnerable species. Since the reason for combining the species is the lack of information, the actual level of risk is often difficult to determine and is therefore further confounded by uncertainty. In fact, this has been the situation for species in the west coast rockfish complex and northeast multi-species groundfish complex. Without adequate study, such species may not be evident and the relative risks to them may not be apparent. Further, fishing on such complexes seems contrary to efforts to enhance the scientific basis for management. For these reasons, the Marine Mammal Commission recommends that the Service not combine individual species into complexes for the purpose of management aimed at achieving national standard 1.

Uncertainty

The framework established for determining whether a stock is overfished or whether overfishing is occurring is based on information about the stock's life history, distribution, size or biomass, productivity, and other pertinent biological and management information. These various sources of input are generally estimated with varying levels of accuracy and precision. The significance of the various sources of bias and error associated with input information is often not conveyed to decision-makers and therefore not incorporated into the decision-making process. As a result, the fished stock specifically and the ecosystem generally may be exposed to unnecessary adverse effects. The value of good science is that it provides a basis for confidence in the information used to make management decisions. If uncertainty in the information needed for management is ignored or not conveyed to decision-makers, then the scientific basis for management is undermined and the risks to the fished stock and the ecosystem are increased. Therefore, the Marine Mammal Commission recommends that the Service review its procedures for

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providing scientific information to fisheries managers seeking to achieve national standard 1 and take the steps necessary to ensure that the information is accompanied by appropriate measures of uncertainty or, conversely, confidence.

Broaden the Precautionary Approach

The regulations implementing national standard 1 describe “a precautionary approach,” but the approach is limited to three measures aimed at the target stock. The described approach therefore fails to address the uncertainties and risks associated with fishery effects beyond those on the target stock (i.e., to non-target species or the ecosystem generally). Throughout this letter we have described the need for caution to avoid such effects. For the reasons expressed above, the Marine Mammal Commission recommends that the Service broaden its definition of a precautionary approach under national standard 1 to address possible effects to non-target species and the ecosystem generally.

Please contact me if you wish to discuss these comments or recommendations.

Sincerely,



David Cottingham
Executive Director

Literature cited:

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