Alaska Small Mammal Working Group

2024 Annual Meeting Notes

Google Group (email): alaska-small-mammal-group@googlegroups.com

Website: https://accs.uaa.alaska.edu/wildlife/small-mammal-ecology/

Over 15 attendees from multiple different universities, state, and federal agencies that are involved in conducting research on small mammals in Alaska.

Presentations

Alaska pox update – presented by Melanie Flamme with the National Park Service

Alaska pox is now called Borealpox, it is in the family Poxviridae, it is an orthopoxvirus. Seven cases have been documented in Alaska from 2015-2023. Initially suspected that it may be endemic to Alaska, with small mammals being a potential vector. It has been determined that the Kenai strain is genetically distinct from the Interior strain in Fairbanks. In a study that involved trapping nearly 400 small mammals (red-backed vole, flying squirrel, masked shrew), they found that 16% had antibodies for Alaskapox, and red-backed voles had the highest percentage with antibodies. The virus seems to be better defined to boreal habitats resulting in the name change to Borealpox. The crew conducting small mammal monitoring in Denali is taking precautions with N95 masks, gloves, bleach wipes, hand sanitizer, may also use goggles. With small mammal trapping efforts, it is important to educate the team about the disease, be vigilant for any symptoms in small mammals, and wash with soap and water or available sanitizers based on fieldwork situation. Many wild small mammal populations have been identified as reservoirs, but they are often overlooked and understudied. It has been circulating in Alaska since at least 1999 in red-backed voles. Smallpox vaccination may provide some protection from Borealpox.

Food web shifts in boreal mammals exposed to 30 years of climate warming – presented by Philip Manlick with the Pacific Northwest Research Station

Arctic boreal systems are warming 2-3 times faster than the global average. Permafrost is exposed to microbial decomposition as the climate warms. The thaw depth is getting deeper, active layer is increasing about 1 cm per year at Bonanza Creek. They found that it can be determined where animals are getting their amino acids from using bones from species in museum collections from 1990-2021. Documented a shift in red-backed voles with up to 40% fungi amino acids and down to 31% plant amino acids from a previous ~60% plant amino acids. In *Sorex cinereus*, also found a shift with amino acids ~90% fungi and <10% plants. Warming is changing food webs to become more brown, and particularly more fungal. Small mammals are indicators of ecosystem change by tracking their diets. Will be trapping small mammals this summer, collecting fecal samples, and looking at stable isotopes.

Southeast Alaska bats in winter – presented by Jesika Reimer, Taiga Wildlife Research in collaboration with ADF&G

Southeast Alaska supports 7 species of bats, 5 species that hibernate in SE Alaska (myotis), 2 species that are migratory (silver-haired bat and hoary bat). Used acoustic surveys to determine which bat species are active during the winter months, where they are active, and when they are active. Previous research has detected hibernating bats (California myotis) during the winter using acoustic surveys. In this study 77 sites were surveyed over a 10-year period (2010-2020). Audio data detected California myotis (99%), silver-haired bat (<1%) and little brown myotis (<1%). California myotis was detected at 39% of survey sites, most commonly on the western outer coast. Silver-haired bat was detected at 18% of survey sites, with a wide distribution. Little brown myotis and Myotis spp. were detected at 17% of survey sites. Most of bat activity in the winter was in the Juneau and Sitka areas, with low levels of activity across the winter season in the Juneau area, and larger pulses of activity in Sitka area. High pulses of California myotis activity in Sitka area were correlated with warmer maximum nightly temperatures starting at 3-4 degree Celsius, likely related to food availability.

Patterns of gene flow in Hoary Marmots (*Marmota caligata*) – presented by Natalie Hamilton, University of Alaska Fairbanks

There are three species, Hoary Marmot, Vancouver Island Marmot and Olympic Marmot, occurring in northwestern North America. This study investigated the extent of gene flow within the Hoary Marmot, how much gene flow was happening between the mitochondrial clades, and what landscape features may impact dispersal. There are nine likely populations of Hoary Marmots with evidence of gene flow between continental and coastal mtDNA lineages. They found that distance contributed the most to gene flow, followed by elevation and over ocean dispersal. They also determined that contemporary gene flow is happening between the two mitochondrial lineages of Hoary Marmots, but is limited between Vancouver Island, Olympic and Hoary Marmot. The next step is to determine fine-scale landscape genomics of Hoary Marmots.

Extralimital Terrestrials: Range extensions and species richness patterns of Alaskan mammals – presented by Andy Baltensperger

The goal was to determine areas where mammalian species range maps have changed since 2010 and where the mammalian species richness hotspots are located now. Used the Alaska Species Ranking System to highlight areas of high species richness and identify species and environmental factors associated with hotspots. They used 124,425 records of 61 mammal species and identified mammal extralimital terrestrial species with records outside of MacDonald & Cook's 2009 marginal limits (39 of 61 species). They determined that 32% of GBIF records were outside the mapped IUCN RedList ranges. Used the concave hull tool to develop 2020 range maps for extralimital terrestrial species. Created a species richness map identifying all species present in each area, with any areas having over 22 species being considered a mammalian species richness hotspot. Found that IUCN range maps often underpredicted species' ranges, and AKGAP range maps often overpredicted species ranges. Largest range changes included Canada lynx, Keen's myotis, least weasel, coyote, northern bog lemming, California myotis, northern red-backed vole, and black bear. Some range changes may be a result of improved sampling effort or more complete archiving, while some may also represent actual range shifts. Interior and southwest Alaska were areas of mammalian SGCN hotspots

including E of Fairbanks, Tanana Flats, N of Fort Yukon, NW of Dillingham, and SW of Juneau. Consistent minimum concave range maps will be available for 2020 and beyond using this method. Mammalian richness increased with increasing longitude, decreased with coastal proximity, increased with summer precipitation, decreased with treeline proximity, and mid-latitudes were more diverse areas. All shapefiles and rasters will be available to download on the SNAP portal soon. The results of the study will be published in PLOS very soon.

Nominations and Election

Andrew Hope with Kansas State University was nominated as the President, Julie Polasik with the Alaska Center for Conservation Science was nominated as the Vice President

Discussion Items

SWAP update

- New coordinator – Audrey is moving on to a new position, currently they do not have anyone to coordinate the SWAP and will be working on it internally.
- Would like to reach out to the Small Mammal Working Group for assistance as needed.

Understudied mammal species

- For most terrestrial small mammal species there is not enough data to assess declining status, but they can be pulled out as unknown based on a lack of data.
- More data on species absence would be helpful, especially to determine cases of potential species takeover in the tundra.
- The list of small mammal SGCN tends to be larger and inclusive because we don't know what is going on with most small mammals.
- Any species listed in Appendix I of SWAP can be funded to be studied with State Wildlife Grant funds.
- The lack of population data on small mammals is limiting our knowledge.

Ongoing research

- Borealpox – Aren
- Denali work on small mammals
- Phil – plans to continue sampling at Bonanza Creek

Future research ideas

- Julie H has been talking to foresters about how small mammals are distributing fungal spores. There was some interest in trapping small mammals creating mounds and ways to connect between areas of uncut forest. Making a link between that and a cash crop like white spruce would be helpful.
- Hotspot monitoring project from Andy's maps would be beneficial to get going, particularly in the Dillingham area. The hotspot areas could potentially become long-term monitoring sites for small mammals.
- State General Fund can serve as match for funds we get, for example from DNR funds.
- Orthopox zoonotics including Borealpox will be studied in more depth by other researchers.
- NIH potential funding route tied to Borealpox for additional small mammal trapping.

- CDC funding tied with ADF&G to conduct the fieldwork to see where it is detected.
- Proposal to pitch idea of hotspot monitoring tied to borealpox - ACCS, universities, and others could potentially lead and conduct research. Julie P at ACCS, Andy and others, willing to help with proposal and/or find students to help with fieldwork.

Trapping database

- Time is a limiting resource for everyone, need students that have time to take on project.
- A negative database would be beneficial to everyone if we can find students to help pull that together, Jes also has negative bat acoustic data that could be added to that.