I propose modelling current and future carbon stocks in Newfoundland’s boreal forests in response to multiple disturbances, to help inform management of these disturbances as nature-based climate solutions. These models will be fit to data on carbon stocks from existing long-term sites in representative forest stands under different disturbance regimes (e.g. undisturbed, insect defoliation, forest fires, moose browsing), and remote sensed environmental conditions. I have created a collection of 30 m resolution remote sensed and aerial surveyed environmental datasets for Newfoundland, including: land cover type, foliage height, forest stand age, dominant forest species, elevation, aspect, slope, temperature, precipitation, and disturbance history. Based on these datasets I have compared the distributions of the environmental variables sampled last summer to the distributions of the environmental variables across our region of interest. Comparing distributions will show gaps in our sampling and help inform site selection for this summer, which I have begun.

In preparation for this summer’s field work, I will be hiring a technician to help with field work, finalizing sample sites, finalizing details for accommodations and resources during the field season, and creating a sampling protocol, itinerary and inventory.

Field work this summer will increase the amount of data on carbon stocks in undisturbed boreal forests and boreal forests impacted by disturbances. It will be combined with the data collected by Moran the summer of 2022. Measurements of trees, shrubs, and deadwood dimensions, and ground vegetation percent cover, litter samples, and soil cores will be used to calculate above and below ground carbon storage. We plan to sample around 20 sites in Terra Nova National Park in late June to early July, and around 20 sites in Gros Morne National Park in mid to late July. The end of this summer and the beginning of the coming fall will be spent calculating carbon stocks based on in field biomass measurements, and processing litter samples and soil cores to be sent to the Agriculture & Food Laboratory at the University of Guelph for carbon analysis. After carbon stocks have been calculated I will be able to model the relationship between measured carbon and our environmental predictors and disturbance at each sample site. These models will then be used to predict carbon stocks throughout Newfoundland’s National Parks.