

## **MARSH DEGRADATION AT THE MOUTH OF MOORE CREEK**

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Moore Creek is located within the Dog River Watershed in Mobile County, Alabama. The mouth of this creek was once home to a significant amount of marsh. However, over the past decade this marsh has slowly been degraded and very little remains. Marshes are vital to marine ecosystems. They are responsible for enhancing ground water supplies and protecting coastal areas from a hurricane's powerful waves and storm surge. Marshes also clean surface water by removing pollutants and using them for their own benefit. Thus, the degrading marsh at the mouth of Moore Creek is a problem that needs to be resolved. The likely source of the problem is nutria, a large rodent that is not native to the United States. These rodents reproduce extremely fast and feed primarily on marsh. To determine if nutria are the cause of the disappearing marsh, a small fenced area was built around the vegetation. The vegetation inside the fenced in area was completely unharmed and the plants outside the fence were damaged. This indicates that nutria have caused the degradation of the marsh at the mouth of Moore Creek. Trapping appears to be the best method to control the expansion of nutria in the Dog River Watershed, as well as prevent further degradation of the marsh at the mouth of Moore Creek.

Keywords: Nutria, Marsh Degradation.

### **Introduction**

The mouth of Moore Creek is home to a substantial amount of marsh which is vital to the marine ecosystems in the Dog River Watershed. Marshes are classified as herbaceous wetlands with no trees, which are inundated with water on a continuous basis. Marshes play an important role in managing the flow of water to individual streams. They also are responsible for enhancing supplies of underground water. Thus, marshes are extremely valuable during times of severe drought. The marshes also help reduce flood damage to a watershed caused from heavy rains or storm surges from a hurricane. Maybe the most important function that marsh possesses is its ability to clean up water pollution. Marshes use excess nutrients and pollutants in the water for their own benefit

and growth. Thus, this type of wetland is very important in maintaining the surface water quality of a watershed (Environmental Protection Agency, 2008).

There are two basic types of marshes, non-tidal and tidal marshes. Tidal marshes are present in the mouth of Moore Creek in the Dog River Watershed. Tidal marshes are found along protected coastlines, mainly in the eastern and southern United States. Some are entirely dominated by freshwater, others lie in areas of brackish water, and some are in waters that are completely salty. The marsh in the mouth of Moore Creek would be considered to lie in brackish waters. Most of the year it is fresh, but during drier times of the year, salt water can penetrate farther up the river and into Moore Creek (Environmental Protection Agency, 2008).

All tidal marshes are defined as such because they are all influenced by oceanic tidal movements. There are two specific zones of tidal marshes: intertidal marsh and high marsh. The intertidal marsh is covered daily by incoming tides and then exposed as the tides retreat. The high marsh is typically located further inland away from the immediate coastal areas, and is located in more brackish or pure freshwater (Environmental Protection Agency, 2008).

Marsh lying in areas of brackish or freshwater can be affected in a negative way by being exposed to water with high salinity values. Coastal Louisiana experienced significant freshwater marsh loss after hurricanes Katrina and Rita devastated the state in the later summer of 2005. Salinity values were measured in a variety of locations throughout southern Louisiana after both storms roared through the area. Swamps, freshwater marsh, intermediate marsh, and brackish water marsh were measured for their salinity values. (Steyer, et al. 2005).

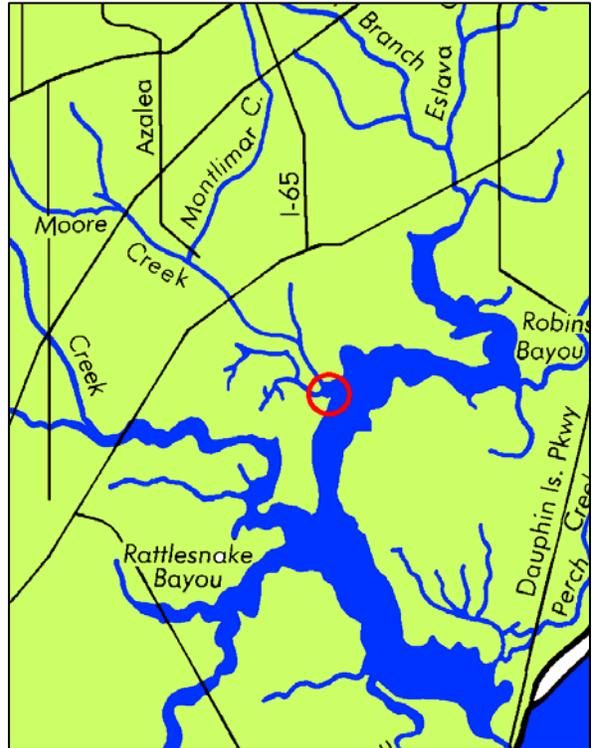
Typical salt values for swamps, which differ from marshes because they have trees, range from 0-0.5 parts per thousand (ppt). After both storms, the maximum salinity values were found to be at 8 ppt. Freshwater marshes are expected to have a salinity value ranging from 0-3 ppt. However, after both storms, a maximum value of 26 ppt was found in some freshwater marshes. Intermediate marsh typically has salinity values in the range from 2-8 ppt, but a value of 26 ppt was measured after the two powerful storms. Brackish marsh is expected to have salinity values ranging from 4-10 ppt. That number soared to 34 ppt after Katrina and Rita made landfall. These high salinity values had a detrimental effect on the wetlands along coastal Louisiana. Therefore, it is easy to see how salt water intrusion can have a negative impact on freshwater and brackish marsh (Steyer, et al. 2005)

Another threat to freshwater marsh is nutria. Nutria were introduced to the United States around 1900 in southern Louisiana. They have since spread throughout the coastal areas of the eastern and southern U.S. (Barret, 2007). Nutria are large rodents growing to a maximum of about 20 pounds. They are highly reproductive and have become a serious nuisance and threat to coastal marshes. They feed almost entirely on coastal vegetation, including marsh. Nutria have been known to consume 25 percent of their total body weight in one day. By eating away vegetation on marshes, the soil becomes exposed and damaged by the incoming tides or any type of rise in water level. Nutria have been responsible for seriously degrading freshwater marshes because of their diets and eating habits. (Explore Blackwater, 2005).

## Study Area

The study area is a small area of marsh located directly at the mouth of Moore Creek (Fig. 1). In 1995, this marsh extended very close to a house located on the water in mouth of the creek. However, now the marsh is almost completely disappeared (Fig. 2).

These pictures are taken from approximately the same location at both time periods (Fig. 2). It is easy to see how this marsh has degraded in just fourteen years.



**Figure 1. Map of Dog River with mouth of Moore Creek circled in red.**



**Figure 2. Photo from 1995 on left and 2009 photo on right**

## **Research Question**

Are the marshes at the mouth of Moore Creek being degraded? If so, what is causing the marsh to be eliminated?

## **Methods**

With the help of a fellow classmate, Joshua Pritchard, I traveled to some of the marshes at the mouth of Moore Creek by way of canoe and a small boat. The first day was spent investigating the marshes for evidence of a possible nutria infestation. Some of the vegetation appeared to have been eaten, which indicated that nutria were present on the marsh.

According to a study I read on nutria control, I decided to build a fence around some of the healthy vegetation on the marsh. The fence was built the second time I visited the marsh. The material used for the fence was chicken wire, measuring two feet tall, fifty feet in circumference, and had one-inch mesh. The fence was held in place by wooden stakes, and the base of the fence was protected by drift wood that had washed up on the marsh. If the vegetation outside the fence was damaged or destroyed, and the vegetation on the inside remained unharmed, it would prove nutria to be the culprit for the marsh degradation. If vegetation thrived inside the fenced area, then it would also indicate that saltwater is not the cause of marsh degradation (Leblanc, 1994).

## **Results**

A few weeks after the fence was built, I visited the marsh to investigate the condition of the vegetation inside and outside of the fenced in area. As expected, the

vegetation on the inside of the fence remained completely unharmed, and the vegetation on the outside was damaged. Small animal footprints were also found in the muddy marsh grounds. These footprints are believed to belong to nutria. Thus, the eaten vegetation outside the fence, and the unharmed vegetation inside the fence proves that nutria are present (Fig. 3). It also indicates that they are the reason for the marsh degradation in the mouth of Moore Creek.

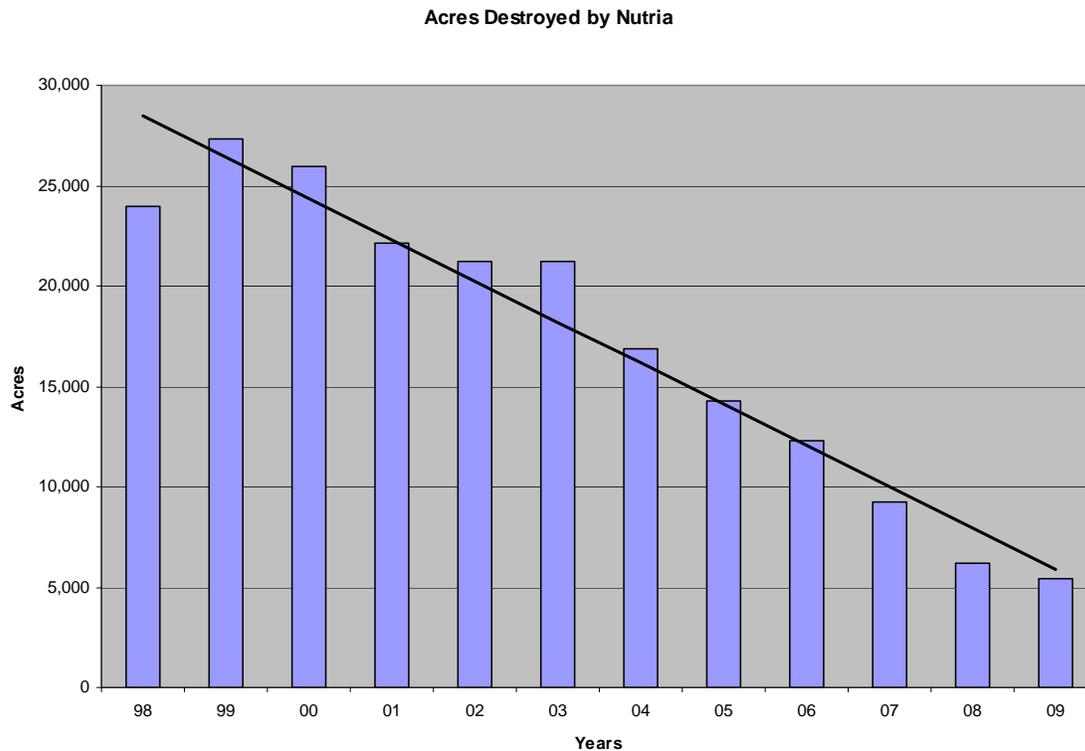


**Figure 3. Left photo shows bare mud outside the fence, right picture shows healthy vegetation inside the fence.**

## **Discussion**

The marsh at the mouth of Moore Creek is degrading because of a nutria infestation. Across the country, nutria have been responsible for degrading marsh for decades. They have been a serious problem in the state of Louisiana, where their numbers are the highest. (*Nutria in Louisiana*, 2008) The Coastwide Nutria Control Program, created by the Louisiana Department of Wildlife and Fisheries, has effectively lowered the number of damaged marshes over the last decades. Figure 4 shows how the number of damaged marsh sites, and acres damaged has decreased since 1998 (Coastwide Nutria

Control Program, 2009). The Coastwide Nutria Control Program has saved thousands of acres of marsh over the last decade in Louisiana. The program shoots and kills countless nutria every year to prevent the animals from further overpopulating and endangering more marshes.



**Figure 4. Graph showing the decrease in marsh destruction brought about by the nutria control program in Louisiana.**

Because Moore Creek and most of the Dog River Watershed lies within the Mobile city limits, shooting nutria is not a possibility. Hunting is not allowed within the city limits. Therefore, the best method for ridding the area of nutria is by trapping them. Trapping is a safe and effective manner to lower the numbers of these rapidly expanding rodents in the Dog River Watershed (Association of Fish and Wildlife Agencies, 2009).

## **Conclusion**

Marshes at the mouth of Moore Creek in the Dog River Watershed have been degrading for quite some time. Before this study was conducted, the source of the problem had been unidentified. However, the culprit is no longer a mystery. The results of the investigation and the study of the marshes clearly show that nutria are the cause of the disappearing marsh in Moore Creek. Trapping is an effective method that must be used along the marshes at the mouth of Moore Creek in order to prevent further loss of marshes.

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