

**DRAFT REPORT**  
**of the**  
**SCIENTIFIC AND STATISTICAL COMMITTEE**  
**to the**  
**NORTH PACIFIC FISHERY MANAGEMENT COUNCIL**  
**August 1-2, 2007**

The SSC met during August 1-2, 2007 at the Marriott Hotel, Anchorage, Alaska. Members present were:

Pat Livingston, Chair  
*NOAA Fisheries—AFSC*

Keith Criddle, Vice Chair  
*University of Alaska Fairbanks*

Sue Hills  
*University of Alaska Fairbanks*

Anne Hollowed  
*NOAA Fisheries—AFSC*

George Hunt  
*University of Washington*

Lew Queirolo  
*NMFS—Alaska Region*

Terry Quinn II  
*University of Alaska Fairbanks*

Farron Wallace  
*Washington Dept of Fish and Wildlife*

Doug Woodby  
*Alaska Department of Fish and Game*

Members absent were:

Bill Clark  
*International Pacific Halibut Commission*

Gordon Kruse  
*University of Alaska Fairbanks*

Seth Macinko  
*University of Rhode Island*

Franz Mueter  
*SigmaPlus Consulting*

**A. Review of May 2007 Draft Revised SSL Recovery Plan**

Presentations were provided by Bill Wilson (NPFMC staff), Kaja Brix (NMFS-PRD), Tom Gellatt (NMFS-NMML), Lowell Fritz (NMFS-NMML), Paul Wade (NMFS-NMML), Tom Loughlin (TRL Wildlife Consulting), Don Bowen (NPRB Review Panel), and Earl Krygier (ADF&G). Public testimony was provided by Andrew Trites (UBC, NPMMC, and former member of SSLRT), Dave Fraser (FV Muir Milach and former member of SSLRT), John Gauvin (H&G Workgroup), and Dave Benton (MCA).

The May 2007 revision of the May 2006 draft recovery plan prepared by the Steller sea lion recovery team (SSLRT) was taken on by a group within NOAA because the SSLRT was disbanded upon completion of the May 2006 draft. The SSC notes that although the revised draft recovery plan built on the foundation of work completed by the SSLRT, the current draft was not reviewed or approved by the SSLRT.

The SSC appreciates the substantial efforts that were involved in developing the revised draft recovery plan and in organizing the external reviews of earlier drafts of the recovery plan. Some portions of this draft have incorporated previous comments made by the SSC. However some issues are still outstanding and these form the basis of our comments that follow.

**Background and Conservation Measures**

*Distribution and Population Structure.* The SSC appreciates the added information on the Asian portion of the wDPS and some additional discussion on the possibility of SSL being a metapopulation. However, metapopulations or other alternatives to the current legal structure of two distinct populations should be developed further. In particular, a discussion of the criteria (for example rates of movement in addition to genetics) that would be needed for the agency to revise its determination of the population structure would be helpful. The SSC recognizes that analysis and interpretation of genetic and movement data is

not easy. **Therefore, until stock structure has been definitively delineated, the recovery plan should explore the management implications of possible alternative stock structures.**

The recovery plan does not include a parallel discussion of population structure (or lack thereof) for the eDPS. As a basis for and justification of the subsequent lack of subregional recovery requirements, it seems reasonable to expect evidence here that the eDPS has no structure, or much less than that in the wDPS. This aspect of similarity or dissimilarity between the eDPS and wDPS should be explored.

*Habitat characterization and use.* The new information on habitat usage by Steller sea lions (presented in section 2—Marine Habitat Use) improves on the information that was originally used to designate critical habitat (section 3—Designated Critical Habitat). Thus, in accord with our previous recommendations, the SSC recommends that Recovery Task 2.1 (maintain, modify as needed, critical habitat) be given a priority of 2a instead of 3.

*Feeding Ecology.* Data on energetic demands should be addressed separately from discussion of the validity of the “junk food hypothesis”; understanding energetic demands is important to understanding potential impediments to Steller sea lion recovery irrespective of the validity of the “junk food hypothesis”. Continued use of the term “junk food” in reference to nutritional studies is confusing and should be discontinued.

#### Factors Potentially Influencing Western and Eastern Populations

Overall, this section presents a comprehensive discussion of the potential threats to Steller sea lion recovery. **The SSC is not aware of additional threat factors that should be considered, but notes that the recovery of Steller sea lions will be influenced by the interplay of multiple factors.**

Issues of food quality and/or limitation are discussed in three sections of the document: page 40, page 81, and page 100. This treatment is confusing. On page 81, the document correctly states that bottom up forces may result from: a) natural changes in the species composition, distribution or quality of prey; or b) changes in the species composition, distribution or quality of prey caused by fishing. However, the discussion of the influence of these changes on Steller sea lions appears on pages 40 and 100. Page 81 notes that the potential effects of bottom up forcing include changes in size at age and the number of successful pregnancies. Juvenile survival should be added to this list. Likewise, page 100 should include a discussion of nutritional stress related to changes in prey diversity.

**Care should be taken to differentiate between the effect of shifts in the abundance and composition of Steller sea lion prey and the nutritional value of gadids and other forage fish.**

**It is important to maintain balance in the presentation of alternate hypotheses.** For example, on page 101, the document cites a paper by Fritz and Hinckley (2005) as conclusive evidence that climate-induced changes in prey availability were not associated with the Steller sea lion decline. For balance, this section should reference the paper by Trites et al (2006), which suggests that climate-induced changes may have contributed to the decline. **The SSC notes that climate-induced shifts in the carrying capacity could occur. These shifts could influence the abundance and distribution of prey.** Differentiating between climate-induced and fishery-induced reductions in carrying capacity will be difficult but is of substantial research and public interest.

The SSC appreciates that the revised draft recovery plan includes historical references. However, it may be advantageous to consider including the historical references under a separate section, to highlight that the information is different in scope and character from information generated in modern sampling efforts.

**The draft recovery plan should include additional explanation of the reasons for which the threat assessment for killer whale predation was downgraded from high to medium.** Was the change made because there is a low probability of mitigating the impact, or because the weight of evidence suggests

that the estimates of killer whale predation do not exceed the estimated natural mortality rate of Steller sea lions? The draft recovery plan should explain if the threat assessments, in general, are influenced by mitigation potential. **Threat assessment should be determined independent of mitigation potential.**

The section on sequential megafaunal collapse should be moved either immediately before, or immediately after, the section on the potential impact of killer whale predation. **The SSC agrees with the NPRB reviewers who remarked that rejecting the sequential megafaunal collapse hypothesis does not lessen the possibility of top-down impacts of killer whale predation; it is a separate issue.**

The SSC was pleased to see the new information on transient killer whale abundance, distribution and diet in the document and in Paul Wade's (NMFS-NMML) overview of recent information on transient killer whale abundance, distribution, and diet that was used for the new killer whale threat discussion.

Throughout the document (e.g., pages 27, 42, 82, and 106) the recovery plan references Holmes et al. (in press) as a study that provides evidence of prolonged declines in birth rate. The SSC received a pre-publication copy of this manuscript. Page 17 of the manuscript includes a description of sensitivity analyses that were conducted. However, none of these examples held birthrate constant. Figure 4 of the manuscript shows adult survivorship was perhaps inversely correlated with birthrate. The constant birthrate hypothesis would balance the hypotheses regarding change in birthrate and change in juvenile survivorship.

### Threats Assessment

Overall, this section presents a comprehensive discussion of potential threats to Steller sea lion recovery that might be operating in both the eastern and western DPS. Sections of the recovery plan regarding threats posed by killer whale predation, threats posed by environmental change, and threats posed by competition with fisheries have been revised from the 2006 version of the plan that was provided to the external reviewers. **To guard against the perception of an unbalanced treatment of the scientific data, and to be sure that all new data are included, a small group of non-agency scientists should be included in a team responsible for preparing a final draft of the recovery plan.**

- The ranking of impacts of threats needs further clarification. How was the “weight of evidence approach” used to categorize the relative impact of each threat? Providing detailed explanation of how factors were ranked and what influenced the ranking decisions would contribute to public understanding.
- The SSC notes that the recovery plan includes separate discussions of the food web and threats affecting Steller sea lions. This partitioning results in discussions on nutritional stress being presented several pages after the discussion of bottom-up forcing. The section on nutritional stress should be moved closer to or included in the bottom up section.
- The recovery plan concludes that toxic substances are found in relatively low concentrations in SSL tissues and provides no evidence to support the “medium” threat level designation. Further clarification is needed.
- Although the reasons for the decline of the western DPS are unlikely to ever be known with any degree of certainty, it is clear that the factors responsible for the decline may not be identical to the factors limiting population growth at this time. This realization is mentioned in the recovery plan but further discussion of how multiple factors may be operating and may have differing strengths in various regions is warranted.

## Recovery Strategy, Development of Recovery Criteria, and Delisting Criteria

**One substantive improvement in this draft recovery plan is that it more fully incorporates the PVA model developed by Goodman.** The SSC reiterates that an appropriately structured PVA “provides a useful framework for evaluation of population recovery and changes in extinction risk”. Nevertheless, endorsement of the use of a PVA, should be understood as an endorsement of PVA as an analytic framework designed to highlight assumptions and data gaps; our August 2006 report includes several recommendations for needed improvements and modifications to the PVA developed by Goodman as well as several suggestions for improvements that are needed in the estimation and forecasts of population trajectories. While our advice was acknowledged in NMFS’ response to comments, the technical issues that we identified in the PVA and in the trend projections have not been addressed in the current draft recovery plan. The extinction risk of 1% in 100 years, lack of density dependence, and use of old growth rates in the PVA are examples of assumptions that need to be re-examined in future analyses.

The recovery criteria are based on an assumption that a change in carrying capacity has not occurred, even though the recovery plan (page 89) acknowledges that it may have. **The recovery plan should include a discussion of how a modified carrying capacity might affect the appropriateness of the proposed recovery criteria.** When the PVA is developed for the implementation plan, the issue of a change in carrying capacity should be fully explored.

**The recovery plan should include a more detailed explanation of the reasons for the recovery criteria and how their attainment will be assessed.** For example, more justification is needed for using the 100-year timeframe as a recovery criterion for Steller sea lions, a pinniped with a shorter generation time than is characteristic of the large cetaceans for which the 100-year timeframe was developed.

**The description of the recovery criteria should be revised to emphasize that the specific values obtained (e.g., 3% over thirty years) are subject to revision as new information becomes available and new analyses are undertaken. Furthermore, those values should be connected with the concepts of recovery explained earlier in the section involving risk probability and increasing population trends.**

Recovery criteria are required to be objective and measurable under the ESA. However the first and second downlisting criteria (page 136) are vague with respect to the definition of statistical significance and need to be defined explicitly.

NMFS has indicated that it intends to revisit recovery criteria every five years, but this schedule is not specified in the body of the recovery plan. In fact, the only place that modification of approved recovery plans is mentioned is in the discussion on page *ii*. There it says that plans may be changed for “new information, changes in species status and the completion of recovery actions.” Is this really intended to be an “and” and how will this comport with the 5-year revision scenario? **The process for the 5-year evaluation of recovery criteria should be described in the recovery plan and in the implementation plan.** It is important that this process be specified soon, because compiling and analyzing new information will be a multi-year task.

## Recovery Action Outline and Implementation Schedule for the Western DPS of SSL.

The SSC has again reviewed the proposed recovery actions for the wDPS of SSL and notes that four items (1—maintain population monitoring and research on key threats, 2—maintain current fishery conservation measures, 3—design and implement an adaptive management program, and 4—develop an implementation plan) were selected from the list of recovery actions and identified on pages 124-125 as items to be implemented. The SSC suggests that the plan provide greater justification for the selection of those items. Items two through four are identified in the plan as having priority 2a, while numerous other actions identified in the schedule (pages 176-184) as priority 2a are not included. **In particular, action 1.2 “estimate vital rates” should be included in the short list of priority items to implement.** We

concur that the implementation plan itself (item 3) belongs in the list of items to implement first. When the implementation plan is written, attention should be given to identification of actions that will be taken in the event that one or more of the recovery criteria for downlisting and delisting are not met during periodic review/revision of the recovery plan (e.g., every 5 years). **The implementation plan should provide an outline of the process, timeline, and expected participants for revising the plan and using a PVA to identify the most prudent actions to promote recovery.**

**The SSC suggests that item 2.1 “maintain and modify critical habitat” be elevated from priority 3 to 2a. In addition, research to specifically test whether the wDPS is now under a new, lower natural carrying capacity should be included as a priority 2a action, and a hypothesis testing framework should be included with clear criteria for that determination.**

With regard to the priority levels, the SSC suggests that the agency revisit the recovery planning guidelines and consider adding a category for monitoring activities. The motivation for this suggestion is that monitoring activities are vital for determining the status of the population, but cannot be easily construed as “an action that must be taken to prevent extinction ...”

It should be noted that the recovery action costs reported in this section are projected costs for the agency to conduct research and outreach activities as outlined. These agency costs do not reflect the costs (foregone net revenues) to communities and industry or the relative distribution of costs across industry sectors and regions.

As noted in our August 2006 report and as noted by the NPRB review panel, because the causes of the decline of Steller sea lion populations and their slow recovery are unknown, the efficacy of management actions taken to date and of the actions contemplated in the recovery plan is, at best, uncertain.