

# Movements and Winter Site Fidelity of Bearded Seals in the Bering Sea

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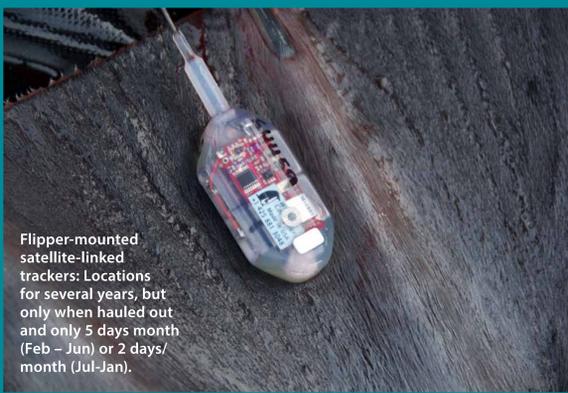


Head-mounted satellite-linked trackers and dive recorders: 8-10 months of multiple daily locations before being shed in the annual molt.

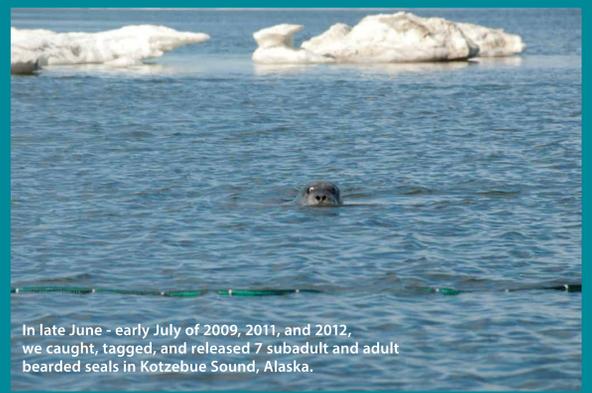


## Movements

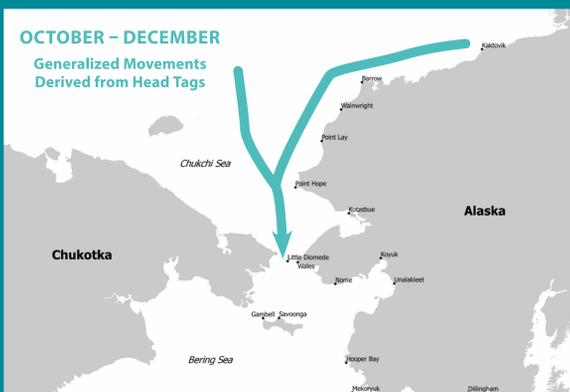
Seven bearded seals (*Erignathus barbatus*) were tagged with both head-mounted satellite-linked data recorders and with small Argos satellite location transmitters attached to their hind-flippers in Kotzebue Sound, Alaska, during late June and early July of 2009-2012. These novel tags, to our knowledge, provided the longest recorded durations for Argos deployments on pinnipeds (346-1,379 days). After spending August – November in the Chukchi or Beaufort seas, all seven seals migrated south to the Bering Sea where they stayed during January – April.



Flipper-mounted satellite-linked trackers: Locations for several years, but only when hauled out and only 5 days/month (Feb – Jun) or 2 days/month (Jul-Jan).



In late June - early July of 2009, 2011, and 2012, we caught, tagged, and released 7 subadult and adult bearded seals in Kotzebue Sound, Alaska.

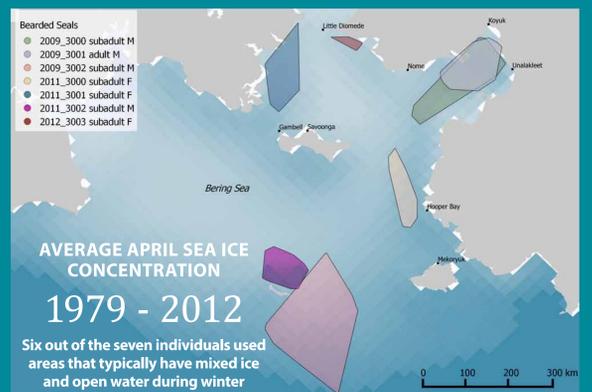
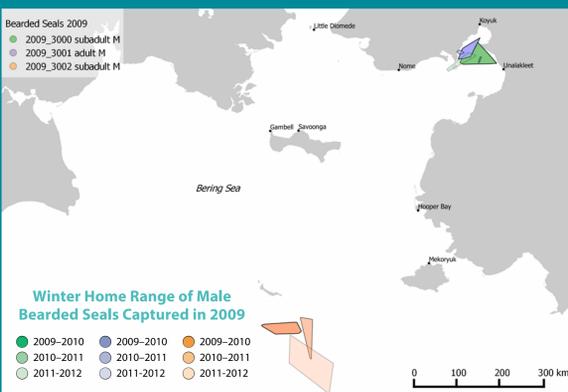
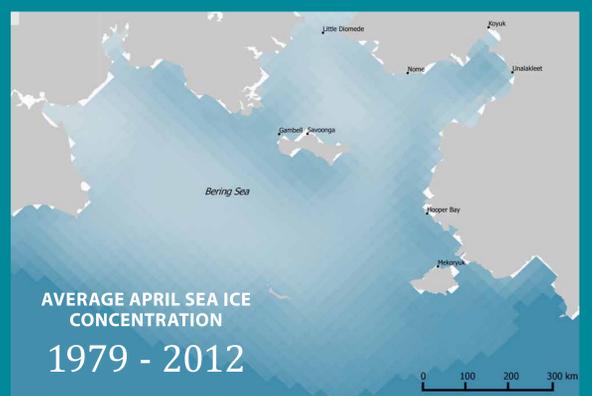
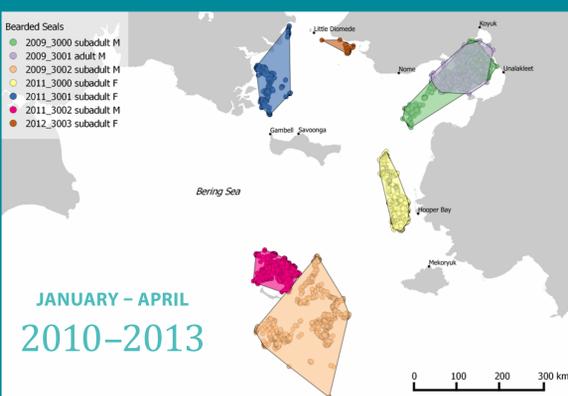


## Winter Site Fidelity

The areas used during winter were much smaller than those used in summer and autumn. Four of the seals were male and they returned in successive winters to the same small areas of the Bering Sea. Two sub-adult males were tracked for 3+ years; thus, Bering Sea bearded seal males apparently establish wintering (i.e., breeding) sites even as sub-adults. We were unable to determine whether females returned to previous wintering locations, though at least one made a return trip to the Chukchi Sea after wintering in the Bering Sea.

## Mixed-Ice Preference

We compared the winter minimum convex polygon home range of each bearded seal to the average sea-ice concentration in April from 1979 to 2012. April corresponds to the typical timing of maximum sea-ice extent. Six of the seals used areas that typically have mixed ice and open water during winter. The benthic habitat of the Bering Sea is rather uniform and this suggests seals deliberately seek winter habitats with optimal balance between sea-ice and open water.



## Implications

Strong site fidelity, particularly fidelity to natal sites, is a basis for population genetic structure and subdivision. Strong site fidelity may reduce the resilience of a species to rapidly shifting habitat distributions, such as a northward shift in the average ice extent.

## Conclusions

The bearded seals found in Kotzebue Sound during late June are 'Bering Sea' bearded seals, which are nomadic foragers during the open-water seasons in the Chukchi and Beaufort seas. Bering Sea bearded seals (males?) exhibit strong winter site fidelity, apparently establishing their preferred sites even as sub-adults. Our results corroborate natural history accounts of bearded seals' preference for the loose, drifting ice of polynyas, flaw-zones, and marginal ice zones. Bearded seals are viable subjects for long-term satellite telemetry studies using flipper-mounted transmitters.

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