

ADF&G Report to ISC February 2023

Biomonitoring – Seal samples are collected from the subsistence harvest to monitor diet, body condition, productivity, age at maturity, survival to weaning, disease, and other health-related issues. In addition, we contribute samples and data to others for important projects. Current projects include:

- Body condition, productivity, age at maturity, and survival to weaning are good indicators of population health and currently are positive for ringed, bearded, and spotted seals. (See poster at this meeting).
- Abnormal seals and tissues. Two bearded seals were harvested at Point Hope in June 2022, neither of these looked sick or injured until they were cut open. One had a ruptured uterus with a full-term fetus still inside. The other had lots of bruising in the blubber and the stomach and intestines were twisted. This is the second bearded seal harvested at Point Hope that we have seen with bruising in the blubber and twisted intestines, the first was harvested in 2019.
- Use close-kin mark-recapture methods to estimate the abundance and demographics of bearded seals. A tooth and tissue sample are collected from harvested bearded seals. The tooth provides age for population dynamics modeling. DNA, extracted from the tissue sample, provides genetics for kinship determination. We found that some of the adult males are not breeding, which increases the preliminary abundance estimate to ~409,000 (see poster at this meeting). We also found that there are no full sibling pairs suggesting that the same female does not mate with the same male. ***More samples from bearded seals (a lower jaw for a tooth and muscle) are needed for a more accurate abundance estimate and to learn more about survival and productivity.*** Samples collected annually can also provide population trend information, not currently available by any other method (NMFS).
- Monitor for toxic algae from harmful algal blooms. We collect feces (contents of lower intestine) from harvested ice seals for toxic algae analysis. Currently, however, ice seals are a lower priority for testing because the levels of toxins found in walrus are much higher than those found in seals (NMFS NWFSC).
- Investigate the role of spotted seals as fish predators. Fish otoliths found in the stomachs of harvested spotted seals are used to determine species and size of fish eaten (NMFS).
- Seals were not included in an outbreak of canine distemper in foxes and dogs in western Alaska. Brain tissue from 13 seals was tested for canine distemper and rabies. All seals were negative for the diseases (UME group).
- Investigate relationship between polar bear body condition and productivity and seal body condition and productivity. Results indicate when seals are healthy, polar bears are also healthy (USGS).
- Graduate student projects
 - Microplastics. Provide samples to determine the prevalence of microplastics in spotted seal stomach contents. (UAF student, see presentation at this meeting).
 - Investigate muscle physiology and development. This project was previously presented to the ISC, and a manuscript has been submitted for publication (UC San Francisco and UC Santa Cruz).

Harvest

- Trends in ice seal harvest for the Y-K Delta region (AVCP) was published in the journal Arctic (ISC is a co-author on this publication).
- Proposal for more harvest monitoring in Hooper Bay, Chevak, Tununak, Togiak, Mekoryuk, Nome, or others as decided by ISC, was funded for the years 2022–2025.

Winter ringed seal density study

- Determine the density of ringed seals within areas of oil and gas development near Prudhoe Bay using dogs trained to find seal breathing holes and lairs. The density of seal structures and snow depth will be compared to a previous study conducted during 1982–1983. Field work was conducted in May of 2022 and will be conducted again in 2023. Cameras mounted in lairs identified an interesting behavior in 2022; ringed seals rest in the access hole of lairs for hours at a time without hauling out. Cameras recorded 78 bouts longer than 30 minutes (ranging from 0.5–10.4 hrs.) of seals sleeping and resting in the access hole.

Satellite telemetry (tag data) – No new tags were deployed. We are analyzing existing data and sharing data with other projects.

- Spotted seal dive behavior and movements relative to oceanographic data (i.e., temperature and salinity) were analyzed and a manuscript has been submitted. Fish data from stomachs were also incorporated into findings.
- Development of correction factors for aerial surveys. Haul-out behavior varies by age and sex. We provided haul-out data from bearded, ringed, and spotted seals instrumented with satellite transmitters as well as their sex and age determination to include in the model to better estimate the number of seals that would be on the ice during surveys (NMFS).
- Ringed seal location data were provided to analyze seal movements relative to shipping (NSB).
- Bearded and spotted seal haul-out data collected during 2009–2020 were used to correct aerial survey data for detectability and a manuscript is in review (NMFS).
- Provided bearded, ringed, and spotted seal location data during 2007–2020 to Council for Arctic Flora and Fauna (CAFF) to determine marine mammal high use areas, or “hotspots”, in the circumpolar Arctic. Published as Hamilton et al. (2022) in Diversity and Distributions (doi:10.1111/ddi.13542).
- Spotted seal location, dive, and haul-out data were provided to determine seasonal movements and haul-out behavior (NSB).
- Ringed seal haul-out data collected during 2007–2020 were provided to determine the timing of ringed seal emergence from lairs and the start of basking (UW PhD student).

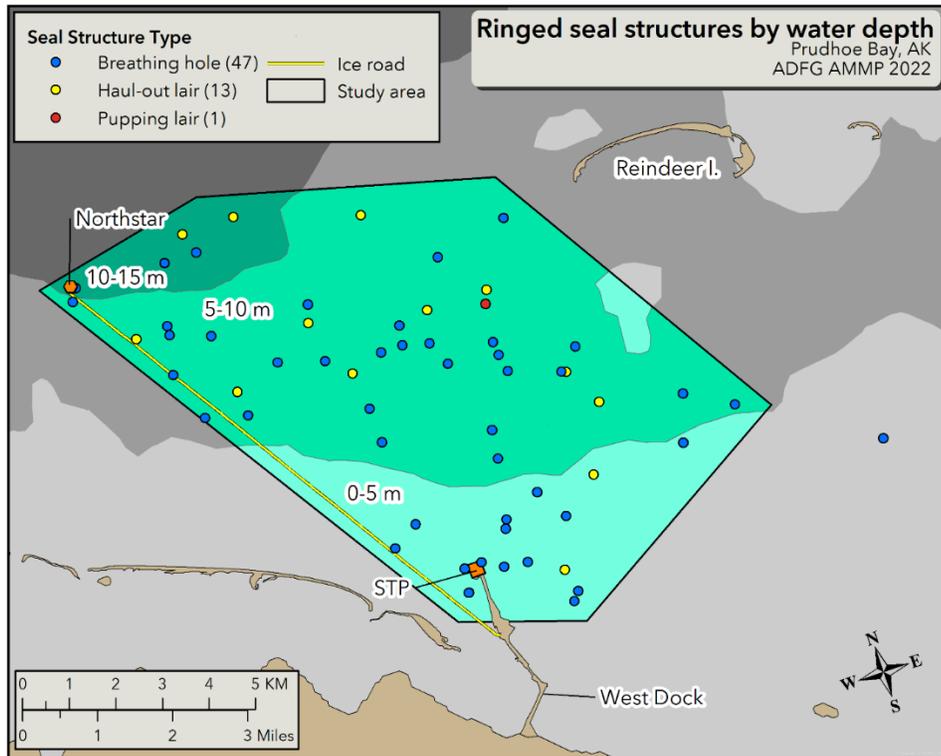


Figure 1. Distribution of ringed seal breathing holes and lairs found by wildlife detection dogs in Prudhoe Bay in May 2022.

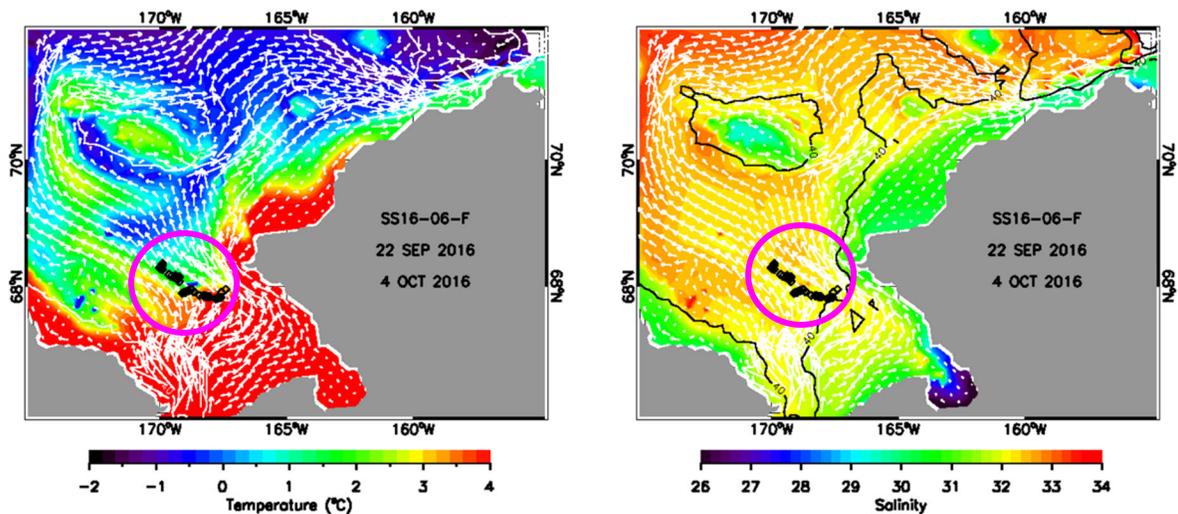


Figure 2. Oceanographic conditions (bottom temperature (left) and salinity (right)) of Chukchi Sea 22 September – 4 October 2016. Data are from the Regional Arctic System Model. Black dots within magenta circles are locations for seal SS16-06-F during this period. White arrows are current velocity. This foraging event appears along a hydrographic front, which is most apparent in the temperature field (left).