

The research questions that I am trying to answer center around the environmental conditions associated with winterkill of turfgrass. There are a few different methods that we are using to gather data throughout the project with a goal of generating a model to predict when turfgrass managers will see damage in winter. With that in mind we want to know when we should expect to see damage from desiccation, disease, crown hydration, or ice encasement. We are working with the University of Minnesota to compare drone flyovers and environmental data gathered at a variety of golf courses in Oregon and Minnesota. I get to do the drone flyovers and monitor the weather sensors installed at the sites. I also have to gather data on the sites and confirm using ground sensors what the drone is seeing.

I do expect to gather a large amount of data over the course of the project. The bulk of which will be associated with the images generated by the drone flyovers. We are using a multispectral camera with a variety of lenses so each time the drone takes an image it does so with 6 lenses. We will use the various images produced to create orthomosaics by stitching together all the drone flyover images and then use those orthomosaics to digitally analyze the areas for damage, temperature, and plant health.

We are going to compare the data generated by the drone flyovers to data gathered by weather sensors to associate what we see in the images with environmental conditions. We have data on soil temperature, gas exchange, soil moisture, and amount of light that reaches the site. We also will have photos of the sites taken from ground level as well as measurements of the snow depth when present.

Another part of this project that we are working on is creating a model for predicting disease pressure in areas without snow of microdochium patch. For this part of the project, I have been gathering light box photos to be digitally analyzed later. We are also gathering weather data from sensors near the golf greens that these trials are on to associate the disease pressure with environmental conditions.

The weather sensors in both parts of this project produce Excel sheets listing the conditions at specified intervals.

Because a large part of this project is reliant on high quality images, I expect to produce a large volume of data. I'm expecting the flyovers and othomosaics to produce between 1-2 terabytes of data. The excel sheets produced by the weather sensors and data gathered by hand sensors will be much smaller. I would expect those, and the photos taken from the ground, to be 1-2 GB.