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NUTRIA

Figure 1. Nutria, *Myocaster coypu*

Damage Prevention and Control Methods

Exclusion

Not practical or effective

Cultural Methods and Habitat Modification

Draining and grading to eliminate small ditches will reduce nutria habitat. Vegetation control eliminates food and cover for nutria.

Frightening

Not effective

Repellents

None effective

Toxicants

Zinc phosphide-carrot bait, most effective with prebaiting.
Floating bait stations preferred

Fumigants

Not effective

Traps

Most effective at feeding stations
No. 2 leghold traps
Live traps

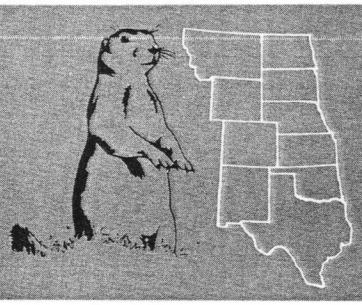
Shooting

Effective, particularly when night shooting using a spotlight is legal

Identification

Nutria *(Myocaster coypu, Figure 1)* are large, brownish or blackish semi-aquatic rodents that are native to South America. They resemble beavers or muskrats but differ by having a long, round tail and webs between the inner four toes of their hind feet but not the fifth outer toe. Their body averages 24 inches (61 cm) in length, plus a 16-inch (41 cm) tail. Large males may grow to 20 pounds (9 kg) and females to 18 pounds (8.1 kg), but the average weight of most adults is not much over 8 pounds (3.6 kg).

Nutria are also called coypus, nutria-rats, and South American beaver.



PREVENTION AND CONTROL OF WILDLIFE DAMAGE
Great Plains Agricultural Council
Wildlife Resources Committee
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B-61
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Range

Nutria were first imported from South America to the United States as fur animals in 1899. During the 1930's, fur farms that raised nutria were established on a wide scale in Washington, Oregon, Michigan, New Mexico, Louisiana, Ohio, Utah, and elsewhere. Shortly after World War II, nutria farms virtually collapsed because of poor reproduction, low fur prices, and competition with beaver fur in the market place, among other reasons. Dejected ranchers released their nutria or did nothing to recapture those that escaped because of inadequate holding facilities, storms, or floods. This is the origin of wild nutria populations in North America.

About the same time, sportsmen and trappers were transplanting nutria into marshes and other suitable habitats. A hurricane which came through Texas in 1941 widely scattered nutria in southwest Louisiana and southeast Texas. But the biggest dispersal occurred in the late 1940's when get-rich-quick promoters selling nutria as "weed cutters" transplanted them throughout the Southeast. State and federal agencies also transplanted nutria into Alabama, Arkansas, Georgia, Kentucky, Maryland, Mississippi, and Oklahoma and inland into Louisiana and Texas.

Through many accidental and purposeful releases, nutria have become established in wetland areas in many parts of the United States. Since they were first introduced, wild nutria have been reported at one time or another in at least 40 states and in at least three Canadian provinces — Quebec, Ontario, and British Columbia. Although some populations have died out, nutria have adapted to a wide variety of conditions, and they continue to persist in areas previously claimed as unsuitable for their existence. The present distribution of nutria is shown in *Figure 2*.

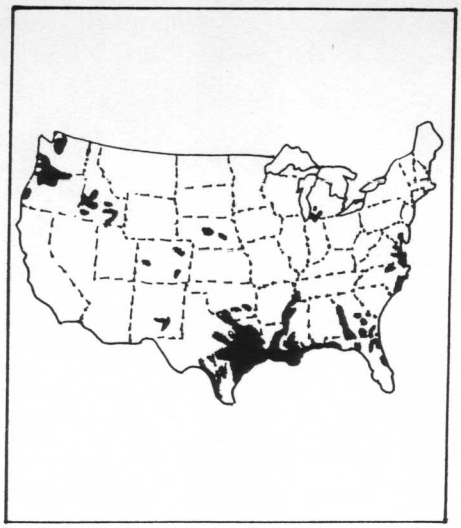


Figure 2. Range of the nutria in North America.

Habitat

Nutria are most at home in the water, and thus are found primarily in marshes and other wetland habitats. On land, they appear somewhat slow and cumbersome, but they can move quite rapidly when necessary.

Food Habits

Nutria are almost exclusively vegetarian. Only occasionally have they been reported to eat animal matter, primarily shellfish.

Nutria eat 2 1/2 to 3 1/2 pounds (1.13 to 1.58 kg) of food a day, consuming this amount in numerous feedings rather than at one time.

Generally, nutria feed on the soft, succulent parts near the base of plants, but they will also eat entire plants or several different parts of the plant. They commonly eat the base parts of coarse plants such as cattail, cord grass, and reeds when these are available, but sometimes will live almost entirely on soft grasses such as Bermuda grass or soft water plants such as duckweed. Nutria in agricultural areas, of course, also eat the weeds and crops growing in planted fields.

General Biology, Reproduction, and Behavior

General Biology

Nutria have fairly long life spans. In captivity, nutria have been known to live for 15 or 20 years. In nature, most nutria probably live less than two years.

Nutria sense danger primarily by hearing; they have relatively poor sight. Although they occasionally test the air for scent, smell apparently plays a very minor role in sensing danger.

Touch plays a major role in feeding. The nutria's sensitive and dexterous forepaws enable it to locate food items, pick up "handfuls" of plants or grain, or handle a single grain of rice or a stem of clover.

During summer, nutria make their home on the ground in dense vegetation, but at other times of the year they often use burrows. Nutria burrows commonly occur wherever there is sloping ground — on banks in levees, spoil areas, and rolling marsh land. Nutria prefer to burrow in areas of dense vegetation such as shrubs or trees, and usually do not burrow on sloping banks without vegetation. Although burrows generally are located along water courses, they are sometimes found quite a distance from water. Nutria may dig their own burrows, and they also make use of burrows abandoned by other animals, such as armadillos, muskrats, or beaver.

Burrows can be homes for single nutria, or for family groups of several generations. The burrows vary from simple, one-entrance, short tunnels to very complex units with several multi-level entrances, tunnels, and living compartments (to be used with different water levels). Normally the tunnels extend from four to six feet (1.2 to 1.8 m) into the bank, but some

have been found going back 50 or even 150 feet (15 or 45 m). The living or resting compartments vary from small ledges [about a foot (.3 m) across] to large family units [three feet (.9 m) or more], and are either dirt-covered or overlaid with plant debris, apparently left from feeding, in which crude nests are formed.

Reproduction

Nutria are generally very prolific animals and have young throughout the year.

Under optimum conditions, nutria may be sexually mature at four months of age. Female nutria that are not pregnant usually come into heat every 24 to 26 days and stay in heat for 1 to 4 days. Males can breed at any time. Pregnancy lasts about 130 days, although this period varies slightly. Most females rebreed within a few days after bearing or losing young.

The young, each weighing 6 to 8 ounces (168 to 224 g), are born fully furred, with their eyes open, and are ready to swim shortly after drying off.

Gulf Coast nutria have from 1 to 9 young in a litter, although the first litter is generally smaller than later ones. Average litter size is 5 young. Most young are weaned at about five weeks, but some continue to nurse for a few weeks longer.

Behavior

Nutria are primarily nocturnal animals. However, they are periodically active during the day particularly when food is scarce.

Although adept on land, nutria are more at home in the water. When frightened while on shore, they will usually hit the water with a resounding splash and either swim rapidly under water for cover or simply stay submerged for a while. They can maintain perfect buoyancy with little or no body motion and can stay well hidden under very sparse vegetation.

In general, wild nutria are not wary animals and appear relatively docile. However, in recent years, man's activities have eliminated many fearless nutria, so that the wariest animals are more likely to have survived and reproduced, passing on their wariness to their young. When approached, nutria generally will try to escape rather than fight. When captured or cornered, however, they can be quite aggressive and can inflict serious injury on people or dogs.

Nutria often build platforms of vegetation for feeding, resting, nesting, or hiding from danger or bad weather. Most platforms appear to result from piles of uneaten plant parts at a favorite site. They vary in size and density with the coarseness of the vegetation, and they appear to consist of the most available vegetation in the area rather than a preferred type of building material.

Most nutria that live in agricultural areas do so only in the summer, coming in when the growing season starts and leaving again after harvest. In sugarcane fields, only about 10 percent of nutria were found to actually make their homes in the fields, and of these only about half lived there all year-round.

Damage and Damage Identification

Potentially, nutria can damage anything they can eat, gnaw, or dig into. Although some damage occurs in corn, grain sorghum, vegetables, ornamentals, tree plantings, roadbeds, and man-made wooden structures, the greatest losses are to sugarcane and rice. In the United States, this damage occurs principally in crop fields adjacent to marshes along the Gulf Coast. This region has the densest nutria population anywhere in the United States, and it is abundantly laced with waterways, the nutria's favorite route of travel.

The greatest damage that occurs in rice growing areas is levee damage. Nutria burrows can break through the smaller levees that serve to divide fields and regulate the water level for small units of growing rice.

Nutria burrows by themselves usually are too small to hurt major levees, although nutria sometimes enlarge burrow systems vacated by muskrats and end up breaking through the water-retention unit. However, more levee damage occurs when cattle, which are allowed to graze the harvested fields or pastures, step on the ground over a nutria burrow and break through. If these cave-ins are not refilled, they are eventually washed out by rain and wave action and cause breaks. If a break occurs during the growing season, the entire rice planting can be damaged or lost. Because the levees are so vital or water is scarce, they are under almost continuous and costly maintenance.

In sugarcane, more damage results from the nutria's habit of gnawing or cutting the stalks than from the actual amount of sugarcane they eat. In cane land that requires levee protection from flooding, nutria may also occasionally damage the levee itself; this type of damage is similar to that in rice fields.

Legal Status

In some states or localities, nutria are protected as furbearers. Depending on the location, a permit may or may not be necessary to control nutria which are causing agricultural damage. In other states or localities, nutria are not

given any legal protection and may be taken at any time by any legal means. Consult your state wildlife agency for regulations concerning nutria in your area.

Damage Prevention and Control Methods

Exclusion

Use of fences, walls, or other structures has not proven to be practical or effective in keeping nutria out of agricultural areas.

Cultural Methods and Habitat Modification

Good farming practices—proper drainage, land grading, and vegetation control—can help control nutria damage in most agricultural areas. In general, a well farmed area is unattractive to nutria.

Draining and Grading. Any drainage system that holds water is a potential highway and homesite for nutria. In rice fields, not much can be done to eliminate waterways, but several modifications are possible in sugarcane and other crops. Typically, fields are drained by ditches that have steep banks and are dug deeper than necessary, so that water stands in them most of the year. Unless the soil is very poorly drained, it is usually possible to drain these ditches, modify their shape, or eliminate them entirely, leaving the land not only better for crop production but much less useable by nutria.

On well-drained soils, precision grading is the best and most permanent way of eliminating the smaller drainage ditches. Precision grading requires well-drained soil, but most types of soil in Louisiana sugarcane areas are suitable for improved drainage by V-ditching and crowning. In one of our studies, V-ditching and crowning eliminated over 30 nutria burrows in a 0.2-mile (0.32 km) primary drainage canal, and no new burrows were made there in over 3 years of study. Grading the banks of levees in rice areas to make them gently sloping gives similar results.

Vegetation Control. Getting rid of unwanted brush, trees, and weeds eliminates much of the food and cover used by nutria. In clearing land, the cut vegetation should be burned or removed. Brush piles left on the ground or in ditches are made-to-order summer homes for nutria.

Frightening

Frightening as a technique to control nutria is neither practical nor effective.

Repellents

No chemical repellents have been found to discourage nutria from eating plants, once nutria are present.

Toxicants

When to Control. Cane-field nutria are quite different from those in rice fields; those in sugarcane are periodic visitors, while those in rice fields tend to live there year-round. Therefore, timing of direct control varies according to the crop being damaged.

In sugarcane fields and in similar crop areas, control is best applied after damage has actually started—principally during the growing season. Preventing damage by control in the winter is not practical. Because there is an almost constant interchange of animals in these areas, preventive control would have to be continuous from late February through December. In addition, a great number of the nutria in sugarcane in the summer simply do not cause damage.

We found that control during the growing season was quite effective in sugarcane areas. Oddly enough, damage was always curtailed for the season once the original damaging population was removed from the area. This held true even when the area was quickly invaded by more nutria than had been removed.

In rice areas, the situation is different. Nutria that are damaging the rice crop can be controlled during the growing season, but because the fields are flooded, most of them do not move much at this time of year and have to be dealt with as individuals rather than groups. Because of this, control is best applied during the winter months when the nutria are more mobile and tend to be concentrated in reservoirs and ditches. The objective of winter control is to reduce the local population to such a low level that few nutria are left to damage the crops the following spring. Winter control of nutria is also best in southern lakes and ponds.

Where to Control. The right place to control nutria is near the area being damaged or in the area where they are the most active. The most efficient approach is to make them congregate in a place you choose. This can be easily done by placing central feeding stations in convenient waterways. Nutria soon learn to become almost totally dependent on these feeding stations, and direct control—poisoning, shooting, or trapping—can then be applied against most of the local nutria at one time and place. Generally, after the main concentrations are removed, only a few nutria—normally the females in late pregnancy, who do not move around much—remain to be controlled individually in their home areas.

Zinc Phosphide. Research has shown that 0.75% zinc phosphide on fresh carrot baits placed on small floating rafts will kill over 95 percent of nutria present along waterways. This bait is also relatively safe for non-target animals such as muskrats, other mammals, birds, and reptiles. At this time, zinc phosphide is the

only federally registered toxicant for the control of nutria.

The procedures described here give good results in controlling nutria, *but only if the directions are followed carefully.* In particular, prebaiting is necessary for good control, and the recommended size and placement of the bait are necessary for safety.

Choosing the Baiting Site. It is best to bait for nutria in waterways when at all possible. This is not only more effective than ground baiting, but safer. Most of the time, the best baiting stations are floating rafts spaced 1/4 to 1/2 mile (0.4 to 0.8 km) apart throughout the area of damage. These rafts are simple to make out of 4 ft. (1.2 m) square (or possibly 4- x 8-ft. (1.2 x 2.4 m)) pieces of exterior grade 3/4-inch (19 mm) plywood with styrofoam floats. They can be anchored to the bottom with a concrete block or tied to an object on the shore *(Figure 3).* Results are best when the top of the raft floats between 1 and 4 inches (2.54 and 10.16 cm) above the surface of the water.

When the nutria population or the waterway is very small, floating bait boards [6-inch (15.24 cm) square boards with styrofoam on the bottom] can be used. These are also shown in *Figure 3.* They are anchored through the center by a slender pole (reed or bamboo is convenient), and float up and down with changes in the water level. They can be evenly spaced about 50 to 100 feet (15 to 30 m) apart along small waterways, or placed only near spots where nutria are active—runs, slides, burrows, or feeding areas.

Occasionally there are also natural sites surrounded by water where baiting can be done without danger to land animals. Small islands, hillocks, tree stumps, nutria platforms, or floating objects like logs are examples. Homes of other animals, such as muskrat houses and beaver lodges, should be avoided. If carrot pieces cannot be simply set out at these sites, they often can be tacked on with small nails.

If there are not suitable water sites at all, ground baiting can be considered as a last resort. It can also be used to clear out the last few nutria that were not controlled by a regular baiting program. In ground baiting it is essential, not only for good control but also for safety, to bait only at areas of known nutria activity such as runs and burrows. The carrot pieces should be placed directly next to these active areas; they are likely to be avoided if placed in them.

Prebaiting. Prebaiting is possibly the most important step in nutria control, because it brings the nutria to the bait. In prebaiting, cut carrots coated with corn oil (like bait carrots, but without the poison) are placed at the baiting stations in late afternoon. Nutria tend to group together for feeding, and if one nutria finds a new feeding spot, most of the other nutria in the area will soon join him. Put out unpoisoned carrots for two nights and poisoned carrots the third and fourth. If for some reason there is a delay over a week or so during this sequence, it will be necessary to start over again with prebaiting. For maximum drawing power no more than 10 pounds (4.5 kg) of carrots per raft, four 2-inch (5.08 cm) pieces of carrot per bait board, or 2 to 5 pieces of carrot at other water sites or on the ground for each night of prebaiting is adequate. Amounts of poisoned bait put out the third night are generally the same.

Preparing the Bait. Zinc phosphide baits are easy to prepare. They contain three ingredients—carrots, corn oil, and zinc phosphide.

Carrots should be sound and fresh; old, limp carrots are not as likely to be accepted by nutria. The tops are discarded and the unpeeled carrots are cut into 2-inch (5.08 cm) lengths.

The corn oil preserves the carrots' freshness and acts as a glue for the zinc phosphide. Other oils or adhesives do not work as well as corn oil; therefore, use no substitutes.

Zinc phosphide is a heavy, strong-smelling black powder. Available as a concentrate, one pound (0.45 kg) will treat about 130 pounds (58.5 kg) of carrots.

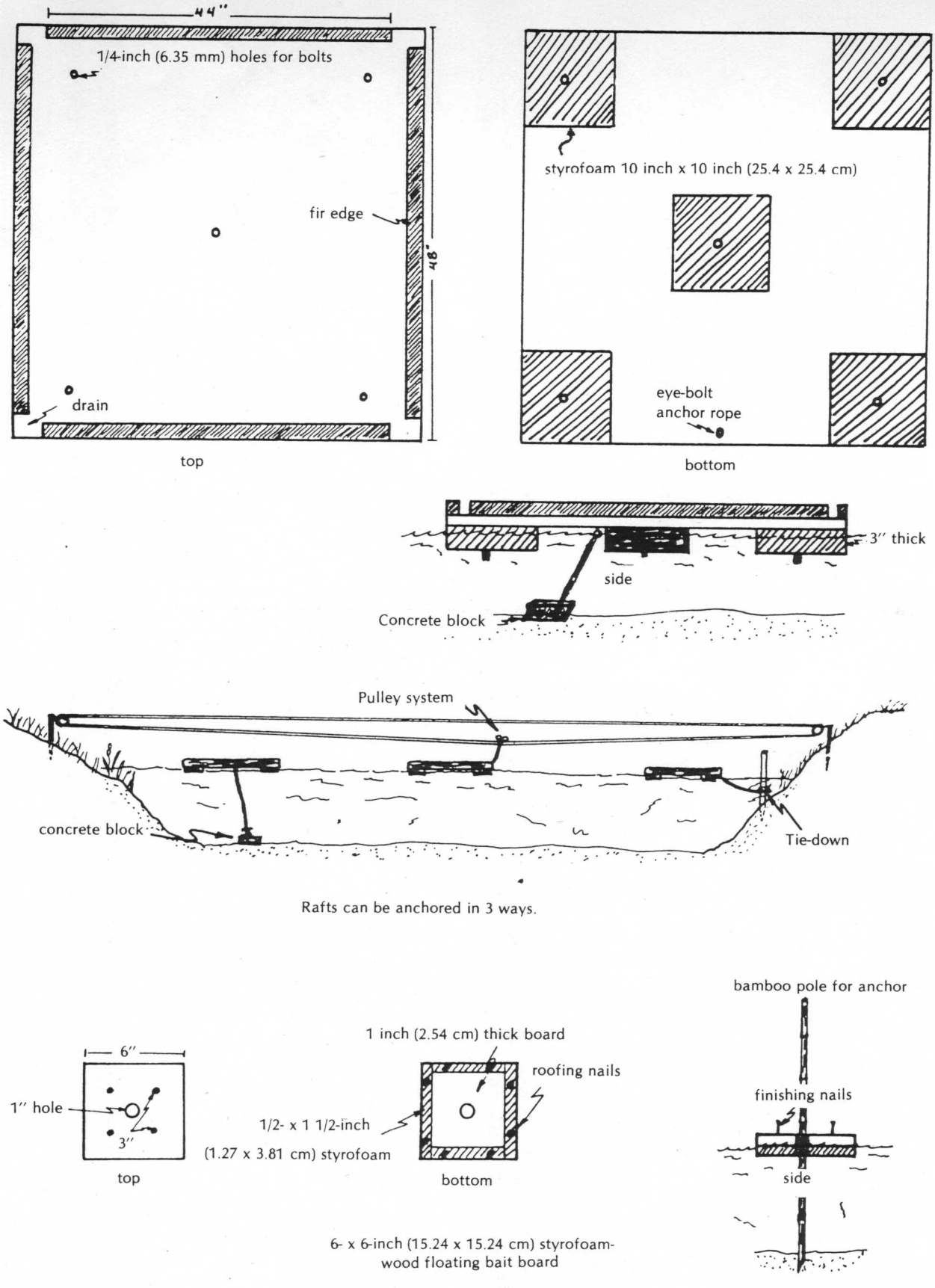
The amount of zinc phosphide in the finished bait—0.75% active ingredient by weight—was chosen so that a single 2-inch (5.08 cm) piece of carrot is enough to kill the largest nutria. Using more is not only unnecessary, but increases the hazards of baiting to non-target animals.

In handling zinc phosphide, be sure to read all precautions printed on the container label and follow all instructions carefully. Store zinc phosphide in a sealed container in a dry location, because moisture causes it to deteriorate.

Breathing of the dust or fumes of zinc phosphide can cause poisoning. As a safeguard, all bait should be mixed outdoors or in a well-ventilated area. Mixed bait or open containers of zinc phosphide should never be left inside a closed room or carried inside a closed vehicle. Since mixing is easy, it is best to prepare bait at the baiting site.

Precautions should be taken not to allow zinc phosphide to touch your skin or clothing. Always wash your hands and arms after mixing or handling bait. It is recommended that you wear long-sleeved rubber gloves when mixing and handling baits.

The bait is most easily mixed in 10-pound (4.5 kg) batches (enough



B-66 Figure 3. 4 x 4-foot (1.2 x 1.2 m) styrofoam and plywood floating raft for baiting nutria.

for one raft) by using this recipe:

Materials:	Amount:
Unpeeled carrots cut in 2-inch (5.08 cm) lengths	10 pounds (4.5 kg)
Corn oil	2/3 fluid ounce (20 ml)
Zinc phosphide concentrate	2 well-rounded teaspoons (10 ml)

Place the cut carrots in a 5-gallon (19 l) plastic or metal container. Add the oil and mix by stirring or placing a lid on the container and shaking or tumbling until carrots are well coated with oil. While wearing rubber gloves, add the zinc phosphide and mix by stirring or shaking until the carrots are well covered. The finished carrots will be black.

Mixed bait needs to dry for at least an hour to be rain-proof. It should not be put out in the rain (or when rain is threatening) unless it has been thoroughly dried first in a well-ventilated area. Once the oil-zinc phosphide mixture is completely dry—a dull, sheenless gray—the carrot will stay poisonous until it deteriorates, regardless of the weather.

Applying the Bait. Although properly dried bait can be put out in the rain, it is not practical to try baiting in open water during high winds when there is continuous wave action day and night.

What happens during prebaiting will help you decide how to complete the baiting program. Examine the baiting sites after each night of prebaiting. If you see many signs of muskrats or other animals besides nutria, you should move operations to another site and start over. Muskrats can be detected by their droppings, which are smooth and not grooved like nutria droppings, and by their habit of nibbling only on the ends of carrots.

If you do not see any signs of other animals, see how much of the unpoisoned prebait has been eaten. (1) When all, or almost all, of the prebait is eaten the second night, use 10 pounds (4.5 kg) of treated bait the third night. (2) When 1/2 to 3/4 of the prebait is eaten the second night, use 5 pounds (2.25 kg) of bait the third night. (3) When only a few pieces of bait are eaten, move the raft to another location and bait the original area with several 6-inch (15.24 cm) square bait boards (it is not necessary to repeat the prebaiting in the original location if you do not skip more than a night or two).

The amount of poisoned bait eaten the third night (the first night of baiting) will also help indicate how much bait to use the fourth night. For rafts, a rule of thumb similar to that just given will help decide: If all, or almost all, the bait is eaten the third night, 10 pounds (4.5 kg) should be put out again the fourth night; if less than 3/4 is eaten, only 5 pounds (2.25 kg) need to be put out the fourth night. Generally, there will be some bait left over the third night and quite a bit of bait left over the fourth night; it takes very little bait to kill one nutria. For the smaller baiting stations—bait boards, small natural water sites, and ground sites—the amount put out the third night should be put out again each subsequent night until essentially no more bait is taken. When the nutria population is large, this may take several nights.

After Baiting. For safety to domestic animals and wildlife, it is essential to dispose of zinc phosphide bait and poisoned animals as soon as possible. Partial or whole carcasses that can be found daily should be deeply buried or cremated as added insurance against secondary poisoning. After baiting, leftover poisoned bait should be picked up from the baiting sites and deeply buried or otherwise disposed of so that animals cannot get to it.

Inadvertent poisoning of domestic or wild animals can occur mainly through careless bait placement or failure to destroy the carcasses and leftover bait.

Estimating the Kill. Our studies indicated that baiting with zinc phosphide by the methods described here should kill 95 percent of the nutria in the immediate area and beyond; some nutria may travel over a mile (1.6 km) to baiting stations. However, nutria poisoned in the baiting programs are usually never seen. Our studies indicate that only 1 of every 4 poisoned nutria dies where the carcass can be found. Many nutria die in dens or in dense vegetation, sink out of sight in the water, or are eaten by scavengers. So it is generally safe to assume that the kill has been good even if very few dead nutria are found.

The best way to tell that the baiting has been effective is the direct observation that the damage has stopped. A way to estimate the amount of reduction in nutria activity, and so in damage, is to put out untreated carrots the night after baiting has stopped and see how much is taken. For example, if 120 pounds (54 kg) of carrots were eaten the second night during prebaiting, and only 2 pounds (0.9 kg) are eaten following zinc phosphide baiting, the reduction in nutria activity or damage has been 98.3 percent. Another method can be used to estimate how many nutria were killed. Nutria eat between 0.29 and 0.41 pounds (0.13 and 0.18 kg) of poisoned carrots per night at baiting stations, or an average of 0.35 pounds (0.16 kg) per nutria. Divide this figure into the amount of poisoned bait gone to give the number of animals that probably ate the bait and were killed. For example, if 30 pounds (13.5

kg) of poisoned bait was eaten, there were most likely 85 nutria killed (30 divided by 0.35).

Fumigants

Poisonous gases, including tear gas and gas cartridges that are effective against some rodents, are not effective against nutria. The only exception to this is carbon monoxide gas pumped directly into dens, but this is hardly a practical technique for large-scale control.

Traps

Leghold Traps. No. 2 double-spring steel traps are suitable for trapping nutria. Trapping success can be increased by using cut carrots or sweet potatoes as "lead-ins" into the trap. Nutria normally pick up small items with their forepaws and large items with their teeth. Small pieces of carrot or sweet potato inside the trap or on the trip pan are suitable for trapping nutria by their forepaws, but larger pieces [1 or 2 inches (2.54 or 5.08 cm) long] are best placed beside the trap and not inside the jaws because nutria pick them up with their teeth and often spring the trap without getting caught.

When nutria are feeding together at a single location such as a raft feeding station, steel traps can produce very favorable results in marshes or agricultural areas. Cut carrots and sweet potatoes are put on the raft to attract the nutria and the traps can be placed both on the raft and on nearby land. Trapping with rafts is also favorable in agricultural areas, particularly in Texas rice fields during the non-growing season.

Live-trapping. Live-trapping for damage control is used mainly to transplant agricultural nutria to marsh areas where they naturally belong. It could also be used by the meat industry in the summer to transfer live animals to slaughtering places where the carcasses can be immediately refrigerated to prevent spoilage.

Though ordinary box-type wire live traps [about 10 x 10 x 32 inches (25.4 x 25.4 x 81.28 cm)] can be set on land near areas of nutria activity, they are more effective when set 4 to 8 at a time on raft feeding stations. Other live-traps, such as the drop-door type, are also quite effective when placed on rafts. In general, it is possible to live-trap nutria on rafts as long as food is put out each night, but unless a large number of traps are put out, it may take a long time to remove the local population. As with other methods, a few nights of prebaiting greatly increases success.

Shooting

Shooting is an effective and sporting way of controlling nutria, either by itself (when it usually gives over 80 percent control) or in mop-up operations after other control measures. Unfortunately, it is most effective at night with an artificial light, a method illegal in most states, even in damage-control situations.

Check your state and local wildlife regulations to make sure the kind of control you want to do will not violate the law.

Raft Shooting. As in baiting with zinc phosphide, cut carrots are put out for 2 nights on a 4-foot (1.2 m) square raft to concentrate the nutria at a single location. Shooting is then done for the 3 following nights from about 1/2 to 3/4 hour after sunset until 9:00 or 10:00 at night. The raft is continuously lit by a spotlight; best results are obtained with a .22 caliber rifle directed from a vehicle or a blind on shore near the raft. All nutria seen on and around the raft should be shot. When there are high populations, the kill may average up to 4 or 5 animals an hour for the 3 nights. In order to repeat operations in the same area, it may be necessary to leave the waterway undisturbed for 2 or 3 weeks.

Boat Shooting. Another good method, is shooting nutria from a small boat with a .22 caliber rifle and a spotlight. On large, open water areas, a .410 gauge shotgun with No. 4 shot can also be used, but a shotgun seems to frighten too many animals to be effective on the narrow waterways common in most agricultural areas. Boat shooting is best accomplished by slowly paddling a canoe or other small craft along primary canals or drainage ditches for 3 successive nights from about sunset to 9:00 or 10:00 at night. Average kill success is usually about 4 or 5 nutria per hour. Nutria are seen in the light or are detected by their red-shining eyes or V-shaped wakes. (However, muskrats also leave V-shaped wakes). After dark, it is also possible to make a "maw" call to locate answering nutria, or to repeat the call to entice nutria to within a few feet of the boat. This low-pitched call, an imitation of the nutria nocturnal feeding and assembly call, is hard to describe in words, but not difficult to learn from someone who can make it, or from listening to nutria "talking" at night. "Maw" calling should not be used in the daytime; in agricultural areas at least, it seems to simply alert the nutria.

Bank Shooting. Shooting on foot while slowly walking the banks of ditches or levees is quite effective for first-time hunts, but is limited to about the last hour before complete darkness. This method is not illegal like spotlight shooting at night, but usually kills off most of the unwary nutria the first hunt. When there are high populations, it is not unusual to kill 12 or 15 nutria an hour the first night of bank hunting, but this usually drops to no more than 2 an hour the second night and practically none the third. Where legal, it is also possible to slowly walk the bank after dark with a spotlight and shoot a fair number of nutria,

but spotlight shooting on land is more effective from a stationary location on the bank. For about 2 hours after complete darkness, "maw" calling can be used to entice nutria to the spot.

Other Methods

Nutria have very few natural enemies, other than man. There are probably few instances where nutria are controlled by predators. In the Gulf Coast area, domestic and feral dogs and cats are probably the most important predators on nutria. Although not commonly seen, alligators, turtles, large snakes, large fish, and some birds of prey may occasionally take very young nutria or older animals that are sick or injured.

Economics of Damage and Control

Nutria have both positive and negative values. They can cause considerable agricultural damage to sugarcane, rice, and other crops. Harvest of nutria for their fur and their meat, which is used as food for pets and for mink, is a multimillion dollar industry in Texas and Louisiana. Some meat is also sold for human consumption. Nutria are, then, both a valuable protected fur-bearer and a pest. For this reason, the nutria has been a controversial animal since it was first introduced into North America.

There are three major situations where people still disagree about nutria, these are (1) nutria's influence in changing marshlands, (2) nutria's effect on muskrat populations, and (3) the extent of agricultural damage caused by nutria.

Apparently, even a high population of nutria plays only a very minor role in the overall changes in a marsh system. Scientific studies indicate that it is only during abnormal conditions such as storms, drought, or marsh burning, when nutria lose their normal food supply, that they noticeably harm a marsh. In these instances they mow down the above-water plants or strip the bottom of underwater roots and tubers. This usually occurs only in isolated locations, since it is unusual to have a large nutria population and a widespread loss of their food supply at the same time over a large area. Most of the time, nutria keep down the growth of many plants, but do not completely wipe out any of them. Nutria that are not over crowded or underfed can be very beneficial in controlling above-water plants like cattails, rushes, and sedges. Thus they help create a more useable water surface and open the way for plants more favored by waterfowl. The effects of nutria are rarely very pronounced, and in general the good they do probably outweighs the bad.

From the 1940s through the 1960s, the harvest of muskrats decreased significantly while the harvest of nutria increased. Nutria have been blamed as the cause of decreased populations of muskrat. In actuality, nutria and muskrats live mainly in different types of marshes, so competition between them is a serious concern in only a few places.

When nutria and muskrats share a marsh in apparent harmony, there is usually a general upward trend in the muskrat population, but we found that removing the nutria often makes the muskrat population sky rocket. So it appears that, even though nutria rarely injure muskrats physically, the nutria's harassment and competition for food and territory sometimes are enough to keep the muskrat population from increasing at its normal potential. If this situation were widespread, it might be a serious concern for those who are looking forward to a resurgence in the muskrat industry. However, nutria and muskrats usually choose to live in different marshes, and therefore competition affects only a small percentage of muskrats.

The value of sugarcane or rice lost to nutria damage has been estimated by various people to run anywhere from several thousand to over a million dollars annually. Studies have shown that there are dozens of changeable factors — such as weather, food supply, cover, and man's activities — that govern the amount of damage nutria do.

To calculate whether nutria are doing enough damage to warrant applying control measures, one has to know the market value of the crop lost so that he can balance it against the cost of the control program. But because it is so difficult to estimate crop losses accurately, most farmers rely on intuition. Today, there are several good control methods available, and people are more aware of the safeguards necessary in using them than they were in past years. This, along with the increasing tendency among farmers, agricultural advisory boards, and state and federal agencies to cooperate in setting up large, well-planned and carefully balanced control programs, is making nutria control both safer and more economical.

Acknowledgments

Figure 1 from Schwartz and Schwartz (1981).

Figures 2 and 3 adapted from Evans (1970) by Jill Sack Johnson.

For Additional Information

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