Greenland Ungulate Calculator
Proposal

May 26, 2017

Objective

The overall objective of this project is to develop a computer software tool, suitable for both biologists and hunters, that will project the consequences of future management decisions on herds of caribou, reindeer and muskoxen in Greenland.

Key features

The Greenland Ungulate Calculator will be designed in such a way that it can be configured for use with any caribou, reindeer or muskox herd. The calculator will project future population levels of each herd based on historical data and assumptions regarding future harvest levels and demographic rates.

The Calculator will be built using the existing DG-Sim software. DG-Sim is a free, user-friendly software product that has been applied to several North American caribou populations (see www.apexrms.com/caribou-simulation-model/ for more information). The software will provide users with two distinct interfaces: (1) a full version of the Calculator, designed primarily for biologists, in order to parameterize the Calculator's initial base population model for each herd; and (2) a simplified version of the Calculator, designed for use by hunters and other stakeholders, including wildlife managers, to then explore alternative "what-if" scenarios regarding future harvest regimes for their herd. Because the approach used by DG-Sim is stochastic, all model projections will include estimates of uncertainty.

As part of the development of the initial base model, model parameters will be estimated using historical data for each new herd. In addition, it will be possible to include one or more possible future scenarios for the possible effects of climate change on key demographic parameters in each herd's base model, thus allowing stakeholders to incorporate uncertainties associated with climate change into their harvest planning. The simplified version of the model will also allow stakeholders to update harvest data each year before making future projections.

Project deliverables

Working with Dr. Christine Cuyler, we will demonstrate the Greenland Ungulate Calculator using the Ivittuut muskox herd. The steps we propose for this project will include:

1. Discussions with key stakeholders in Greenland, confirming the key model indicators and parameters that should be made available in the simplified version of the Calculator; Initial discussions with, and playing with the model for Arsuk hunters/Resource Council will begin in June and will continue in July under C. Cuyler;
2. Modifying the existing DG-Sim software, as required, to accommodate specific requirements for this project (e.g. multi-language support);
3. Parameterizing the base model using historical data for the Ivittuut muskox herd;
4. Holding a workshop in Greenland to review the model approach and train stakeholders in using the simplified version of the model for harvest planning;
5. Delivering a final version of the calculator software, including simple instructions and examples, for how stakeholders can update and use the software each year for harvest planning.