NMFS' RESPONSE TO COMMENTS ON DRAFT STELLER SEA LION (SSL) RECOVERY PLAN
Notice of Availability and Request for Comments
(71 FR 29919, May 24, 2006; 71 FR 41206, July 20, 2006)

In May 2006, NMFS released the draft Steller Sea Lion Recovery Plan for public review and comment (71 FR 29919). On July 20, 2006, NMFS extended the customary 60-day comment period until September 1, 2006 (71 FR 41206) to provide additional time for public review and comments. NMFS received comments from 18 individuals and organizations during the 100-day comment period. Comments were provided by the Marine Mammal Commission, the State of Alaska, the North Pacific Fisheries Management Council, members of the fishing industry, non-governmental organizations (NGOs), members of academia and other interested parties. NMFS reviewed these comments and incorporated recommendations into the Draft Revised Plan. This document provides the full suite of comments and responses. Comments and responses are organized by topic area. Non-substantive or supportive comments that simply reiterate Plan content are not included here. All citations referenced in this document are included in the "Literature Cited" chapter of the Draft Revised Steller Sea Lion Recovery Plan. .

Population Structure

Comment: There were a number of suggestions that NMFS should use a different population structure of Steller sea lions in its management for recovery:

- Despite the current ESA listing, data on DNA and movements support other possible divisions of the population (e.g. Western Aleutians/Russian). More natural divisions focused upon rookeries would focus management priorities.
- The Plan needs to consider smaller geographic boundaries with the western DPS.
- The Plan should base its models and management plans on the SSL as a single meta-population.
- Evidence supports more stock structure within the eastern DPS. The Plan recognizes distinct sub-regions for the western DPS, but makes no distinctions for the eastern DPS. Baker et al. (2005) constructed a neighbor-joining genetic tree which indicates that eastern DPS from rookeries in British Columbia, Oregon and northern California form a lineage distinct from all western stock rookeries, and the longer branch lengths separating these breeding populations indicate substantial isolation over long periods of time. The evidence suggests that the U.S. West Coast subpopulation may in fact constitute a distinct population segment from the more northerly eastern populations, and further research should be required to make this determination prior to delisting of the eastern DPS.

Response: NMFS acknowledges that there are many different ways (e.g., three DPSs, seven metapopulations, 40+ rookeries; recovery units) that the Steller sea lion could be managed. However, recent genetic information from analyses of mitochondrial and nuclear DNA still strongly supports the two DPS structure NMFS currently recognizes. Metapopulations (geographical clusters of rookeries) or individual rookeries could have formed the basis of recovery units (and management actions), but this assumes a level of

knowledge regarding movement between units that currently does not exist. The Plan recognizes that not all parts of the western and eastern DPS are recovering or responding in the same way or at the same rates. As part of a status determination or a post-delisting monitoring plan, NMFS will collect information on population status throughout the entire range of each DPS, determine the population's status, and assess whether it meets the criteria for a change in listing status.

The stock structure currently recognized by NMFS (eastern and western DPSs separated at 144°W) is based on analyses of mitochondrial DNA (mtDNA), a marker passed on to offspring only by the mother. Bickham *et al.* (1996; 1998) and Ream (2002) reported that there was a distinct break in the distribution of mtDNA haplotypes between sea lion pups sampled on rookeries in the western part of the range (Russia to the eastern Gulf of Alaska) and eastern locations (Southeast Alaska and Oregon), indicating restricted gene flow between these two populations.

Results of subsequent genetic samples taken throughout the Steller sea lion range, including additional samples from rookeries in Asia, generally confirm the strong east/west population delineation, but also indicate that there is additional structure within the western DPS (Trujillo *et al.* 2004, Baker *et al.* 2005, NMFS unpublished data). Baker *et al.* (2005) hypothesize that a third population may exist just west of the Commander Islands in Russia. However, they point out that this potential division is not nearly as robust as the previous split between the eastern and western DPSs. Additional research points to a genetic break at Samalga Pass in the Aleutian Islands within the western DPS (O'Correy-Crow *et al.* 2006). Recent research suggests that the boundary between the western and eastern populations may be blurring (Pitcher *et al.* submitted 2006, NMFS unpublished). Of the two most recently established rookeries in the eastern DPS, about 70% of the pups born on Graves Rock and about 45% of the pups born at White Sisters were from western DPS females (Gelatt et al. *in press*). This has potential long term implications regarding the management of these populations, but it is also possible that we are witnessing in real-time a very infrequent event in which female sea lions from one population cross over to breed in another.

Trujillo *et al.* (2004) examined mtDNA and nuclear DNA (which is contributed by both parents) from the same samples to show that the population separation apparent from the mtDNA work was not clearly defined when males were taken into account. They found no clear separation of populations based on genetics when markers from both parents were included. They concluded that the difference in results may be attributed to a faster population divergence at the mtDNA locus, or it may be because Steller sea lions, like many other mammals, show a greater level of male-mediated gene flow via immigration than in females, e.g. males tend to disperse more than females and do not show the same philopatry for their natal areas as females.

Population Status and Trends

Western DPS Status

Comment: Describe any management measures implemented in Russian waters that affect Steller sea lions.

Response: The Steller sea lion has been listed as an endangered species in Russia since 1994. At the time it was listed in the Russian Red Book, all hunting or harvest of Steller sea lions in Russian waters was also prohibited. This is the only management measure taken specifically to conserve Steller sea lions by Russian authorities.

However, beginning in the 1950s, Russia established marine mammal protection zones in the Commander and Kuril Islands, along the Kamchatka peninsula, and in the Sea of Okhotsk (e.g., Tuleny Island) that also affect Steller sea lions. These zones were enacted primarily for the protection of sea otter and northern fur seal marine habitats, but because of their size (three to 30 miles in radius) and number (around virtually every island in the Kuril and Commander archipelago, for instance), they serve to protect Steller sea lion habitat as well. The zones prohibit vessels from transiting nearshore and prohibit any type of fishing in waters both nearshore and offshore of sea otter or fur seal terrestrial habitat sites. No transit zones range in size (radius) from three to 12 miles, while the no fishing zones extend up to 30 miles offshore (as in the Commander Islands and around Tuleny Island in the Sea of Okhotsk). The marine mammal protections zones around the Commander Islands were enacted in 1958, while those around the Kuril Islands and other parts of eastern Russia were established in the 1970s. All these zones are shown on the Russian navigation charts used by all fishing vessels. In the 1980s, enforcement was rigorous, and resulted in as many as 150 prosecutions per year for violation of the no-fishing zones by vessels. Since 2000, limited fishing has occurred within some of these zones but only with a scientific fishing permit issued by the Russian fishery authorities.

Comment: The Plan asserts that the stock is recovering, yet not all areas or population segments have shown optimistic trends (four of nine trend sites [areas?] are decreasing, some by as much as 30%). Even areas that have shown increases remain well below numbers counted in the 1990s.

Response: Sub-areas within the western DPS in Alaska have had different trends in abundance. For instance, the eastern Aleutians and the western Gulf of Alaska (GOA) have both been relatively stable since 1990, while other parts of the Aleutians and GOA have had decreasing or slightly increasing trends. The Plan does not assert that the stock is recovering, but does acknowledge the western DPS increased between 2000 and 2004. The NMFS will consider both trends in the western DPS as a whole and within each sub-area and measure them against the biological recovery criteria as it monitors recovery.

Eastern DPS Status

Comment: Nearly all increases in pup numbers in SE Alaska have occurred in new rookeries. Please explain whether the size of a rookery population in SE Alaska is determined by prey availability or the availability of terrestrial space.

Response: Rookery population size is likely dependent on a combination of factors, including both prey availability and terrestrial space, as well as prevalence of diseases and parasites and the abundance and distribution of predators. It is not known which factors currently predominate in determining rookery size in SE Alaska.

Comment: Add a timeline of management measures in British Columbia (e.g., shooting SSL at salmon net pens in late 1990s).

Response: NMFS believes that this information is not needed in the Recovery Plan. The commenter should look for this information in materials published in Canada, specifically the Status Report on Steller sea lions presented to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) by P.F. Olesiuk and A. W. Trites, September 2003.

General Trend Analyses

Comment: The trend analyses cited in the Plan are problematic: (a) trend models should use a random coefficients estimator rather than ordinary least squares to be consistent with the PVA assumption that the parameters are stochastic; (b) trend models should use a GLS or MLE estimator designed to address heteroschedasticity since the variance of observation errors associated with these data are not constant; (c) trend models do not allow for density dependence; (d) inclusion and omission of data sets is not explained; (e) the outputs should be rescaled and expressed in terms of the untransformed data; (f) use of a seemingly unrelated regression or other simultaneous equation model to estimate model parameters and to test the statistical significance of differences in the estimated parameters between regions is warranted because the models share a common set of explanatory variables and the allocation of counts to six regions is arbitrary; (g) autoregression and moving average models or polynomial time-trend models can describe trends without imposing the assumption that the trend is constant across observation periods; and (h) the Plan should note that splines were specified rather than fitted and that the same discontinuities were assumed for all regions.

Response: All of the suggested statistical analyses could be performed and would yield interesting information. However, NMFS does not believe they would improve our understanding of the dynamics of the western DPS. Population models, such as Winship and Trites (2006) and Goodman (2006; Appendix 1 of Plan), have considered many of the issues listed above and were used and referenced in the Plan.

Other issues, such as the strength of a density-dependent response, are highly uncertain (Goodman 2006) and have been assumed to exist by some modelers (Winship and Trites 2006) but not by others (Holmes et al 2007; Fay and Punt 2006). NMFS refers the

commenter to primary sources such as Sease and Gudmundson (2002) and Fritz and Stinchcomb (2005) for a complete description of the specific data and analyses used in trend models.

Feeding Ecology

Comment: Seasonal availability of herring and capelin when juvenile SSLs are weaning should be described.

Response: Capelin, herring, and eulachon spawn in spring and summer as juvenile sea lions are being weaned and during the late stages of pregnancy for adult females. At this time, these prey species are densely aggregated in highly predictable locations, particularly in bays and estuaries, and the aggregations of fish provide a rich resource for sea lions (e.g., high energy return for energy expended). Feeding has been documented at several locations, so it is highly likely that juvenile and adult sea lions are feeding at most of the known forage fish spawning aggregations throughout Alaska and British Columbia.

Conservation Measures

Comment: The historical review of conservation measures regarding incidental takes is weak. Thousands of sea lions incidentally caught in the roe-stripping fishery in Shelikof Strait in the 1980s are not mentioned. That fishery was eliminated, in part because of the sea lion issue but also because of concerns about wanton waste. NMFS observers are confined to groundfish vessels and a large number of small vessels lack coverage, including salmon and herring vessels. There is a long history of interactions between longline, troll, and other fishing vessels and sea lions since the start of these fisheries in the late 1880s.

Response: While a detailed history of incidental take and the fisheries involved could be added to the Plan, NMFS believes this is unnecessary. The objective of the Recovery Plan is to outline and prescribe actions that will lead to recovery. Historical information is useful to provide context for understanding the current situation; however, the Plan already explains that incidental take was high in the past and that a variety of measures were implemented to reduce it to the point where it is no longer believed to be a threat to recovery. Therefore, NMFS believes the description in the Plan is sufficient.

Comment: Potential beneficial relationships with fisheries should be considered and discussed. Sea lions have been depredating commercial fishing gear since commercial fisheries began in Alaska in the late 1880s. Presumably, there is some energetic benefit to a sea lion that consumes a longlined cod or gillnetted salmon, both in terms of caloric intake and reduced energetic costs from not having to seek and capture a free swimming prey. Fisheries discards may also benefit SSL.

Response: NMFS is aware that some Steller sea lions feed on discards from fishing vessels and onshore fish processing plants, while others consume fish caught on fixed

gear, but this is not believed to be a common sea lion foraging practice. While sea lions that forage in this way may expend less energy to obtain food than those that do not, such food resources are unreliable for sea lions and are most likely a source of opportunistic foraging rather than a primary food resource.

None of the satellite-tagged sea lions studied in foraging research have been observed feeding near commercial vessels or within harbors with fish processing plants (e.g., Dutch Harbor, Kodiak) or from fixed gear. It would be very difficult to quantify the number of sea lions that forage in this way, how frequently those individuals do so, or the total proportion of their diets (both in mass and caloric intake) comprised of fisheries-caught food.

Comment: The Plan should discuss how litigation shaped the measures currently in place to reduce competition with fisheries (page 65). It has bearing on the likelihood of future conservation actions being taken proactively without judicial mandates.

Response: The only action that NMFS was required to take because of litigation was the court-ordered closure of Steller sea lion critical habitat to trawling from August to November 2000. All other actions, including the Steller sea lion and groundfish fishery management measures enacted in 2002, were taken freely by NMFS. Legislation (e.g., ESA, NEPA) requires NMFS to consult on the potential consequences of any federal action that could affect Steller sea lions and the environment. The commenter is referred to the following excellent summary of litigation history and responses from NMFS and the North Pacific Fishery Management Council, in light of uncertainty regarding the factors involved in the decline and recovery of Steller sea lions:

McBeath, J. 2004. Greenpeace v. National Marine Fisheries Service: Steller sea lions and commercial fisheries in the North Pacific. Alaska Law Review 21: 1-42.

Factors Potentially Influencing the Populations

Comment: Fisheries incidental take should be reviewed. The estimate for the Prince William Sound gillnet fishery is likely too high, whereas takes in unobserved fisheries may not be adequately accounted for.

Response: Although a detailed history of incidental take, fisheries involved, and how each fishery responded could be added to the Plan, NMFS believes it is not necessary. The Plan describes in detail the fact that incidental take was high in the past and that a variety of measures were taken to reduce it to the point where today, and in the foreseeable future, it is no longer believed to be a threat to recovery. Although the commenter believes that estimates for particular fisheries may not be accurate, the Recovery Team and NMFS used the best available data when the Plan was written. Recovery actions associated with minimizing the threat of incidental take to the recovery of Steller sea lions are in Chapter V.D.3.1. It is very expensive to observe fisheries that are not covered by the Groundfish Observer Program. Given limited resources, NMFS

has not been able to implement an additional observer program in Prince William Sound; as such, we must rely on the most recent data as the best available information.

Comment: A significant proportion of sea lions sink immediately after death, thus reducing the probability of recovery on the beach and ability to determine level of entanglement, disease and other health factors.

Response: NMFS agrees with this comment. This is most likely one of the reasons why there have been few stranded sea lions found from which samples could be taken in an attempt to determine cause of death.

Comment: The description of groundfish harvest strategy for the North Pacific is oversimplified and misleading. An $F_{40\%}$ harvest strategy is not exactly an MSY harvest strategy; an $F_{35\%}$ harvest strategy results in harvests somewhat less than those that would result from an F_{msy} strategy. The $F_{35\%}$ is set as overfishing, which is a limit not a target. $F_{40\%}$ results in harvests set to be safely below $F_{35\%}$. Possibly, higher fishing levels have been applied in parts of the Pacific region and BC, where sea lion numbers are increasing.

Response: NMFS believes it is unnecessary for a Recovery Plan to contain detailed descriptions of the harvest strategies or the actual harvest rates of commercial groundfish. This information is more appropriately provided in other widely available resources, including the 2000 Biological Opinion available on the NMFS website (http://www.fakr.noaa.gov/protectedresources/stellers/plb). The Plan cites a review of the harvest strategy by Goodman et al (2002) and contained within the 2000 Biological Opinion, and the reader is referred to these sources as well as other information available within Stock Assessment and Fishery Evaluation reports published by the North Pacific Fisheries Management Council and available on the NMFS-AFSC website (http://www.afsc.noaa.gov/refm/stocks/assessments.htm).

Comment: Humpback and fin whales may be significant competitors for food. The Plan should examine the spatial relationship between their distribution, diet/population trajectory and SSL.

Response: The Plan recognizes this threat, which is discussed as a potential factor causing nutritional stress in Chapter III.B.11.

Comment: The Plan is inconsistent in how it represents the data on nutritional stress. Appendix 2A indicates strong evidence that nutritional stress has not been found in the western DPS, yet the discussion (p.89-92) indicates the data are inconclusive. The discussion in Appendix 2A (*note;* Appendix 2A cites a table that is missing) should be included in the main body of the Plan. The Plan would also be improved by inclusion of a table comparing the various hypotheses with any additional new data.

Response: NMFS agrees with this comment. The section on nutritional stress has been completely rewritten for the May 2007 Draft Revised Plan. Information in the appendices has been incorporated into Chapter III.B.3, and redundancies were removed.

Threats Assessment

Western DPS

Comment: The fisheries competition threat should be changed from 'potentially high' to 'low.' (13, 18) The fisheries are currently managed as a 'high' threat, and the science supporting nutritional stress and localized depletion of prey caused by fishing activities is uncertain. The Plan highlights the modeling exercise by Fritz and Brown and a study by Hennen, which both contain deficiencies (see Tagart Consulting, "Review of 2005 Fishery Bulletin Paper by Fritz and Brown," submitted to the Council in June 2006 by the H&G Environmental Workgroup). NMFS' Fishery Interaction Team field studies of cod aggregations in fished and unfished areas, coupled with tagging studies documenting seasonal disaggregation of cod, show no localized depletion effects. Tagart also found that "the most probable explanation" of the apparent correlation found by Hennen between fisheries and the decline of SSLs "may be shootings of sea lions by fishermen in areas where they fished."

Response: One of the primary purposes of the Plan is to identify and rank threats to the recovery of Steller sea lions. Competition from fisheries, which could result in nutritional stress, was identified as a possible threat by the Recovery Team and NMFS. The Team was unable to come to a consensus regarding the expected magnitude of the threat to recovery posed by future fisheries competition, as modified by the current management measures. Because the Recovery Plan is a planning document, it is necessary to rank the potential threat posed by fisheries competition and identify those fisheries-related actions (both research and management) that are needed to recover Steller sea lions. Actions in the Plan regarding fisheries competition involve both research and management, including: design and implementation of an adaptive management program to evaluate fishery conservation measures (Action 2.6.8), and evaluation and implementation of appropriate fishery regulations to protect foraging habitat and prey resources for sea lions **(**2.6.6). The Plan also recommends that current fishery regulations be maintained until it can be positively determined that reducing protections for Steller sea lions would not reduce the likelihood of recovery or increase the time to recovery. A more detailed analysis of the current suite of regulations and the extent to which fisheries actions may jeopardize the species, adversely modify critical habitat, or significantly affect the recovery of Steller sea lions will be presented in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific scheduled to be released in draft form in spring 2008.

Comment: The fisheries competition threat should also include: the differences in mean prey depths, sizes, and the 'mean' locations; fisheries low harvest levels of significant SSL prey; and the underlying assumptions of the effects of an F_{40} harvest strategy reducing the biomass of some SSL prey species. First, it is uncertain whether such a response would be linear given that not all prey species are commercially harvested.

Second, to the degree that a linear response is plausible, this should result in a change in carrying capacity. Given global control rules and the various mitigation elements in fisheries as currently managed, the threat is that the carrying capacity has shifted to something like current population levels. A shift in carrying capacity to a population level between 40,000-50,000 animals is very different from extinction.

Response: Information presented in the Plan suggests that a reduction in carrying capacity may have occurred; however, neither the Team nor NMFS could determine with certainty which contributed more to this possible change: competition with fisheries or natural changes in sea lion prey fields due to environmental change and oceanographic regime shifts. Results of population modeling strongly suggest that if the declines observed in the 1980s were largely due to natural causes (i.e. regime shifts), then the current sea lion population of approximately 45,000 animals in Alaska has a relatively high likelihood of extinction, because natural changes will likely occur again. While NMFS agrees that a reduction in carrying capacity is different from being on a path to extinction, there is considerable uncertainty regarding the factor(s) responsible. This issue will be addressed in greater detail in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific, which is scheduled to be released in draft form in spring 2008.

Comment: The pollock fishery should be reinstated because pollock prey on herring—a critical food item for the SSL.

Response: The pollock fishery has never been cancelled as a result of fishery regulations related to Steller sea lions. The closure of critical habitat to trawling in 2000 significantly affected the shoreside pollock fishery, but this was ordered by a federal court as a result of litigation and was not an action taken voluntarily by NMFS as part of a suite of measures to avoid jeopardy or adverse modification, or to promote recovery. Furthermore, food web interactions in the North Pacific are complex. Ecosystem modeling has shown that actions which might intuitively appear to have predictable consequences often do not.

Comment: The rankings of impacts appear subjective—a basis for each ranking should be clear in the Plan.

Response: NMFS has now clarified the basis for the threat ranking in the Plan, as well as the process undertaken by both the Team and NMFS to assess threats. A "weight of evidence" approach was used to assess the relative impact of each threat (factor) identified in Section III. This qualitative assessment approach was selected rather than a quantitative approach because of the substantial uncertainty in the understanding of each threat's influence on sea lion population dynamics. Using the extensive expertise of the recovery team, we were able to identify three relative threat levels (High, Medium, and Low), defined as follows:

- High: a threat with substantial impacts to recovery requiring mitigation and/or further research to identify impacts

- Medium: a threat with moderate impacts which if mitigated could increase the likelihood of recovery, but in and of itself has limited impact on population trajectories
- Low: a source of mortality that likely has little impact on population trajectory

Comment: The definition of Direct and Indirect Threats needs to be clarified. What is the distinction between effects that kill individuals and reduce survival rate and the effects of reduced body condition? Individuals die of diseases.

Response: NMFS rewrote the introduction to the threats assessment chapter (Chapter IV) and removed most of the discussion involving the terms 'direct' and 'indirect'. Instead, threats are described as operating from the 'top-down' if they were factors that killed animals directly (e.g., predation, incidental take), the 'bottom-up' if they were factors that primarily involved food-web interactions (e.g., nutritional stress resulting from oceanographic regime shifts), or both (e.g., certain diseases).

Comment: A high ranking for predation by killer whales cannot be defined as a precautionary approach. Rather a precautionary approach would be to focus on fisheries which is the only area in which precautionary actions may be taken .

Response: After public review and comment, as additional scientific information became available, NMFS concluded that the threat posed by killer whale predation was unlikely to be high, and thus changed the ranking to medium. NMFS agrees that it is not necessarily precautionary to rank a threat as high if it is essentially beyond mitigation. Fisheries are the focus for many recovery actions in the Plan, with an emphasis on gaining greater understanding of the magnitude and mechanisms of competition and determining how to separate fisheries effects from those which would have occurred naturally. In this sense, NMFS believes that the Plan's approach, relative to the threat posed by competition with fisheries, is precautionary.

Comment: It is difficult to fully rule out the possibility of sleeper shark predation on sea lions, because only one study has examined the diets of sharks near rookeries. Hulbert et al (2006) found sleeper sharks to be an ambush predator with geographic overlap with sea lions. Sigler et al (2006) documented harbor seal remains in sleeper shark stomachs, which demonstrates that they are able to consume small pinnipeds. Given this information, it seems premature to fully discount sleeper shark predation on Steller sea lions.

Response: Sleeper sharks are scavengers with diets substantially comprised of carrion (Smith and Baco 2003; Smith 2005), rather than live, actively hunted prey. In the studies of sleeper shark stomach contents (Hulbert 2001; Hulbert et al. 2003; Wynne 2005), no Steller sea lion remains have been found. Moreover, Steller sea lions have not been identified as a likely prey item through fatty acid analysis (Schaufler et al. 2005).

Because there is no definitive evidence that sleeper sharks actively prey on Steller sea lions, this type of predation is not believed to be a threat to recovery.

Comment: The relevance of whether the present climate shifts are outside the range of past climate shifts is not clear. Almost certainly there have been climate shifts in historical, let alone prehistoric times, which rival those of the present. However, the changes in the present have taken place in the context of an altered ecosystem and thus may stress sea lions in ways that were not present before. A quick look at the Aleutian volume of Fisheries Oceanography will provide evidence of major declines in sea lion populations and shifts in populations of fish in the not so distant past.

Response: NMFS agrees that recent changes in the North Pacific Ocean (e.g., 1976-77 regime shift) must be placed into the context of current state of the ecosystem as affected by other anthropogenic sources (e.g., global climate change and effects of fishing). All of these changes could affect Steller sea lion carrying capacity. The Aleutian volume of Fisheries Oceanography did not mention major shifts in abundance of Steller sea lions in the Aleutians prior to the present decline; the paper by Causey et al. describes changes in bird populations as evidenced by the examination of remains in middens. Information on the frequency and distribution of mitochondrial DNA haplotypes indicates that Steller sea lions have not gone through a genetic 'bottleneck' in which haplotypes were lost due to a large reduction in population size. Consequently, large population fluctuations do not appear to be common within the evolutionary history of Steller sea lions. However, environmental change remains as a potentially high threat, due to uncertainty about the nature and magnitude of this stressor on current sea lion population dynamics, as well as how it relates to anthropogenic sources of change.

Comment: It is not accurate to say that fish community structure in the eastern Bering prior to the 1976-77 regime shift is similar to that of today. Community structure is more than just species composition- the proportion of those species also plays an important role. Arrowtooth flounder and other flatfishes increased substantially, pollock increased and then decreased, salmon increased and stayed high, and changes in forage fishes have been observed. So, it is hard to accept this assertion without some supportive analysis.

Response: Bakkala (1993; NOAA Technical Report NMFS 114) provides an excellent summary of the limited fish survey data collected prior to the 1976-77 regime shift in the eastern Bering Sea, upon which to base our knowledge of fish community structure in the 1960s and early 1970s. He concluded that both pollock and Pacific cod had peaks in abundance of approximately the same magnitude both before and after the 1976-77 regime shift. He also found little evidence to suggest that gadids increased to unprecedented levels following the regime shift. Regarding Pacific herring populations (often included in the 'forage fish' complex), Wespestad (1991; PhD. Dissertation, Univ. WA) assessed the entire Eastern Bering Sea population of Pacific herring (both stocks) for the period from1959-1988 using both fishery and survey information. His population reconstruction revealed a total herring biomass of over one million tons in the early to mid-1960s, followed by a steep decline and low population levels throughout the 1970s. This decline, however, preceded the regime shift by approximately 10 years, and may

have been the result of heavy fishing pressure. In the early 1980s (after the regime shift), the herring population increased. However, even at its peak in the early 1960s, the abundance of herring was not greater than that of pollock prior to the regime shift. Population sizes of other fish species, particularly flatfish, have changed considerably over the last 40 years, due to natural and anthropogenic factors. However, there is no strong evidence that the eastern Bering Sea was dominated by 'forage' fish prior to the regime shift and by gadids and flatfish after. It is important to remember that pollock, a gadid, is also an important forage fish for other fish, birds and marine mammals in the eastern Bering Sea.

Comment: The 60% reduction in multiple prey species biomass needs to be referenced by geographic area and how well the information from one area can be extrapolated to the next.

Response: The 60% reduction in multiple prey species biomass refers to the harvest policy of $F_{40\%}$, in which fish are harvested at a rate which reduces the average spawning biomass per recruit from 100% (in an unfished equilibrium population) to 40%, hence the 60% reduction. This reduction is not applicable to a specific geographic area, but applies to the ecosystem (e.g., eastern Bering Sea) in which the fish reside and the fishery occurs. This issue will be addressed in more detail in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific scheduled to be released in draft form in spring 2008.

Comment: Nelson (1887) should be cited in the Summary and Scenarios section as evidence of a historical collapse prior to the onset of commercial fisheries. This entire section should be cited to appropriate literature; otherwise it comes off as being entirely speculative.

Response: The Summary and Scenarios section has been removed and replaced by a section entitled "Synthesis and Discussion of Threats" at the end of Chapter 4. In Chapter III.B.11, more discussion of the observations of early naturalists (including Nelson) regarding species abundance and distribution is included, and indicates that the population sizes of gadid fish and other species likely fluctuated in the past as well.

Comment: Appendix 1 [**'Managing and Maintaining Steller Sea Lion Prey Fields']** should be removed as it is highly speculative.

Response: Appendix 1 has been removed from the Plan. This issue will be addressed in more detail in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific, which is scheduled to be released in draft form in spring 2008.

Eastern DPS

Comments: The Plan needs a full comprehensive evaluation of threats to the eastern DPS. The Plan states that prior threats associated with past declines in the eastern DPS

"may have been largely ameliorated" but the only evidence to support this claim is the overall three percent annual growth in the DPS as a whole, which fails to consider why the DPS should be growing at only three percent per year from Southeast Alaska to southern Oregon (but not California). This rate of increase is only one-third to one-quarter of the theoretical maximum rate of increase for a pinniped species at depleted numbers and only about half of the rate of increase in California sea lions over the same period, suggesting that either (1) there are cryptic sources of mortality which have not been adequately accounted for and ameliorated, or (2) that the potential for population growth at low numbers is considerably lower for this pinniped species than for others. In addition, the California range contraction may be due to a combination of environmental changes, competition for prey with California sea lions, contaminants, and disease, but the evidence of influence on the population is not fully analyzed, especially in the Goodman PVA which limits the environmental variability to the western DPS. Justification is needed on why the eastern DPS was not considered for environmental effects especially given El Niño. The Plan fails to adequately consider fishing effects on the loss of southern California rookeries. The large scale Pacific hake fishery may have significant effects.

Response: NMFS believes that the Plan provides a thorough evaluation of the threats to the eastern DPS. The primary factors affecting the eastern DPS, which are those involving direct mortality, have been reduced. There is no signal in the overall population trend observed since the late 1970s to indicate that environmental change, regime shifts or effects of El Niño have substantially affected the recovery of the eastern DPS. The lack of recovery and decline in populations in parts of southern California may be, in part, a contraction of the southern end of the range due to climate change. It may also be related to competition with California sea lions. NMFS is concerned about the loss of genetic diversity in the eastern DPS if the southern CA population disappears entirely. Therefore, this will be addressed in a post-delisting monitoring plan. However, the population in southern CA is not considered to be a significant portion of the eastern DPS, nor does it appear to be limiting its recovery.

Recovery Strategy

Maintain Current Fishery Conservation Measures (Recovery Strategy and Recovery action 2.6.6)

Comment: These measures are considerably less protective than those recommended in the 2000 BiOp and do not address key aspects of jeopardy and adverse modification[1] .

[1] Commenter 15 cites Capron pers. comm at the SSL mitigation committee June 2006 as stating that the draft Recovery Plan will serve as a template for the new BiOp. The commenter mistakenly interprets this to mean that the recovery criteria must meet the recovery and survival standard of section 7, and many of their comments go to this issue, which are not included here.

Response: NMFS disagrees with this statement. NMFS concluded in the 2003 supplement to the 2001 Biological Opinion (BiOp) that the current fishery conservation management measures avoid jeopardy and adverse modification. The question is whether the current measures will allow for recovery, which is a level of detail and analysis that is not necessary in the Plan. A detailed analysis of the current suite of regulations and the extent to which they jeopardize the continued existence, adversely modify critical habitat, or significantly affect the recovery of Steller sea lions will be presented in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific, scheduled to be released in draft form in spring 2008. Recovery action 2.6.6 in the Plan calls for the current suite of measures (or their equivalent level of protection) to be maintained until it can be positively determined that reducing those protections for Steller sea lions would not reduce the likelihood of or increase the time to recovery.

Comment: The existing fishery management measures do not consider food requirements of other consumers in the ecosystem or the cumulative effects on SSL carrying capacity of reducing target fish stocks 60% (i.e., Global Control Rule does not entail TAC reductions until the stock biomass has decreased >60% from the unfished stock size). Further, there is no comprehensive evaluation of the fisheries measures; specifically:

1. How needs of competitor apex predators, such as Steller sea lions, are accounted for when the long-term equilibrium spawning biomasses of multiple prey species are reduced by 60% on average, by design;
2. The efficacy of recent modifications to the harvest control rule for pollock, Pacific cod and Atka mackerel, which reduces the maximum permissible fishing mortality rate only after stock biomass has fallen below a target stock size equivalent to 40% of the theoretical unfished level;
3. The efficacy of the trawl exclusion zones and other gear restrictions at reducing fishing impacts to critical habitat, since these measures were implemented without an experimental design and have permitted large amounts of fishing for SSL prey species in critical habitat during 2002-2006;
4. The continued likelihood of fishing-induced localized depletions of prey, given the temporal and spatial concentration of fisheries allowed by current regulations;
5. The combined and cumulative effects of fishing at local, regional and cumulative scales

Until such evaluation is complete, maintaining the current fishery management (action item 2.6.6) is not adequate and is irreconcilable with the Plan's downlisting and delisting criteria.

Response: The Plan lists the competitive effects of fishing as a potentially high threat to recovery for the western DPS of Steller sea lion. In addition, the Plan calls for more research on fishing effects and the development of an adaptive management program to help distinguish natural from anthropogenic impacts. Identifying and evaluating the ways in which fishing may affect the ecosystem and outlining the specific steps that the Council and NMFS could take to mitigate that are beyond the scope of the Plan and responsibility of the Recovery Team. All of the issues brought up by the commenter will

be discussed and evaluated in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific scheduled to be released in draft form in spring 2008.

Adaptive Management (Recovery Strategy and Recovery Action 2.6.8)

Comments: The Plan should provide a formal definition of 'adaptive management' because several definitions are provided and used interchangeably. Few efforts have been made to analyze the effectiveness of current management, re-assess risk in this context, and modify future actions as a means for adaptive management. There is a high risk that the concept will be defined opportunistically and without benefit to SSL. The scope and intent of the adaptive management plan needs to be clarified. The adaptive management experiments must be based on a well-designed system of controls and treatments running for 5-10 years in order to discern confounding factors. These experiments must also provide adequate protection to the western DPS.

Response: NMFS believes that these are all well-founded comments, and will take them into account as it develops a plan for an adaptive management program. It is beyond the scope of the Plan to work through all these issues. Instead, the Plan points to the need for such a program and for NMFS, with the help and guidance of scientists, managers and the public, to design it.

Comment: The adaptive management requirement should be removed—it is not a high priority for the recovery of the western DPS.

Response: The Team, NMFS and other review bodies (e.g., NRC 2003) have each recommended the development of an adaptive management program so that managers and scientists can learn more about how natural and anthropogenic factors affect the North Pacific ecosystem and the various species that inhabit it. An adaptive management program will bring all the key management and scientific partners to one table to discuss factors that affect sea lion populations and the design of a program through which we can learn how the system and sea lions respond with and without various forcing factors (e.g., fishing). Currently, the only formal system set up to evaluate this information is the consultation process under ESA section 7, but this only affects federal actions. The development of an adaptive management program would provide another means by which the scientific and management communities can evaluate new information, determine the efficacy of current regulations, and recommend that new actions be taken or regulations be changed.

Comment: The research emphasis should be on population monitoring and on evaluating the efficacy of fishery restrictions that have been put in place. Numerous fishery regulations have been implemented to address the potential negative impact from fisheries on the prey field of sea lions, which may subsequently reduce sea lion abundance. However, efforts must be increased substantially to assess the efficacy of those regulations to determine if they are necessary and sufficient, and if not, how those regulations should be modified. Such efforts should potentially include the use of an adaptive management approach, with the primary focus to reduce the uncertainty

associated with the potential impact of fisheries on the prey field, and subsequently sea lions.

Response: NMFS agrees and it is for these reasons that the Plan calls for the development of an adaptive management program (Recovery Action 2.6.8).

Development of Recovery Criteria (PVA)

The comments regarding the approach used in the draft Plan to develop recovery criteria were diverse and diametrically opposed. Comments have been organized together into the following groups: comments supporting the approach used in the draft Plan; comments for and against using the Goodman PVA; comments supporting the use of alternative PVAs; and comments supporting other alternatives.

Approaches to the Criteria

1. Weight-of-Evidence

Comment: The Goodman PVA supplements the Plan's 'weight-of-evidence' approach to threats, providing insights into the potential risks and identifying key areas of uncertainty. The role of uncertainty in the threats assessment should compel stringent recovery criteria with high population values, as noted in the PVA. The PVA is the only method to integrate all risks into a single quantity to meet the measurable and objective ESA standard. The Appendix explains the rationale for rejecting the PVA for the 'weight-of-evidence' approach as well as explains how the team used the PVA in setting recovery criteria. Attempts to downplay the PVA or not to include it as an Appendix would be unwise. The Appendix discussion regarding: (a) the team's decision not to use the PVA; (b) how the PVA insights were applied to developing the criteria; and (c) why less conservative criteria were selected under the 'weight-of-evidence' approach needs to be further elaborated in the body of the Plan.

Response: The Plan now includes additional explanation about how the Recovery Team used the PVA in guiding their approach to setting the recovery criteria. The PVA is not downplayed. The utility of the PVA in directing the thinking of the Team and NMFS is now more clearly explained in the Plan.

Comment: The recovery team's debate on the use of the Goodman PVA was focused solely on whether to include it as an appendix or not at all. No inference should be drawn that the team assigned more weight to the Goodman PVA over others. Rather it was the PVA sub-group that assigned the 80% weight as a 'correct' model. The fact that the downlisting criteria departed so far from the PVA is an implicit statement that the team did not give the Goodman PVA more consideration. Unfortunately, the team never articulated its rationale, however the weaknesses identified by the SSC were contributing factors to rejecting the Goodman PVA.

Response: The recovery team discussed at length the results of the PVA and the appropriate location for it in the document. The PVA sub-group represented the team. The selection of criteria does not indicate the level of consideration given the PVA. Rather, as is explained in the document, the criteria were selected based on the collective analyses presented.

Comment: Many team members agreed to the "<1% chance over 100 years" standard; however, the degree of precaution that results from coupling this with the 'quasi-extinction' level may not be necessary, especially with on-going population monitoring requirements that would appropriately up-list, if necessary.

Response: For modeling purposes, both a quasi-extinction level and a risk level are needed. NMFS disagrees with the comment that both were set too conservatively by the Team. The quasi-extinction level is in the middle of the range of values recommended in the literature and the "<1% in 100 years" threshold, is gaining popularity among ESA practitioners and is not overly conservative for delisting.

2. Population Viability Analysis (PVA) – Comments Not Supportive of the Goodman PVA:

Comments: The PVA results were not explicitly used in the criteria, but heavily influenced the criteria in terms of risk uncertainty and time period necessary for recovery. Because of this influence, the PVA should not be included in the Plan for the following reasons:

a) PVAs assume that population vital rates are drawn from a stationary distribution. This is rare in nature. Consequently, PVAs are more academic than practical and should not be used to advise management;
b) The only data used in the PVA came from a declining SSL population, thus the results are predictable and uninteresting;
c) The PVA should be tested with an early time series to assess how well it predicts the later part of the time series. The PVA cannot be tested due to the short time-series of data and is inappropriate for use;
d) The PVA assumes distinct time periods of decline and are statistically independent. This is not the case since individual sea lions were alive in consecutive periods. The importance of this assumption is unknown, but it is unlikely that rate changes within each period were unrelated to adjacent periods. It could also be argued that the most recent time period is the most relevant and should be weighted in the analysis;
e) Density Dependence: the Southern Ocean mammal populations is not a good example as there are uncertainties about the lack of density dependence; there is a stronger argument for not using PVA than the argument that density-dependence is not essential for a PVA; and Figs 1 and 2 indicate features of classic density-dependence;
f) The PVA assumes historical population declines were evenly distributed—local versus range-wide effects could have important implications for long-term population viability. Metapopulation structure, regional, or rookery-scale

observations, or shorter-time scale observations were dismissed without discussion;

g) The PVA should use different assumptions on the critical population size (4753) because other marine mammal species have shown phenomenal recovery well below this size;
h) A weight should be applied to ***r*** [the intrinsic rate of population growth] with a time lag for those periods where management actions were taken to decrease the population decline, especially after the cessation of shooting on rookeries
i) Other input parameters should be examined: (1) 2.5% estimate of fishery prey interaction effect is highly uncertain—one alternative would be to assume no competitive effect at current prey biomass; (2) extraneous mortality (or modeled as stochastic); (3) Constant growth rate within a period and independence between successive periods—there may be autocorrelation in the growth rate between periods; (4) effect of weighting each observed growth rate equally when averaged over very different periods of time (five to 19 years). An alternative is to combine two shorter periods that correspond to a known oceanographic regime; or weight period-specific growth rates by the number of years over which they were averaged; or representing growth rates as a moving average; and (5) the probability that the PVA is correct;
j) Table 4—the rationale for the choice values for biological parameters and values for the fishery competition effect should be explicit.

Response: The fundamental attributes of a PVA are based on the assumptions used to drive the model. The assumptions used in this particular PVA are similar to those used in other Steller sea lion population models, as explained in Chapters I and V. Chapter V also explains how the PVA served the Team in helping them focus on the factors important in evaluating extinction risk. Many of the comments suggest that the PVA is inappropriate for use. However, as explained in the Recovery Plan, the PVA was used as a tool to focus attention and not as a driving force. Therefore, the comments that the "PVA should not be used" are best answered by responding that it was not used except as one of many pieces of information that contributed to the ultimate decisions. The PVA does not guide management so much as it guided the Team in their weight of evidence approach to deriving recovery criteria. The following responses are directly related to the ten points made by the commenters (for example, response "a" corresponds with comment "a" above):

a. The PVA created during the formation of this Plan used a Bayesian framework in order to account for uncertainty especially as it relates to vital rates. The team recognized that in this case the PVA was most useful as a guiding tool in allowing the team to test various outcomes due to different scenerios. The assumptions and results of the PVA are well explained in the Appendix and in Chapter V and address these comments.
b. As explained in Chapter V, the PVA included the period of increasing population trend between 2000 and 2004. There has been only a small period of time in the last 50 years where the data has shown an increase. As pointed out in Chapter V, the population trajectory of

previous time periods was modified to reflect mitigation measures currently in place. Thus, the model was much more involved than a simple prediction based on the old trends.

c. Same answers as above. The commenter suggests that the PVA serves no useful purpose if it cannot be tested due to lack of data. However to ignore potentially useful information or the best available science because it is incomplete would not be in line with the requirements asked of the Team.
d. Again, this comment refers to the assumptions used in the PVA. There is no way to avoid the fact that distinct time periods that occur in sequence are correlated. This is likely the case in any PVA that addresses population change over time. The time periods used in the Plan were chosen to represent differing segments of the population trend.
e. This comment is confusing as the respondent is arguing that the PVA should not be used yet it is clear in the document that the PVA was only a tool not a deciding factor. Again, the assumptions used in the model are those chosen by the author and the Team with the best available science.
f. As explained in Chapter V, the PVA had to make assumptions based on the available data. Chapter V details that individual rookeries or clusters of rookeries displayed different population trends during the greatest period of decline. The Team was asked to put together a plan for each stock; the western and eastern stocks. This required a population-wide perspective for recovery of the species. The team did recognize that different areas may ultimately show incongruent trends and as such included recovery criteria that account for these different trends.
g. As explained in Chapter V, the quasi-extinction size of 4,753 was based on the recommended genetic effective population size of 1,000 individuals necessary to maintain genetic variation. Because Steller sea lions are polygynous, each animal does not contribute equally to the genetic composition of the population. Therefore, a greater number of individuals are necessary to preserve the genetic variation expected from an “ideal” population, in which every animal produces an equal number of offspring.
h. Any assumptions made in the PVA would provide different results. Applying a weight to r for periods when other actions were incorporated assumes that the value of that weight is known. It is not. This comment implies that had a weight been applied to r during the period when management actions were taken to decrease the population decline, removal of that weight would yield a greater rate of increase now. There are two points to consider here. First, although any weight to the variable would certainly change the outcome, there have obviously been additional management actions taken over the last 6 years to decrease the decline and they would also have to be

weighted accordingly. Second, regardless of the model, if the population grows at a faster rate, NMFS will have the ability to revisit the criteria required for recovery.

i. (1) The 2.5% estimate of fishery prey interaction effect is highly uncertain, as are all the estimates for impacts for which the Team and the PVA sub-group had no data upon which to base an estimate. The Team considered a wide range of estimates for this interaction, but settled on 2.5% based on the expert opinion of various Team members. (2) NMFS is unclear what this comment is referring to. The Team did the best job it could at estimating extraneous mortality in each period, but did not try to model it. (3) There may be autocorrelation in the growth rates in successive periods, and there is no real reason to believe that growth rates were constant within a period. These were simplifying assumptions used in the PVA and there are many ways in which more complexity (and uncertainty) could be added to the model. (4) Weighting each modified growth rate by the length of time over which it had been observed in the past is something that could have been added to the PVA. Other alternatives can also be envisioned, such as the one suggested by the commenter. NMFS does not know how changes such as these would have affected the outcome of the PVA. However, the PVA results were not used explicitly to set recovery criteria. (5) Given the assumptions and structure of the model, the results of the PVA speak for themselves regarding the threat of extinction. Many other PVAs with different structures and assumptions could have been developed.

j. The rationale that Goodman used in preparing the PVA is explained in the document. However, this seems a moot point as was pointed out previously, since the PVA was only used as a guide by the team and not as an explicit justification for any particular decision. It is primarily for that reason that the PVA is included as an appendix rather than as part of the Plan.

Comment: Goodman uses the adjusted rates to populate the 5 sides of the dice that are at the heart of the model. The simple average of these rates is a negative 0.473%. The weighted average is a positive 0.441%. I fail to understand why the die has only 5 sides, rather than 46 sides with the 5 growth rates distributed pro-rata to the length of the interval over which they were observed to have occurred. Eliminating the 1985-89 growth rate may be plausible because an alternative hypothesis is that: (a) it is an uncommon event that would not occur three times in one century; and (b) it would not persist for a full decade.

Response: The PVA was used to help the Team focus on the factors important in estimating extinction risk. The results were not used as recovery criteria. Weighting each modified growth rate by the length of time over which it had been observed in the past is something that could have been added to the PVA. Other alternatives can also be envisioned. NMFS does not know how changes such as these would have affected the

outcome of the PVA. However, the PVA results were not used explicitly to set recovery criteria. The commenter seems to support excluding the negative growth rate (-15% per year) observed from 1985 to1989. NMFS believes that to do so would suggest that the events that resulted in a 15% per year decline during this period will never occur in the next 100 years (since this growth rate is eliminated from the possible choices in the future), and as such, are not likely to be 'natural' (e.g., oceanographic regime shifts, prey switching by killer whales).

3. Population Viability Analysis (PVA) – In support of the **Goodman PVA:**

Comment: The Goodman PVA is supportable and should be a basis for establishing the recovery criteria. The Plan does not justify rejecting the PVA and their 'weight-of-evidence' approach appears to limit the evidence used in developing the criteria. The team's basis for removing the period of rapid decline from the PVA creates the impression that they were manipulating the model to produce an outcome consistent with their criteria (15). No substantive reason is provided for adopting the less precautionary downlisting criteria that do not meet the PVA's standard of <1% extinction risk in 100 years.

Response: Chapter V details the rationale used by the Team in their choice of how to use the PVA. Chapter V explains how the weight of evidence approach is the common method used by Recovery Plans. The use of a PVA provides yet another tool available to the Team. The reason for the decline of Steller sea lions in the Western stock remains unclear. However, one part of the history that was useful to the team in trying to understand future challenges was to examine the magnitude of the past decline as a template of potential trends. As explained in Chapter V, the Team felt that the management changes put in place when the species was listed effectively eliminated the primary factor responsible for the rapid decline observed in 1985-89. However, the Team acknowledged that there were still unknowns as to all of the causes of that decline, as well as the lower rate of decline observed in the 1990s, and to ignore it completely would be inconsistent with the precautionary approach required by the ESA. The benefit of the PVA was the process that it forced the Team to work through, the realization that the population needs to grow, and the agreement that it needs to grow for an extended period of time (1.5 to 3 generations). This long term growth is necessary to show that threats identified by the Team are no longer affecting recovery. Taking all of this information into consideration, the Team chose the middle ground in terms of the criteria. NMFS believes that using the PVA as a guide was the right choice but that our knowledge of the magnitude of past and future threats is too uncertain to use the PVA results directly to set recovery criteria.

4. Other PVAs*:*

Comment: An alternative to the current PVA would be for three independent analysts to work with the same data sets, including information on management actions to undergo multi-factorial statistical models. The analysts would compare the models and assumptions and either create a new model or select the best model. The Goodman PVA

should be in an appendix and specifically referred to as an example among other available PVA models. The SSC of the NPFMC recommended that the PVA be taken out of the Appendix and moved into the main body of the Plan, although the NPFMC itself disagreed with that recommendation. A PVA should be used in constructing the down and delisting criteria and the current criteria are subjective and difficult to justify. The Goodman PVA is just one approach, additional parameters and assumptions need to be explored in further development of a PVA, specifically density dependence, age and sex structure, lag effects in recruitment and population parameters, and dispersal within a metapopulation structure. Other models should be explored, such as: Winship and Trites 2006; Gerber and Van Blaricom, 2001; Fay, 2004; Wolf and Mangel, in press.

Response: The models cited by the commenter were developed for reasons other than setting of recovery criteria and therefore would not provide the Team with the information needed to develop listing and delisting criteria. However, the Plan describes and cites other relevant population models that address the uncertainty inherent in the decline of Steller sea lion populations and had limited applicability to the recovery planning process. These population models were useful, but fell short of meeting the Team's needs because: they were too limited in the scope of their analyses, they focused the analysis of extinction risk on a specific moment in time, or they ignored unusual periods of steep decline in the assumptions. Because the Recovery Team needed to gain a better understanding of the relative effects of threats on Steller sea lion populations and the likelihood of different population trend scenarios, they contracted a biometrician (Dr. Goodman) with extensive experience in modeling populations in the Bering Sea and North Pacific systems.

NMFS used the PVA as a guide for evaluating some of the threats that may have caused population decline and those that exert some level of extinction risk. The Plan acknowledges that there is considerable uncertainty in our understanding of threats, and the PVA provides one way to quantify the magnitude of this uncertainty. For the Plan, the PVA results were one of many pieces of information used in our 'weight of evidence' approach.

5. Non-PVA Alternatives

Comment: Rather than using the weight-of-evidence or PVA, the Plan should adopt the 'Risk Assessment Framework' from the National Academy of Sciences 'Science and Judgment in Risk Assessment'. This framework would provide a better link between assessing threats and prioritizing actions.

Response: The Team chose to follow the 'weight of evidence' approach used in other recovery plans, which included use of the PVA results as a guide in determining risk. The Team was not presented with the framework suggested by the commenter. NMFS recognizes that there are other methods available, but felt that the Team's approach was suitable.

Recovery Criteria

General

Comment: The recovery criteria should be revised because of the highly prescriptive nature of the criteria, the difficulties with obtaining adequate information to support some of the criteria and the lack of biological feasibility for some means they are unlikely to be met. A set of judgment questions as a means of down-listing or delisting is more appropriate. [The commenter submitted examples of such questions which were very similar to the five listing factor criteria prescribed by the ESA.]

Response: The questions submitted by the commenter are very similar to the five listing factor criteria that the ESA requires Plans to address. However, the ESA requires that the recovery criteria are objective and measurable. The threats component is intended to be prescriptive in order to provide a roadmap for recovery. Both sets of criteria were developed based on the best available scientific information and meet the requirements of the ESA.

Comment: The Plan does not address any actions of planning for the possibility of future SSL declines—explicit planning for this occurrence and rationale for any management response should be included.

Response: This is a recovery plan and as such is intended to outline the requirements for downlisting and delisting. Future declines in the Steller sea lion population, if they occurred, would be addressed, as have past declines, with measures appropriate to any known causes. If the population were to decrease after a period of increase but before it is delisted, the recovery criteria would ensure that the species retains protection under the ESA.

Comment: The recovery criteria requires specific performance metrics of sub-area populations that are not ESA listed entities, which goes beyond the ESA requirements.

Response: Recovery plans commonly have sub-population goals in planning. This takes into consideration the concept and ESA requirement of 'significant portion of its range'.

Comment: The recovery criteria fail to fully account for the complexity of threats including fishing, killer whale predation, climate variability and change.

Response: NMFS disagrees. The threats criteria address all of the identified threats and the recovery criteria are quantifiable and objective. The performance of the population over the long-term (1.5 to three generations) will demonstrate whether or not threats to it have been lessened. The complexity of the threats and the large uncertainties in our understanding of their interactions necessitates the type of recovery criteria proposed by the Team and used by NMFS in the Plan.

Comment: The criteria for downlisting and delisting must rely on the PVA rather than the 'weight-of-evidence approach' that resulted in less precautionary criteria.

Response: NMFS agreed with the Team that the criteria are sufficiently precautionary and that the results of the PVA were best used as a guide in preparing the criteria. The PVA was built on numerous assumptions each with varying degrees of certainty. NMFS and the Team believe that the PVA results were more conservative than necessary and not entirely reflective of current management, which would lessen the likelihood of some predicted outcomes.

Western DPS

Downlisting WDPS – Biological Criterion 1

Comment: The rationale for the 15-year time period should be expanded and clarification is needed on what 'statistically significant' means.

Response: Chapter V.C explains the rationale for the 15-year time period, which in part reflects the generation time of Steller sea lions as well as a precautionary approach. "Population growth for 15 years would reflect sustained growth by two generations of sea lions during two environmental regimes. Such growth provides assurance the population is recovering and not experiencing the unsustainable conditions of the past 30-40 years." A statistically significant change in population growth is an observed, long-term trend that is unlikely to have occurred by chance. After extensive discussions by the Team, NMFS decided that it will address the issue of defining a statistically significant population increase at the time of downlisting. All of the downlisting factors will be incorporated into the decision, including the population increase. The level of statistical significance will be addressed at that time, relative to these other factors.

Comment: The logic of using the recent history of the eastern DPS as a model for criteria to apply to the western DPS is questionable. A more logical approach to this criterion would be to use the PVA. [The same comment was made regarding the delisting criteria for the WDPS, so both are addressed here.]

Response: The eastern DPS was not considered a model in the sense that the western DPS is expected to perform in the exact same way. However, the eastern DPS lives in a similar, sometimes overlapping environment and is subjected to many of the same factors affecting its survival and reproduction. The eastern DPS has experienced many of the same threats as the western DPS and has displayed a long term population trend that may be representative of Steller sea lions in Alaska. The eastern DPS provides a useful overview of a possible recovery scenario for Steller sea lions. Therefore, NMFS believes that it was appropriate for the Team to review the recent history of the eastern DPS as they developed downlisting and delisting criteria for the western DPS.

A PVA model requires the input of growth rates to run simulations of different scenarios. The recent, three percent rate of increase for the eastern DPS was used in the Goodman-

PVA to test the extinction risk for the western DPS, because the Team needed a plausible future population trajectory for which extinction risk could be calculated at time horizons of interest (e.g., 15 and 30 years). The current growth rate of the eastern DPS was used in the PVA because it seemed more appropriate than borrowing a growth rate from another species of pinniped or another mammal species in general. To ignore the information presented by a nearby population of Steller sea lions would not be an adequate use of the best available science. However, if a different, more accurate growth rate value is discovered for the western DPS, then NMFS can re-evaluate the likelihood of extinction based on time and population growth rate at that point.

Downlisting WDPS – Biological Criterion 2

Comment: Vital rates are uncertain, include biases, and may not be a good indicator of population trajectory. For example, under extreme food deprivation, apparent pup growth rate in Antarctic fur seals actually increased due to sampling problems in years of low pup survival (i.e. the covariance of measured growth rate with pup survival). There is heterogeneity among individual responses to nutritional deprivation. Those who are most affected by lack of food are not good competitors and their removal may have comparatively little influence on population dynamics. Current fecundity measures (using aerial surveys and mark-recapture) introduce biases that are not acknowledged in the Plan. Overall, vital rates may not be a feasible criterion.

Response: All data collected from surveys, behavioral observations, mark/recapture analyses, and other sample estimates include some level of uncertainty and/or bias. It would not be prudent for NMFS to ignore vital rates data when available. Vital rates are important because they provide the only empirical evidence of potential changes in the population that could indicate environmental change. The Antarctic fur seal example underscores the value of vital rates analysis – vital rates enabled researchers to recognize that sampling problems had biased the data. Vital rates data are often the only metric available with which to recognize population change. Changes in long-term, stable vital rates are a common indicator of modifications to the local environment. The challenge is then to find the mechanism that caused the change. Without vital rates data, NMFS would risk missing an explanation for short-term or long-term changes in population trend data or misinterpreting the reasons for such changes.

Comment: Vital rates as a down- and de-listing criterion should be eliminated. By using a PVA, if the population risk of extinction is above the threshold, then biological criteria are irrelevant. It is only when the population falls below the threshold that other data are needed to explain why and helps define the threat.

Response: It would be inappropriate for NMFS to ignore vital rates information when downlisting. Although Criterion #2 has been removed from the Draft Revised Plan, all data available to NMFS, including information on vital rates, will be considered when downlisting and delisting decisions are made. The PVA was structured on past population counts and incorporated available information into the model in order to make predictions. The PVA did not have the ability to project changes in vital rates that might affect the model. Ignoring the vital rates information simply because the population

numbers reach a certain point would not allow NMFS to answer the first question necessary to downlist or delist – "Why did the population increase?" Without the ability to explain why the population size changed, appropriate monitoring measures could not be put in place and NMFS would be unable to meet the criteria required for downlisting.

Delisting WDPS – Biological Criterion 1

Comment: Carrying capacity is unaccounted for in this criterion, and the Steller sea lion should be reviewed every 5 years to determine whether or not the three percent annual growth rate is relevant to the population stability. Also, non-pup counts at haulout sites may be nonlinear with actual population size as competition increases with approaching carrying capacity.

Response: NMFS does not know the exact size of a Steller sea lion population at carrying capacity. Assuming the environment (carrying capacity) has not changed, western Steller sea lions would clearly be far below carrying capacity since they have declined about 80%. However, changes in western Steller sea lion survivorship and natality indicate that carrying capacity may be lower now than in the past, and competitive effects of fishing may be one of the factors responsible. If the abundance of western Steller sea lions does not increase, population modeling indicates that they have a high likelihood of extinction if high rates of decline observed in the past can occur in the future. NMFS will review the status of the western Steller sea lion population biennially upon the completion of each aerial survey for adults and juveniles. The three percent rate of increase is a guideline that NMFS will use to judge recovery of the population. If the average rate of increase is smaller than three percent, then more time will likely be required prior to initializing delisting procedures to insure that threats to the western Steller sea lion population have been addressed.

Comment: This criterion [Biological Criterion 1: Delisting] is consistent with the Goodman PVA in indicating the need for substantial population recovery to achieve an acceptably low level of extinction risk. However, the Plan provides no clear rationale for believing that the future dynamics of the western DPS will mirror the eastern DPS (11, 15). Factors influencing these stocks are very different—the eastern DPS has exhibited density dependent growth and has not shown evidence of decadal-scale climate regime-driven variation. In contrast, the western DPS does not display density dependence. This growth rate is also below the optimal potential for pinniped populations indicating unknown mortality sources. For these reasons, future decisions to downlist or delist should undergo additional PVA sensitivity analyses.

Response: In the calculation of the Potential Biological Removal for Marine Mammal Stock Assessments under the Marine Mammal Protection Act, the default maximum growth rate (R_{max}) for pinnipeds is 12%. The eastern DPS has increased at approximately three percent per year for about 30 years, far below the default R_{max}, which suggests that there are other mortality sources within the range of the eastern DPS that have slowed its

recovery, or that perhaps Steller sea lion populations may not be able to grow as fast as other, smaller pinnipeds (such as northern fur seals or California sea lions). While the eastern DPS has shown no decadal-scale climate regime-driven variation in growth rate, there is no proof that the western DPS has either since it is not possible to separate natural from human-caused declines in the west. NMFS believes that the eastern and western DPSs of Steller sea lion have more in common than suggested by the commenter, since they are the same species living in largely the same environment and subject to many of the same factors affecting their survival and reproduction. Perhaps the western DPS has not exhibited the expected density-dependent response (an increase after a large decrease) because of changes in its environment that are different from those experienced by the eastern DPS, which may be related to a decrease in carrying capacity due to human uses of the marine ecosystem (e.g., large-scale commercial fishing for groundfish). In this scenario, western Steller sea lions would currently be near or perhaps above current (and much lower) carrying capacity, which could explain the almost 30-year decline in reproductive rates observed in parts of the range of the western DPS. NMFS will review the status of the western Steller sea lion population biennially upon the completion of each aerial survey for adults and juveniles.

Comment: This criterion may not be achievable even if the DPS fully recovers to its pre-decline abundance—this could happen if the DPS slowly and/or irregularly recovers below the three percent growth rate.

Response: The three percent growth rate is only one possible delisting scenario picked by the Team and agreed to by NMFS. The recent history of the eastern DPS informed this choice, as did the results of the PVA. It is true that the western DPS could reach its pre-decline abundance and still not satisfy this criterion if the growth rate were very slow. NMFS was required to pick a de-listing scenario that was plausible and would satisfy the ESA. It is plausible since it is a growth rate observed by a different population of the same species; it satisfies the ESA because it would indicate that serious threats to the population's existence had been mitigated. If the average growth rate of the western DPS is different than three percent (either greater or less), NMFS will reevaluate the status of the western DPS in the future.

Delisting WDPS – Biological Criterion 2

Comment: Vital rates are uncertain, include biases, and may not be a good indicator of population trajectory. For example, under extreme food deprivation, apparent pup growth rate in Antarctic fur seals actually increased due to sampling problems in years of low pup survival (i.e. the covariance of measured growth rate with pup survival). There is heterogeneity among individual responses to nutritional deprivation. Those who are most affected by lack of food are not good competitors and their removal may have comparatively little influence on population dynamics. Current fecundity measures using aerial surveys and mark-recapture introduce biases which are not acknowledged in the Plan. Overall, vital rates may not be a feasible criterion. Vital rates as a down- and de-listing criterion should be eliminated. By using a PVA, if the population risk of extinction is above the threshold, then biological criteria are irrelevant. It is only when

the population falls below the threshold that other data are needed to explain why and help define the threat.

Response: The explicit vital rate criterion for downlisting and delisting the western DPS of Steller sea lions was removed. However, all information on the population of western Steller sea lions will be considered by NMFS in its decision to downlist or de-list. This includes rates of survivorship and reproduction. The PVA is based solely on total counts of adults and juveniles (extrapolated to estimate total population size), and does not include information on the age and sex structure of the population. Age-structured modeling and information from mark-recapture studies provides much more detailed information on the demographic reasons behind total population responses and as such, can indicate the effectiveness of mitigation or other recovery efforts.

Delisting WDPS – Biological Criterion 3

Comment: Remove the 50 percent criterion for the sub-region. The significant declines in two adjacent sub-regions should be based on a meta-population PVA. This criterion should reflect the spatial correlation that is likely to occur between adjacent areas. Also, the Plan should clarify that this criterion applies to the time period in Criterion 1 and is predicated on Criterion 1 being achieved.

Response: NMFS clarified the criteria list to indicate that each biological criterion must be satisfied in order to delist. Thus, the western DPS as a whole must show evidence that threats to its existence have been mitigated or eliminated. This would be demonstrated through population growth at an average rate of three percent per year for approximately three generations, as seen in the eastern DPS. Additionally, NMFS and the Team decided that if two adjacent sub-regions were declining while the western DPS as a whole satisfied criterion 1, then it would not be prudent to delist. If this situation were to occur, it would be likely that NMFS did not fully understand or mitigate the threats to the population. This criterion prevents loss of a significant portion of the range of the western DPS, which is a requirement of the ESA.

Comment: We are also concerned that under the weight of evidence approach, consistent increasing trends are necessary for only 5 of the 7 delineated sub-regions and not all 7. Thus two areas may apparently show ‘significant’ declines so long as they are not adjacent to one another. If NMFS ignores the negative trends in some sites [sic] and instead considers the overall current rate of annual increase in the Western DPS (three percent per year), this would result in a population size roughly equal to the size of the population at the time it was listed as threatened in 1990. That still represents a decline of approximately 70% below numbers from the 1950’s and 1960’s and thus is an inappropriately lax standard.

Response: NMFS has not defined recovery for the western DPS as a return to a population similar in abundance to that observed in the 1960s, and believes that the species can be removed from the list of those requiring the protection of the ESA at a population size smaller than was observed prior to the decline. The western DPS,

however, must show evidence of health and evidence that threats to recovery have been mitigated by increasing in population size for an extended period of time. As an example, NMFS and the Team chose a population growth rate similar to that achieved by the eastern DPS. If five of the seven sub-region populations are increasing, but two non-adjacent sub-regions are decreasing, and the western DPS as a whole is increasing at approximately three percent, then the rate of increase demonstrated by the five increasing sub-regions must be greater than three percent in order to compensate for the declines in the two decreasing sub-regions.

WDPS – Listing Factor Criteria: threatened

Comment: The listing factor criteria for the western DPS are largely subjective and are not measurable and objective.

Response: The listing factor criteria are not required to be measurable and objective. The five listing factors are the same for every species, as defined in Section 4(a)(1) of the ESA. These five listing factors must be addressed in any reclassification of a species (ESA Section 4(c)(2)(B)), and are:

> *"(A) The present or threatened destruction, modification, or curtailment of its habitat or range;*
> *(B) overutilization for commercial, recreational, scientific, or educational purposes;*
> *(C) disease or predation;*
> *(D) the inadequacy of existing regulatory mechanisms; and*
> *(E) other natural or anthropogenic factors affecting its continued existence."*

However, the recovery criteria outlined in the Plan are objective and measurable, as required by the ESA. NMFS will expect demonstrated progress towards the minimization of threats in order to change the listing status for the western DPS.

Comment: Eliminating or controlling the threats to the western DPS is unachievable because it is impossible to define the threats, much less control many of them.

Response: While it may be difficult to eliminate or control many of the threats to recovery for the western DPS of sea lions, it is the goal of the Plan to increase our understanding of them and attempt to mitigate them when and where possible.

Comment: This section of the Plan seemingly states for the first time that "modification of the foraging habitat of the western DPS of Steller sea lion, through both natural and anthropogenic sources, likely resulted in decreased survival and reproduction and may currently limit recovery." This indicates that the sea lion's habitat has been modified; citations and supportive information are necessary when making this statement for the first time.

Response: This section is intended to contain only the listing criteria, not the background or the citations supporting them. The commenter is referred to previous sections of the Plan, particularly Chapters III.B and IV.A that describe potential modifications of

foraging habitats by natural forces (e.g., oceanographic regime shifts, global climate change) and anthropogenic (e.g., fishing) forces.

Comment: Under Listing Factor C ["**Disease or predation**"] the Plan suggests that disease may present greater risks if population abundance declines further. Why would this be the case? If the animals are less crowded, transmission may decline and disease may pose less of a threat.

Response: NMFS agrees that the probability and rate of disease transmission may decline in a less crowded population. However, it is important to distinguish between the risks to an individual versus the risks to a population. In a smaller population, the proportion of the population infected might be greater, and each death or decline in fecundity caused by disease would have a greater population-level effect. NMFS must monitor for disease and insure that the western DPS is not precluded from recovery because of an outbreak of a new or existing disease whose impact is exacerbated by the current population's smaller size.

Comment: Under Factor E ["**Other natural or anthropogenic factors affecting the species' continued existence**"] the Plan prescribes annual collection and description of catch and effort statistics of state and federal commercial fisheries for Steller sea lion prey species within designated critical habitat. Collection of annual catch and effort statistics within designated critical habitat is not possible. The State monitors only to the level of detail of a statistical area.

Response: NMFS will develop appropriate, replicable methods to estimate catches within critical habitat for purposes of monitoring the recovery of the western DPS. Observer data can be used, when available, to parse data between regions inside and outside of critical habitat by statistical area. If observer data are not available, other methods, such as habitat area of the fish (e.g., less than a certain depth) inside and outside critical habitat within a statistical area, combined with known catch and effort data, can be used to estimate catches by zone. As part of development of an ecosystem approach to management, it is critical that NMFS estimate and make available information on the spatial and temporal distribution of catch at scales relevant to the foraging of other predators eating the same species.

Eastern DPS

Comment: The conditions for delisting the Eastern DPS have been met because: (1) the eastern DPS is at historic population levels; (2) new rookeries have been established in the northern segment of its range; (3) the population continues to increase at over three percent per year and has done so for three decades, with the exception of Southern California; (4) threats to the population are at a minimum; and (5) federal and state laws and regulations are in place to protect the animals, their places of birth and rest, and the prey upon which they feed.

Response: NMFS agrees. Pending a status review, the eastern DPS is a likely candidate for removal from the list of those species requiring protection under the ESA.

Comment: The conclusion that the eastern DPS can be delisted as the species is unlikely to become endangered in the foreseeable future throughout a significant portion of its range was reached only by writing off much of California as an insignificant loss of range. Given the magnitude of historical decline, the recent population trends in central California, and the small size of the main reproductive centers of SSL on the West Coast near the Oregon-California border (~15% of the DPS), significant portions of the eastern DPS range remain at high risk of becoming endangered. The eastern DPS recovery criteria should be modified to account for identified sub-regions and delisting should be evaluated in light of trends within these sub-regions before, not post, delisting. This criterion should be modified to reflect the biogeographic structure of the eastern DPS. Sub-regions within California do not meet this criterion.

Response: The Team discussed at length whether Steller sea lions breeding and residing in southern California represented a significant portion of the range of the eastern DPS. The Team decided that they did not, largely because they live at the southern extent of the eastern DPS range and populations often fluctuate most at the ends of their ranges. Also, there is evidence that the eastern DPS has moved northward. NMFS agrees with the conclusion of the Team. Splitting the eastern DPS into sub-areas would not alter the fact that populations in all other areas besides southern California have either increased steadily or been stable for an extended period of time (e.g., three generations).

Comment: A third delisting criterion (similar to the western DPS) should be added based on four sub-regions, as follows; a delisting criteria should be predicated on growth rates within sub-regions similar to the western DPS:

> The population trends in at least three of the four sub-regions are stable or increasing, consistent with criteria #1-2. The population trend in any two adjacent sub-regions can not be declining significantly. The population trend in any sub-region can not have declined by more than 50%. Available information on the population ecology and vital rates for the sub-regions is consistent with the respective sub-region trend.
>
> The four sub-regions are:
>
> a. southeastern Alaska (U.S.)
>
> b. British Columbia (Canada)
>
> c. southern Oregon-northern California (U.S.)
>
> d. south-central California (U.S.)

Response: The Team considered this but realized that the recommendation would be the same -- that the eastern DPS should be delisted. Therefore, this criterion was considered to be unnecessary.

Delisting EDPS – Biological Criterion 2

Comment: This criterion should be modified to reflect the biogeographic structure of the eastern DPS. Vital rate information for the U.S. West Coast sub-regions is lacking; pup production in California is limited (1996-2004) and there is no historical baseline to compare recent production in Oregon; time series for surveys in California span only one SSL generation; factors affecting the SSL population dynamics in California are unknown.

Response: Criterion 2 has been removed from the list of biological recovery criteria for downlisting and delisting the eastern DPS, just as it has for the western DPS. For further information, the commenter is directed to the previous sections in this Response to Comments document titled "Downlisting WDPS – Biological Criterion 2" and "Delisting WDPS – Biological Criterion 2."

Recovery Actions

Comment: Recovery Actions 2.6.6 and 2.6.7 should be omitted or, if retained, the cost to the fishing community of eliminating the Atka mackerel fishery (which would occur given SSL consume 181% of fishery catch) needs to be explicitly calculated in the analysis.

Response: Recovery action 2.6.6 (Evaluate and implement appropriate fishery regulations to protect foraging habitat and prey resources for sea lions) is one that was highlighted in the executive summary of the Plan because it deals with the threat posed by the potential competitive effects of fishing. The Team and NMFS determined that conservation measures enacted in 2002 (or an equivalent level of protection) should be maintained until it can be positively determined that reducing those protections for Steller sea lions would not reduce the likelihood for or increase the time to recovery.

NMFS is committed to the development of ecosystem-based approaches to fishery management (recovery action 2.7.7 supports these efforts) which include the exploration of ways to explicitly account for the needs of Steller sea lions and other consumers in the ecosystem, as well as insure that fisheries for important sea lion prey (e.g., Pacific cod, pollock, Atka mackerel) do not limit their recovery. NMFS is researching ways to estimate costs of recovery to other sectors of our economy as well as estimate the economic benefits of recovery and the intrinsic value of Steller sea lions for their ecosystem.

Comment: Recovery action 3.1 dismisses observer coverage as not cost-effective. However, even limited observer coverage may detect mortality in fisheries for which a more rigorous sampling program can be focused. The extent and remoteness of the Alaska coast makes stranding monitoring difficult, thus observer programs would be more efficient. Coverage would be for fisheries with historical or self-reported interactions or in time and areas for significant interaction potential.

Response: Recovery action 3.1 focuses on monitoring of sea lion mortality due to incidental take in fisheries, which is best addressed, as the commenter suggests, by limited, targeted, or broad-based observer programs that are either currently in place or have been used in the past. It is not the intent of NMFS to "dismiss" the value of observer coverage. Instead, Recovery Action 3.1 states that "In fisheries where the rate of incidental mortality is low, deriving statistically reliable mortality estimates may be cost-prohibitive." In such cases, NMFS should find more cost-effective means (such as stranded carcass surveys) to detect fishery-related mortality, and "dedicated observer effort could subsequently be focused on the fisheries, areas, and seasons most needed"

Comment: It is premature for the Plan to recommend that 'the current branding/resighting program should be continued' when the court ordered EIS has not yet been concluded and has not yet recommended the type or level of research that should occur.

Response: One of the objectives of the Plan is to outline those steps necessary to recover the species. The Team and NMFS developed the list of recovery actions without considering the legal action taken against the current research permits authorized by NMFS under the MMPA. One of those actions was the continuation of the current branding/resighting program because of the valuable information on trends in vital rates that it will provide. NMFS anticipates that legal issues surrounding Steller sea lion research permits will be resolved by June 2007 allowing the resumption of this important research activity.

Comment: Recovery Action 5.8 should be omitted. A 'fast track' approach to research permits is inappropriate and will result in less oversight and additional stress to the SSL. NMFS should assure that research relies on a robust sampling protocol based on minimally appropriate sample sizes, using minimally invasive techniques and focuses on providing information critical to accomplishing key recovery objectives (i.e. the adaptive management program).

Response: NMFS is addressing the process by which research permits for Steller sea lions are issued in an Environmental Impact Statement (Draft Programmatic Environmental Impact Statement for Steller Sea Lion and Northern Fur Seal Research). NMFS will insure that research relies on robust sampling protocols based on appropriate sample sizes and techniques that will provide information necessary to recover Steller sea lions, while at the same time providing permits to researchers in a timely manner.

Comment: Recovery Action 5.7: Data regarding subsistence harvest is collected under suboptimal methods, such as retrospective interviews with hunters. Self-reports are inappropriate for an ESA-listed species. Real-time monitoring such as that implemented in St. Paul should be exported to all communities that kill Steller sea lions for subsistence.

Response: NMFS agrees that real-time monitoring provides better estimates of mortality related to subsistence hunting than retrospective interviews. NMFS, working with its co-management partners and the Subsistence Division of the Alaska Department of Fish and Game, will continue to work toward development and implementation of improved methods to estimate mortality.

Comment: Vessels should be prohibited from landing too close to rookeries or haulouts. Heavy fines or boat seizures should be a consequence of any violations.

Response: NMFS and the U.S. Coast Guard continue to enforce the established No-Entry Zones within three nautical miles around all rookeries and many major haulouts.

Comment: Alternatives to at-sea observers to monitor fisheries interactions should be explored.

Response: NMFS believes the best data on incidental catches of Steller sea lions comes from at-sea observers. NMFS will also explore the use of data collected by Vessel Monitoring Systems regarding the distribution of fishing and other vessel activity inside portions of designated critical habitat.

Comment: The Plan's reliance on conducting further research appears to have paralyzed implementation of protective measures. The Plan is knowledge-hungry to an extent that makes it unsustainable—some of the scientific problems simply cannot be solved with our current technology and capability. The Plan implicitly requires further research as a rational basis for further management.

Response: NMFS agrees that the Plan has many recovery actions which involve more and continued research. Research conducted since the publication of the first Recovery Plan in 1992 was instrumental in removing many of factors from serious consideration as threats to recovery in this plan. Of the eleven factors listed in Table IV-1 of the Plan, seven are currently listed as Low threats to recovery for western Steller sea lions, and many of these were considered to be of high or unknown importance as recently as 2000 (Ferrero and Fritz 2002). Only two factors remain as potentially high threats to recovery – environmental change and competition with fisheries – and there is considerable uncertainty in our understanding of their relative importance in future Steller sea lion population dynamics. It is for largely this reason that the new Plan is weighted toward research, while at the same time maintaining the status-quo level of fisheries management protection until we can ensure that changes in management, particularly anything that would lessen the level of protection, would not affect the rate of recovery.

Comment: Current mitigation measures should be maintained but reviewed periodically in light of new information.

Response: NMFS agrees, and this idea is captured within Recovery Action 2.6.6.

Comment: Research under each recovery action should be prioritized based upon relevance to the risk assessment, the likelihood of success, and the level of past cost/benefits. Of particular importance is research on population trajectories and their underlying vital rates. Tasks 2.4.2 and 2.4.3 are highly speculative and the costs in the implementation schedule are too low. Task 2.6.8 appears to be the entire purpose of the Plan in one sub-task. Overall, the Plan lacks a credible and cohesive research program. The Plan needs a clear prioritized research plan, together with a recommended public process, under the auspices of the North Pacific Research Board.

Response: Action 1.5 in the Plan calls for the development of an implementation plan that includes a comprehensive ecological and conceptual framework to integrate and further prioritize the numerous recovery actions of the Plan. The implementation plan will synthesize and prioritize the individual actions, and coordinate their implementation in a cohesive strategy outlined in Section V.B. The development of such a plan was beyond the scope of the Team's responsibility, but the Team recognized its importance and highlighted this to NMFS in their draft Plan.

Comment: The Plan should make it clear that the Council and NMFS have broad flexibility to modify existing fishery management measures on a continuing basis as new information becomes available.

Response: Both the North Pacific Fishery Management Council and NMFS have flexibility to modify existing management measures as new information on Steller sea lions and fishery interactions becomes available. However, all changes must be evaluated under the ESA section 7 provisions, and this Plan calls for maintenance of the existing level of protection at a minimum until it can be shown that less protection will not decrease the rate of recovery of the population.

Comment: The Plan should ensure that no erosion to fishery management measures occurs in the near future, given the tenuous SSL population trend.

Response: NMFS agrees with this comment. Recovery action 2.6.6 states that "… conservation measures should be maintained until it can be positively determined that reducing those protections for Steller sea lions would not reduce the likelihood for or increase the time to recovery."

Comment: Trade measures with Russian/Asian countries that impact SSL should be sought to level the field for US industry and promote international conservation. Collection of data from Russia and Japan on fishery bycatch and directed harvest should be an action item to initiate international agreements.

Response: NMFS has periodic dialogues with Russia regarding fisheries management issues. We recently introduced our concerns about Steller sea lions during discussions with our Russian counterparts. Trade measures with Russian and Asian nations are not

addressed in the Recovery Plan because they are outside the scope of this type of document.

Comment: The argument that current measures should be maintained because of a correlation between population stability and fisheries management measures is unfounded. Correlation cannot be equated to causation.

Response: NMFS agrees that correlation between the implementation of new management measures and recent population stability cannot be equated to causation in its argument regarding maintenance of status quo management measures. However, the Plan highlights the considerable uncertainty that remains in our understanding of the relative magnitude of the two factors ranked 'potentially high' as threats to recovery – environmental change and competitive effects of fishing. This alone is reason enough to maintain the current level of fisheries protection until more information can be collected which would indicate that the level of protection could be lessened without reducing the likelihood for or increase the time to recovery.

Comment: No information exists to suggest that the eastern DPS has ever been as abundant as it is now, so the use of 'recovering' is unjustified.

Response: Under the ESA, a species or DPS is 'recovering' until it is determined by NMFS or USFWS to be 'recovered' and removes it from the list of those species requiring protection. NMFS agrees that the eastern DPS of Steller sea lion has shown signs of health (increasing at three percent for nearly 30 years) and that it should be considered for delisting.

Comment: Two key recovery actions required before downlisting or delisting contradict each other –i.e., maintain current fishery measures and design and implement an adaptive fishery management program.

Response: NMFS disagrees. One of the recovery actions identified in the Plan (2.6.8) is to design and implement an adaptive management program to distinguish between the effects of fisheries, climate change, and predation on the western Steller sea lion. The current groundfish fishery management measures avoid jeopardy of the species and adverse modification of critical habitat, but were not enacted as part of an experiment designed to test the efficacy of measures or estimate the relative magnitudes of different factors on sea lion growth rates. The Recovery Team and NMFS determined that until a new adaptive, scientific experiment can be designed and implemented, the conservation measures enacted in 2002 (or an equivalent level of protection) should be maintained. Conservation measures should not be lessened until it can be determined scientifically that reducing those protections for Steller sea lions would not reduce the likelihood for recovery or lengthen the time to recovery. A more detailed analysis of the current suite of regulations and the extent to which they jeopardize the continued existence, adversely modify critical habitat, or significantly affect the recovery of Steller sea lions will be presented in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific, which is scheduled to be released in draft form in Spring 2008.

Comment: Recovery actions should be recommendations rather than requirements. The ESA calls for management actions 'as may be necessary' which means that NMFS need not rigidly bind itself to a particular suite of actions.

Response: The set of recovery actions described in the Plan represent the action items that will enable us to work toward recovering the species and downlisting or delisting. NMFS recognizes that conditions may change in the future, such that the actual actions needed for recovery may evolve and change, as may the priorities for action. However, based on our current knowledge of the species and the environmental conditions required for recovery, the set of recovery actions provided in the Plan are those that the Team and NMFS believe are needed to recover the western DPS of Steller sea lions.

Comment: Recovery action 2.6.7 should be eliminated as it is based on speculative information.

Response: NMFS disagrees. NMFS is working to develop ecosystem approaches to fishery management, one element of which may be multi-species stock assessment models that will enable the setting of fishery catch limits to ensure adequate prey resources for other apex predators in the ecosystem, including a recovered western sea lion population. It is not speculative to explore their utility; it is a necessary part of this research.

Comment: Fishery effects should be a priority research action. An experimental program is needed to assess fishery effects, including not only short-term effects arising from the spatial and temporal distribution of fishing effort but also the long-term effects arising from catch levels based on an MSY paradigm.

Response: Recovery action 2.6.8 calls for the design and implementation of an adaptive management program to distinguish between the effects of fisheries, climate change, and predation on the western Steller sea lion. The current groundfish fishery management measures avoid jeopardy and adverse modification, but were not enacted as part of an experiment designed to test their efficacy or estimate the relative magnitudes of different factors on sea lions. Regardless, assessment of the long-term, ecosystem-wide effects of fishing under single-species harvest strategies (e.g., MSY, $F_{40\%}$) is likely going to be beyond the scope of the type of adaptive management program envisioned in 2.6.8 and recommended by the NRC (2003) and others (NPFMC). It is the responsibility of NMFS to investigate high or potentially high threats to recovery to western Steller sea lions.

Comment: Recovery Action 2.6.9 calls for the preparation of a habitat conservation plan. Why should the State of Alaska be responsible for habitat conservation in managing fisheries?

Response: Nearshore fisheries authorized by the State of Alaska interact with Steller sea lions and are likely to result in adverse effects, including both sub-lethal and lethal takes.

These fisheries (e.g., salmon, herring, and groundfish) are not currently authorized to take Steller sea lions under the ESA. Studies have been funded through the Alaska Department of Fish and Game to look into the competitive overlap between State-managed fisheries and Steller sea lions. These analyses should provide the basis for an ESA habitat conservation plan (ESA section 10) to minimize the take of Steller sea lions while providing the legal authority for incidental take under a section 10(a)(1)(B) permit for commercial and sport fisheries. If adverse impacts are identified during the development of the habitat conservation plan, conservation measures should be developed and adopted in order to mitigate fisheries impacts. The process for developing a habitat conservation plan is outlined in the Habitat Conservation Plan handbook published by the US Fish and Wildlife Service (http://www.fws.gov/endangered/hcp/hcpbook.html).

Comment: Recovery Action 2.6.10: The historical population dynamics and distribution of herring and salmon in the SSL habitat is totally inconsistent with these prey being limiting and there being a competitive interaction with state managed herring and salmon fisheries. Salmon occur in SSL habitat only during the summer, and the fishery generally occurs downstream (in the direction of the salmon natal stream migration) from SSL rookeries, thus it does not affect the prey fields exploited by SSL. Pacific herring were depleted by the large pre-statehood reduction fisheries in the central and eastern Gulf of Alaska, decades prior to the decline in SSL. Pacific herring presently and historically have never occurred in significant numbers in large areas of the SSL critical habitat. The fisheries are intensively managed for sustainable relatively low exploitation rates, and occur very quickly.

Response: Steller sea lions and fishermen know about and exploit predictable locations and timing of aggregations of salmon, herring, and groundfish in State of Alaska waters. The predictability and size of these aggregations may be critical to sea lion health, condition and reproduction. It is the responsibility of the State of Alaska to work with the NMFS on an assessment of the impact of state-managed fisheries on the recovery of the western Steller sea lion.

Implementation Schedule and Plan

Comment: Recovery Action 5.4: Rather than a single research coordinator, an interdisciplinary team should be formed. The development of an implementation plan is critical and urgent, especially because the Recovery Plan does not provide the link between the recovery strategy and the scores of individual recovery actions. NMFS should establish an interagency, interdisciplinary team to develop the ecological framework for implementing the plan. The team should set research priorities and oversee coordination to guide recovery efforts.

Response: NMFS will explore the establishment of an interagency, interdisciplinary team to develop an implementation plan and provide guidance on the setting of research priorities and other recovery efforts.

Comment: Add to the implementation Schedule (pages 157-163) the category under which tasks are ordered. This is done for 1. BASELINE POPULATION MONITORING' but is missing for the other categories.

Response: NMFS agrees and added the categories to the implementation schedule.

Critical Habitat

Comment: Critical habitat designations should be reviewed and adjusted to better reflect the extensive research conducted over the past 13 years.

Response: It is not an objective of the Plan to redefine critical habitat for the western DPS of Steller sea lion. The Plan does have a recovery action (2.1) calling for NMFS to maintain, and modify as needed, critical habitat designations.

Comment: The current zonal approach to fishery management within the critical habitat needs to extend beyond 10 nm of shore to encompass the foraging range of all age classes during all seasons, particularly the feeding trips of adult females and older juveniles outside of the summer breeding season. The Plan provides no evidence to conclude that the current fisheries management practices in critical habitat are compatible with the recovery criteria.

Response: An assessment of the efficacy of the current groundfish fishery management measures is beyond the scope of the Plan. A more detailed analysis of the current suite of regulations and the extent to which they jeopardize the continued existence, adversely modify critical habitat, or significantly affect the recovery of Steller sea lions will be presented in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific scheduled to be released in draft form in Spring 2008.

Comment: Maintaining critical habitat designations should be changed from a priority 3 to a priority 2 or 1, for all the reasons stated in the Plan (e.g., technical errors, importance of rookeries).

Response: Although maintaining critical habitat designations is important, NMFS believes this is a lower priority than other recovery actions listed in the Plan.

Estimates of Recovery Time and Cost

Comment: There should be a full and proper assessment of the effectiveness of past management actions. Cost-benefit analyses are particularly important given the high level of uncertainty in current data and the potential impact that some measures may have upon the economics of the fishery. Annual and aggregate costs to fisheries of SSL conservation measures should be included.

Response: The efficacy of the current set of management measures and the extent to which they jeopardize the continued existence, adversely modify critical habitat, or significantly affect the recovery of Steller sea lions will be presented in the forthcoming Biological Opinion on the groundfish fisheries in the North Pacific scheduled to be released in draft form in spring 2008. NMFS is aware of some limited analyses that attempted to estimate the costs of certain management actions (e.g., the closure of critical habitat to boats fishing with trawls in fall 2000), but is not aware of any analyses that have estimated the economic impact of the suite of regulations enacted in 2002. These estimates have not been made because there are no data upon which to base these estimates nor are there ways to separate the costs of the Steller sea lion regulations from those resulting from other actions taken at the same time (e.g., regulations to implement the American Fisheries Act). Even when critical habitat was closed in 2000 by order of the federal court, there has never been an instance when a quota (TAC) for a target groundfish species has not been fully harvested because of a regulation whose management objective was to avoid jeopardy to the continued existence of Steller sea lions or adverse modification to its critical habitat because of actions by the groundfish fishery.

Comment: The Plan fails to meet the standards established in the 1994 NMFS and USFWS interagency policy calling for consideration of social and economic impacts in recovery planning (59 FR 34273, July 1, 1994). Recovery planning under the ESA must focus on measures that are "practicable"; the Plan needs to inform the public about whether or not this recovery effort is truly practicable.

Response: NMFS believes that the commenter is referring to the "Interagency Cooperative Policy on Recovery Plan Participation and Implementation Under the Endangered Species Act" (59 FR 34272) NMFS disagrees that the Plan fails to meet the standards set forth in the 1994 interagency policy on recovery planning established between NMFS and the Fish and Wildlife Service. The referenced interagency policy states that this "cooperative policy is intended to minimize social and economic impacts consistent with timely recovery of species." Specifically, this policy outlines the ways in which the agency will promote coordination among State, Tribal or Federal agencies, academic institutions, private individuals and organizations, commercial enterprises and other affected parties to enhance recovery plan development and implementation. The composition of the Steller sea lion Recovery Team clearly reflects NMFS' efforts to follow this policy, as the Recovery Team was comprised of 17 members, including representatives of State, Tribal and Federal agencies, representatives of the fishing industry, members of academia, and the environmental community.

The Recovery Team and NMFS believe that the measures outlined in the recovery plan are appropriate for the recovery of the species and are practicable. The Plan establishes a set of checks and balances (in the form of an adaptive management plan and recommended research priorities) to ensure that recovery measures and objectives are achievable, and so that they may be further refined as new information becomes available. Specifically, the Plan calls for: (1) NMFS and the Council to develop an adaptive management program so that relative impacts of fishing, environmental change

and predation on the recovery of Steller sea lions can be assessed;, and (2) continued and additional research on Steller sea lions and factors that could affect their recovery (e.g., killer whales, environmental change, fisheries). The social, economic and environmental impacts of the adaptive management and research programs will be analyzed in NEPA documents once they are developed and when research permit applications are received.

Other General Comments

Comment: Much of the discussion around the causes of the Western DPS decline should be consigned to an appendix. The Plan should be condensed from a rambling discourse of the controversy surrounding the SSL to a more focused discussion on balanced and practical management actions.

Response: The commentor does not indicate why the discussion should be moved. NMFS felt it was necessary for the Plan to include some of the recent history of Steller sea lion management in order to put the rest of the Plan in context. Readers are directed to the Executive Summary for a more concise review of the recommendations.

Comment: The Plan should contain several caveats regarding 'recovery': (1) recovery may not be achievable because the ecosystem that once supported large numbers of SSLs may not be restored; (2) a single-species management approach may not reflect the complexities of a multi-species system; (3) 'recovery' is a value judgment and may not represent a biologically optimal solution.

Response: It is true that the North Pacific ecosystem that once supported five times more western DPS Steller sea lions than currently exist may not be restored. However, the recovery criteria in the Plan do not call for a return of the western DPS to historic levels in order to be considered "recovered" and consequently removed from the list of species needing ESA protection.

NMFS recognizes that in order to delist the species, we need to gain a better understanding of the North Pacific ecosystem and the factors affecting recovery. For example, if the population decline observed prior to the year 2000 was the result of predominately natural factors, those stressors could recur (e.g. regime shifts), and given the historic rates of decline (as high as -15% per year) the western DPS will remain in danger of extinction. Alternatively, these natural factors might also improve conditions for the western DPS, leading to an increase in population. If the causes of the population decline were largely anthropogenic, then they may be mitigable, enabling us to prevent a similar decline in the future. However, human activities may have so significantly altered the ecosystem that a return to former population levels is unlikely.

For the upcoming Biological Opinion on the groundfish fisheries in the North Pacific (scheduled to be released in draft form in Spring 2008), NMFS plans to determine how the ecosystem has changed, to what extent those changes are related to human activities (and thus controllable to be some degree), and whether recovery of the western DPS is possible given current and predicted future conditions. NMFS is also working to develop

ecosystem approaches to fishery management, one element of which may be multi-species stock assessment models that enable the setting of fishery catch limits to ensure adequate prey resources for apex predators in the ecosystem, including a recovered western sea lion population. NMFS believes that the recovery goals are achievable and are based on the best available information for the western DPS and eastern DPS.

Comment: NMFS should revise the Plan to incorporate more flexibility in recovery criteria and management actions and circulate the revision for public review and comment. This is particularly important given the weak rationale for maintaining the current fishery management regime—fisheries measures introduced in the past 5 years are not likely to be responsible for the SSL trend.

Response: Flexibility in recovery criteria is contrary to the ESA requirement to have objective, measurable criteria. The flexibility in the criteria will come in as the Plan is modified in the future, as new data are collected, and as biological conditions are re-evaluated. NMFS has revised the Plan, released it for additional public review, and will seek an additional peer review through the Council of Independent Experts. The efficacy of the current set of management measures and the extent to which they jeopardize the continued existence of Steller sea lions, adversely modify critical habitat, or significantly affect the species recovery will be evaluated in the upcoming Biological Opinion on the groundfish fisheries in the North Pacific, which is scheduled to be released in draft form in spring 2008.

Comment: NMFS should conduct a formal status review to assess the biological significance and relationship of the West Coast SSL populations to the eastern DPS and determine whether the West Coast populations merit a separate designation as a recovery unit or possibly a separate DPS listing.

Response: NMFS will consider these issues, along with the issue of whether the eastern DPS has met the delisting criteria recommended in the Plan, in a future review of the status of the eastern DPS of Steller sea lion.

Comment: The Plan states that environmental groups were represented on the team, which is incorrect. At least one environmental member should be appointed to the team.

Response: When the Team was formed in 2002, one of the members did represent an environmental organization. Despite changes in employment status with that organization, the individual continued to be a member of the Team and provided valuable perspective to Team discussions. All Team meetings and processes were open to the public, and any organization or member of the public was welcome to participate and comment on proceedings of the Team at these meetings.