



## OREGON DEPARTMENT OF FISH AND WILDLIFE

# LIVING WITH WILDLIFE: AMERICAN BEAVER

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### FACTS ABOUT OREGON'S BEAVERS

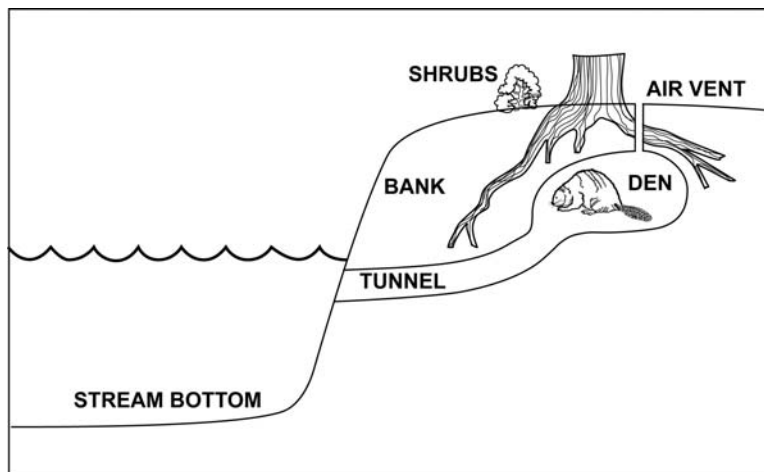
The American Beaver (*Castor canadensis*) is the largest living rodent in North America. Adults average 40 pounds in weight and measure more than three feet in length, including the tail. They have a nose and ears that seal out water. These semi-aquatic mammals have webbed hind feet, large incisor teeth and a broad flat tail. They have poor eyesight, but excellent hearing and sense of smell. The beaver's sharp incisors, which are used to cut trees and peel bark while eating, are harder on the front surface than on the back so the back wears faster creating a sharp edge that enables a beaver to easily cut through wood. The incisors continually grow, but are worn down by grinding, tree cutting and feeding. Beavers are territorial and to mark their territory by creating small mounds of mud, leaves, and sticks, which they then cover with pungent oil called castoreum.

Once among the most widely distributed mammals in North America, beavers were trapped virtually to extinction in the 1800s to meet demand for beaver pelts. A subsequent decline in demand coupled with proper wildlife management allowed beavers to become reestablished in much of their former range and are now common in many areas, including urban settings.

Beavers are found where preferred foods are in good supply—along rivers and small streams, lakes, marshes and even roadside ditches that have adequate year-round water flow. In areas where deep, calm water is not available, beavers with enough building material available will create ponds by building dams across creeks or other watercourses to impound water.

## Food and Feeding Habitats

- Beavers eat the leaves, inner bark, and twigs of aspen, alder, cottonwood, willow and other deciduous trees. They also eat shrubs, ferns, aquatic plants, grasses, blackberries and agricultural crops.
- Most foraging is done within 165 feet of the water's edge. In areas with few predators and a lean food supply, toppled trees and other signs of foraging may be found twice that distance from the den site.
- Foraging levels are most intense during late fall (earlier in cold winter areas of Oregon) as beavers prepare for winter.
- Fermentation by special intestinal microorganisms allows beavers to digest 30 percent of the cellulose they ingest from vegetation.
- When the surface of the water is frozen, beavers eat bark and stems from a food cache anchored to the bottom of the waterway for winter use. Food caches are seldom found where winters are comparatively mild, such as in the lowlands of western Oregon.



**Figure 1.** Like many rodents, beavers construct nesting dens for shelter and for protection against predators.

## Beaver Dams

- Beavers build dams to create deep water for protection from predators, for access to their food supply and to provide underwater entrances to their den. Resultant moist soil promotes growth of favored foods.
- Beavers living on water bodies that maintain a constant level (lakes or large rivers) do not build dams.
- Dams are constructed and maintained with whatever materials are available—wood, stones, mud and plant parts. They vary in size from a small accumulation of woody material to structures 10 feet high and 165 feet wide.
- The sound of flowing water stimulates beavers to build dams; however, they routinely let a leak in a dam flow freely, especially during times of high waters.
- Beavers keep their dams in good repair and will constantly maintain the dams as the water level increases in their pond. A family of beavers may build and maintain one or several dams in their territory.
- In cold areas, dam maintenance is critical. Dams must be able to hold enough water so the pond won't freeze to the bottom, which would eliminate access to the winter food supply.

### **Lodges and Bank Dens**

- Depending on the type of water body and the geographic area they occupy, beavers construct lodges or bank dens as a place to rest, stay warm, give birth and raise young. These may be burrows in a riverbank or the more familiar lodges in the water or on the shore. Both burrows and lodges consist of one or more underwater entrances, a feeding area, a dry nest den and a source of fresh air.
- Lodges consist of a mound of branches and logs plastered with mud. One or more underwater openings lead to tunnels that meet at the center of the mound where a single chamber is created.
- Bank dens are dug into the banks of streams and large ponds, and beavers may or may not build a lodge over them (Fig. 1). Bank dens may also be located under stumps, logs, or docks.
- All family members concentrate on repairing the family lodge or den in late fall (earlier in cold winter areas of Oregon) in preparation for winter.

### **Reproduction and Family Structure**

- A mated pair of beaver will live together for many years, sometimes for life.
- Beavers breed between January and March, and litters of one to eight kits (average four) are produced between April and June. The number of kits born is closely related to the amount of food available (more food, more kits) and the female's age.
- The female nurses the kits until they are weaned at 10 to 12 weeks of age.
- Most kits remain with adults until they are about two years old although some leave as early as 11 months and a few females stay until they are three years old. The kits then go off on their own in search of mates and suitable spots to begin colonies, which may be several miles away.
- Beavers live in colonies that may contain two to 12 individuals. The colony is usually made up of an adult breeding pair, kits of the year, and kits of the previous year or years.
- Populations are limited by habitat availability; the density of beavers appears not to exceed one colony per one-half mile under the best of conditions.

### **Mortality and Longevity**

- Because of their size, behavior and habitat, adult beavers have few natural enemies.
- When foraging on shore or migrating overland, beavers may be killed by bears, coyotes, bobcats, cougars or dogs.
- Other causes of death include severe winter weather, winter starvation, disease, water fluctuations and floods, falling trees and collisions with vehicles along roadways.
- Historically, beavers were one of the most commonly trapped furbearers.
- Beavers live five to 10 years in the wild.

### **VIEWING BEAVERS**

Although beavers are nocturnal, they are occasionally active during the day. They do not hibernate but are less active during winter, spending most of their time in the lodge or den. Freshly cut trees and shrubs and prominent dams and lodges are sure indicators of beaver presence. Look for signs of beavers during the day; look for the animals themselves before

sunset or after sunrise. Look for a V-shaped series of ripples on the surface of calm water. A closer view with binoculars may reveal the nostrils, eyes and ears of a beaver swimming.

If you startle a beaver and it goes underwater, wait quietly in a secluded spot and chances are that it will reemerge within one or two minutes. However, beavers are able to remain underwater for at least 15 minutes by slowing their heart rate. In order to warn each other of danger, beavers slap their tails against the water, creating a loud splash. Sounds also include whining (noise made by kits), a breathy greeting noise and loud blowing when upset.

When seen in the water, beavers are often mistaken for muskrats or nutria. Try to get a look at the tail. Beavers have a broad, flat tail that doesn't show behind them when swimming, whereas muskrats and nutria have a thin tail that is either held out of the water or sways back and forth on the water's surface as the animal swims. When on land, beavers will generally stand their ground and should not be approached or cornered. They will face the aggressor, rear up on their hind legs and hiss or growl loudly before lunging forward to deliver extremely damaging bites.

### **Forage Sites**

Beavers cut down trees, shrubs and other available vegetation for food and building materials. There will be a pile of wood chips on the ground around the base of recently felled trees. Limbs that are too large to be hauled off are typically stripped of bark over the course of several days. The cut on small wood usually involves a 45-degree cut typical of rodents, but at a larger scale. Branches and twigs under  $\frac{3}{4}$  inch in diameter are usually eaten entirely.

### **Slides and Channels**

Slides are the paths beavers make where they enter and leave the water. They are 15 to 20 inches wide, at right angles to the shoreline, and have a slicked down or muddy appearance. Beavers construct channels or canal systems leading to their ponds, using them to float food—such as small, trimmed trees—from cutting sites. With receding water levels during summer, beaver activity shifts toward building and maintaining channels to access new food supplies. Channels often look man-made, have soft, muddy bottoms and are filled with 15 to 25 inches of water.

### **Food Storage Sites**

Beavers that live in cold climates store branches of food trees and shrubs for winter use by shoving them into the mud at the bottom of ponds or streams near the entrance to their bank den or lodge.

### **Droppings**

Beaver droppings are seldom found on land—those that are will commonly be found in the early morning at the water's edge. Individual beaver droppings are usually cylindrical, up to  $2\frac{1}{2}$  inches long and look as if they were formed of compressed sawdust. The diameter is an indication of the animal's size—1 inch is average for adults. The color of fresh deposits is dark brown, with lighter-colored bits of undigested wood, all turning pale with age.

## **BEAVERS ON THE LANDSCAPE**

### **Beaver ponds and dams benefit Oregon's native fish and other wildlife**

- Beaver dams create ponds that provide fish protection from strong winter flows. They increase the storage of water resulting in a more stable water supply and maintenance of higher flows downstream for a longer period of time.
- By providing plenty of woody debris in which juvenile fish can hide from predators, beaver dams help young trout and salmon survive their first vulnerable year. They also provide winter pool habitat that is important for fish such as cutthroat trout and coho.
- Beaver ponds help store leaf litter in the water and in turn support aquatic insect production, an important food for fish, amphibians, waterfowl, bats and songbirds.
- Beaver dams contribute to improved nesting and brood rearing areas for waterfowl in ponds and surrounding areas. The increased growth of vegetation provides additional forage and cover for a variety of wildlife such as big game and songbirds.
- Beaver ponds attract and provide habitat for mink, river otter, muskrats, turtles, frogs and salamanders.
- The trees that die as a result of rising water levels behind beaver dams attract insects that are a food source for many wildlife species such as woodpeckers. The tree snags also provide homes for cavity-nesting birds.

### **Beavers can help private landowners**

- Beaver dams create wetlands which help control downstream flooding by storing and slowly releasing water, reducing the severity of high stream flows particularly after winter storms and spring snow melt.
- Beaver created wetlands improve water quality by removing or transforming excess nutrients, trapping silt, binding and removing toxic chemicals and filtering out sediment.
- Beaver dams facilitate ground water recharge and help raise the ground water table. This promotes vegetative growth, which in turn helps stabilize stream banks and minimize erosion. In some areas, beaver dams have been a major factor in building up soil in meadows and reducing the impact of invasive vegetation.
- Beaver dams reduce water velocity, reducing channel scouring and streambank erosion.
- Wetlands created by beavers attract a variety of fish and wildlife that provides recreational and aesthetic values to landowners.

### **Beavers can cause damage on public and private lands**

- Beavers can become a problem if their foraging habits or building activities cause flooding or damage property.
- Beaver activity may result in damage to timber, crops, ornamental or landscape plants.
- Beaver dams and subsequent increased water levels may jeopardize the integrity of septic systems, roads or other human structures.
- There are several options for landowners in dealing with problem beavers that are covered in the following sections: preventing conflicts and remedying existing problems; lethal control; and moving beaver.

## PREVENTING CONFLICTS AND SOLVING PROBLEMS: PLANTS AND TREES, FLOODING

Knowing that beavers fulfill an important role in creating wetlands that provides multiple benefits to a variety of fish and wildlife as well as landowners, one approach to dealing with beavers is to learn to live with them.

### PROTECTING PLANTS AND TREES

#### Choose and place plants carefully

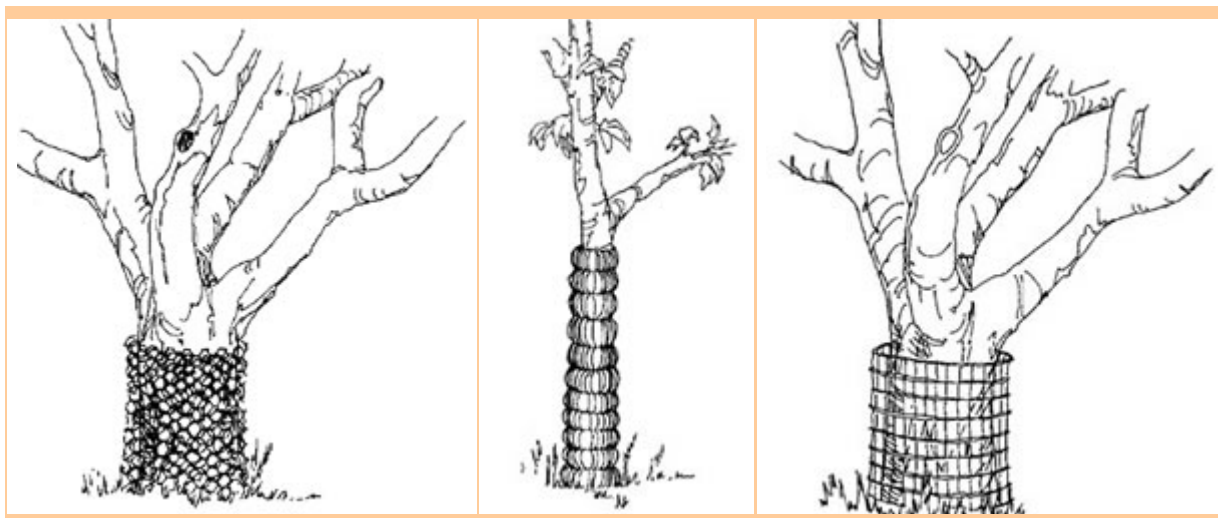
Plant areas with Sitka spruce, elderberry, cascara, osoberry (Indian plum), ninebark, and twinberry, because they are not the beavers' preferred food plants. Densely plant aspen, cottonwood, willow, spirea (hardhack), and red-twig dogwood because once their roots are well established the plants often resprout after being eaten. Planting preferred plants away from known beaver trails will limit losses. *Note:* Beavers do use plants as construction materials that they might not eat.

#### Install barriers around trees

Wire cages around trees can prevent beavers from chewing on them. The trunks of individual large trees can be loosely wrapped with galvanized welded wire fencing, hardware cloth, or multiple layers of chicken wire (Fig. 2). Metal flashing can also be used. Trunks should be wrapped to a height of at least four feet, or in areas where flooding is common, at least two feet above the high-water mark. A 6 to 12 inch space should be left between the wire cage and the tree trunk as beavers may try to chew between the wires. Some form of stake or support is needed to keep beavers from pushing fencing against tree trunk and chewing. Check wire barrier every year to make sure they do not inhibit tree growth. Barriers can be painted to make them less noticeable. Welded wire fencing coated with green vinyl that helps the fencing blend in is also available. Lengths of corrugated plastic drainpipe can be attached around the trunks of narrow-diameter trees. *Note:* Dark-colored pipe can burn trunks in full sun; wider diameter pipe or pipe with holes in it may prevent overheating problems.



Newly planted tree protected from beaver damage using rebar and fencing. Rebar stake is used to hold up protective cage. (Photo by Doug Ray.)



**Figure 2.** Various barriers can be used to protect plants from beaver damage. All plants should be protected to at least 4 feet above ground—or the snow line—and inspected regularly to ensure that wire does not become imbedded in the bark. (Drawing by Jenifer Rees.)

Surround groups of trees and shrubs with 4-foot high barriers made of galvanized, welded wire field fencing or other sturdy material (Fig. 3). A beaver's weight will pull down chicken wire and other lightweight material. Stake the barriers to prevent beavers from pushing them to the side or entering from underneath. An electric fence with two hot wires suspended 8 and 12 inches off the ground is also effective at protecting groups of plants. Consult local codes and experts before installing electrical fencing.

Protect large areas that border beaver habitat by installing 4-foot high field fencing. Keep the bottom of the fence flush to the ground, or include an 18-inch wide skirt on the beaver side of the fence to prevent beavers from entering underneath. *Note:* Preventing access to food sources may force beavers to eat other nearby plants, including roses and other ornamentals.



**Figure 3.** Groups of plants can be protected from beaver damage by surrounding them with wire fencing. (Photo by Russell Link)

### **Apply repellents on trees**

Painting tree trunks with a sand and paint mix (2/3 cup masonry grade sand per quart of latex paint) has proven somewhat effective at protecting trees from beaver damage. The animals presumably don't like the gritty texture.

Commercial taste and odor repellents have provided mixed results, perhaps because they need to be reapplied often, particularly in moist weather. Taste and odor repellents are most effective when applied at the first sign of damage, when other food is available, and during the dry season. Two repellents that have had some success are Big Game Repellent<sup>®</sup> and Plantskydd<sup>®</sup>. Taste repellents are usually most effective when used at the first indication of beaver activity.

## **PREVENTING FLOODING**

Before starting *any* of the following treatments or activities, landowner approval must be obtained. In addition, as these activities typically require some work in wetlands or streams, permits may be required from various local, state, and federal agencies before work is started. Please refer to the [State Water-Related Permits Users Guide](#) for more information or contact the [Department of State Lands](#) to determine if a removal-fill permit may be required.

### **Help maintain beaver dams and ponds with flow devices**

It may be possible to make a change in the depth of a beaver pond to prevent flooding by installing a flow device at the intended depth that extends upstream and downstream of the dam. The flow device, a beaver deceiver or flexible leveler, keeps the rise in water level in the pond at a minimum by using one or more plastic pipes to continually drain the pond area. In general, at least three feet of water in the pond area will need to be maintained for the beavers to stay. See a diagram of a flexible leveler on page 11.

Installation of flow devices may require an approved fish passage plan to ensure that fish are able to navigate the flow control device. To learn more and to review the Oregon State fish passage laws, visit the [fish passage section](#) of the ODFW Web site. People may also contact their local ODFW office for more information.

### **Dam removal**

Removing beaver dams may alleviate a damage situation temporarily, but generally dam removal is a futile effort because beaver will quickly rebuild the dam, sometimes overnight.

For information on beaver dams while conducting forest management activities on private land, contact the Oregon Department of Forestry. Except as needed for road maintenance, operators must submit a written plan to ODF prior to the removal of beaver dams and other natural obstructions from waters of the state during forest operations. In compliance with the Forest Practices rules, removal of any beaver dam that is within 25 feet of a culvert can be considered necessary for road maintenance. See Oregon Department of Forestry Forest Practices rules and (Oregon Administrative Rule 629-660-0050). Implemented by Oregon Department of Forestry.

See Department of State Lands sources list at the end of this document.

### **Removal of beaver lodges or dens**

In western Oregon, most lodges are bank dens, not in-water structures. ODFW does not generally recommend that lodges or dens be removed, but removal does not require a permit from ODFW. Check with your local ODFW office for more information. *Note:* Muskrat lodge removal is prohibited.

### **Blocked culverts**

To a beaver, a culvert probably looks like a hole in an otherwise fine dam, and when they plug the hole, a flooded road can result. One option to keep beavers from plugging a culvert is to create an alternative location for the dam. In overview, a series of 3 to 5 inch diameter non-treated lumber posts or live willow posts spaced 18 to 24 inches apart can serve as a foundation for the beavers to build a new dam. If you place the woody material from the removed dam upstream from the posts, beavers will use it to start the new dam. See diagram on page 12.

Other options to prevent beavers from plugging a culvert are available but some may prevent fish passage so you are encouraged to contact your local ODFW biologist for the best option for the property in question.

## **MOVING BEAVERS**

It is illegal for anyone to *move* beaver in Oregon without a permit from ODFW. Contact your local ODFW biologist to request a permit.

ODFW is currently developing guidelines for live-trapping and relocating beaver. The intent of the guidelines is to maximize the ecological benefits provided by beaver while



minimizing potential conflicts (e.g., damage to private property) where beaver relocation is deemed appropriate and is authorized by ODFW.

## **LETHAL CONTROL**

After assessing beaver activity, determine if beavers are causing damage or creating a hardship that requires lethal control. Sometimes, the very presence of beavers is seen as a problem when, in fact, the beavers are causing no harm.

**Private** landowners or their agents may lethally remove beaver without a permit from ODFW. Beavers are defined in state statutes as a predatory animal on private land. See section below on Species Status.

Once lethal control is decided upon, the landowners can trap the beaver themselves, hire an ODFW-permitted Wildlife Control Operator who works directly with property owners to resolve problem beaver situations on a fee basis, or allow an ODFW-licensed regulated trapper to remove beaver during the established trapping season. Call your local ODFW office or visit the ODFW Web site for a current list of [Wildlife Control Operators](#).

*Note:* Removing beavers is often a short-term solution as other beavers will move into the area if suitable habitat is present.

## **SPECIES STATUS**

**Beavers on Public land:** Beavers are classified as Protected Furbearers by Oregon Revised Statute (ORS) 496.004 and Oregon Administrative Rule (OAR) 635-050-0050 on public land. Statute implemented by ODFW.

**Beavers on Private land:** Beaver are defined as a Predatory Animal by Oregon Revised Statute (ORS) 610.002 on private land. Statute implemented by Oregon Department of Agriculture.

## **Explanation of terms**

- "Predatory animals" means coyotes, rabbits, rodents, and feral swine which are or may be destructive to agricultural crops, products and activities. This definition is applicable where wildlife is taken under the authority of one who owns leases, occupies, possesses or has charge or dominion over the land. On public land this typically includes one who has a grazing lease. Refer to ORS 610.105.
- "Take" means to kill, attempt to kill or obtain possession or control of any wildlife (ORS 496.004).

## **REGULATED TRAPPING**

Trapping, like most technologies, has changed dramatically during the last two hundred years. Traps and trapping systems have made tremendous advances since the 1800s when beaver were nearly eliminated. Today, all regulated trappers in Oregon must first complete a study course and successfully pass a written test showing an acceptable level of

knowledge of animal behavior, current laws and regulations and trapping skills. Modern science based information is used to establish strict laws, enforced by Oregon State Police, which allows regulated trappers to harvest beaver during authorized seasons using state-of-the-art traps and techniques. Such trapping systems are a benefit by removing damage-causing beaver while maintaining healthy and abundant beaver population. The vast majority of beaver trapped today fall into this damage category. ODFW Furbearer Regulations can be found on the [ODFW Web site](#).

## **PUBLIC HEALTH CONCERNS**

There are few public health concerns to the general public in regard to beaver. Trappers and biologists should follow safety rules when dealing with beaver. Beavers can be infected with the bacterial disease tularemia, which is fatal to animals and is transmitted to them by ticks, biting flies and via contaminated water. Animals with this disease may be sluggish, unable to run when disturbed or appear tame. Tularemia may be transmitted to humans if they drink contaminated water, eat undercooked, infected meat, or allow an open cut to contact an infected animal. The most common source of tularemia for humans is to be cut or nicked by a knife when skinning an infected animal. A human who contracts tularemia commonly has a high temperature, headache, body ache, nausea, and sweats. A mild case may be confused with the flu and ignored. Humans can be easily treated with antibiotics. Contact your family doctor immediately if you believe that you have contracted tularemia.

## **OTHER INFORMATION**

[Oregon Department of State Lands](#)

[Oregon Department of State Lands Removal-Fill Guidelines](#)

[ODFW Furbearer Regulations](#)

[ODFW Web Site](#)

[ODOT Beaver Bafflers \(pdf\)](#)

[State Water-Related Permits Users Guide](#)

[USDA Extension Service: Beaver \(pdf\)](#)

[USDA Living with Wildlife: Beaver, suitable for children \(pdf\)](#)

### **Oregon Department of Fish and Wildlife**

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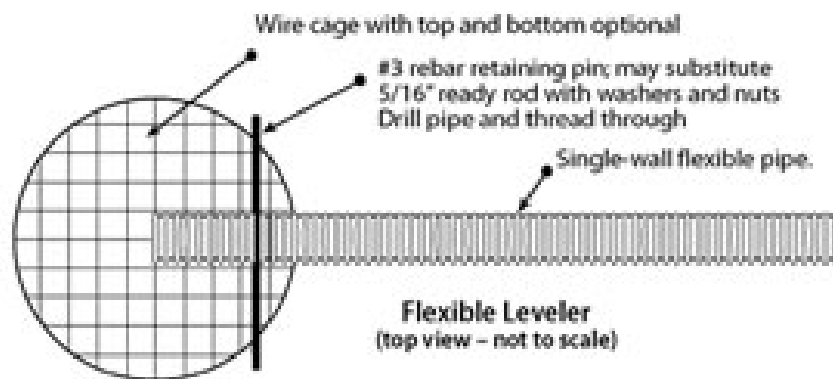
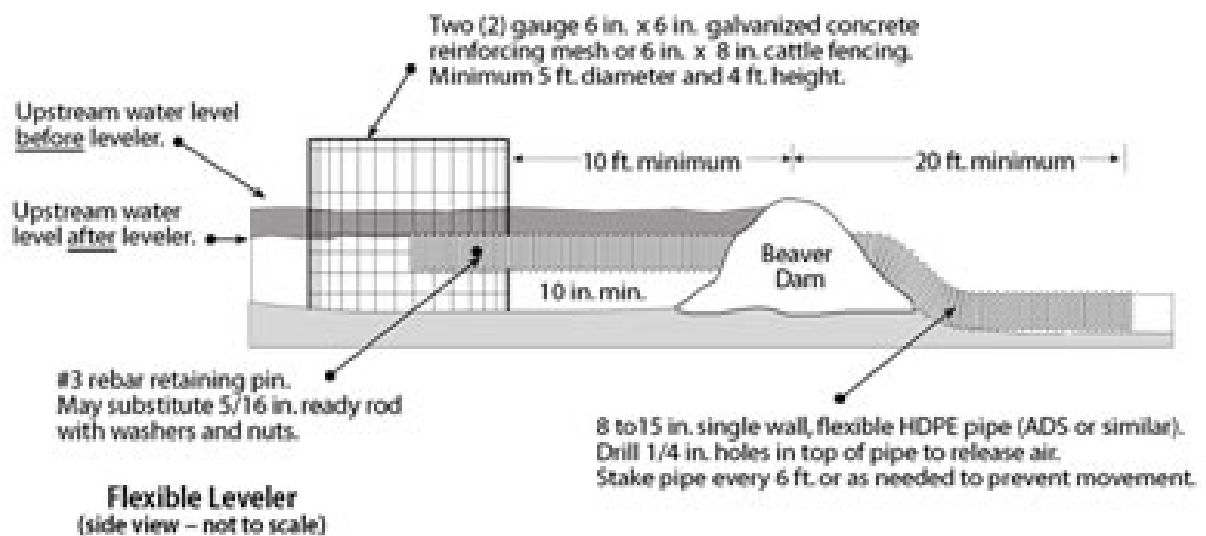
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See diagrams on pages 11 and 12.

*Note: The use of trade, firm, or corporation names and links in this publication is for the information of the reader. Such use does not constitute an official endorsement or approval by the Oregon Department of Fish and Wildlife.*



**Construction notes:**

1. Construct wire cage using hog rings or similar devices for fasteners. Overlap one section for cage wall.
2. Cut out hole for flexible pipe in cage wall.
3. Remove dam as needed to place flexible pipe. Replace dam after leveler is installed.
4. Stake single-wall HDPE pipe every 6 ft. To prevent it from floating or beavers from moving it, use two T-posts and wire between them and over the top of the pipe to secure the pipe.
5. Drill 3/8th in. hole in culvert for rebar to allow for friction fit. If ready rod is used, place washers next to pipe and secure with double nuts.
6. One (1) 16 foot section of fencing will construct a cage wall approximately 5 feet in diameter. An additional section is needed to construct the top and bottom of each cage.
7. Pipe diameter should be sized to pass the stream base flow.
8. Final layout of the pipe should allow for a shallow gradient to facilitate fish passage.

### Prevent beavers from plugging culverts

