**Introduction**

Erosion caused by invasive species, can damage communities, cost taxpayers hundreds of thousands of dollars, and permanently destroy the delicate ecology of a local ecosystem.

**Empirical Questions:**
- How do nutria impact bank erosion in Oregon wetlands?
- How do beaver impact bank erosion in Oregon wetlands?
- How do these species effects on erosion in Oregon wetlands directly compare?

It is widely known that nutria are destructive pests. Their burrowing and herbivory activities demolish habitat spaces and drive out native species. But it is not known how the American beaver, a species that occupies the same niche, directly compares to nutria in terms of effects on erosion.

Nutria burrow into riparian embankments and consume embedded plant material, which weakens the natural structure and disturbs the substrate. Erosion from nutria behavior is a targeted issue and nutria control programs are widely implemented by government agencies. Despite efforts, nutria populations continue to grow.

Unlike the invasive nutria, beaver are native to Oregon and are known to reduce overall erosion in a habitat by creating step-pools, but specific comparison of bank erosion to nutria is unknown. The two species are considered sympatric, closely influencing each other's population.

By studying the influences a native and invasive species have on bank erosion, we can predict the potential antagonistic outcomes the invasive species has on the native species. From this, improved nutria control programs can be implemented, and in turn erosion can be reduced.

**Proposed Method**

**Target Species**
- Nutria
- Beaver

**Proposed Results**

It is predicted that there will be a larger population of nutria than beaver in Fernhill wetlands, and that nutria contribute significantly more to bank erosion than beaver. A Pearson’s correlation will be used to compare nutria and rootmass regrowth, and nutria and mass of soil lost will be high. Plots within the study site of Fernhill Wetlands that contain nutria will have a greater mass of soil lost, and a lesser rootmass regrowth than plots in which beaver reside.

The findings from this study will greatly contribute to the knowledge of how invasive and native species interact, and provide a foundation for future erosion studies and species control programs. Subsequent studies should provide details to how nutria and beaver directly and indirectly compete for habitat within the same ecosystem. These studies should explore the mechanisms of nutria and beaver habitat competition and how their relationship effects erosion.

**Implications**

 Widening knowledge on the relationship dynamics of nutria and beaver can drive new species control and eradication programs, in which native populations are promoted in an effort to demote an invasive species population. The sympatric relationship between nutria and beaver can be used as a model for this method, and in Oregon, be used as part of erosion control programs. Because nutria are one of the largest contributors to wetland erosion in Oregon, it is essential for successful erosion control programs to consider decreasing the nutria population.

**Fernhill Wetlands in Forest Grove, OR.**}

The proposed study site. Fernhill represents a typical Oregon wetland. Both nutria and beaver reside within Fernhill.

**Population of beaver and nutria is measured by counts of each species,**

- The second technique to measure bank erosion is the rootmass regrowth, and the mass of soil lost. Volume is measured by the length, height, and width of the indented substrate using a tape measure. Density is found by sampling the soil using a borer, drying the sample using a gravimetric oven, and weighing said soil sample.

- The second technique to measure bank erosion is the rootmass regrowth, or the mass of plant material that has regrown in a certain time interval. Rootmass regrowth is found by coring the substrate using a borer, filling the hole with sand, and later re-coring the same hole. The re-cored material is sifted and dried using a gravimetric oven, then weighed.

- Population of beaver and nutria is measured by counts of each species, captured by trail cameras. The population counts from each camera is to be analyzed every 7 days, for two 8-week periods, one in the early spring, and one in late summer.

**Materials**

- A Bushnell trail camera, used to capture beaver activity and determine species counts. The camera is attached to a pole using a cable, and secured with a lock box.

- A borer, used to take core soil samples in order to measure soil density and rootmass regrowth. The bottom end is inserted into the substrate, the handle is turned to separate the soil. The borer is lifted, extracting the sample.

**References**


