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WOODLAND FISH AND WILDLIFE: BEAVER, MUSKRAT, AND NUTRIA ON SMALL
WOODLANDS

The attached Technical Note is one of series produced by the Woodland Fish and Wildlife Project, a cooperative effort including NRCS and other related agencies and interest groups in Washington and Oregon.



Woodland Fish and Wildlife

Beaver, Muskrat, and Nutria On Small Woodlands

A Guide to Understanding America's Largest Rodents

Three semi-aquatic rodents distributed throughout the Pacific Northwest are the beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and nutria (*Myocastor coypus*). Each can easily be identified in hand, but it can be difficult to tell them apart in their aquatic habitats. All three species have lips that close behind their large incisor teeth. This allows the mouth to be sealed off while the large incisors protrude for underwater feeding.

The large incisors are constantly growing, replacing the worn surfaces caused by constant chewing.

The beaver is the only one of the three that "fells" trees, making the presence of this large rodent easy to determine. Limbs with the bark removed, or dams and lodges constructed of limbs and mud also indicate the presence of beaver.

Muskra use marsh vegetation to build a characteristic lodge, smaller than that of a beaver.

Nutria leave no telltale sign,

except for droppings. Nutria droppings, unlike those of the muskrat or beaver, are grooved along the long axis of the pellet. All three species consume vegetation and leave trails and burrows. Other signs, including lodges, dens, feeding platforms, loafing areas and mud slides vary among species in size, shape, and placement, and can be used to determine which species is present.

Beaver and muskrat are native to Oregon and Washington rivers, lakes, and ponds. The nutria is an introduced rodent. Probably the subspecies *Myocastor coypus bonariensis* from Argentina is the primary

source of most North American introductions. However, subspecies of nutria from areas in Bolivia, Brazil, and Paraguay were introduced to North America to be raised domestically for their fur. Because the fur was of low value, many nutria were released into the wild.

All of these furbearers have economic impact because of their fur and the damage they do to trees, agricultural crops, land, and water control structures.



Beaver which was a sought-after natural resource in the Pacific Northwest in the 1700s and 1800s. The establishment of a trading post in Vancouver, Washington by Dr. John McLoughlin came about in part due to beaver. Other trading posts and communities developed in the quest for furs. Although beaver were trapped throughout the intermountain west and were greatly valued, muskrat pelts exceeded beaver pelts in both total number and total value.

Beaver

(*Castor canadensis*)

The American beaver is one of two species in the genus *Castor*. A similar species, *C. fiber* occurs in Europe and Asia. Extensive trapping eliminated the American beaver and the European beaver from much of their original natural range. Both species have since been reintroduced to much of their original ranges. Beaver are distributed from near the Alaskan and Canadian tundra, to north eastern Mexico, and from the Pacific coast to the Atlantic coast, except in southern Florida and along the Louisiana coast. Beaver are absent from large areas of southern California, New Mexico, Utah, Nevada, and Texas. This is attributed to a lack of aquatic habitat and in some areas an expanding urban

civilization. Beaver, the largest North American rodent, can weigh up to 100 pounds but this is unusual. The usual weights for beaver are from 35 to 68 pounds. Typical total length for this species is from 39 to 47 inches, and the large flat tail varies from 10 to 13 inches long and from 3.5 to 8 inches wide.

The large flat tail easily identifies this species. Other identifying characteristics are the hind feet which have four webbed toes and a fifth free toe that supports an articulating split nail used for grooming. The coat consists of two layers; a coarse outer layer of guard hair, often yellowish to reddish in color, and a fine dense layer of underfur. This is the portion of the pelt used to manufacture clothing items.

Beaver build various forms of elaborate burrows and lodges in which they live year round and raise their young. Their primary food is vegetation, mostly leaves, twigs, and bark of deciduous trees growing near their aquatic environment. "Felling" both coniferous and hardwood trees, and consumption of bark are common. Beaver prefer cottonwoods, willows, and maples, although they will use most any deciduous tree or shrub. Within the last decade, damage to conifers has become more prominent in some small drainages although conifers are not preferred food sources. Beaver fell trees and collect branches for storage, eating the

bark and leaving the "white" skeleton of the branch in the pond or river. Beaver eventually abandon colony sites when the food supply is exhausted.

Beaver are most commonly associated with lodges, but in the northwest, they generally burrow tunnel systems into river banks. Beaver "dams" and associated ponds are perhaps the most recognized feature of a colony. Beaver engineered storage of water in most instances is beneficial to other forms of wildlife and fish. Beaver ponds can be important habitat components to resident and anadromous fish. Land managers should retain them where they do not compromise other land management objectives. The slow release of water, and trapping of sediments that would otherwise rush out of the watershed with the spring runoff, are considered beneficial aspects of beaver ponds. The ponds also tend to supply cooler water downstream.

Beaver reproduce after they are 1½ years old, usually producing two to four young (kits). Young are born in May or June. Kits are weaned at six to eight weeks and remain with the parent colony until they disperse, at about 2½ years of age. The beaver colony is most often a family group, having a dominant breeding female and a dominant male. Colony size averages five to seven individuals, depending on the habitat capability and mortality.

Management

Damage caused by this mammal varies with the habitat type, locality, topography, and objectives of the landowner. Across the United States the three most important sources of damage commonly listed are flooding of roads, fields, and pastures; flooding and cutting of commercial timber stands and orchards; and burrowing into dikes, ditch banks, and dams.

Damage control consists of removal of the offending animal or colony by live trapping or dead trapping. In cases where damage occurs during a state managed trapping season, and state regulations allow, licensed trappers can be employed to remove the animals. Techniques exist for installing water level control devices in beaver ponds where culverts, roads or crops are threatened and the landowner does not want the beaver removed. **Before attempting removal of an offending beaver, the landowner should always consult state fish and wildlife agency personnel.**

Beaver are furbearing animals protected by state regulations, and beaver trapping is an art, requiring experience and the proper equipment. The most common traps used for catching beaver are leg-hold traps, where drowning sets can be made, or the box or "clam-shell" live traps. Snares can be employed with success for those who have the experience to set them in proper locations. Most experienced beaver trappers use a scent or lure, usually made of



Beaver

the beaver's castor gland and other "secret" ingredients, which will usually remain a secret!

A method often tried by the novice beaver controller is destruction of the dam or lodges either by mechanically dislodging the dam or using explosives to destroy it. The use of explosives is illegal in most instances and not recommended. Dam removal often is ineffective in the long run.

Variations of culvert guards such as wire mesh culverts or T-culvert guards, and three-log drains have had some success. However, once beaver detect flowing water they usually are quick to plug the leak. Another approach with fairly good success in controlling water levels in existing beaver ponds consists of perforated pipe wrapped in hogwire and placed below the surface of the beaver pond. A solid eight-inch diameter pipe is attached to the perforated pipe and inserted through the beaver dam. This

device is known as the Clemson beaver pond leveler. It works best in allowing continuous water flow in previously blocked culverts and drains and at maintaining an even water level in existing ponds. Contact the U.S. Dept. of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control and request their publication on Prevention and Control of Wildlife Damage for beaver control.

Muskrat

(*Ondatra zibethicus*)

This semi-aquatic rodent has the distinction of having its native range expanded by human introduction of the species to many areas of North America, South America, and Europe.

Muskrat need aquatic environments with large amounts of emergent vegetation. They seldom inhabit fast-flowing

streams with rocky bottoms or banks. They prefer quieter waters that will not dry up during the year or freeze to the bottom in winter—conditions usually resulting in death to the colony.

Introduction of muskrat and range expansion of this species occurred for the same reason nutria now exist in North America; early settlers saw the promise of wealth and riches through the fur market. Having habitat needs similar to those of the beaver, the muskrat is absent from Florida, most of Mexico, and the extreme northern parts of Alaska and Canada. The range of muskrat was extended in the northwest by transplanting. It now occupies habitats not naturally used by the species.

Muskrat fur is soft and velvety to touch, composed of an inner layer of soft, short fur protected by a layer of long, glossy guard hair. A muskrat will be 16 to 25 inches in total length with a tail 7 to 12 inches long. The tail is a distinctive identifier of this species because it is ratlike, but flattened from side to side, rather than round. An adult weighs about 3 to 4 pounds.

Muskrat reproduction in the Pacific Northwest usually occurs from March through October. A pair of muskrat will average three litters per year, producing three to five young per litter. The young are born blind, furless, weighing about 0.7 ounces, and nearly helpless. Young muskrat, called kits,



Muskrat

have fur within a week, open their eyes at 14 to 16 days, and can then swim, dive, and climb. Weaning occurs at about 21 days, at which time the young are independent and can move out on their own. Young muskrat reproduce after 10 to 12 months, and the cycle continues.

Muskrat structures include houses, huts, push-ups, feeding platforms and dens. In aquatic areas where the water level is not stable or too deep for houses, muskrat usually build an elaborate system of burrows in banks, levees or dikes. Burrows or tunnels can be 10 to 45 feet in length leading to a nest chamber. Tunnel entrances are usually 4 to 10 inches under water. Where stable soil is not available adjacent to their aquatic habitat, muskrat construct houses of native plant material that usually persist for 3 to 7 months.

Muskrat houses can be very elaborate and multichambered, sheltering more than one family. Sometimes they support an "open-sided" platform on the

side used for loafing and feeding. Feeding platforms, which last only a few days, are constructed so the animal can leave the water to eat. Feeding huts also are constructed to protect the muskrat from the elements. These are more stable than platforms that have the entrance under water. Muskrat in pond or marsh environments will build about two to three feeding huts per muskrat house. "Push-ups" are constructed during winter by the muskrat cutting a four- to six-inch hole in the ice. The muskrat pushes up small, fine vegetation to form a pile of debris on the ice that shields a small enclosed cavity for feeding.

Musk rats remain within a small home range of 20 yards or less around their house or den. However, they are capable of dispersing long distances to find suitable habitats. Mortality can be quite high where they must travel overland or through unknown waters. Dispersal occurs frequently in the spring and fall because of forage shortage, population pressures

or exploratory behavior. Muskrat are described as being herbivorous "dainty feeders" utilizing bulbs, shoots, leaves, stems, and tubers of aquatic plants. They commonly dig plant material and are fond of alfalfa, carrots, corn, apples, and clover where these crops are grown near muskrat habitat. In some instances, muskrat eat animal material composed of clams, mussels, crustaceans, snails, and small birds. They may consume an amount of food equal to one-third of their weight each day.

Muskrat are largely nocturnal, spending about 80 percent of their time moving and feeding after darkness. They can be aggressive and have been known to attack a person, dog or mink, when cornered. The primary predator of the muskrat is the mink.

The muskrat is the most valuable furbearing animal in North America, leading all other furbearers in number of animals caught and total value of pelts. The price for an individual pelt is usually quite low when compared with other furbearers, averaging \$2 to \$6 per pelt over the last two decades. However, the great number of animals taken makes for a high total value. For example, 6,415,861 muskrat pelts were sold in 1975-76 for a total value of \$22,455,514. The fur is used in making coats, trimmings for garments, and garment linings. Names that have been used to market garments made of muskrat fur were river mink,

electric seal, Hudson seal, and red river seal. However, laws now require that garment labels list the specific name of the furbearing mammal from which the fur was derived in addition to any trade names.

Muskrat provided a food source for early Americans, fur trappers, hunters, and voyagers. In past years it was not uncommon to find this animal on menus of southeastern U.S. restaurants listed as marsh rabbit, water squirrel, marsh hare, hare, or Chesapeake terrapin. This table delight has been described as having a game flavor similar to wild duck.

Management

Negative aspects of this furbearer include damage to water control structures caused by burrowing and the consequent water action and erosion. In some situations, mechanical barriers such as rip-rapping, steel mesh or fiberglass screen can be installed to protect earthen water control structures. Crop damage is common where agricultural lands are adjacent to muskrat habitat or the type of agriculture being practiced, such as rice farming, provides muskrat habitat.

Trapping especially during



Muskrat

the winter when pelts are in prime condition, is an effective method of controlling muskrat damage and muskrat populations. Where drowning sets can be made (usually in water more than 18 inches deep) a leghold trap is very effective if properly set. Instant-kill traps such as the Conibear are very effective in shallow water and along runways. Anyone attempting to trap muskrat should be experienced or ask for help to reduce chances of nontarget species being accidentally caught. Waterfowl can be victims of improperly placed traps. In isolated cases where damage is severe and persistent, chemical control can be effective using the proper kinds of bait material and proper bait placement. **Before attempting control of this furbearer, the landowner or prospective trapper should consult state fish and wildlife agency personnel.**

Nutria (*Myocastor coypus*)

Within the English speaking countries, the most common name for this aquatic furbearer is nutria. This name refers to an otter in Spanish. The most appropriate common name is coypu, derived from an Indian word meaning "water sweeper." Nutria were first introduced to the United States at Elizabeth Lake, California in 1899 for the purpose of fur farming. In the 1930s the animal was more extensively sold throughout North America as a "weed cutter," or a means of controlling unwanted aquatic vegetation. Nutria now live in at least 15 states, including both Oregon and Washington.

Nutria are much larger than muskrat and weigh from 11 to 22 pounds. Their front legs are short. Their small feet have five toes, four of which are long with claws; a fifth toe is reduced in size. The fur has two distinctive layers, an outer layer of coarse guard hair often yellowish in color, and a soft underfur. The muzzle usually is covered by white coarse hair, a distinctive identifying characteristic. The tail is round and hairy, not compressed from side to side and hairless as is the muskrat's.

This nonnative animal breeds throughout the year in Oregon and Washington. Breeding can occur after six months of age. Females usually bear their first litter at 12 to 15

months. Several kinds of nests are constructed ranging from flattened areas in aquatic vegetation to large platforms constructed in shallow water. Young usually are born in an open nest near the edge of open water, or in a large nest chamber within a burrow system. Three to five young per litter is most common, with an annual production of about eight young per female. The young are born furry and active. They are weaned after approximately six weeks. Teats on female nutria are located laterally along the sides, rather than on the belly, allowing the young to feed while the female is in the water.

Nutria are primarily night feeders, resting and grooming during the day. Cold weather and a shortage of food can cause the animal to range not far from its maternal habitat. Does suffer significant mortality from cold weather.

Management

Damage caused by nutria is usually restricted to feeding on crops grown adjacent to an aquatic system or by burrows the nutria build into water control structures such as banks, levees, and dikes. Northwest crops that can be damaged in such areas as the Willamette River and river systems that drain into the Willamette River within the broad valley floor are corn, alfalfa, ryegrass, and orchard trees bearing nuts and fruits. Conifers and deciduous forest

trees are frequently girdled.

Nutria control can be effectively implemented using water level control, vegetative control within and adjacent to nutria habitat, chemical control using an approved chemical agent, by live or dead trapping, and shooting. Methods other than trapping or shooting may result in many nontarget species of wildlife being destroyed as well as much of the aquatic system. When fur prices are high, the addition of nutria pelts to a trapper's bag can be profitable for the trapper and the landowner when the trapper removes nuisance animals. Belly fur of nutria is usually the only portion of the pelt utilized in the fur industry. Fur value varies depending on quality and style. In the past two decades, nutria pelts from Washington and Oregon have commanded the highest prices in the nation, the better pelts averaging \$6-8 each.

Not all areas lend themselves to water level manipulation or vegetative control within the aquatic system. In these types of nutria habitats leg-hold traps will be most efficient where drowning sets can be applied. A Conibear No. 220 trap will also work for this species. In aquatic habitats other species are usually present, such as mink, beaver, otter, and muskrat, which you may not wish to trap. In these habitats, nutria can be controlled using a single or double door treadle operated box live trap or by selective

shooting. A noncollapsible style live trap is recommended. You can dispose of animals causing damage and release other aquatic species. Daily trap monitoring and applications of fresh bait, such as carrots, apples or lettuce, aid success.

Summary

Beaver, muskrat, and nutria are economically valuable furbearers that have harvest seasons and regulations managed by the state fish and wildlife departments.

All serve various ecological functions from controlling certain aquatic plants to supplying habitat for waterfowl, fish, and amphibians.

Localized damage to forest and agricultural products can occur; especially damage to timber resources by beaver.

Control is best done by maintaining populations during regular trapping seasons. Information on trapping, or

securing the services of a licensed trapper, is available from the state fish and wildlife agencies (each has a furbearer biologist). In Washington, contact the Washington State Trappers Association at PO Box 2245 Olympia, WA 98507 for names of local licensed trappers. In Oregon, inquire at your local Department of Fish and Wildlife office.

Reinforced perforated PVC pipe placed in ponds and connected to solid pipes installed through beaver dams may help maintain water levels. Modifications to existing culverts can prevent beavers from detecting the source of flowing water and further reduce flooding damage.

To maintain or enhance habitat for muskrat and nutria, permanent surface water must contain emergent wetland vegetation such as cattails, sedges, rushes, and other riparian annual and perennial plant species. These plant species do not grow well or

proliferate under a forested canopy. In agricultural zones, leave a few rows of corn, small grain or hay adjacent to wetlands to supply additional food resources.

Beaver need hardwood trees and shrubs near small streams, rivers, swamps, ponds, and lakes. They are the most adaptable of the three species as they can modify their environment. They may create lodges and dams out of woody material if steep-sided banks are unavailable for dens.

In limited habitat, a beaver colony may be short lived due to exhausted food supplies. After abandonment, many old dams wash out, exposing soil devoid of most living vegetation. If these sites are replanted to hardwood and coniferous trees and shrubs adapted to moist sites, beaver will probably recolonize as sufficient food resources develop.

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This leaflet was written by R. Pedersen (retired), USDA Forest Service, Portland, OR. Publications in this series provide practical information on fish and wildlife management to private woodland owners and managers.

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