

Gulf of Alaska - Marine Mammals

Fine-Scale Foraging Behavior of a Marine Predator: Linking Diving Behavior and Prey Availability

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Air-breathing marine predators, such as harbor seals, should forage in ways that maximize their fitness, thus they must efficiently track the temporal and spatial distributions of prey both horizontally and vertically in the marine environment. Diving beneath the surface allows a seal to search for and encounter prey, thus a seal may benefit by varying its dive behavior in relation to the spatial distribution of the target prey and by maximizing the time spent at the most profitable depth. However, information regarding fine-scale prey availability in the foraging areas of marine predators is typically rare. We combined the use of Time Depth Recorders and VHF telemetry to quantify diving behavior of harbor seals and concurrent hydro acoustic surveys to index prey availability in foraging areas of individual seals ($n = 27$) in Glacier Bay. One adult female was tracked continuously for ~ 8 hours, diving in an area where high densities of small-schooling fish commonly occur. Mean maximum dive depth was 43.0 m (SD = 19.8), with 62% of dives occurring between 2.5-50.0 meters and overlapping with the highest prey densities which ranged from 7.0-40.0 meters in the water column. Although, 36% of dives occurred between 51-80 meters, less than 4% of prey was located at those depths. Dive duration was positively correlated with the number of vertical excursions at depth (wiggles) ($r^2 = 0.48$), which are an indicator of the seal searching for and pursuing prey. 42% of dives returned to the same intra-depth zone indicating that the seal dove to a similar depth as the previous dive and suggesting the return of the seal to a profitable foraging area. Real-time tracking studies that integrate movement, dive behavior, and prey availability will provide a more informed understanding of the foraging ecology of marine predators and is essential to understanding trophic interactions in marine ecosystems.



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