# Datasets

ELEVATION

* 2meters, 10 meters, 32 meters, 100 meters, 500 meters, and 1 kilometer available
* National Snow and Ice Data Center (NSIDC) Sea Ice Polar Stereographic North and referenced to WGS84 horizontal datum (EPSG:3413).
* Not clipped to a coastline
* I downloaded the 100m for now. The 30m one I would need to download an assortment of different tiles, not just one file
* http://data.pgc.umn.edu/elev/dem/setsm/ArcticDEM/mosaic/v3.0/

GEOLOGY – 3GB

* Vector file of all land north of the arctic circle
* What is Buffer 5000? Patterns?
* North America is already separated from Greenland and Europe
* Has a hydrology layer with major bodies of water, coastlines
  + This came from every area individually and was pieced together. Seems likely that datasets won’t align perfectly
* I should ask someone about the most biologically relevant way to categorize this data
* Might be distorted at lower latitudes?

DISTANCE TO COAST

* I can generate this myself using whatever coastline vector I decide to use to clip all of the other datasets to

SNOW MELT – ask someone, I’m overwhelmed. What do I need?

* MODIS Terra Daily Snowcover (Global) – uses normalized difference snow index
  + 500m resolution
  + When I made a polygon around ~study area: 132,515 files selected (~600 GB), 2,000 displayed.
  + In google earth engine
* Northern Hemisphere EASE-Grid 2.0 Weekly Snow Cover (older)
  + <https://nsidc.org/data/nsidc-0046>
  + 25km resolution, weekly, 1966-present

National Snow and Ice Data Center

#### [MEaSUREs Northern Hemisphere State of Cryosphere Daily 25km EASE-Grid 2.0](https://nsidc.org/data/NSIDC-0534/versions/1) – has snow melt

#### [MODIS/Terra Snow Cover 8-Day L3 Global 500m SIN Grid](https://nsidc.org/data/MOD10A2/versions/6)

#### [Timing and Statistics of Autumn and Spring Annual Snow Cover for the Northern Hemisphere, 1972 to 2000](https://nsidc.org/data/G02168/versions/1)

#### [IMS Daily Northern Hemisphere Snow and Ice Analysis at 1 km, 4 km, and 24 km Resolutions](https://nsidc.org/data/G02156/versions/1)

* Canadian Meteorological Centre (CMC) Daily Snow Depth Analysis Data, Version 1
  + Daily, monthly, longer term – 24km

https://climate.rutgers.edu/snowcover/docs.php?target=datareq

-use modis to calculate date of snow melt – would reduce the size of dataset substantially Massive because it has them for every day of every year

-have data for each year and a long-term average

?? should the long term average be even longer term? (but coarser resolution?)

-how would I match up each bird with appropriate year?

* I think this has essentially calculated what I wanted. Problem might be missing a couple of years on the early end. <https://daac.ornl.gov/CLIMATE/guides/Snowmelt_timing_maps.html>
  + Is this missing year 2000? Could be calculated for northern areas based on modis dataset
* Paul suggested: IMS Daily Northern Hemisphere Snow and Ice Analysis

Data: https://nsidc.org/data/G02156/versions/1

Description (powerpoint): https://earth.esa.int/documents/700255/2043381/Mon3.1\_HelfrichEtAl.pdf

TEMPERATURE

* Can be derived from MODIS (1km), on google earth engine

LANDCOVER

* Red Knot paper just used NALCMS, would that be enough?
* CAVM has been re-released as a raster <https://www.sciencedirect.com/science/article/pii/S0034425719303165>

NLC2000

<http://ftp.geogratis.gc.ca/pub/nrcan_rncan/archive/image/landsat_7/Northern_Land_Cover/>

SOIL MOISTURE

<https://www.esa-soilmoisture-cci.org/node/145>

* Low resolution version.
* Might get rejected because not European. Could ask Jean-Louis or Morgan

Can also calculate NDMI (moisture index)

Possible with landsat or sentinal data

Need to pay to access the sentinel data (16 euros)

Needs to be corrected at high latitudes

<https://developers.eos.com/radiometric_correction.html>

Can also calculate NDMI (moisture index)

TEMPERATURE

*MODIS LAND SURFACE TEMPERATURE*

<https://cran.r-project.org/web/packages/MODIStsp/vignettes/MODIStsp.pdf>

<https://cran.r-project.org/web/packages/MODISTools/vignettes/modistools-vignette.html>

best way likely is to use R packages. This is super complicated. Might want to include a easier version

-Daily or 8 day composite

1km

-likely warmer than air temperatue: <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2010JG001486>

-might be biased by only using clear-sky pixels

<https://www.researchgate.net/publication/236173600_Pan-Arctic_land_surface_temperature_from_MODIS_and_AATSR_Product_development_and_intercomparison>

*ARCTIC REANALYSIS*

<https://climatedataguide.ucar.edu/climate-data/arctic-system-reanalysis-asr>

<https://rda.ucar.edu/datasets/ds631.1/>

2000-2016 (there should be a 2019 version available now or soon)

Daily?

15km

Harder format to deal with

*WORLDCLIM*

-30 seconds of latitiude (~1km)

-1970-2000

-used by Pearson et al, so I’ll have to use it for my other chapter I suppose. Or maybe not – just because they used it for the plants doesn’t mean I have to use it for the birds

ClimateNA

-1km

-1961-2010?

-uses worldclim and prism?

*NRCANMET*

-

Another global climate data option:

http://chelsa-climate.org/

ENVIREM: additional bioclimatic rasters at the same resolution as worldclim

<https://envirem.github.io/>

MERRAclim: remote sensing reanalysis bioclimatic variables

<https://datadryad.org/stash/dataset/doi:10.5061/dryad.s2v81>

# Analysis

* Talk to Lenore and Paul about refining my hypothesis/idea/plan
* Email Jenny about Prism data on Sept 18th ish
* Need to get Alaska data – talk to Paul
* Would using something like Google Earth Engine or Climate Engine make sense? Or Open data cube? I suspect they might not have everything I need but worth looking into what their functionalities are

<https://github.com/JesJehle/earthEngineGrabR>

package for using earth engine and R together

OLD NOTES TO MERGE WITH THESE ONES

Potentially useful sources of data

https://freegisdata.rtwilson.com/

<https://www.arctic.gov/portal/land.html>

https://www.polardata.ca/

## Shorebirds

-create a test dataset using the excel file that I have right now

## Elevation

-Download ArcticDEM

## Distance to Coast

-find or create a layer that defines the coastline of my study area

## Surface Water – year specific

-address question about how this would be used

-select between options on available within the tool

**Date of Snow Melt – year Specific**

-address question about how this would be used

<https://gcmd.nasa.gov/KeywordSearch/Metadata.do?Portal=NASA&KeywordPath=Parameters%7CTERRESTRIAL+HYDROSPHERE%7CSNOW%2FICE%7CSNOW+DEPTH&OrigMetadataNode=GCMD&EntryId=NSIDC-0447&MetadataView=Full&MetadataType=0&lbnode=mdlb4>

-1996-2016 Snow depth, 24km resolution.

<https://daac.ornl.gov/CLIMATE/guides/Snowmelt_timing_maps.html>

-2000-2015 , 500m resolution

National Snow and Ice data centre

<https://nsidc.org/data>

## Mean June temperature

**Substrate**

-Download

https://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/fulle.web&search1=R=287868

## Land cover

-should I use CAVM? (same as the other chapter so less work, covers the entire area,

-1993 and 1995. data

-also 15 classes. Probably similar to below

-1km resolution?

-maps and metadata here: http://www.arcticatlas.org/maps/themes/cp/

-or northern land cover map of Canada? (better resolution, would need to cross-walk with something American? This seems like it must exist already but I’m not sure if it does)

-15 classes (4 gram, 3 shrub, 3 sparse veg, 1 wetland, 4 non-veg)

-30 m resolution. Has a less refined spectral version for more personalized analyses

-1996-2005.

-Download and metadata here: https://open.canada.ca/data/en/dataset/97126362-5a85-4fe0-9dc2-915464cfdbb7

-one source of uncertainty here is how much does this vary over the 20 year time period that PRISM data was collected? i.e. map was made earlier, things changed later

## Migratory flyway

-Categorical. Where to get this from?

## Historical tundra areas

**-** Where to get this from?

**Species pool**

-Once I have the PRISM data, develop using the network modularity methods described in the paper

## Predators and Conspecifics

-How would I include these?

## Misc.

-create a bounding box/outline of my study area

-create grid(s) that all of my layers will be resampled to