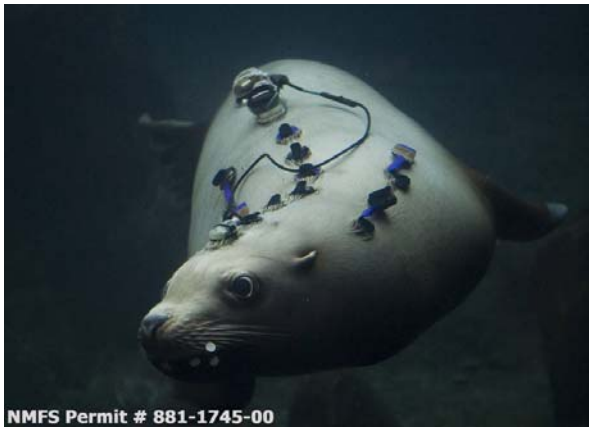
Sea Lion Goes High Tech

Alaska SeaLife Center
windows to the sea



With steady advancements in computers, electronics and navigation, the technological revolution has extended its reach into the marine mammal world. As new technology evolves, so too have the research possibilities for scientists to study marine mammals. For nearly 10 years, the Alaska SeaLife Center (ASLC) has been developing and testing cutting-edge technology to answer tough questions about Steller sea lion (*Eumetopias jubatus*) biology and ecology. Through our research efforts, we hope to better understand why the western population of Steller sea lions has declined by more than 80% in recent decades, and moreover—help this species recover from their population decline.

Perhaps some of the most difficult questions our scientists are challenged with are what and how much Steller sea lions eat, how they go about capturing and ingesting their food and how far they will go to forage. It is still unclear what exact movements and sensory cues (i.e. vibrissae or whiskers, odors, or visual) are needed to locate and capture prey. It is possible that these indices may provide important clues to their population decline. But to answer these questions, we have to go below the water's surface, and view what the world might look like to a sea lion.

Scientific instruments called telemetry devices are attached to the heads and backs of sea lions which remotely record movements and behaviors. Information is stored on flash memory accompanying the telemetry devices, or in many cases, transmitted to a satellite orbiting in space and sent directly to the Alaska SeaLife Center. These different instruments have been able to record how far and long sea lions dive, where they are geographically, temperature and salinity of the ocean, how fast they accelerate, video footage of their foraging, internal body temperatures, and more—all in a package no bigger than a remote control for a television! Unfortunately, the cost for each of these devices is not the same as a television remote—some reach up to $5,000 per unit!

At the Alaska SeaLife Center, we have a unique opportunity to test our telemetry devices on our resident sea lions, Woody, Sugar and Kiska, before we deploy them on Steller sea lions in the wild. We can also record information on these animals to give us a better understanding of what Steller sea lions might exhibit in the wild. Most recently, Kiska has been involved in an extensive study examining how she forages when fed live fish and how she ingests prey.

ASLC scientists have been recording Kiska's movements and how wide she opens her jaw to capture fish—markers that can be detected with camera equipment have been attached to her jaw line. Telemetry devices have also been attached to her head and back to measure and record her acceleration in the water. Lastly, a stomach temperature pill is being tested to determine the change in stomach temperature from the time of prey ingestion until fish are completely digested. It is likely that when Kiska ingests the cold fish, her stomach temperature will initially decrease, but as her body begins to metabolically breakdown and digest the fish, her stomach temperature will increase gradually until normal. The time it takes to reach normal stomach temperature (37 ^{0}C) is a reflection of the fish's mass. The stomach temperature pill, when coupled with measuring dive depth and duration, will provide a good indication of exactly when and where wild sea lions are foraging in the water column.

This project is federally permitted by the National Marine Fisheries Service (NMFS) under major permit numbers 881-1745-00
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