

Beaver Damage Prevention and Control Methods

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The American beaver (*Castor canadensis*), our largest North American rodent, is nature's equivalent of a habitat engineer (Figure 1). Beaver create ponds and wetlands used by waterfowl, shorebirds, mink (*Mustela vison*), muskrats (*Ondatra zibethicus*), river otters (*Lutra spp.*), fish, amphibians, aquatic plants and other living species. Beaver ponds generally slow the water flow from drainage areas and alter silt deposition, which creates new habitat. During drought conditions, beaver ponds create water holes for livestock and wildlife, particularly wood ducks (*Aix sponsa*) and river otters. However, their engineering feats cause problems when they:

- Flood homes, roads and croplands.
- Dam canals, drainages and pipes, which inhibits water control.
- Girdle and fell valuable trees.
- Flood valuable trees, causing them to die after prolonged flooding.

The purpose of this fact sheet is to provide information about alternative control methods to address these issues. Because wildlife laws are subject to change, refer to a local wildlife officer, an Arkansas hunting guidebook or an Arkansas Game and Fish Commission office (800-364-4263, www.agfc.com) for current information.

Description and Life History

The beaver is a large, stocky-appearing rodent, generally 35 to 40 inches long from head to tail. It has a broad, flat paddle-shaped tail, short ears and generally brown fur. The beaver's tail is used as a rudder while swimming and is slapped against the water as a danger signal. The beaver's four large front teeth enable it to girdle or cut down large trees or other vegetation used as foods or dam and lodge construction materials. Their webbed hind feet have a



Figure 1. Through its activities, the American beaver is unique in the animal kingdom in its ability to create habitat.

Photo by Charles H. Warren, U.S. Geological Survey

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double second claw on the fourth digit for grooming themselves. Beaver weigh between 30 and 40 pounds at maturity, but keep growing slowly their whole lives and may reach 80 pounds or more. Beaver can live as long as 11 to 12 years in the wild.

Beaver are primarily nocturnal, both feeding and working during the night. Beaver are true vegetarians, eating only plant material. Their diet in Arkansas consists primarily of bark, twigs and leaves of trees such as sweetgum (*Liquidambar styraciflua*), cottonwood (*Populus* spp.) and willow (*Salix nigra*) (Figure 2), but they may feed on any available tree species, including pine (*Pinus* spp.) and Eastern red cedar (*Juniperus virginiana*). Beaver also eat the roots, stems and leaves of aquatic plants, as well as feed on agricultural crops such as corn (*Zea mays*), soybeans (*Glycine max*) and fruit trees. They will often store food in the den or lodge or under ice to eat during severe weather.



Figure 2. Beavers consume bark, twigs and leaves of willow trees and will store this food in their lodges.

Photo by Steve Hillebrand, U.S. Fish and Wildlife Service

Beaver breed in winter and have a gestation period of four months. The young are usually born in April, May and June and stay with their parents until they are driven from the den at about two years of age. The female normally reaches sexual maturity during her third year and will breed once each year throughout her lifetime. On average, a beaver colony consists of two parents, two or three juveniles and four kits, with only one litter produced yearly. River otters prey on beaver kittens, and occasional predation on young beaver occurs from coyotes (*Canis latrans*), bobcats (*Felis rufus*), black bears (*Ursus americanus*) and alligators (*Alligator mississippiensis*) where ranges overlap.

Nature's Engineers

Beaver sign is usually quite evident. If there are beaver in the area, you can spot their characteristic

tree cutting and girdling activity (Figure 3). Closer examination will reveal slides, “mud dabs,” a lodge or den, tracks (Figure 4) and the dam. After building a



Figure 3. Beavers chew trees to construct dams and lodges.

Photos by Steven Katovich, USDA Forest Service, Bugwood.org



Figure 4. A beaver leaves distinctive tracks in the mud.

Photo by Rob Routledge, Sault College, Bugwood.org

dam (Figure 5), beaver normally build bank dens or lodges out of sticks and mud. By damming a stream, beaver flood the bushes and trees which serve as their primary food source. Ponds also serve as a place to escape where a beaver can remain under water for a long period of time. They usually use bank dens in streams or where water levels fluctuate often, or lodges made of sticks and mud in shallow-water areas formed by their dams (Figure 6). Beaver enter their lodges or dens below the water level, but their living quarters are high and dry above the water level (Figure 7). Active lodges are easily recognized by



Figure 5. A beaver dam increases wetland habitat but can also flood valuable timber.

Photo by Brian Lockhart, USDA Forest Service, Bugwood.org



Figure 6. A beaver lodge symbolizes the successful return of nature's engineers to The Natural State.

Photo by Hans Stuart, U.S. Fish and Wildlife Service

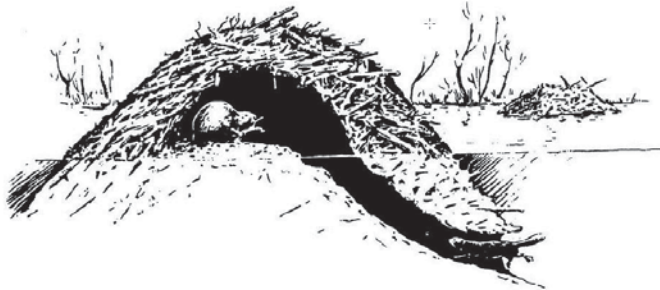


Figure 7. Diagram of a beaver lodge with an underwater entry.

fresh cuttings and mud on the lodge. There may be more than one colony of beaver in a large beaver pond or lake, but each colony defends its own territory.

Economics and Legislation

In many chronicles, the beaver is recognized as a resource that contributed to European westward expansion and settling of Arkansas. Early explorers depended greatly on beaver hides for revenue as well as barter. Beaver pelts were avidly sought by trappers until, in many areas, beaver were virtually trapped out. Arkansas was practically devoid of beaver soon after 1900 due to unregulated trapping and hunting for fur. Any beaver that remained were in the most inaccessible areas. Fur prices began to decline, and trappers became fewer. Timber was cleared and land drained for farms. Subsequently, 77 beaver were restocked in Arkansas from 1926 through 1957. Changing land use provided increased aquatic habitat, and regulated harvest allowed the population to thrive. Today, beaver are back and occupy watersheds throughout the entire state. Besides selling beaver pelts, castoreum (a secretion from the castor sacs) is used in the perfume industry. Beaver meat is eaten by some people and used for dog food.

The return of the beaver, although beneficial from a wildlife standpoint, created problems for farmers,

forest owners and road maintenance crews. Damage caused by beaver usually consisted of flooded timber and agricultural land, girdling and cutting valuable trees and interference with drainage systems. A 1975 survey of county Extension agents indicated beaver were responsible for about \$3 million in damage statewide that year (*University of Arkansas Cooperative Extension Service, unpublished report*). Ten years later, estimates from a 1985 survey of landowners owning > 2 ha indicated beaver damage cost as much as \$23 million annually (*Wigley and Garner 1987*). Most respondents (90%) to the survey agreed that government agencies should provide some services to landowners experiencing beaver-related problems.

In 2000, two surveys were conducted about beaver damage problems. A statewide survey of county Extension agents (63% response rate) indicated one-third (30%) received “some” inquiries while almost half (45%) received “a few” inquiries about beaver problems in their county. Three agents (6%) reported receiving “many” inquiries about beaver problems (*McPeake, unpublished report*). Arkansas Game and Fish Commission’s telephone survey reported a statewide estimate of costs associated with beaver damage was \$35 million. The Delta region reported highest losses at \$13.1 million. A little over half of all respondents (53%) stated they would **not** be willing to pay for beaver removal on their land.

In 1993, the Arkansas State Legislature passed Act 630 called the Beaver Eradication Program, which was amended to Act 1358 in 1997 and renamed the Conservation District Beaver Control Program. This program is administered by the Arkansas Natural Resources Commission (www.anrc.arkansas.gov) through Arkansas conservation districts. An annual state appropriation of \$150,000 reimburses conservation districts \$10 per beaver paid to certified beaver harvesters, thereby subsidizing removal of approximately 15,000 beaver per year. Once the \$150,000 appropriation is spent, reimbursements to conservation districts are halted. The conservation district must submit a plan to the Arkansas Natural Resources Commission to receive funds. The Arkansas Game and Fish Commission in their *Furbearing Animal Report* states, “Although it is clear that bounties have encouraged the taking of beaver, the effectiveness of this program in reducing nuisance problems in counties with many beavers has not been evaluated” (*Sasse 2011*). Landowners can contact their conservation district office to learn whether a beaver control program is established in their district.

Beaver Control Methods

Currently, landowners wishing to remove beaver from their property have multiple options:

- Contact a certified beaver harvester if their conservation district participates in the beaver control program
- Hire a private nuisance wildlife control operator (www.agfc.com)
- Register beaver problems with the Arkansas Game and Fish Commission to be contacted by a willing trapper or furbearer hunter (www.agfc.com) OR
- Do it yourself.

Following are descriptions of methods and their potential for success. Using several methods is recommended for reducing damage and beaver control.

(1) Removal or Modification of Dam and Lodge

When confronted with beaver problems, many people immediately think that destroying the dam or lodge will cause the beaver to leave. In practice, this seldom works. Even a small colony can quickly rebuild a completely destroyed dam in less than 24 hours. Sometimes, beaver inhabiting a fairly new dam or lodge will move, but only to the next strategic dam location up or down the stream or ditch. Depending on conditions, stream flow and length of residence by the beaver, they will often build several dams. It is not uncommon to find three or four dams along one-half mile of drainage ditch or stream. Occasionally, new beaver colonies can be moved by bulldozing, burning or otherwise destroying the lodge and the dam. However, another colony may move into the area if desirable habitat is available. Therefore, solely removing dams to reduce beaver populations is not recommended.

An alternative is installing a water-leveling device through the dam or lodge. Several types are on the market. Two models are described below. Note that an alteration permit may be required before installing water-leveling devices in wetland systems under local, state and/or federal wetland regulations.

- The Clemson Beaver Pond Leveler works on the principle that the detection of water currents stimulates beaver to quickly plug the source of water drainage. The leveler consists of a perforated PVC pipe that is encased in heavy-gauge hog wire. This is placed upstream of a dam or

blocked culvert in the deepest part of the stream or water flow. It is connected to nonperforated sections of PVC pipe which are run through the dam or culvert to a water-control structure downstream. Because beaver do not detect flowing water as it drains, they do not block the pipe. The leveler works best in relatively flat terrain with short-term flooding. The leveler will not work where water volumes exceed the capacity of the pipe, such as periods of unusually high rainfall or where steep terrain may cause excessive flooding.

- A simple three-log drain is made from three or more hardwood logs (such as oak logs) that are under water. Beaver rarely chew these logs under water. The logs are placed perpendicular through the beaver dam. Two logs are laid on top of a board or sheet of iron with their upstream ends slightly apart. The third log is placed on top, forming a funnel.

(2) Habitat Alternation

Altering beaver habitat can be quite effective for resettling problem beaver. On many drainage ditches or canals where beaver become a problem, they can be moved simply by cleaning up the food and construction material. This is particularly true where only willow and cottonwood trees are present. These trees are fast growing and are favorite foods of the beaver. Trees can be removed, thereby eliminating the basic food and construction material for beaver. However, removing trees may negatively affect other wildlife and fish species. A lack of trees could cause water temperatures or bank erosion to increase once removed.

(3) Exclusion Fencing

Fencing may be an option for small areas such as culverts or drains but can also promote more damage by providing beaver with materials for dam construction. Encircle important trees with metal barriers, hardware cloth or woven wire. Fences should be at least 3 feet high and constructed of ½-inch mesh hardware cloth or 2- by 4-inch welded wire. Install the fence so that it is 8 to 10 inches from the plant and completely surrounds it. Bury the fence 3 or 4 inches in the ground and drive metal rods into the ground inside the fence.

(4) Electric Fencing

An alternative for protecting small areas is installing an electric fence. Electric fences can be used to enclose an area or group of trees from beaver and other wildlife, or as a horizontal barrier between the shoreline and the land to be protected. One or two

strands of ½-inch-wide electric polytape will suffice, with the lower strand no more than 4 inches above the ground. Polytape should run on nonconductive or insulated posts spaced 20 to 30 feet apart on flat ground or as close as 6 to 10 feet on rougher terrain to maintain the 4-inch height. Types of prefabricated electric fences are available commercially and allow for simple, quick setup. In areas up to 10 acres, a 12-volt battery will be adequate, but areas over 10 acres may require a solar charger. Keep weeds from grounding the electric fence by clipping frequently or applying herbicide two or three times a year.

(5) Toxicants and Fumigants

Using toxicants (poisons) or fumigants for beaver control is illegal in Arkansas. Under section 05.08 of the Arkansas Game and Fish Commission code, toxicants and fumigants are unlawful for taking any wildlife except to control rats and mice. Violation is a Class 3 offense with a fine of \$500 to \$5,000 and a jail sentence of 0 to 1 year.

(6) Repellents

Studies from the National Wildlife Research Center indicate repellents have limited effectiveness at reducing beaver damage. Repellents containing various organic and chemical compounds may require frequent applications. If few food sources are available, beaver may be less selective and consume vegetation regardless of repellent applications. Following are a few findings about repellents:

- Several beaver repellents on the market report using natural or organic formulas. A study using Hot Sauce® animal repellent found beaver were moderately repelled from cottonwood stems, but not red cedar. An unpublished study reported beaver were not repelled by 100x concentration of Hot Sauce® on willow twigs.
- Chemical repellents are available which discourage rodents from chewing and browsing plants. For example, Ro-Pel® markets a repellent containing a bitter-tasting liquid which can be painted or sprayed on trees, shrubs and ornamental landscape plants to reduce chewing.
- A textural repellent of paint mixed with 30 mm sand has been tested on cottonwood stems. Only a few treated compared to untreated stems were damaged by beaver in the trial.

(7) Frightening Devices

Although animals are initially wary of such devices, they soon become accustomed unless paired with negative reinforcement. For beaver, visual

displays combined with noisemakers are generally more effective than when used alone. Such devices include sirens, strobe lights, firecrackers, cracker shells, propane cannons and radios. Sporadic, random or motion-sensing devices are more effective than permanent or routine devices. In one trial, a Critter Gitter® (commercial device which emits a high-pitched sound) was combined with strobe lights to repel beaver from rebuilding a breached dam. The device discouraged beavers only a few days but long enough to allow temporary drainage of the pond.

(8) Trapping

Where beaver are causing damage, trapping can be an effective and practical method of control. Foothold traps, Conibear-type traps and snares (Figure 8) are legal in Arkansas (leg snares are illegal). Trapping beaver generally is not as easy or productive as for other mammals, such as mink or muskrat. Beaver do not congregate like mink or muskrat and are more territorial. Also, beaver are more wary and trap-shy than other rodents. However, with a good knowledge of beaver habits, ability to read signs and armed with the proper trap, most anyone with some outdoor savvy can effectively trap beaver.

Beaver that are causing damage to personal property may be taken during daylight hours or trapped the entire year. Although trapping nuisance or pest beaver is of primary concern, beaver can be trapped during the fur season as established by the Arkansas Game and Fish Commission. Pelts can be sold if the trapper has a trapping license. Fur prices vary due to size and season, and generally furs from Arkansas and other southern states bring lower prices than those from the northern states.

Beaver may not return to a particular food source, but they are creatures of habit in their routes of travel. They repeatedly use the same runs, slides, trails, lodge and burrow entrances. These are the best places to set traps. Look for strategic locations for trap placement in relatively shallow water by simply putting on hip boots or waders and feeling out the



Figure 8. A body snare is set in a beaver run.

*Photo by John and Karen Hollingsworth,
U.S. Fish and Wildlife Service*

runs and burrow entrances. Active runs and burrow entrances will be beaten down from 2 to 18 inches deeper than the surrounding bottom. The bottom of these runs will be hard packed, much like a cow trail in a pasture.

Many people not familiar with beaver habits attempt to catch beaver with the trap placed above water. This type of set is difficult to make properly and may catch other animals or is prematurely thrown. The trap should be placed at the base of a slide, where the beaver is going beneath a log or where beaver cross a levee between two ponds. Traps set at lodge or den entrances should be set on the bottom, since that is where the beaver enters its home. However, trails crossing dams may require the trap to be placed only partly submerged, since the beaver will be swimming on the surface as it approaches a dam crossover.

Of the various beaver traps, the body-gripper, or Conibear trap, is one of the most effective and widely used. These traps must be at least half submerged in water but can be set in deep or shallow water with equal effectiveness. Conibear traps can be set in the dam, burrow or lodge entrance, in runs, in front of drain pipes or beneath slides. When setting a trap in runs or trails, always set the trap so that it is on the bottom of the run or trail. Otherwise, the beaver will swim under the trap. When properly set, the beaver must swim through the trap to get to its destination. When the trap trigger is thrown, the beaver is killed almost instantly.

Using snares can be a safer and more cost-effective method for capturing beaver, since snares cost much less than body-gripper traps and are more convenient to use in many situations. Snares are anchored cable or wire nooses set along a pathway to capture a passing animal. Snares can be placed in runways, much like traps, but unlike body-grippers, do not have to be placed in the water to be legal. Check with the Arkansas Game and Fish Commission (800-364-4263, www.agfc.com) for regulations regarding snares.

Other types of traps, such as suitcase-type live cage traps and smooth-jawed foot-hold traps, also can be used in Arkansas to catch beaver. Suitcase-type traps are rarely used, however, since they are rather expensive (in the hundreds of dollars). Foot-hold traps (no greater than 8½-inch jaw spread in water or 6 inches on land) may also be used to catch beaver in slides, runs, dam crossovers or feeding areas. Check with the Arkansas Game and Fish Commission (800-364-4263, www.agfc.com) for further regulations regarding leg-hold traps.

When initially purchased, the Conibear trap size 330 may come with round wire coils; these are unnecessary and can be dangerous if improperly used. Ignore these coils. Because these traps exert tremendous pressure and impact when tripped, extreme care should be taken when setting and placing traps. For safety, set the trap on dry land and put the safety hooks in place before carrying into the water.

The easiest way to set a Conibear trap (Figure 9) is to run a rope through spring eyes on one side of the trap, then around and back and through the other spring eyes. The rope can be pulled tight to depress the trap. Place the safety catch across the two spring wires. The other side of the trap is set the same way. With both springs depressed and safety hooks in place, place the trigger catch over the groove at the top of the two wires, which the beaver will trip. Enter the water, set the trap at the site you've previously located, and stake it down securely through the back part of each spring eye. You may position a row of stakes on either side of the trap to guide the beaver into the trap. On a dive set, place a stake between the spring arms on each side to support the dive stick and guide the beaver into the trap. Remove the two safety catches, keeping hands and feet clear of the jaws. The trap is now ready to catch a beaver.

Because hunting and trapping laws are subject to change, refer to the *Arkansas Hunting Guidebook* by the Arkansas Game and Fish Commission (800-364-4263, www.agfc.com) or contact a local wildlife officer for current information.

(9) Shooting

In Arkansas, shooting nuisance beaver causing property damage is allowed year-round during daylight hours on your own land, but shooting nuisance beaver at night requires that the landowner obtain a depredation permit from the Arkansas Game and Fish Commission. Shooting beaver with a shotgun requires large shot size at close ranges. Rifle shooting requires a steady hand and should not be done where ricochets off water or rocky banks would be a problem. Shooting is generally not effective in eliminating all beaver but can be used, along with trapping, to quickly reduce a beaver population. For additional laws about shooting nuisance wildlife, refer to the Arkansas Game and Fish Commission web site (www.agfc.com) or contact a local wildlife officer (800-364-4263) for current information.

Conibear Trap Set

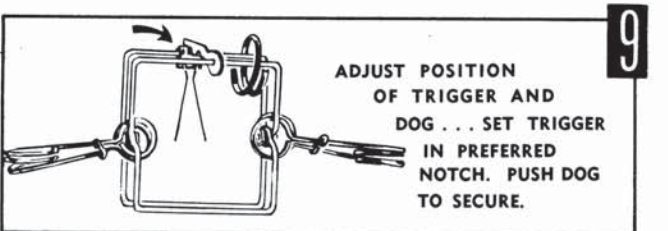
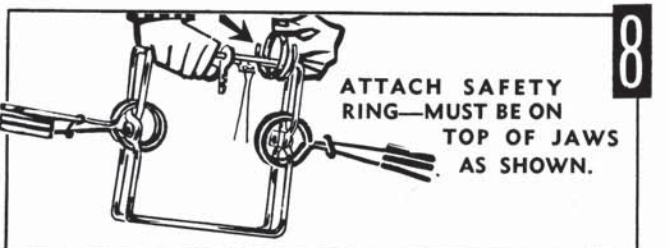
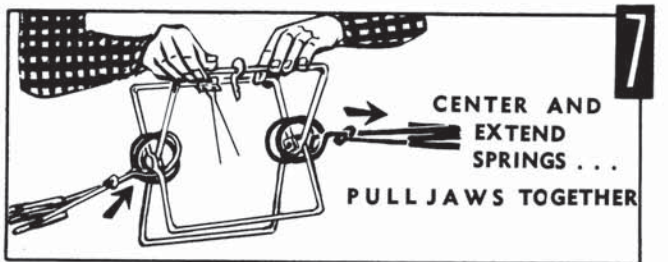
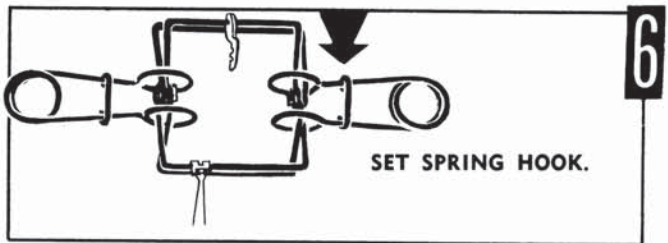
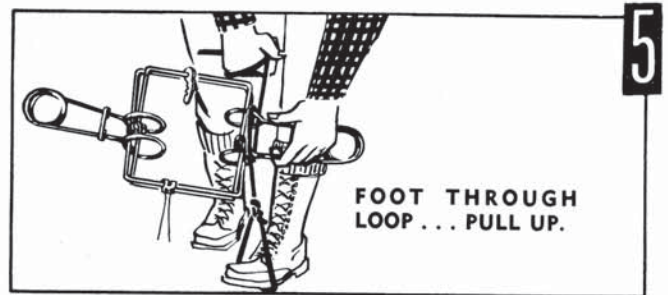
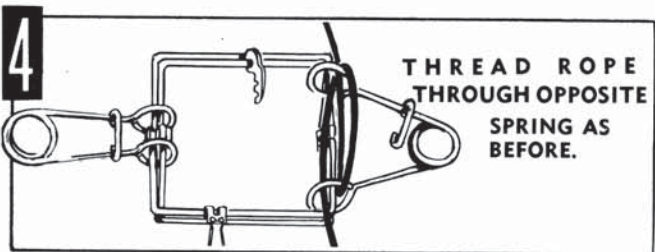
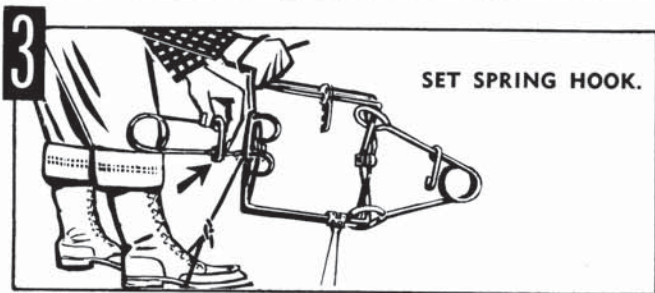
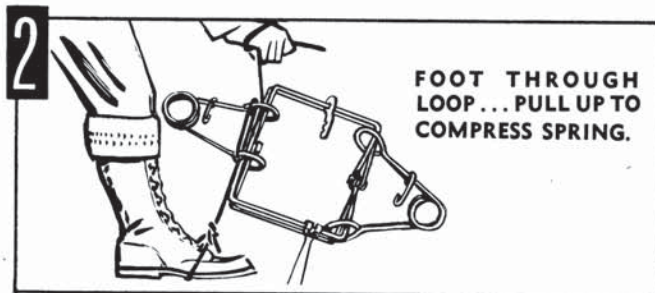
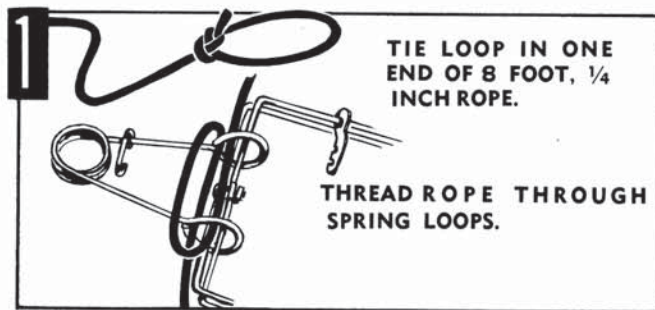


Figure 9. Illustration of how to set a Conibear trap.

Summary

The American beaver is of historical importance to Arkansas and exemplifies the successful return of wildlife to “The Natural State” (Figure 10). Their activities create watering holes for wildlife and habitat for warm-water fish, waterfowl, mink, muskrat and otters. However, increasing numbers of beaver have caused serious property damage for some forest landowners, crop farmers and county governments which maintain roadways and culverts. In these areas, it is necessary to control beaver populations. Knowing about the beaver, its habits and options for control methods will assist with reducing these conflicts between people and the American beaver.



Figure 10. The American beaver is a keystone species in wetland ecosystems.

Photo by Gerald J. Lenhard, Louisiana State University, Bugwood.org

Web Site Resources

- **Arkansas Forest Resources Center**
www.afrc.uamont.edu
- **Arkansas Game and Fish Commission**
800-364-4263, www.agfc.com
Arkansas Hunting Guidebook
List of nuisance wildlife control operators
Landowner Nuisance Wildlife Registry
- **Arkansas Natural Resources Commission**
www.anrc.arkansas.gov
Beaver Control Program
- **Arkansas Trappers Association**
www.arkansastrappers.org
- **University of Arkansas Division of Agriculture, Cooperative Extension Service**
501-671-2000, www.uaex.uada.edu
Dealing With Wildlife
Additional nuisance wildlife publications
- **USDA National Wildlife Research Center**
www.aphis.usda.gov

Research Publications and Reports

Sasse, Blake. 2011. *2010-11 Furbearing Animal Report*. Arkansas Game and Fish Commission, Wildlife Management Bureau.

Wagner, Kimberly K., and Dale L. Nolte. 2000. *Evaluation of Hot Sauce® as a repellent for forest mammals*. Wildlife Society Bulletin 28:76-83.

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