

BEAVER

BEST MANAGEMENT PRACTICES



A PRACTICAL GUIDE TO LIVING AND WORKING WITH BEAVER
RELIABLE TREE PROTECTION
FLOW-CONTROL DEVICES TO PREVENT UNWANTED FLOODING
PROTECTIVE CULVERT FENCING & ENCLOSURES
NON-LETHAL REMOVAL OPTIONS FOR UTAH



Free water storage!

WHY WORK WITH BEAVER?

Beaver provide essential services, and the solutions outlined here, creatively applied, make it possible to solve almost any beaver-related conflict while protecting and utilizing a valuable public resource. Beaver can damage or interfere with landscaping, irrigation, drainage, roadways, and private property. Managing them can become a time consuming and costly task. By following these Best Management Practice recommendations, you can anticipate a beaver's behavior and prevent unwanted cutting of trees, blocking of culverts, and flooding through simple, cheap, and most importantly, *effective* solutions.

WHY NOT JUST GET RID OF THEM?

Removal should be considered as a last resort. It's difficult, time consuming, and often proves ineffective at solving problems caused by beaver. Good habitat attracts beaver year after year. Beaver also bring many benefits to our communities, our forests, watersheds, and other wildlife. Efforts are underway to conserve and restore beaver populations in appropriate settings throughout the West. However, there are some settings from which beaver simply need to be removed, like irrigation ditches and canals. In these instances, *non-lethal* removal is preferable. Beaver are a valuable resource and many private property owners and public lands managers would like to see beaver back in waterways where they once thrived. Utah has a management plan that allows for live trapping and transplant of beaver to approved sites on public and private lands. Contact the Utah Division of Wildlife Resources for more information.



RELIABLE TREE PROTECTION

Beaver chew and fell trees for three reasons: for food (beaver are strict vegetarians, and the inner bark of aspen, willow, and cottonwood are their preferred meals); for building materials for their dams and lodges; and because they have to keep chewing on things to keep their teeth honed. If you live near a creek or irrigation ditch, fence any trees you wouldn't want to lose, especially those close to homes or power lines, shade trees, newly planted landscaping, etc. Beaver will sometimes travel long distances overland, but those most at risk are deciduous trees (cottonwood, willow, aspen, birch, alder) within 100-300' of creeks, ponds, and irrigation ditches.

MATERIALS:

- 12.5 or 14 gauge welded wire fencing, 50' or 100' rolls
- Wire or bolt cutters
- Hog Rings, Hog Ring pliers
- Fencing pliers
- T-post or rebar
- Bailing wire

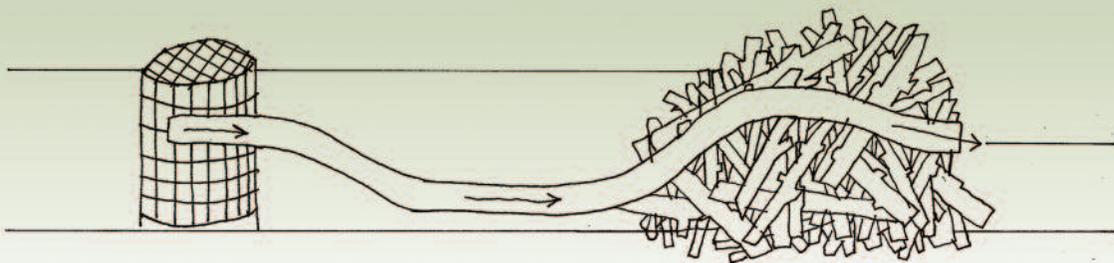
TOP: Tree Fencing.
RIGHT: Hog Rings.



NO CHICKEN WIRE! Use heavy welded wire fencing available at most farm and ranch or home improvement stores. 12.5 gauge wire will stand up to falling limbs and piling snow. Thinner wire is not recommended.

Leave space for the tree to grow. Wrap the fencing so that you leave 10–12" of space between the fence and the tree. Wrap too tightly and the tree may be girdled and die. **TIP FOR MEASURING OUT FENCE:** take the measurement around the tree (circumference), and add about 6'. This is the length of fence you will need for leaving 10–12" of space between the tree and fence.

Wrap the fence around the tree and secure with 10–12 hog rings. For added stability or to prevent beaver from digging underneath, reinforce the fencing by securing it with 1–2 T-posts, or 2–4 rebar stakes, wired to the fence with bailing wire. Focus on fencing mature, aesthetically valuable trees, or newly planted trees within 100–200' of a creek, stream, irrigation ditch, canal, or pond.



FLOW CONTROL DEVICES

Beaver ponds provide important wildlife habitat, water storage, and sediment retention, and should be left intact whenever possible. If a pond becomes too large or raises the water table in an area where it causes flooding or property damage, reducing the size of the pond, without draining it completely, can often solve the issue.

POND LEVELER: *Controls unwanted flooding.* This device creates a permanent leak in a beaver dam that the beaver cannot plug, eliminating the need for repeated trapping, despite the presence of beaver. Beaver want to dam where they hear running water. By caging the intake and submerging the drain pipe so it flows silently, beavers are unable to detect or prevent the leak. These require no more than periodic maintenance to ensure they are functioning properly. Depending on where you set the elevation of the outlet pipe, you can control the elevation of the pond behind the beaver dam, allowing you to prevent a pond from getting too big and flooding property. Every site is different. Some sites may require more than one pipe and cage to handle higher flows. Consider the average, as well as maximum flows expected at the site when determining the appropriate action.

MATERIALS:

Most of these items are readily available at most farm and ranch or home improvement stores. *These same materials are also used for culvert protective fences and fence and pipe systems.*

- 6-gauge concrete reinforcing panels (commonly 7'x 20') – 6"x 6" mesh (can cut down to 10' lengths for ease of transport). Available at concrete supply stores.
- Heavy duty metal T-posts (5', 6', 7')
- 40' single or double-walled solid polyethylene drain pipe (10"–15" diameter)
- Split Couplers, correct for diameter of pipes
- Concrete blocks (half size)
- Hog Rings (large)
- 9–12 gauge galvanized wire
- 1 1/4" galvanized screws

TOOLS:

- Bolt cutters
- Pick axe
- Cordless Saws-All or chainsaw
- Cordless circular saw
- Cordless drill
- 1/4", 3/8" drill bits, Phillips driver
- Cordless batteries/charger
- Large bolt cutters
- Post pounder
- Small sledge hammer
- Hog Ring pliers
- Fencing and rebar pliers



ABOVE: Pond Leveler being installed. BELOW: Preparing the pipe using a circular saw.

POND LEVELER INSTALLATION

1. Prepare the dam to accept the pipe. Dig a notch in the dam and allow the pond level to drain to a reasonable level (this might take awhile). The depth of the notch will be the height that the pipe sits in the dam, and will determine how much of the pond will drain. Try to leave as large a pond as can be tolerated.
2. Prepare the pipe so it can be submerged. Double-wall pipe (smooth inside) is very buoyant so you first need to score the pipe lengthwise with the circular saw. Set the depth to 1/4" and make a short test cut to be sure you are only cutting through the outer layer, opening up the air chambers, and not cutting through the inner wall. Make two such cuts, 3" apart, down the length of the pipe. Then take your drill and make 3/8" holes through the inner and outer pipe, every 6th or 7th ring, down the length of the pipe. Turn the pipe over and repeat the steps on the opposite side. For single-wall pipe (corrugated inside) it is only necessary to cut along the top of the pipe to provide ventilation and allow the pipe to be submerged.



Pond Leveler
intake cage.



- 3.** Create the round, domed-top cage that will house the pipe intake, to be submerged in the beaver pond. Every site is different so you'll have to build the cage to fit the pond where it will be submerged. Check the depth of the pond and the area you have to work with, and make the cage as large as can fit. An average cage is 5' across and 4' tall. You'll have to recall some geometry. To create a 5' diameter cage, you'll need to calculate the circumference by multiplying the diameter by 3.14 (Pi). So, for a 5' diameter cage, you'll need 5' x 3.14' of wire mesh (about 16'). Round it up so you'll have some material to overlap when you wrap it into a round cage. Secure the overlapping mesh together with plenty of hog rings (too many is just enough). You'll then have a round, 7' tall wire mesh cage, with no bottom or top.
- 4.** With bolt cutters, beginning at 5" off the ground (or whatever height you want—6" x 6" mesh makes the measurement a snap) cut the mesh up to the top, every 24" or so around the circumference of the cage, so that you have a series of mesh "tabs" every 24". Carefully bend these tabs into the middle of the cage (edges are very sharp), creating a domed top of overlapping mesh, and secure with plenty of hog rings. Next, set the cage on top of a flat piece of wire mesh and cut out the bottom piece. Secure it in place with hog rings and by bending the prongs of the wire mesh with a nipple wrench or fencing pliers.



Pond Leveler intake cage with pipe. Note that the intake cage is being floated into place on two plastic floats made from capped sewer pipes. This trick, devised by Mike Callahan of BeaverSolutions.com, is very helpful for deeper ponds.

- 5.** Cut a hole in the wall of the cage just big enough to accept the pipe. Feed the pipe through the cage wall so that the intake is roughly in the center of the cage, about a foot or so off the bottom. Drill two holes in the top of the pipe, feed a length of 9 gauge galvanized wire through the holes, and firmly secure to the walls of the cage, top and bottom, crossing the wires so the pipe can't rotate or move in or out. Couple lengths of pipe; reinforce split coupling with galvanized deck screws, zip ties, etc. to prevent them from coming apart or from rotating.
- 6.** Now that the pond has had time to lower to a reasonable level, make a final determination on the elevation of the notch and prepare to install the device. It helps to have at least 3 people. If the pond is too deep to wade, floats can be made from capped lengths of sewer pipe attached to the cage with quick releasing knots, and the device can be floated into place then submerged. Otherwise, wade into position carrying the cage and pipe. Lay the outlet side into the notch in the dam. Submerge the cage and pipe in the pond and secure with multiple T-posts and galvanized wire (longer T-posts are helpful for making sure they can be securely driven into the pond bottom). T-posts or long rebar driven at an angle and crossed over the pipe and wired together help keep the pipe submerged and the system securely anchored.
- 7.** Finally, replace wood and debris over the top of the outlet. Optionally, the outlet side can be fenced as well, however this is not often necessary.

Beaver are driven to build dams by the sound of running water, usually made at a constriction (riffle, drop) in a stream. A culvert or spillway makes a convenient location because they are noisy and generally easy to block, and with little effort the beaver can back up a significant amount of water. By understanding this behavior, we can effectively “deceive” the beaver and thwart damming efforts at culverts and spillways by building a protective cage which forces beaver out and away from the sound at the culvert. These structures are designed to accommodate fish passage, as well as other small animals which use the culvert for travel.

PROTECTIVE CULVERT FENCING AND “PIPE AND FENCE” SYSTEMS:

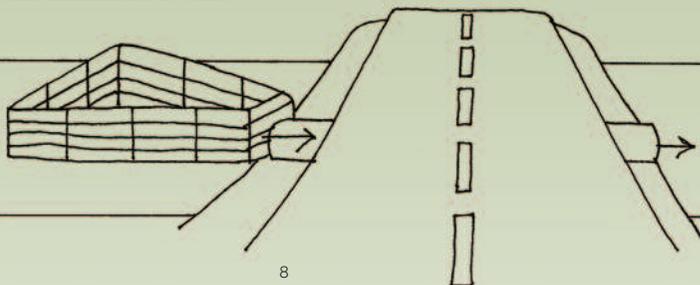
Prevents plugging of culverts. Using the same readily available tools and materials, you can also prevent culvert blockage or damming by building a protective enclosure around the culvert intake (upstream end). A beaver wants to dam where it hears running water (a culvert creates an enticing sound as the water is forced through). A trapezoidal enclosure (rectangular works too, especially in irrigation ditches) forces a beaver out and away from the sound and the source of its interest. Beaver generally won’t dam around the perimeter of the fence, which is generally 30–40’ around. It’s important to fence the floor of the enclosure as well, as beaver will easily dig under the fence if allowed. Anchor the installation securely using T-posts and heavy wire. For those charged with maintaining the culvert, the task is simplified by removing debris as it accumulates against the fencing (easy), as opposed to having to remove a blockage from within the culvert itself (difficult and dangerous).

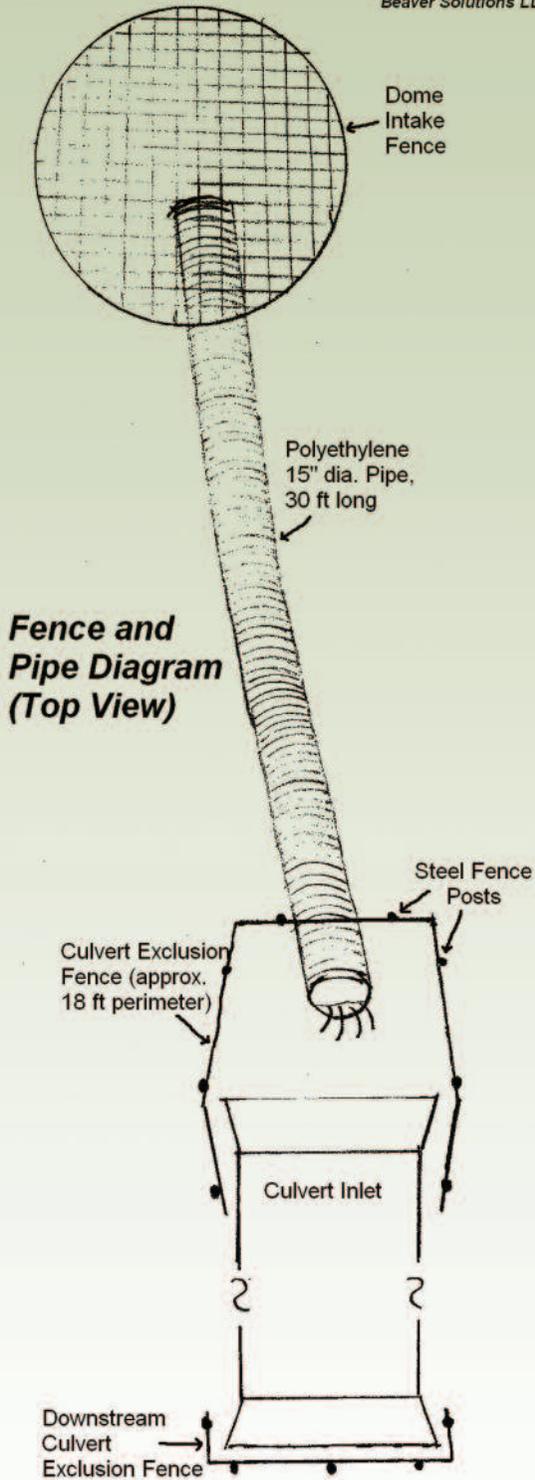
If excessive debris collects around the perimeter, or if beaver do manage to dam around the enclosure, a pond leveler can be combined with a small culvert fence in a “fence and pipe” system. The small culvert fence becomes a dam, and a pond leveler is used to maintain the pond at a tolerable level while

the culvert remains free of obstruction. Consider the average, as well as maximum flows expected at the site when determining the appropriate action.



LEFT AND BELOW:
Protective culvert fences.







NON-LETHAL REMOVAL OPTIONS (UTAH)

Understanding the Utah Beaver Management Plan (2010-2020)

Beaver in Utah are classified as protected wildlife and the Utah Division of Wildlife Resources (UDWR) is responsible for their management. In 2010, UDWR adopted its first comprehensive beaver management plan to address a wide variety of management goals and concerns. The Plan provides direction for management of American beaver (*Castor canadensis*) in Utah and where appropriate, expansion of the current distribution to their historic range. It also encourages work to improve riparian habitats, associated streams, and wetlands through translocations of beaver into unoccupied suitable habitat on public and/or private land.

STRATEGIES INCLUDE:

- Using Best Management Practices and working WITH beaver instead of against them in natural settings.
- Using approved non-lethal removal methods. Contact UDWR for assistance. Non-agency personnel with an interest in live trapping can be trained to provide assistance at the request of UDWR staff.
- Utilizing the beaver source and transplant priority table appended to the Plan when considering translocations (Appendix 1).
- Coordinating at the UDWR regional level and with land management agencies, local governments, private landowners, and any other affected parties that have an interest (positive or negative) in the establishment of beaver populations within the watershed.
- Encouraging land management agencies and private property owners to manage riparian habitat (aspen, willow, and cottonwood) to support translocated beaver populations.

Contact your local UDWR Regional Office for more information on live trapping and beaver transplants. Northern Region: 801-476-2740, Northeastern Region: 435-781-9453, Central Region: 801-491-5678, Southeastern Region: 435-613-3700, Southern Region: 435-865-6100.

ADDITIONAL READING AND INTERNET RESOURCES

Buckley, Mark. 2011. *The Economic Value of Beaver Ecosystem Services, Escalante River Basin, UT*. Eugene, OR: ECONorthwest.

Collier, Eric. 2007. *Three Against the Wilderness*. CITY, ST: Touchwood Editions.

Long, Kim. 2000. *Beavers: A Wildlife Handbook*. Boulder, CO: Johnson Books.

Müller-Schwarze, Dietland. 2011. *The Beaver: Its Life and Impact*. Ithaca, NY. Cornell University Press.

- Utah Division of Wildlife Resources–Utah Beaver Management Plan 2010-2020:
http://www.wildlife.utah.gov/furbearer/pdf/beaver_plan_2010-2020.pdf
- Beaver Solutions LLC: pioneering best management practices for beaver since 1998, with information and DVDs available showing how to install a variety of flow control devices and protective fencing.
<http://www.beaversolutions.com>
- Grand Canyon Trust–Utah Forest Program: helping to resolve beaver-related conflicts and restore beaver to southern Utah's National Forests, where they are needed to restore watersheds following decades of drought, fires, and other impacts.
http://www.grandcanyontrust.org/utah/forests_issues.php



GRAND CANYON TRUST UTAH FOREST PROGRAM
maryobrien10@gmail.com

www.grandcanyontrust.org



GRAND CANYON TRUST



Grand Canyon Trust
2601 N. Fort Valley Road
Flagstaff, Arizona 86001
(928) 774-7488

Solutions for Life on the Colorado Plateau