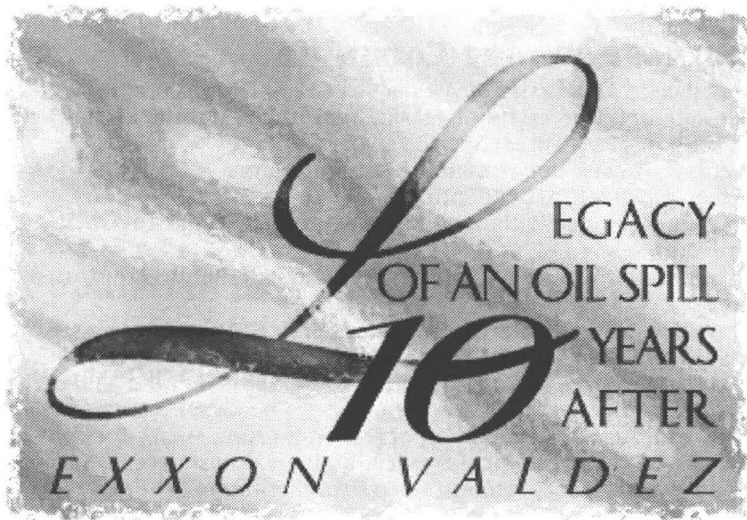


Patterns and Spatial Scales of Foraging in Harbor Seals (*Phoca vitulina richardsi*) in Prince William Sound and the Gulf of Alaska using Fatty Acid Signatures

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In Prince William Sound (PWS), harbor seals have declined by over 60% since 1984, with only part of this decline attributable to the 1989 *Exxon Valdez* oil spill. Declines have also occurred in adjacent parts of the Gulf of Alaska (GOA). We have used and further developed methods of fatty acid signature analysis, in the largest such ecosystem study to date, to indirectly address the hypothesis that food limitation or quality (e.g., a change in trophic structure of the ecosystem) may be playing a role in this process and/or helped to prevent recovery from the spill. Since 1994, blubber from 296 harbor seals (PWS, $n = 210$; GOA, $n = 86$) has been sampled and analyzed for fatty acid composition. In total, 792 individual PWS prey representing 18 taxa (capelin, chum, flathead sole, rex sole, flatfish sp., yellowfin sole, greenling, Pacific herring, octopus, Pacific cod, pink salmon [adults and smolts], pollock, rainbow smelt, rockfish, sand lance, shrimp, squid, and tomcod) have been analyzed for total fat content and fatty acid composition.

Analyses indicate that 95% of all prey can be identified to species by fatty acid signatures alone, but that within species differences are apparent with size class and perhaps geographical location. Results suggest localized use of prey by harbor seals, with spatial scales of foraging distinguished over both broad geographical regions of 400 to 800 km as well as across fine-scale habitats separated by 10 to 50 km. Diets of harbor seals appear to have changed over the 3-4 years of study, especially in 1996-1997 compared to 1994-1995, which may have coincided with changes in prey species abundance. Diets of adults also differ most from the youngest, smallest animals, namely the half-year-olds, yearlings, and <40 kg subadults in both PWS and GOA. Recent mathematical modeling work has now been developed to allow estimation of the species composition in diets of all individual seals sampled.



Abstracts

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