

Underwater Capture of Juvenile Steller Sea Lions with Scuba: A Narrated Video Presentation

Dennis C. McAllister

Alaska Science Diving Services, P.O. Box 1122, Sitka, AK 99835

Donald G. Calkins

Alaska SeaLife Center, P.O. Box 1329, Seward, AK 99664

Kenneth W. Pitcher

*Alaska Department of Fish and Game, 333 Raspberry Road,
Anchorage, AK 99518, 907-267-2363 (tel.), 907-267-2859 (fax),
ken_pitcher@fishgame.state.ak.us*

The western population of Steller sea lions (*Eumetopias jubatus*) in Alaska declined by approximately 85% over the past 30 years and is classified as "endangered" under the U.S. Endangered Species Act. Data collected during the 1980s strongly suggested that nutritional stress played a role in the declining population (Calkins et al. 1998, Pitcher et al. 1998). Studies conducted during the mid-1990s suggested that reproductive females and young pups were in "good" nutritional status, and analyses by York (1994) suggested that low survival of juveniles contributed to the declining population. Because of these findings, it was decided that studies on health and nutritional status of juvenile sea lions were of high priority. However, traditional methods of capture such as darting with immobilizing drugs were inefficient for juvenile sea lions and new capture techniques were needed.

Shane Moore, a noted underwater photographer, suggested that juvenile Steller sea lions could somehow be captured under water using scuba because they often appeared to be attracted to divers and interacted closely with them. Divers with the Steller sea lion project of the Alaska Department of Fish and Game began diving with sea lions and confirmed Shane's observations that juvenile animals often closely approached divers and sometimes interacted with the divers, at times mouthing fins, hoods, and gloves. Adult animals appeared more wary and normally did not approach

closely. Our experiences as well as discussions with other divers and a search of the literature suggested that diving with Steller sea lions was relatively safe. We were unable to document instances of serious injury or death to divers caused by Steller sea lions, although many divers felt intimidated by the close approach or contact with sea lions under water.

After many discussions and trials we focused on development of a noosing technique. A two-person dive team enters the water near a group of juvenile sea lions in the water, usually near a haulout. The divers settle on the bottom and young sea lions are enticed to stick their heads through a noose held on a short, maneuverable aluminum rod by baiting with a herring attached to another similar rod. The noose is fitted with a stop to prevent the noose from tightening to the point of strangling the animal and a lock to prevent the noose from loosening and releasing the animal. The noose is attached to a 15 m length of light, stiff rope with an inflated buoy on the other end. This limits the working depth to about 12 m. When the sea lion reaches through the noose to grasp the herring with its mouth, the noose is tightened around its neck and the line is then released by the diver. The divers then surface and a crew in a capture skiff retrieves the buoy and places the noosed sea lion into a restraint box in the skiff. The skiff delivers the captured sea lion to a research vessel where it is moved into a field laboratory, placed on gas anesthesia, and processed. Procedures performed include weighing, measuring, obtaining a variety of samples for health and condition evaluation, and attaching telemetry devices for tracking and dive performance. The animal is returned to the sea after recovery from anesthesia.

As of 1 May 2001, 171 juvenile sea lions ranging from two months to three years of age have been restrained using this technique. No animals have been killed or seriously injured during the capture process. One animal died from an anesthesia-related accident.

We are continually refining the capture and handling processes to improve our efficiency and to increase safety for both the sea lions and capture personnel. Our greatest concerns for diver safety are entanglement in the capture line after an animal has been noosed and barotrauma injury. We have made several modifications to reduce the probability of entanglement, including using floating line to keep the capture line above the divers and streamlining dive gear to reduce the probability of entanglement. We have also made improvements in the equipment and procedures used to load sea lions into the capture skiff to reduce the probability of injury to both sea lions and personnel.

In order to extend this technique as a research tool we are cautiously pushing the envelope as far as size of animals we are attempting to capture and the geographic areas and water conditions where we are working. To do this safely and effectively we are obtaining advanced dive training and evaluating the use of such technologies as nitrox, full-face masks, dry suit insulation enhancements, underwater communication, and rebreathers.

We acknowledge the contributions of many colleagues in the development and utilization of this technique and particularly would like to recognize Walt Cunningham (now deceased). Walt was a key team member during the early development of the underwater capture technique who persevered despite tremendous skepticism, bureaucratic hurdles, and early disappointments.

Development of this technique and all captures have been conducted under authorization of Marine Mammal Act and Endangered Species Act permits issued by the National Marine Fisheries Service Office of Protected Resources. All diving has been conducted within the guidelines of the Alaska Department of Fish and Game Scientific Dive Safety Program.

References

- Calkins, D.G., E.F. Becker, and K.W. Pitcher. 1998. Reduced body size of female Steller sea lions from a declining population in the Gulf of Alaska. *Mar. Mam. Sci.* 14:232-244.
- Pitcher, K.W., D.G. Calkins, and G.W. Pendleton. 1998. Reproductive performance of female Steller sea lions: An energetics-based reproductive strategy. *Can. J. Zool.* 76:2075-2083.
- York, A.E. 1994. The population dynamics of northern sea lion, 1975-1985. *Mar. Mam. Sci.* 10:38-51.