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# NUTRIA: AN INVASIVE RODENT PEST OR VALUED RESOURCE?

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***Abstract:*** Nutria or coypu (*Myocastor coypus*), semi-aquatic rodents native to southern South America, are an invasive species having detrimental impacts mainly in the southern and eastern United States. Nutria were introduced into the U.S. in 1899 for fur farming and became established in several states. Nutria dispersals resulted primarily from releases by fur farmers, escapes during hurricanes or rising floodwaters, or as translocations in an attempt to control nuisance aquatic vegetation. The ravenous appetite of these herbivores can cause damage to agricultural crops and aquatic vegetation, and can alter aquatic ecosystems. Their burrowing habits can weaken irrigation structures and they are a host for some diseases. Eradication is desired in areas such as national wildlife refuges, but can be difficult due to the nutria's extensive suitable range of habitat, the logistical challenges posed to land managers associated with these habitats, their efficiency in dispersal, and their high, year-round reproductive ability. Control is more practical in some areas and is facilitated by periods of cold temperatures and sustained lethal control. An example of an eradication strategy was implemented by USDA/Wildlife Services at Blackwater National Wildlife Refuge, Maryland, during 2002-2004 where systematic intensive control depopulated nutria from the Refuge. An example of long-term management of nutria was implemented by the Louisiana Department of Wildlife and Fisheries where an incentive payment is distributed to registered trappers and hunters on a per nutria basis. Louisiana continues to recognize nutria as a beneficial natural resource, such as fur and food, and manages for a low population. To offset negative attributy Blackwater National Wildlife Refuge recognizes only the negative impacts of this invasive species and has implemented an eradication strategy. Research efforts continue to develop efficient methods for nutria control, including detection and monitoring techniques, attractants for bait delivery of toxicants or fertility control materials, lures for improved capture rates, and improved capture devices.

***Key words:*** control, coypu, damage, invasive, Louisiana, management, Maryland, *Myocastor coypus*, nutria, rodent

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## INTRODUCTION

Nutria (*Myocastor coypus*) are large semi-aquatic rodents native to South America that inhabit fresh and brackish coastal aquatic and wetland habitats in North America (Bounds et al. 2003). Female

nutria are polyestrous and are sexually mature at approximately 5 months of age (Bounds et al. 2003). They are nonseasonal breeders capable of producing 3 to 4 litters a year with an average of 4 to 5 kits per litter (Bounds et al. 2003). Nutria are voracious consumers of vegetation and known to completely denude vegetation from areas where they feed before moving to another area (Mach 2002). Their ease of mobility on land and in water makes them effective dispersers, which can pose a significant challenge to resource managers.

Nutria were first introduced into the United States in 1899 to establish a fur farm in California. This initial introduction failed due to lack of reproductive success (Ashbrook 1948). During the 1930s, nutria were imported for fur farms in Louisiana, Ohio, New Mexico, Washington, Michigan, Oregon, and Utah (Kinler et al. 1987). In addition, nutria were promoted as controllers of nuisance aquatic vegetation and were rapidly transplanted in the southeast in the 1930s and 1940s (Dozier 1952, Evans 1970). Since then, accidental and intentional releases have permitted nutria to establish in wetlands in at least 15 states (Willner 1982) with the highest densities occurring along the Gulf Coast of Louisiana and Texas (LeBlanc 1994). The introductions of nutria have been summarized by Carter and Leonard (2002) and Long (2003).

Impacts to wetlands by nutria, especially in areas of Louisiana and Maryland, have triggered intensive control of the rodents. In Louisiana, nutria are found in the highest densities primarily in freshwater marshes and rivers and swamp margins to brackish or salt marshes (Dozier 1985). At the Blackwater National Wildlife Refuge (NWR) in Maryland, the highest densities of nutria occur in open brackish marsh (Willner et al. 1979). Nutria impacts include damage to agriculture, damage to native coastal wetlands, and as potential hosts for disease transmission. Attempts to control or eradicate introduced nutria have been summarized by Carter and Leonard (2002). This paper briefly describes damage by nutria and different management approaches, specifically in Louisiana and Maryland, relative to land management and local cultural value of nutria, and research needs for better management of nutria.

## IMPACTS BY NUTRIA

### Agriculture

Impacts by nutria to agriculture include foraging on crops, weakening irrigation structures by digging burrows, and potential disease transmission to livestock. Crop damage is most prevalent in areas adjacent to aquatic habitats supporting nutria, and especially where nutria are abundant (Bounds et al. 2003). Crops primarily damaged by nutria are sugarcane and rice, but also include corn, milo (grain sorghum), sugar and table beets, alfalfa, wheat, barley, oats, peanuts, and various melons and vegetables (LeBlanc 1994). In Louisiana, nutria commonly undermine and break through water-retaining levees in flooded fields used for rice and crawfish production (LeBlanc 1994). Nutria burrows can weaken flood control levees that protect low-lying areas as well as roadbeds, stream banks, dams, and dikes under heavy weight (LeBlanc 1994). Nutria can be infected with pathogens (e.g., leptospirosis) and parasites transmissible to livestock, which is especially a concern in situations where livestock drink from water contaminated by nutria urine and feces (LeBlanc 1994).

### Human Disease

Transmission of diseases and parasites carried by nutria to humans is not well-documented, but could potentially involve toxoplasma, chlamydia, and

salmonella (Bounds et al. 2003). Diseases are common in captive populations where too many nutria are housed in close proximity and where cleaning standards are low (Bounds et al. 2003). In turn, these conditions pose the greatest risk to human handlers who do not wear appropriate personal protective equipment such as gloves while handling animals, or masks while cleaning pens. Nutria parasites most often transmitted to humans are nematodes and blood flukes (*Strongyloides myopotami* and *Schistosoma mansoni*) that cause what is commonly known as "swimmer's itch" (LeBlanc 1994).

**Coastal Wetlands**

Nutria are an important resource for the Louisiana fur industry. During the 2000-2001 trapping season, nutria pelts made up 51% of the total fur harvest in Louisiana (Linscombe 2001). From 1990 to 2000, nutria and raccoon together brought in approximately $1.1 million to Louisiana (Linscombe 2001). Despite this economic advantage, nutria in high densities also can be detrimental to wetlands. Nutria are recognized as at least a contributing factor to the decline of native Louisiana coastal marsh, declining vegetative biomass, and changing plant communities (Shaffer et al. 1992, Grace and Ford 1996, Evers et al. 1998). Louisiana has lost about 22,000 acres of marsh to nutria vegetative damage and over 100,000 acres of marsh have been negatively impacted by nutria (Marx et al. 2004).

The purpose of Blackwater NWR in Maryland is to protect and manage habitat for migratory birds, threatened and endangered plants and animals, and other native species. The NWR specifically manages for control of invasive species to protect native species (Bounds and Carowan 2000). In Maryland, nutria have no natural predators, such as alligators found in Louisiana. Nutria are considered a primary factor in the decline of the marsh in the Blackwater basin due to their "eat out" of the vegetative root mat. The vegetative root mat is a floating marsh above a layer of fluid mud. Nutria will chew through the mat exposing the mud, which leads to erosion caused by tidal currents and wave action. Erosion causes sinking of the marsh surface, which results in vegetation loss to flooding. The areas damaged by nutria become permanent, open water ponds. Much of this marsh loss removes habitat for native wildlife species such as waterfowl, wading birds, and muskrats.

**NUTRIA MANAGEMENT**

**Louisiana**

Louisiana's approach to nutria control is managing for low populations. Nutria continue to be a valuable furbearer in Louisiana providing both livelihoods and recreation for hunters and trappers. However, to maintain a viable market, the value of nutria pelts must be an incentive for hunters and trappers (Kinler et al. 1987). Without an appropriate incentive to entise outdoorsmen nutria populations will not be trapped and allowed to rapidly increase. In addition to the fur market, nutria are marketed as a healthy alternative for human consumption, having just 1.5g of fat per 100g of meat (turkey 2.9g, beef 26.6g) and a high protein level at 22.1g/100g (turkey 21.8g, beef 16.6; Marx et al. 2004). Nutria also provide a food base for alligators, another valuable natural resource of Louisiana.

In January 2002, the Coastwide Nutria Control Program (CNCP) was initiated to significantly reduce damage to coastal wetlands caused by nutria by removing 400,000 nutria annually. The project was funded by the Coastal Wetlands Planning, Protection and Restoration Act

through the Natural Resources Conservation Service and the Louisiana Department of Natural Resources with the Louisiana Department of Wildlife and Fisheries as the lead implementing agency. The method used to reduce nutria damage is an incentive payment to registered trappers and hunters of $4.00 per nutria tail to encourage trappers and hunters to remove nutria from marshes. In the 2003-2004 season a total of 332,596 nutria tails were collected by 346 participants under the CNCP.

The CNCP conducts aerial vegetation surveys following nutria harvests to assess damaged area. In 2004, the extrapolated estimate of coastwide vegetation damage was 63,400 acres impacted at any one time. This is a 22.8% decrease from 2003 (82,080 acres extrapolated coastwide; Marx et al. 2004). Additionally, the amount of conversion to open water was reduced by 98% over a two year period. The CNCP demonstrates that marsh habitat can recover in the absence of, or with low populations of, nutria.

**Maryland**

The Blackwater NWR manages natural resources for native species. Thus, the approach of the NWR is to eradicate the invasive nutria from the Refuge. In 1997, a partnership of federal, state, and private natural resource organizations was formed to address the nutria problem and create a management plan to reduce or eliminate nutria on the Maryland Eastern Shore (Bounds and Carowan 2002, Kendrot 2004). The Nutria Project was designed in two phases, the first collected biological information on nutria in the Chesapeake Bay marshlands. The second phase was designed to assess the feasibility of eradicating nutria throughout the Delmarva Peninsula. The U.S. Department of Agriculture Wildlife Services, the U.S. Fish and Wildlife Service Chesapeake Bay Field Office, and Chesapeake Marshlands National Wildlife Refuge Complex signed an interagency agreement in March 2002. The role of Wildlife Services was to implement field operations for Phase 2 of the Nutria Project.

Wildlife Services' method of removal was trapping and shooting nutria in the NWR systematically from west to east. To do so, the NWR was divided into 40-acre trapping units using global positioning systems, and units were assigned to specific agency personnel. Fifteen personnel trapped and shot nutria within their units and once a two week period passed with no nutria removals, the unit was considered depopulated. Personnel then moved their traps eastward toward the next unit. After depopulation, trapping units were monitored for signs of resident or transient nutria activity at three month intervals. Residual nutria were trapped when monitoring efforts indicated that capture was likely. Dogs were also used to find elusive nutria.

Approximately 14,000 acres were trapped between September 2002 and August 2003, with the removal of 4,550 nutria during initial trapping and 97 during monitoring efforts (Kendrot 2004). Over a two-year period, approximately 8,300 nutria were cleared from about 35,000 acres in and around the NWR (Kendrot, unpubl. data). The Blackwater NWR is considered clear of nutria and is considered a success story in eradication of nutria within a designated area. Continued vigilance will be needed to prevent the reestablishment of nutria in the NWR.

## RESEARCH AREAS TO IMPROVE NUTRIA MANAGEMENT

Management plans to control nutria typically involve population reduction or eradication (Schitoskey et al. 1972, Gosling and Baker 1989, Carter and Leonard 2002). The tools used to accomplish reduction or

eradication of nutria need to be assessed based on management objectives and approach. Currently, research needs identified to improve nutria management include monitoring techniques, lures and attractants, toxicants, and multiple capture systems. Fertility control (Mach 2002) and landscape-level population and management modeling (Carter et al. 1999) may also provide useful techniques to future management.

**Monitoring Techniques**

Detecting and reducing or eliminating low-density populations of nutria is a major challenge in an effort to completely eradicate nutria from an area. Managers' investment of resources and effort can be negated by residual nutria that go undetected and are left to quickly re-populate an area. Currently, Wildlife Service's use of Labrador retrievers at Blackwater NWR has facilitated their efforts to remove nutria that personnel may have missed (Kendrot 2004). Retrievers are effective at detecting nutria on air currents both in open water and mud situations. With the help of retrievers, personnel can remove individual nutria from an area immediately rather than making repeated visits to the site when using traps.

**Lures/Attractants**

Lures and attractants are useful in nutria control by attracting nutria to sites where a treatment is presented. Attractants are useful for luring several nutria to a common site, such as a toxic bait station, or individual nutria to a specific site, such as a trap. Attractants can increase the number of nutria visiting bait stations and reduce time required for bait stations to be operational, thereby reducing non-target exposure. Most rodent species have a keen sense of smell and respond to various odors (Mason et al. 1994). When presented with visual, auditory, and odor cues, nutria responded best to odors; thus olfactory cues appear to have the greatest potential for developing future attractants (Nolte et al. 2004). In other olfactory trials, nutria were most attracted to semiochemicals, such as fur extract from female nutria and nutria anal gland secretions (Jojola, unpubl. data). Additionally, nutria are more attracted to fertilized marsh plants when offered with nonfertilized marsh plants (Jojola, unpubl. data). Conversely, while nutria emit audio calls, recorded calls tended to be avoided and there was indifference toward live conspecifics as cues (Nolte et al. 2004). The assessment of other potential olfactory attractants for nutria should continue so as to provide effective management techniques.

**Toxicants**

Zinc phosphide is the only toxicant currently registered for controlling nutria (LeBlanc 1994). Effective attractants would enhance efficacy of toxic baiting stations. Schitoskey et al. (1972) recommended toxicants, such as zinc phosphide, for large scale nutria control. Placing zinc phosphide-treated bait on rafts has been an effective method to reduce nutria populations on open waterways (LeBlanc 1994). Rafts with treated baits were less effective when placed in coastal marsh, but this is probably because nutria had access to other food sources available in late spring (Nolte et al. 2004). Efforts to bait nutria on native marsh would probably be more effective if applied during the winter when native forage is less abundant (Nolte et al. 2004). Mach (2002) discussed the potential use of other rodenticides for nutria control. They noted the concern about secondary hazards from the use of anticoagulant rodenticides.

**Multiple-capture Systems**

Multiple-capture traps would enable several nutria to be captured within a single trap, thereby reducing the effort required to maintain numerous traps. Traps with one-way doors are ideal for multiple-capture systems in that captured live nutria may serve as a lure for other nutria in the area. Other effective lures for multiple-capture systems would most likely be olfactory cues or fertilized plants of coastal marshes. A trapper would need to visit the traps periodically to euthanize and remove the captured nutria.

## CONCLUSION

Nutria are a challenge to control and even more difficult to eradicate from a sizable area, but with an effective strategy and sufficient resources and effort, they can be removed from large areas. Improving the tools available to managers will enhance the effectiveness and efficiency of nutria control. For example, Labrador retrievers are more commonly being used to detect nutria at low densities. Effective attractants will most likely be biologically-based or food-based olfactory cues and would serve to enhance other means of control such as multiple-capture traps and toxic bait stations. Zinc phosphide is currently the only registered toxicant for nutria and research is underway to improve its effectiveness while reducing potential hazards.

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