

## **A Step-By-Step Guide to Installing Flex Pipes**

The following description is to help you envision how to install a water flow control device to resolve beaver flooding problems using ABS flex pipes. **Please note that the effectiveness of the flow device is largely dependent on it being properly installed.** It is extremely difficult to include all the necessary details and trouble-shooting tips that an experienced installer would utilize when fitting a device to the particular site's natural features. This is why we always recommend working with an experienced installer when installing a water flow control device.

### **GENERAL TIPS**

- The flex pipes used for these jobs are perforated, single wall ABS pipes. The further the pipes extend away from the *inlet* end of the dam, the better the device will work. This is because when beavers feel the flow of running water, their instinct tells them to patch their dam. However, they don't tend to recognize a breach in their dam if the pipes are extended away from the inlet side of the dam at least 20 to 25 feet.
- Stainless steel or rust resistant wire should be used for the flow devices; carbon steel wire will rust very quickly.
- When using any type of fencing in front of a culvert, make sure that the materials are flush with the bottom of the waterway. Beaver can get through a very small hole, or will enlarge those that they can't get through. If the bottom of the waterway consists primarily of mud, cut off the bottom horizontal wire of the fencing material, leaving just the vertical wires sticking down. You can then step on the bottom of the fence, sinking it into the mud.
- Notching the dam the day before will make the work easier and safer. Drop the water level down to the level you would like to maintain. When breaching the dam for piping, only remove enough debris to fit the pipe through at the desired level. Save the debris and use it to cover the pipe after it is inserted through the dam.
- Flex pipes will float when placed in water, so you will need to use weights to keep the pipes below water at the desired level. One way to do this is to put two sign posts on top of each other, and attach them to the pipe by putting the posts alongside and horizontal to the pipe and wiring both ends of the posts (using rust-resistant or stainless steel wire) firmly around the pipe. Other options for weighing down the pipes are to use a) concrete cinder blocks or b) 5 gallon buckets filled with rocks, which, if used, should be attached to the flex pipes every 6 feet.
- One person can install this system, but it is always easier with two.

## **FLEX PIPE SYSTEM**

### **Materials**

- Corrugated, single wall ABS flex pipe with perforations. Do not use the smooth interior walled flex pipes: such pipes are too stiff to maneuver. Beavers sometimes chew through size 4" flex pipes; if concerned about chewing, wrap hardware cloth around the pipes on the *outlet* side of the dam extending at least four feet from the dam
- Concrete reinforcement wire, 8 gauge. Galvanized will last longer. Obtain the 5'x10' sections of 6" square mesh instead of rolls, since rolls are difficult to work with and have a tendency to spring back at you.
- Split couplings
- End caps
- 6'-8' street sign posts
- Stainless steel wire or form wire that is rust-resistant (not carbon steel wire which rusts out quickly)
- Hog rings
- Rebar or round stock, cut to length. Rebar will often penetrate hard or rocky surfaces when other materials will not.

### **Tools**

- Bolt cutters
- Wire cutters
- Cutting pliers
- Battery-powered drill
- Power saw or cordless sawzall
- Hog ring pliers
- Post driver
- Mall or sledgehammer
- Potato fork
- Chain saw (for removal of fallen trees, where needed)

**STEP 1: Making a protective cage for the inlet pipe**

*NOTE: This “cage” to protect the inlet end of the pipe can be made in advance or assembled on-site. The objective is to create a protective cage that will prevent the beavers from plugging the inlet end of the pipe. The shape of the cage can be rectangular or cylindrical.*

- Using three sheets of concrete reinforcement wire, cut two sections 8 squares across, and four sections 6 squares across.
- The sections 8 squares across are the top and bottom, and the sections 6 squares across are the four sides.
- Use hog rings or wire and fasten the sections together to make a 3'x5' box



## STEP 2: Preparing the pipes

- Put *end cap* on what will be the inlet end of the pipe
- Cut a 6" wide x30" long slot in underside of pipe using a cordless power saw or sawzall. This is where the water should enter the pipe, from the underside only, so beavers don't feel the sensation of water flow.
- Drill one hole in the top of the end cap, and another in the exact same location on the bottom





### STEP 3: Assembly (on site)

- With the cage sitting on the ground, cut a hole in the concrete reinforcement wire just big enough to fit the pipe through, and in a location that will place the pipe at the desired water level (normally midway). Make sure any space around the insertion area of the pipe is not large enough to allow beavers to pass through.
- Slide the pipe all the way to the back of the cage. Take a 2-3 foot long section of rebar and put it through the holes that were drilled in the end cap, making sure that there is approximately 8" to 10" of the rebar rod extending on each side of the pipe
- Turn the pipe as needed so that the 6"x30" slot in the flex pipe is facing the *bottom* of the cage.
- Using form wire, securely attach the rod to the back of the cage, which will keep the pipe in place and prevent it from turning. It is important to securely wire the rebar rod to the back of the cage because if the pipe turns so that the slot is facing the *side* of the cage, beavers will feel the sound of rushing water and try to plug it up with debris.
- If double flex pipes are being used, attach the second pipe using a split coupling. Put the coupling on the first pipe, slide the 2<sup>nd</sup> pipe into the other end of the coupling and wire each end of the coupling with form wire to close it and hold the pipes firmly together.



#### Step 4: Putting device in water

- Guide the device into the water so that the protective cage extends at least 20 feet from the *inlet* side of the dam. Even though beavers don't tend to plug the outlet end of the pipes, it is better to play it safe and allow several feet of pipe to extend beyond the *outlet* side of the dam.
- Insert the pipe through the notch you made in the dam, and then cover the pipe with the debris that was removed to create the notch. The goal is to get the beavers to continue damming at the site, and placing leftover debris on top of the pipes will make it less noticeable to the beaver that their dam has been breached. As a result, the beaver will focus their energies on repairing the "imperfect" dam you created with the leftover debris, and the desired water level will be maintained by the water now flowing through the device.
- Attach signposts if they are to be used to weigh down the flex pipes. Put two signposts on top of each other, attach them to the pipes by putting the posts alongside and horizontal to the pipes, and then wire both ends of the posts (with rust-resistant or stainless steel wire) firmly around the pipes. The posts will end up sinking to the underside of the pipes, which is fine. The posts should be set on the pipes at a distance approximately 4-5 feet from the cage.





### **A Note on the *Beaver Block***

The *Beaver Block* was developed by The Fund for Animals *Beaver Remedies* program staff to protect culvert pipes from beavers. The *Beaver Block* is a freestanding rectangular mesh box placed in front of the culvert to prevent beaver access. It can either have pipes inserted through it or it can stand-alone depending on the level of beaver activity at the site. If pipes are inserted, the inlet end should be protected by the cage as described previously in Step 1.

The *Beaver Block* is constructed of heavy-gauge, concrete reinforcement wire (6 or 8 gauge), and the size of the device is tailored to the size of the culvert. The *Block* is created much like the protective cage described above pertaining to the water flow control device using flex pipes. The *Beaver Block* is secured to the culvert with U channel posts or signposts.

Prior to setting the *Block* in place, remove any debris around the culvert and remove any rocks that will prevent the block from sitting snugly on the floor of the waterway just outside of the culvert. It is also important to make sure the device is flush to the culvert lip. These measures will ensure a tight seal and prevent beavers from swimming beneath the device and getting inside the culvert. All four corners should be reinforced with posts, as pictured below.

