



MARINE MAMMAL COMMISSION

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Dear Dr. Balsiger:

The Marine Mammal Commission (MMC), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the National Marine Fisheries Service's (NMFS) Draft Environmental Impact Statement (DEIS) for Steller Sea Lion Protection Measures for Groundfish Fisheries in the Bering Sea and Aleutian Islands Management Area (noticed at 78 Fed. Reg. 29131). The MMC provides the following recommendations and rationale.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the National Marine Fisheries Service revise its draft document to provide—

- for each of the proposed management alternatives, a full explanation of how that alternative will affect the Alaska groundfish stocks' biomass, density, age/size structure, and spatial/temporal distribution throughout the Aleutian Islands region;
- a full account of how these changes to groundfish stocks could potentially compromise or otherwise alter the quality of the Steller sea lion prey field and affect individual foraging efficiency of Steller sea lions, particularly for juveniles and adult females;
- an explanation of how changes in foraging efficiency could affect overall vital rates, at the rookery cluster and statistical area levels; and
- in cases where NMFS is unable to provide a comprehensive analysis of predicted effects of fishing activity on Steller sea lion foraging and survival, a description of important information that is needed but lacking, and how NMFS plans to acquire such information.

Given the paucity of data and information on which to assess population-level effects of increased fish harvests in and around the western and central Aleutian Islands, the Marine Mammal Commission further recommends that NMFS (1) adopt a precautionary approach in the development of the final EIS and any subsequent rulemaking, (2) apply the selected protection measures within the framework of an adaptive, experimental approach to managing Alaska groundfish fisheries, and (3) closely monitor for evidence of the effects such measures may have on Steller sea lion foraging success, vital rates at the population, statistical area, and rookery levels, and progress towards overall recovery.

RATIONALE

Pursuant to the National Environmental Policy Act, the DEIS provides an assessment of environmental impacts associated with proposed Steller sea lion protection measures for the Aleutian Islands Atka mackerel, Pacific cod, and pollock fisheries. The western population of Steller sea lions is listed as endangered under the Endangered Species Act (ESA) and critical habitat has been designated to protect important rookeries (breeding areas), haulouts, and foraging areas. NMFS has also implemented protection measures since 1997 that disperse fishing effort both spatially and temporally across the Aleutian Islands and Bering Sea management areas, in an effort to minimize the direct (e.g., entanglement in fishing gear) and indirect (e.g., competition for important prey species) effects on Steller sea lions.

Under the ESA, federal agencies are required to consult with NMFS to ensure that their actions do not jeopardize the continued existence of an endangered species or adversely modify or destroy its critical habitat. In 2007, NMFS initiated a review of its fishery management plan for groundfish fisheries in the Alaska Bering Sea/Aleutian Islands (BSAI) management area to assess potential impacts on Steller sea lions and other ESA-listed species. As a result of this review, NMFS issued a biological opinion in 2010 that determined a possible adverse relationship between Steller sea lions and these commercial fisheries that target important Steller sea lion prey such as Atka mackerel, Pacific cod, and pollock. The harvest of these fish species may result in competition between marine mammals and fisheries, and have adverse effects on Steller sea lions if fisheries reduce the availability of prey to the extent that it limits an animal's growth, reproduction, or survival. In its biological opinion, NMFS recommended alternative protective measures specific to Atka mackerel and Pacific cod fisheries for areas 543, 542, and 541 of the Aleutian Islands, and implemented these measures in an interim final rule effective on 1 January 2011. The State of Alaska and fishing industry groups challenged NMFS's decision in federal court, and the court ultimately found that, although NMFS adhered to its duties under various statutes, it did not provide a clear scientific explanation for its 2010 decision and did not sufficiently incorporate public input. The court ordered NMFS to prepare an environmental impact statement to assess fully the environmental consequences of the proposed protection measures and allow the public sufficient opportunity to comment.

Potential impacts of fisheries on foraging efficiency

The central question surrounding this DEIS pertains to the ecological effects of the Alaska groundfish fisheries on the western population of Steller sea lions. The primary concern is whether competition for fishery resources may leave insufficient biomass, or may alter the prey field in such a way, that it inhibits foraging efficiency of Steller sea lions and, consequently, their ability to survive, grow to maturity, and reproduce at rates sufficient for the population to recover in accordance with criteria set forth in NMFS's 2008 revised Steller Sea Lion Recovery Plan. Juveniles and adult females are most at risk—for the most part, these animals are central-place foragers that must find sufficient food within foraging range of their rookeries. Juveniles are relatively inexperienced foragers (compared to adults) with high energetic and metabolic demands to support growth and development. Adult females may be at more risk than juveniles because they must find food with sufficient energy content to support themselves, their nursing pups, and developing fetuses.

To forage efficiently, a Steller sea lion must be able to encounter, capture, and consume sufficient prey within its environment. Previous MMC letters to NMFS highlighted several ways in which current fishery harvest levels may compromise the prey field and thus influence Steller sea lion foraging efficiency, and these concerns are summarized again here.¹ For example, current fishing levels and strategies may result in a shifting of the age/size distribution of the target stocks. Once a certain age-class or cohort of fish matures to the point where it recruits to the stock, or reaches a physical size where it is typically caught by the fishery, it becomes exposed each year to repeated fishing exploitation. The end result is that fishing effort reduces the prevalence of older, larger individuals in a stock, leaving behind a stock that is skewed toward younger, smaller individuals that may have less nutritional and energetic value to predators such as Steller sea lions.

Fishing can also change the spatial and temporal distribution of fish stocks. At reduced population density, a fished stock's distribution may contract, reducing sea lion foraging efficiency at the edges of the distribution and causing Steller sea lions to contract their foraging range. Alternatively, fished stocks may contract their distribution based on habitat characteristics—assuming an ideal free distribution—and at lower density may contract to areas of primary habitat preference over secondary ones. If important Steller sea lion rookeries or haulouts overlap spatially with these secondary fish habitat areas, the outcome could be declines in foraging success and population status in or near the fished stock's secondary habitat. Finally, intense fishing pressure may result in gaps or holes in the distribution of the fished stock that persist for some time, especially for patchily distributed species like Atka mackerel, that return to multiple spawning grounds each year. This would result in localized depletion of prey, with prey patches that are fewer and farther between.

If the fished stock maintains its original distribution, large reductions in groundfish biomass would reduce prey field density, or biomass per volume of water, and thus potentially lower the encounter rate between Steller sea lions and their prey. Recent research has highlighted the importance of prey density, as opposed to prey abundance, to fur seals and seabirds in the Bering Sea (Benoit-Bird et al. 2013). Like marine predators, fishermen often achieve the greatest yield per unit effort when targeting high-density aggregations of fish. Thus, the effect on the availability of high-density aggregations of prey to the predators may be even more important than the overall depletion or changes in range of a fish stock that is brought about by industrial fishing.

Previous MMC letters to NMFS also highlighted the need for better scientific understanding of the links between current harvest strategies in the BSAI and Steller sea lion population trends, and encouraged NMFS to make those linkages clear in its biological opinion and the DEIS. In its current form, the DEIS does not adequately describe the potential changes to the biomass, density, age structure, distribution, and ecological function of fish stocks under the current management regime and does not provide the reader with sufficient information to assess how these changes might impact Steller sea lions or the relative ecological benefits and detriments of each proposed alternative. For example, the DEIS describes predicted impacts of the management alternatives to the groundfish stock biomass for each of the major fisheries in the aggregate (i.e., whether an alternative is expected to affect the overall status of the stock), but offers little or no discussion of expected impacts at the local level (i.e., for a particular portion of critical habitat or even within the

¹ For more information, see MMC letters issued to NMFS on 3 September 2010 and 19 October 2012, available online at <http://www.mmc.gov/letters/welcome.shtml>

individual fishery statistical areas). In terms of changes to groundfish stock biomass distribution, NMFS only provides a description of the stock's past, current, and future allocation of fishery effort to the three statistical areas in terms of allowable biological catch. It does not characterize the local distributions, density and movements of fish stock biomass within these statistical areas, or how the stock biomass could shift spatially or temporally in response to the proposed fishing activity.

Changes to stock biomass, density, distribution, and age/size structure across time and space are central to the question of whether proposed fishery management measures are sufficient to protect Steller sea lion prey fields and foraging habitat. Therefore, the MMC recommends that, for each of the proposed management alternatives, NMFS provide a full explanation of how that alternative will affect the Alaska groundfish stock's biomass, density, age/size structure, and spatial/temporal distribution throughout the Aleutian Islands region. The MMC also recommends that NMFS provide a full account of how these changes to groundfish stocks could potentially compromise or otherwise alter the quality of the Steller sea lion prey field and affect individual foraging efficiency of Steller sea lions, particularly for juveniles and adult females, and how changes in foraging efficiency could affect overall vital rates for sea lions at the rookery cluster and statistical area levels.

Data gaps

Conducting a detailed analysis of the ecological effects of groundfish fisheries is difficult, given that data on Steller sea lion survival rates and abundance in the western and central Aleutian Islands are virtually non-existent due to the extreme remoteness and logistical difficulty in conducting surveys. Even if there were good data available on population trends for sea lions in these areas, attributing those trends to particular causes, particularly indirect effects such as prey depletion, further complicates such an analysis. The majority of data available on Steller sea lion foraging and population trends are mostly from studies in the eastern Aleutians and Gulf of Alaska, where population trends are stable or increasing.

One of the key questions in evaluating the potential effectiveness of proposed Steller sea lion protection measures to preserve prey field quality is the sea lions' utilization of preferred foraging habitat. To date there have been few studies using satellite telemetry for Steller sea lions in the western and central Aleutian Islands. For example, the DEIS notes that Alaska Fisheries Science Center staff captured and equipped 23 juvenile Steller sea lions with satellite linked time depth recorders (SLTDRs) between 2003 and 2006. These data were combined with earlier SLTDR data from tagged juveniles to study foraging habitat preferences between groups and across time and yielded interesting insights into juvenile foraging habitat use. The DEIS also notes that the at-sea behavior of adult females changes dramatically between the breeding and non-breeding seasons, but there is not yet enough telemetry data to discern regional differences, and few telemetry studies have been done since 2006 due to logistical constraints. It is currently unknown whether adult females in that portion of the sea lion's range are nutritionally stressed and exhibiting lower than expected fecundity or natality. Further SLTDR studies on adult females at these breeding sites could help determine whether proposed protection measures are consistent with foraging habitat preferences.

In those sections of the DEIS where NMFS is unable to provide a comprehensive analysis of predicted effects of fishing activity on Steller sea lion foraging and survival, the MMC recommends that NMFS describe important information that is needed but lacking, and how the

agency plans to acquire such information. It is important to fill these data gaps, or at the very least, recognize they exist and lay out a plan to fill them. Without sufficient data, there is no way to determine what effect the proposed measures will have on the spatial distribution of stock biomass of prey species and its relationship to Steller sea lion foraging success. In other words, no matter which alternative NMFS chooses, it has little basis for assessing the impacts to Steller sea lions without better information and dedicating more resources to studying fish stocks in the western and central Aleutian Islands and Steller sea lion vital rates and foraging patterns. NMFS identified a reasonable and prudent alternative in its 2010 biological opinion (also presented as Alternative 1 in the DEIS) as being necessary to ensure that any potential adverse population-level effects due to prey depletion by commercial fishing activities would not jeopardize the population's survival and recovery. It is unclear how NMFS can select a different suite of measures at this time, yet provide reasonable certainty that its preferred alternative will not result in jeopardy to the species or adverse modification of its critical habitat.

Adaptive management

The 2008 Steller sea lion recovery plan calls for NMFS to design and implement an adaptive management program to evaluate fishery conservation measures. Because there is so little information available to assess population-level effects of increased fish harvests in and around the western and central Aleutian Islands, the MMC recommends that NMFS (1) adopt a precautionary approach in the development of the final EIS and any subsequent rulemaking, (2) apply the selected protection measures within the framework of an adaptive, experimental approach to managing Alaska groundfish fisheries, and (3) closely monitor for evidence of the effects such measures may have on Steller sea lion foraging success, vital rates at the population, statistical area, and rookery levels, and progress towards overall recovery.

Thank you for the opportunity to provide comments on this DEIS. Please let me know if you have any questions regarding the MMC's recommendations or rationale.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

Literature Cited

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