

# Assessing Marine Habitat Utilization of Marbled Murrelets and Other Seabird Species in Haida Gwaii, BC: Using long Term (1990-Current) and Additional Data From Laskeek Bay

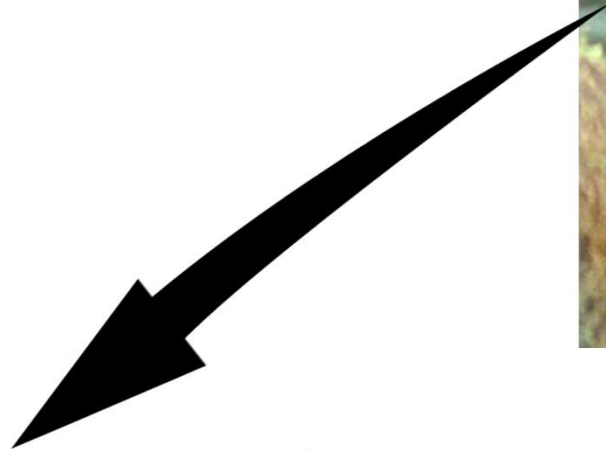
MSc project  
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# Outline

- Habitat needs
- Gap in Literature
- Scientific Question
- Study Area
- The Data
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- Species of interest
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# Habitat Needs



- Seabirds partition their time between land and water (Schreiber & Burger 2001)
- Example: Marbled Murrelets (MAMUs) nest far up in old growth canopies but spend majority of their time foraging on the coastal waters (Meyer et al. 2002)
- Demographic Models show that populations would be most sensitive to changes in adult survival. Most likely would occur if there were changes to marine habitat (Canada. 2012)

# Status : Threatened

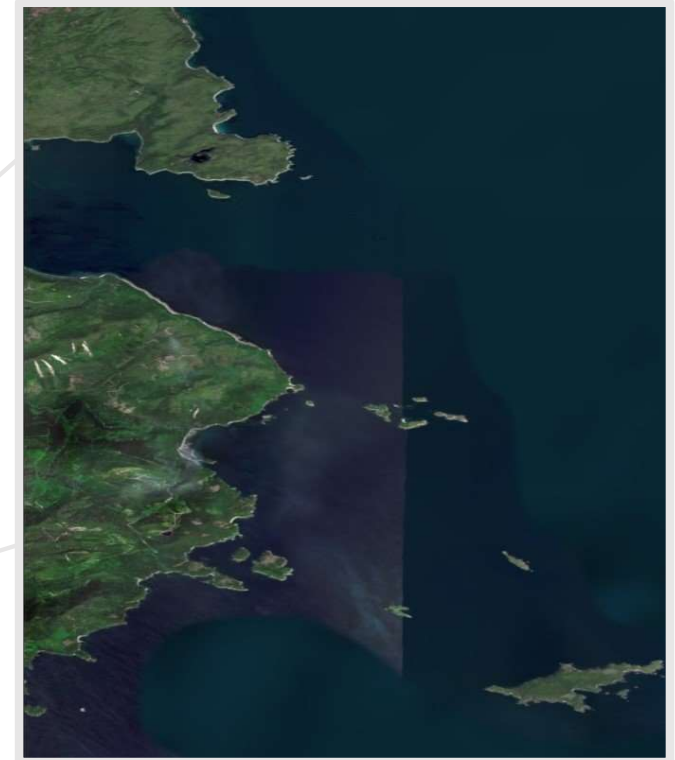


## A Gap in Knowledge:

- Studying the marine ecology of seabirds challenging (Schreiber & Burger 2001; Meyer et al. 2002)
- Only handful of studies focused on marine habitat needs of the MAMU (Ronconi & Burger 2008; Meyer et al. 2002; Drew et al. 2013)
- No marine habitat studies done in Haida Gwaii on MAMU
- Laskeek Bay Conservation Society (LBCS) has only long term data set on seabirds

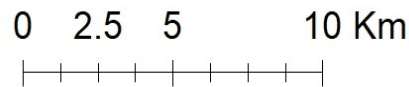


# Study Area

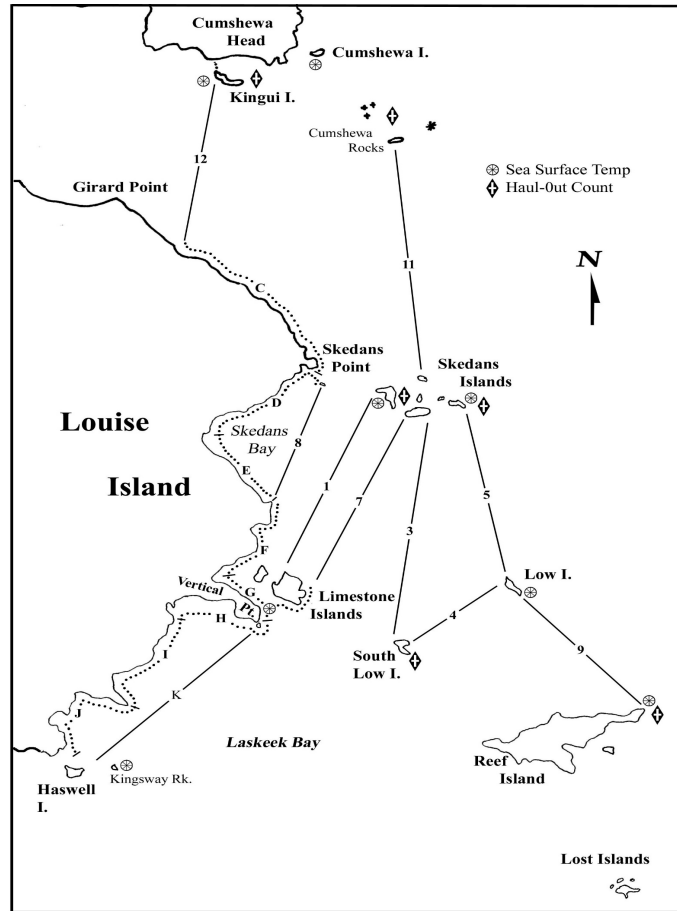


Inshore waters of  
Laskeek Bay

Sea Survey Transects



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



East Coast of Louise Island

Total Transect area covered: ~65.0 km

1996-Current: Birds recorded within 50 meters from either side of the boat



# The Data

## **Historical Data: Sea-Survey Data from Laskeek Bay Conservation Society (1990-Current)**

Line transect surveys conducted nearshore in the Laskeek bay waters

- used for coarse scale analysis
- Environmental variables taken from online sources : Temperature, Salinity, Upwelling, Distance to shore, Distance to nesting habitat, Distance to streams, Bathymetry
- Annual Hot- and Cold- spots will be determined

## **Additional Data: 2018 and 2019 Sea-Surveys conducted by Sonya**

sea-surveys using same transects and methods as LBCS but record additional variables for finer scale analysis

### **Additional Variables:**

- Temperature and Salinity at 1 km intervals (at 3 different depths)
- Collect information on general fish abundance as surveys are being conducted
- 2019 field season: collection of sedimentation data along transects



# Avian Predation Experiment



## Predation Experiment



0 1.25 2.5 5 Kilometer

- Situated within 10 km of shoreline along Louise Island
- Locations chosen based on accessibility
- 5 eagle kites and 5 peregrine falcon kites
- Kites raised at dawn, followed by survey then taken down after survey is finished on the same day.
- Real Birds of prey also recorded
- Presence/absence experiment

# Species of Interest

Abundant species recorded by Laskeek Bay Conservation Society (1990-Current):

- **Marbled Murrelet (MAMU)**
- Rhinoceros Auklet (RHAU)
- Ancient Murrelet (ANMU)
- Pigeon Guillemot (PIGU)
- Pelagic Cormorant (PECO)
  - Pacific Loon (PALO)
- White-Wing Scoter (WWSC)
- glaucous winged gull (GWGU)

# Goals

- (1) Map out the yearly abundance and distribution of species of interest in the Laskeek Bay waters, as well as analyze hot- and coldspots the birds have been repeatedly seen or absent through the years
- (2) Test for retrospective relationships between physical oceanographic conditions and potential influencing variables to the species abundances and distribution
- (3) Examine the influence of prey abundance and availability on current distributions

# Planned Analysis

- Similar basic methods used to analyze both historical and additional data.
- Plot distributions and determine Hot- and Coldspots (ArcGIS)
- Additional layers will then be created for the static independent variables and annual layers for the dynamic variables
- To test which variables or combination of variables predict distribution data mining (i.e. decision trees) as well as a statistical approach (i.e. regression models) will be used (Hochachka et al. 2006)
- Experimental data will be analyzed with standardized block design

# Significance of Study

- Understanding Spatiotemporal dynamics can be used to identify and manage seabird responses to human induced or climate related changes on marine systems (Ballance 2007)
- The Laskeek Bay data are the only long-term series available for Haida Gwaii
- Can consider their potential relevance to the archipelago as a whole, the northern and central regions of BC, and beyond.



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