RINGED SEAL SATELLITE TELEMETRY IN NORTHERN LABRADOR

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Explorers Club Flag # 50
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Geographic Region(s): Labrador  
Country(s): Canada

Ultimate Destination:  
Latitude N: 60°  S:  
Longitude E: 64°

Objective: To capture and deploy ringed seals with satellite transmitters to describe ringed seal movement patterns and diving behavior along the coast of Northern Labrador.

To understand marine food web dynamics along the north coast of Labrador and determine how these are being affected by stressors such as climate change and industrial activities.

Additional objective: to establish a benthic biodiversity baseline and produce benthic habitat maps to track future changes brought on by climate change or industrial stresses along the north Labrador coast. The development of benthic habitat maps for northern Labrador could be used to compare similar habitats in other Arctic and sub-arctic fiords and have applications to fisheries management and conservation in the region.
**Background:** Northern Labrador is of great importance to understanding the dynamics and impacts of global climate change in eastern Canada, as it represents a transition zone between arctic and subarctic climates. Ringed seals are a valued country food for Inuit, and consequently are an important part of their culture and health. They are also a keystone species in the arctic food web and are an excellent species for assessing the status of the marine ecosystem and for monitoring contaminant levels in the marine environment and potential health effects on top predators including humans, arctic fox, and polar bears.

This study was commissioned 4 years ago in Saglek Bay, Labrador to assess the current level of PCB contamination in the marine sediments and biota and to monitor the ecosystem recovery of Saglek Bay after the removal of a PCB point source. Heavily contaminated soil and sediment, due to a former US military radar station, were discovered at Saglek Bay in the 1990’s, and contaminated soils have since been cleaned up. This study was also commissioned to determine if elevated PCB levels still persist in some ringed seals along the Labrador coast, and if so why?

The lead researchers on this project have been Ken Reimer of the Royal Military College of Canada and the Environmental Sciences Group, Tanya Brown from the University of Victoria and the Environmental Sciences Group, and Tom Sheldon from the Nunatsiavut Government.
Unique Methodology: Using Inuit knowledge (and assistance) of ringed seal movements and behavior we will live capture ringed seals and place satellite tags with GPS to track movement and foraging patterns. Live captures without a tranquilizer are necessary to prevent animal drowning and require quick and knowledgeable handling of seals. Native Inuit hunters coupled with park biologist will work together to accomplish this goal.

Benthic Sampling using Multibeam bathymetry: based on the fact that more beams are better than one. Multibeam surveys can provide detailed bathymetry data for these fiords from which quantitative descriptors of the seabed terrain (e.g., slope) may be obtained. Once an accurate profile of sea floor strata was established we then groundtruth the area using a box core to collect samples of sediment and benthic biota to establish a map of the biological communities. This information has applications to fisheries management and conservation. For example, benthic habitat maps can be used to determine and explain preferred seabed habitat for fish and benthic invertebrates and can be used to identify biodiversity hotspots.

The lead researchers on this project have been Tanya Brown from the University of Victoria, and Mallory Carpenter, Trevor Bell and Evan Edinger from Memorial University.
Previous results

Preliminary data indicate that PCB levels in some ringed seals collected from the northern Labrador coast exceed adverse health effects thresholds established in harbor seals, underscoring the potential for local population impacts. In order to examine whether these elevated PCB levels are affecting the health of ringed seals; information is being collected to understand the health of the population and the health of the Labrador coastal ecosystem. We are looking for health effects in ringed seals that may have been caused by contaminants, such as changes in hormones levels. We are also checking their general body condition and for the presence of parasites. Collectively, our results will provide information on the health of the ringed seal population of Labrador. To gain a better understanding of ringed seal contaminant levels and health we are also studying their diet, movement and foraging patterns. To collect this information, we are placing satellite receivers on ringed seals to assess their movement and foraging locations and we are collecting marine food web species (e.g. clams, shrimp, fish) to assess what ringed seals are eating and what the contaminant levels are in their food.

Preliminary results from September 2010 studies:

Tanya Brown lead researcher is starting to analyze the samples that we collected this past summer and does not have any new results as of yet. However, regarding the seal movement of the two seals that my group was directly involved (seal #4 and seal #5) we do have some preliminary results. Ringed seal #4 is a juvenile female and was tagged on September 2. She left Saglek on September 6th and went south to Hebron Fiord, and then continued on further south to Napaktok Bay and Pistolet Bay. She’s travelled less than 100 km south.
Ringed seal #5 is a juvenile female and was tagged on September 2. She stayed in Saglek Fiord till September 9th and then went offshore and travelled north along the Labrador coast to Hudson Strait and then travelled along the southwest coast of Baffin Island, north to Chakbak Inlet which is just east of Cape Dorset. She’s probably travelled over 1,000 km north since we tagged her.

The other three seals that we tagged on Sept. 1 - the first ringed seal we tagged stayed in Saglek till Oct. 1, then travelled north 20 km to Bears Gut then offshore and south 66 km to Hebron, then further south to Okak Bay and then into Nain Bay. The second ringed seal (juv. male) left Saglek on Oct. 14th and travelled north along the coast to Nachvak Fiord and then back south to Saglek on Oct. 18th. And the third ringed seal (juvenile male) has stayed in Saglek Bay the entire time.

Why so far and why so near? One of the seals we tagged #4 remained relatively close to the tagging area while #5 traveled over a 1000 km in just a few months. One of the questions being asked is do ringed seals exhibit resident or migratory behavior patterns similar to Orca’s.

Other research groups have found that generally older animals tend to establish finite zones while younger (especially males) travel considerable distances.

The results within our study are consistent with that theory.

Another question with respect to resident versus migratory behavior patterns is whether or not higher levels of contaminants such as PCB’s would be found in ringed seals staying more resident within Saglek Bay, versus ringed seals travelling offshore and further distances.
A climate side note: During our study period large pods of Orca’s were observed in Sagleq Bay as well as other fiords in the Torngat Mountains National Park Reserve. Local Inuit who have fished these areas for decades identified these sightings as a rare occurrence in northern Labrador.

Are Orca’s becoming more prevalent due to population growth or ranging further as food sources change or become more limited?