Gulf of Alaska - Marine Mammals

Estimating Capture and Handling Mortality Risk to Endangered Juvenile Steller Sea Lions (*Eumetopias jubatus*)

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Many marine mammal studies utilize capture techniques with some mortality risk. In addition to ethical considerations, assessing total mortality risk is important for studies of endangered species, and has been a recent concern surrounding Steller sea lion research in Alaska. We estimated mortality risk from captures of 464 Steller sea lions in Alaska during studies foraging behavior and physiology studies. During 2000-2005, 2-35 month old sea lions were captured on land or underwater, and physically or chemically restrained. Sampling included blood draws, marker injection, tissue biopsies, stomach intubation, transmitter attachment, and permanent marking. Not all procedures were performed on all animals, allowing evaluation of potential short-term survival effects. While mortality during capture is observable, mortality related to handling that occurs post-release may not be. Using behavioral data obtained from satellite telemeters attached to 192 animals and subsequent visual observations of branded animals we indirectly estimated post-release mortality by assuming effects would occur within 14 days of release (from literature estimates) if mortality could be distinguished from instrument failure. Three mortalities during capture or anesthesia resulted in a capture mortality rate of 0.6%. Satellite transmission durations ranged 6-257 days and were affected by age and season. Transmission durations were binned into =14 days, 14-30 days, and >30 days, and models suggest that probability of transmitting =14 days was unaffected by handling or anesthesia duration, anesthetic, procedure invasiveness, or handling complications. There were no differences among groups in proportions of marked animals observed after transmitter failure. Three animals with instruments transmitting =14 days have not yet been subsequently observed, a potential post-release mortality rate of 1.6%. This estimate plus the capture mortality rate result in a potential maximum mortality rate of 2.2% which also includes natural mortality. Basing estimates solely on transmitter failure rates is conservative but overestimates research impact.

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