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GIS 5577 - Project Proposal

5 March 2019

**Introduction:**

Since Fall 2017 I have been working on a project that aims to classify beaver wetland areas in the Lake Superior North Shore watershed using object-based image analysis (OBIA). The overall goal of the project is to look at 3 years of NAIP (leaf-on) imagery (2008, 2013, 2017) and one year of SAIP (spring, leaf-off) imagery (2009) to assess how beaver wetlands are changing over time, and how those changes affect native trout populations in North Shore streams and rivers. My part of the project has been to create a repeatable OBIA workflow that classifies beaver wetlands. The idea is, every time a new imagery dataset is released, the workflow can be applied and results for that year can be obtained with only minor changes to the workflow. The importance of using a database for this is that, given the immense number of polygons in the various wetland datasets and the number of ancillary datasets used to complete the process (vector and high-resolution lidar-derived raster datasets), data management is a constant challenge. And each time a new beaver wetland dataset is created it can be added to the existing database, keeping everything organized. Being able to access data quickly and easily for change detection, validation, and publication will be a huge time saver.

**Methods:**

At this point, I know that I will use shp2pgsql to load shapefiles into the database. I will explore using raster2pgsql, though I have not used that program yet. As far as I know, these two programs will get me through all the steps I have planned thus far. If it turns out I need more to make my project more robust, I will explore other possibilities. My current thinking is that I will look into doing change detection on beaver wetland polygons, for instance, did beaver ponds get bigger or smaller between 2013 and 2017?

**Expected Results:**

I expect to create a database that contains the updated National Wetland Inventory polygons (MN DNR), watershed boundaries (NHD), and beaver wetland polygons for four study years: 2008, 2009, 2013, and 2017 that I have created. I will explore other possible methods and results depending on the complexity and amount of time required to complete the aforementioned steps.

**Timeline:**

I have already obtained the NWI data which I think, based on previous work, are ready to be loaded into a database. Next, I will compile and load the shapefiles created from my OBIA workflow. I will load any ancillary data used for the process as well, however I am not yet sure how I will deal with the raster products or if including imagery will be necessary. Including raster products will be limiting as the files are so big. I will also include a metadata record explaining how the data were created and other necessary information. I plan to be done with the previous steps by the end of spring break.

After spring break, I will work on the database schema (due 3/16) and finish up any additional things I decide to do with the data. In the last few weeks of the semester I will work on the final write-up and submit hopefully before the final due date of 5/9.