Marine Nearshore

Protocol: Harbor Seal

Parks Where Protocol Will Be Implemented: ANIA, KATM, KEFJ, LACL

Justification/Issues Being Addressed: Harbor seals (*Phoca vitulina*) perform a dynamic role in the marine nearshore environment by transferring nutrients and energy though their predatory activities and by influencing the physical complexity of their environment. Thus, they may serve as indicators of status and change of the marine nearshore environment. Harbor seals also are an important resource for Alaska Natives and for the tourism industry. However, this species has suffered serious declines in abundance at several coastal areas in Alaska over the past several decades; populations in the Gulf of Alaska are of particular concern to management agencies (Boveng et al. 2003, Ver Hoef and Frost 2003).

Specific Monitoring Questions and Objectives to be Addressed by the Protocol:

Questions:

- Are numbers of harbor seals decreasing along marine coastlines of SWAN parks?
- Are numbers of occupied haul-outs of harbor seals changing over time along marine coastlines of SWAN parks?
- Is distribution of harbors seals changing along marine coastlines of SWAN parks?

Objectives:

- Devise and implement a protocol for obtaining past, present, and future survey data of harbor seals for marine coastlines of ANIA, KATM, KEFJ, and LACL from the Polar Ecosystems Program (PEP) at NMFS-National Marine Mammal Laboratory (NMML).
- Estimate long-term trends in abundance and occupancy of harbor seals at haul-outs sampled via aerial photosurvey along marine coastlines of ANIA, KATM, KEFJ, and LACL.

Basic Approach: The PEP at NMFS-NMML conducts aerial surveys of harbor seal haul-outs on a 5-year rotational basis to monitor trends in seal abundance on Alaska's marine coastlines (Boveng et al. 2003). PEP has divided Alaska's entire marine coastline into five regions (Southern southeast, Northern southeast, Gulf of Alaska, Alaska Peninsula and Bristol Bay, and Aleutian Archipelago); one region is surveyed each year. Regions are further subdivided into routes, and one observer is assigned to each route. Surveys are conducted during the time of day and time of season when maximum number of seals are known to haul out.

The survey is divided into reconnaissance and site-to-site phases. The reconnaissance flight searches every possible seal haul-out along the route, with a list of previous haul-out locations to aid in the search. One reconnaissance flight is conducted on the first day of the survey and a second one at the midway point of the survey. The first reconnaissance generates a reduced list of currently occupied new and former haul-outs that is used to devise the site-to-site route. Digital photographs of each occupied haul-out are taken to obtain counts of seals during both phases of the survey. Counts will be corrected for seals present but undetected (underwater) based on haul-out behavior of radiotagged individuals (Huber et al. 2001) from previous research at seal haul-outs in Alaska (Simpkins et al. 2003).

In addition to the statewide surveys discussed above, the Alaska Sea Life Center conducts aerial surveys of harbor seals on a seasonal basis within KEFJ. These efforts are partially funded by KEFJ.

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- Dorothy Mortenson, NPS-SWAN

Development Schedule, Budget, and Expected Interim Products: Because this is an existing monitoring program within PEP at NMFS, there will be no costs to NPS for developing or implementing the sampling protocol. PEP has tentatively indicated that previous survey data for SWAN parks should be available for transfer to SWAN by the end of FY2006.

2006 Draft SOPs ($ to be determined).

2007 Implement data acquisition protocol ($ to be determined).

Literature Cited:

Boveng, P. L., J. L. Bengtson, D. E. Withrow, J. C. Cesarone, M. A. Simpkins, K. J. Frost, and J. J. Burns. 2003. The abundance of harbor seals in the Gulf of Alaska. Marine Mammal Science **19**:111-127.

Huber, H. R., S. J. Jeffries, R. F. Brown, R. L. DeLong, and G. VanBlaricom. 2001. Correcting aerial survey counts of harbor seals (*Phoca vitulina richardsi*) in Washington and Oregon. Marine Mammal Science **17**:276-293.

Simpkins, M. A., D. E. Withrow, J. C. Cesarone, and P. L. Boveng. 2003. Stability in the proportion of harbor seals hauled out under locally ideal conditions. Marine Mammal Science **19**:791-805.

Ver Hoef, J. M., and K. J. Frost. 2003. A Bayesian hierarchical model for monitoring harbor seal changes in Prince William Sound, Alaska. Environmental and Ecological Statistics **10**:201-219.