Do Steller Sea Lions at the Pribilofs Have Enough to Eat? Evidence from Diet and Stress Hormones

Alan Springer and Alexander Kitaysky

Abstract

Steller sea lions at the Pribilof Islands consume principally walleye pollock in winter-spring and flatfishes in fall-winter. Other common prey species include Pacific cod, octopus, sculpins, and skates. These all tend to be low-fat forage species and are considered to be less nutritious than species such as herring, capelin, sand lance, and salmon, which occur rarely in sea lion diets at the Pribilofs. In contrast, sea lions in the eastern Aleutian Islands have a more varied diet that includes several energy-dense forage species.

We propose to evaluate the "junk-food hypothesis," namely that diets high in prey of low nutritional quality impose greater physiological costs to wild sea lions, that may be detrimental to the health of individuals, than diets consisting of more high-quality species. The measure of physiological cost will be levels of cortisol, a sensitive indicator of stress. Cortisol will be determined in scats collected from haulouts and rookeries at the Pribilofs and eastern Aleutians in summer, fall, and winter-spring. Hormone levels will be compared to data on sea lion diets and the energy density of prey, and evaluated in relation to hormone levels in other wild populations and in captive animals in controlled feeding trials. Diets, in terms of energy consumption, will be further evaluated using bioenergetic models of Steller sea lions. The results will provide information on the adequacy of the forage base at the Pribilofs and eastern Aleutians in maintaining healthy individuals and populations of sea lions in the current meteorological/oceanographic regime. The study also will help to answer the contentious questions of whether there are too many or too few pollock, and whether large protected areas, such as the Pribilof Islands Habitat Conservation Area, are sufficient to ensure adequate prey resources for sea lions.