

WOLF DIETARY DIVERSITY IN AN ISLAND ARCHIPELAGO

G. H. Roffler, J. M. Allen, A. Massey, and T. Levi

Study Description

Alexander Archipelago wolves (*Canis lupus ligoni*) are cryptic predators that inhabit an expansive and heterogenous landscape. To quantify variation in wolf diets, we used DNA metabarcoding of prey remains in wolf scats, which can reveal rare or difficult-to-identify species. Wolves increased the number and diversity of species consumed and widened their dietary niche as the proportion of ungulates in their diet declined, rather than switch to one or few individual diet items. The wolves made extensive use of marine, terrestrial, and avian alternate prey. Understanding use of alternate prey may provide insights into wolf population viability and predator-prey dynamics.



Photo 1: Alexander Archipelago wolf (*Canis lupus ligoni*), Southeast Alaska, USA. This subspecies of wolf inhabits a vast island archipelago that is naturally fragmented by steep terrain and expanses of ocean. These elements contribute to variation in species distribution and assemblages between island and mainland areas of this region. Photo credit: Bjorn Dihle.



Photo 2: An Alexander Archipelago wolf foraging in the intertidal zone, Pleasant Island, Alaska, USA. Despite the near absence of ungulates, wolves continued to occupy this small island (49 km^2) during our study period. Marine mammals were the most prevalent diet category for wolves on Pleasant Island, with sea otters (*Enhydra lutris*) dominant and Stellar sea lions (*Eumetopias jubatus*) and harbor seals (*Phoca vitulina*) in small proportions. Photo credit: Bjorn Dihle.



Photo 3: An Alexander Archipelago wolf after successfully acquiring a flat fish, Glacier Bay National Park and Preserve, Alaska, USA. Access to marine environments can provide a wider variety of forage species, with marine mammals, fish, and marine invertebrates available in the intertidal zone. Increased consumption of these species could be advantageous for wolves because of reduced handling times and risk, allowing wolves to forage individually. Photo credit: Jessie Klump.



Photo 4: Alexander Archipelago wolf-tracks in the intertidal zone, Southeast Alaska, USA. Photo credit: Gretchen H. Roffler.



Photo 5: The author (G. H. Roffler) collecting wolf scat samples, Bartlett River, Glacier Bay National Park and Preserve, Alaska, USA. Previous research efforts have described wolf diets by visual identification of prey remains in scat. This work demonstrates use of a novel method (DNA metabarcoding of fecal prey remains) that has improved the capacity to identify species and is applied here to 860 wolf scats collected during 2010–2018 across 12 Southeast Alaskan study sites. Photo credit: Natalie Dawson.

These photographs illustrate the article “Metabarcoding of fecal DNA shows dietary diversification in wolves substitutes for ungulates in an island archipelago” by Roffler, G. H., J. M. Allen, A. Massey, and T. Levi. *Ecosphere*. <https://doi.org/10.1002/ecs2.3297>