

Update Ice seal Health Studies - North Slope Borough , Department of Wildlife management, teleconference Ice seal Committee annual Meeting 2021

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There is little information available about natural causes of morbidity and mortality of ice seals. The North Slope (NSB DWM) Marine mammal health program works with hunters and communities to continually monitor the health of animals so we can detect diseases and contaminants early on that are of concern to people, provide veterinary medicine - science based information to hunters regarding “healthy” and “hunter concern” catches, and address individual and “big picture” concerns about native food health, food safety, and food security. The following provides an update on findings from ongoing and completed ice seal health studies.

Covid 19: To address concerns by the coastal communities about risks of covid 19 exposure to subsistence animals including seals, the NSB DWM collected during summer 2020 extra types of samples (nasal swabs; lung tissue; brain tissue) from harvested seals in Utqiagvik to have them tested for SARS-COV2, the virus that causes *COVID 19*. A total of 16 seals (ringed; bearded) were tested and **no seal tested positive. Samples were also tested for *avian influenza A, toxoplasma gondii, and morbillivirus*. All tests were negative.** This work was a collaboration between the NSB DWM ice seal harvest/health monitoring program (Dr. Raphaela Stimmelmayer), UC DAVIS veterinary school (Dr.Tracey Goldstein), NOAA NMFS head quarters (Dr. Deborah Fauquier), and the UME investigative team for the ongoing 2018 ice seal unusual mortality event (onsite coordinator Gay Sheffield, NOME UAF SEA-Grant; Barbara Mahoney AK Stranding network). A Big Thank you to the hunters for supporting the NSB DWM ice seal harvest monitoring program !

As we continue to learn about Covid 19 and the viruse’s potential (SARS-COV2) to affect wildlife and domestic species further monitoring including other species is planned if deemed necessary.

Parasites

A new collaborative study **on parasites** specifically worms found in harvested ice seals between the Alaska Department of Fish and Game, Alaska Sealife Center, the University of Florida and the NSB DWM was published (see Publications & Presentations). The purpose of the study was to characterize the type of worms (helminths: round; flat and tapeworms) present in harvested ice seals from Western and Northern Alaska and compare prevalence (number of seals with parasites divided by all examined seals) to previous baseline data. The outcome of the study confirms that although climate change is moving ahead and the oceans are changing **no new species and no increases in the prevalence of known parasites in ice seals were detected.**

As a follow up to this parasite worm study, findings on microscopic parasites found in meat of ringed and bearded seals from 2008-2016 were analyzed to **better characterize the percentage of seals with sarcocystis and toxoplasma gondii** (see Publications & Presentations).

Sarcocystis is a small parasite that was first detected in a bearded seal in the 1980's on the North Slope, Alaska. In ice seals, the parasite generally does not cause health problems and there is no human risk associated with ingesting these microscopic parasites. Preliminary findings suggest that more ringed seals are infected with the parasite than bearded seals (ringed seals (66%; 44/67) versus bearded seals (53%; 68/128). The prevalence of sarcocystis in Alaskan ringed seals (66%) is significantly higher than in Arctic Canada (9%). Unknown environmental and ice seal related ecological factors likely contribute to the geographic gradient. **Toxoplasma gondii**, an important zoonotic parasite (causes a disease called toxoplasmosis in mammals including humans that ingest meat, water and soil contaminated with the spores/cysts) **was not detected** in examined tissues from Alaskan ringed and bearded seals. The latter however have been detected albeit at a very low rate in ringed seals from Northern and Eastern Canada. The life cycle of toxoplasma gondii in the Arctic is not well understood. Cooking and freezing meats and organs is sufficient to destroy the parasite.

Case report

Urinary and kidney stones are rare observations in ice seals with only one report in a ringed seal from Canada. A large stone (~ 1.5 to 2") (A) was found in the empty bladder in a male adult ringed seal harvested for subsistence purposes in Utqiagvik in 2020 (see Publications & Presentations).

Fig. A. Urinary Stone with scale (in cm).



Size of the stone indicates a longstanding formation process, however no gross and microscopic evidence was seen that it was negatively impacting the animal health. An unusual bacteria *S. pseudintermedius* was cultured from the stone core. This type of bacteria has previously only been cultured from Antarctic Weddell seals (*Leptonychotes weddellii*). This is the first report of successful isolation of *S. pseudintermedius* from an ice seal and the first report of *S. pseudintermedius* infection associated with urinary stone formation. The isolate exhibited limited antibiotic resistance to commonly used antimicrobials in veterinary and human medicine. Antibiotic resistant bacteria are an emerging issue in human and veterinary medicine.

Marine Biotoxin - Harmful Algae Bloom Monitoring.

Harmful algae blooms in the Arctic are an emerging problem. To better understand the trends and possible impacts on people and animal health, feces and stomach contents of key subsistence animals are regularly monitored for toxin presence [domoic acid (known as amnesic shellfish poisoning) and saxitoxin (known as paralytic shellfish toxin)]. Findings from a multi-year study (see Publications & Presentations) provide evidence that **bearded seal stomach content samples from the Bering Sea showed a significant increase in the prevalence of domoic acid overtime with no toxin detected in 2012 to toxin detected in 100% of bearded seals sampled in 2019.** Levels of toxin detected in feces **are below FDA regulatory safety limit and todate no clinical cases of domoic acid toxicosis (seizures) have been observed.** In addition a pilot study is ongoing, to monitor for the presence of **cyanobacteria** (microcystin-LR and nodularin) in seal and walrus livers (analysis is pending). Cyanobacteria also known as blue-green algae, live in fresh, brackish (combined salt and freshwater), and marine water. Algae poisoning has been documented in dogs, sheep, and cattle in the lower 48. Large cyanobacteria blooms have been observed in the Kotzebue Sound area since 2009. There is no evidence currently that mortalities of ice seals and other animals have been associated with these regional blooms in western Alaska.

Plastics in the Arctic

Arctic Plastic pollution is an emerging problem. Environmentally sound management of waste including plastics and microplastics in the Arctic is an important focus of the Arctic council's Arctic Contaminants Action Program (ACAP) to eliminate pollution of the Arctic. To better understand the problem, **stomach content of key subsistence harvested animals are regularly examined.** Similar to a study from Arctic Canada grossly visible ingested plastics in stomachs collected from harvested and found dead ice seals have not been observed on the North Slope, Alaska. However, in a recent Canadian study uv -stabilizers (chemical compounds associated with plastics) have been detected in the liver of harvested seals from Arctic Canada. Microplastics (very small pieces) have been detected in Beaufort Sea beluga whales and microplastic uptake is linked to fish consumption. Plastics continue to be found in Southern Beaufort Sea polar bears harvested for subsistence from Utqiagvik and Kaktovik.

Publications & Presentations

Raphaela Stimmelmayer, David Rotstein , Gay Sheffield. Prevalence of Sarcocystis in ringed and bearded seals, Alaska 2021 Alaska Marine Science Symposium

Raphaela Stimmelmayer, David Rotstein , Kyle Bodefish. Urinary stone formation caused by Staphylococcus pseudintermedius in a free-ranging ringed seal (Phoca hispida), Alaska 2021 Alaska Marine Science Symposium

Heather S. Walden, Anna L. Bryan, Antoinette McIntosh, Pam Tuomi, Anne Hoover-Miller, Raphaela Stimmelmayer, and Lori Quakenbush (2020) HELMINTH FAUNA OF ICE SEALS IN THE ALASKAN BERING AND CHUKCHI SEAS, 2006–15. Journal of Wildlife Diseases: October 2020, Vol. 56, No. 4, pp. 863-872."

Alicia M. Hendrix, Kathi A. Lefebvre, Lori Quakenbush, Anna Bryan, Raphaela Stimmelmayer, Gay Sheffield, Gabriel Wisswaesser, Maryjean L. Willis, Emily K. Bowers, Preston Kendrick, Elizabeth Frame, Tom Burbacher, David J. Marcinek. (2021) Bearded seals (Erignathus barbatus) as indicators of increasing algal toxin prevalence in North Bering Sea food webs (accepted with revisions Marine Mammal Science).