Comparison of Bank Erosion by Nutria (*Myocastor coypus*) and American Beaver (*Castor canadensis*) in Oregon Wetlands

Julia Manfredini, Comparative Behavior Research (PSY 224)

Dr. Heide Island, Dept. of Psychology | Pacific University | 2043 College Way | Forest Grove, OR 97116

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:

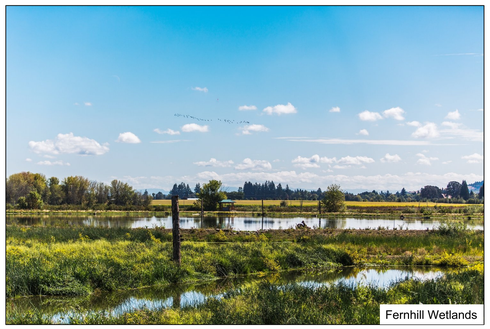
- *How do nutria impact bank erosion in Oregon wetlands?*
- *How do beaver impact bank erosion in Oregon wetlands?*
- *How do these species effects on erosion in Oregon wetlands directly compare?*

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 others 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.



Fernhill Wetlands

Fernhill Wetlands in Forest Grove, OR., the proposed study site. Fernhill represents a typical Oregon wetland. Both nutria and beaver reside within Fernhill.

Proposed Method

Target Species

Nutria

Live Science

Smaller than the beaver, with a long and skinny, rat-like tail, and hunches over on land.

Beaver

Natural History Museum

Larger than the nutria, with a horizontally flattened and shorter, paddle-like tail.

Design and Procedure

Bank erosion is measured in two ways. The first is the mass of the soil disturbed by burrowing or digging. This is found from the volume and the density of the lost soil. 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 and nutria activity and determine species counts. The camera is attached to a post using a cable, and secured with a lock box.

B&H Photo and Video

AMS Samplers

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, then the handle is turned to separate the soil. The borer is lifted, extracting the sample.

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 r 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.

References

Meyer, A. (2006). *The impacts of nutria on vegetation and erosion in Oregon* [Unpublished master's thesis]. University of Colorado.

Sheffels, T. R. (2013). Status of nutria (Myocastor coypus) populations in the Pacific Northwest and development of associated control and management strategies, with an emphasis on metropolitan habitats. [Doctoral dissertation, Portland State University]. PDXScholar.

Witmer, G., Sheffels, T. R., & Kendrot, S. R. (2012). The introduction, impacts, and management of a large, invasive, aquatic rodent in the United States. In D. C. Abreu & S. L. De Borbon (Eds.), *Marshes: Ecology, Management and Conservation* (pp. 49-89). Nova Science Publishers, Inc.

Bounds, D. L. (2000). Nutria: an invasive species of national concern. *Wetland Journal*, 12(1) 9-16.