

Use of ice and terrestrial habitat by harbor seals in Glacier Bay, Alaska: why pup in the ice?

Blundell, Gail M.¹; Pendleton, Grey W.¹; Womble, Jamie N.²; Herreman, Jason K.³; Karpovich, Shawna A.¹; Ben-David, Merav³; Gende, Scott M.²

(1) *Alaska Dept. of Fish and Game, Division of Wildlife Conservation, 802-3rd St., Douglas, Alaska 99824, USA*

(2) *National Park Service, Glacier Bay Field Station, 3100 National Park Rd., Juneau, Alaska 99801, USA*

(3) *University of Wyoming, Dept. of Zoology & Physiology, 1000 E. University Ave., Laramie, Wyoming 82071, USA*

gail_blundell@fishgame.state.ak.us

Glacial fjords are important habitat for pupping and breeding harbor seals (*Phoca vitulina*), seasonally supporting disproportionate numbers of mothers and pups relative to the total population. In Glacier Bay, Alaska, over ¾ of the seals haul out on icebergs in Johns Hopkins Inlet (JHI); others use terrestrial sites. We equipped seals captured in JHI (“ice seals” n=8) and at terrestrial sites (n=19) with Time Depth Recorders and VHF transmitters to track foraging locations and dive behavior. We examined time/energy budgets, diet (stable isotopes), and body condition (% body fat) of ice and terrestrial seals. Body condition at capture was similar but foraging strategies differed by habitat. Ice seals traveled further, some ranging up to 100km from their capture site to forage (mean distance 32.5 +/- 7.3km), while terrestrial seals foraged nearby (4.6 +/- 0.7km). Ice seals had diets significantly higher in high-lipid/high-protein pelagic fishes, and most foraging trips started around 02:00, coinciding with nocturnal, near- surface availability of pelagic/forage fishes. Terrestrial seals started foraging midday and proportion of time-hauled-out was tidally influenced. For females, proportion of time-hauled-out did not differ by habitat except during pupping season when adult females in ice spent significantly more time hauled out than did terrestrial adult females, followed by longer foraging trips, post-weaning. Seals pupping in JHI may accept temporary tradeoffs, using body reserves while bypassing distant foraging opportunities. Pupping in ice could enhance offspring survival via reduced predation pressure (hauling out on floating icebergs) and possibly through greater weaning-weights resulting from increased opportunities to nurse, irrespective of tide. Extended foraging trips by females post-pupping, especially during energetically expensive molt, may not be sufficient to restore depleted reserves, potentially reducing chances of pupping the following year. We will investigate these hypotheses using resight data from 5-year VHF transmitters, assessing survival and successive-year presence/absence of adult females.

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