

Western Steller sea lion population viability and recovery: Predicting the future from an uncertain past

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The western population of Steller sea lions was listed as endangered in 1997 after a sustained, range-wide population decline of 80% that likely began in the late 1950s. Since 2000, the aggregate number of sea lions may have stabilized, with population growth observed in parts of the range and continuing decline in others. An ambitious research program has achieved significant advances in understanding sea lion ecology; however, there remains considerable uncertainty about the respective roles of various factors in causing the decline and influencing future recovery. The eventual reclassification of the western population of sea lions to ESA threatened status will be based, in part, on criteria that are thought to indicate that the risk of extinction has been reduced. We will present the basic model structure and assumptions of a population viability analysis (PVA) designed to assess the adequacy of proposed reclassification criteria. The primary PVA results we will present are (1) the sensitivity of reclassification criteria to the ~15% per year decline in the late 1980s, and (2) the subsequent development of alternative hypotheses that address the substantial uncertainty for that period in light of the ecology of Steller sea lions, the natural dynamics of the North Pacific marine ecosystem, and the potential anthropogenic influences on both. PVA modeling also provides a means for calculating how a strict commitment to a particular recovery program, including contingencies, would affect the risk of extinction and the prospects and probable time table for recovery. Adaptive recovery programs, for which the implementation of future management actions is based on the results of monitoring, are especially interesting and hold much promise. The case-specific results and unresolved issues from our Steller sea lion PVA experience will be explored in the larger policy context of regulatory management of the recovery and conservation of endangered species.

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