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Acknowledgment
I wish to thank Hayden Haucke, Area Manager of the Gus Engeling Wildlife Management Area, for his assistance with testing and applying the drain method.

Partial funding for this publication was contributed by Federal Aid (P-R) Project W-124-M

4200 Smith School Road
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PWD BR W7100-320 (10/97)
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TEXAS PARKS AND WILDLIFE

An Improved Device for

Managing Water Levels in Beaver Ponds

by Carl Frentress

WILDLIFE DIVISION

Many ponds constructed by beaver are utilized by wintering waterfowl. Also, the large majority of these wetlands are excellent examples of the habitats required for rearing wood ducks. Some researchers have found that breeding wood ducks prefer foraging habitats comprised of shallow water areas among or adjacent wooded sites. Most beaver ponds fit this description. Therefore, because beaver ponds have been recognized as valuable both to wintering waterfowl and to production of wood ducks, attention has been turned to management possibilities for these sites. A major consideration in this strategy is the ability to manipulate water levels in order to influence wetland plant communities.

However, because of the tenacity of beaver, the capability of wildlife managers to alter water levels in beaver ponds often is obstructed. Breaches may be repaired overnight. Conventional drain pipes are plugged repeatedly. During 1985, in searching for ways to manipulate water levels in beaver ponds, I devised a technique to overcome the efforts of beaver to prevent drawdown of their ponds. Preliminary testing of the device followed ideas developed from field experience with beaver ponds. Subsequent examination of literature revealed that the same general concept had been proposed earlier in states in the Northeast. However, my updated version of the drain device employs readily available, economical materials which require no pre-assembly, and, which are easily transported and handled in the field. I have found these features to be useful improvements.

This technique is based on the fact that beaver tenaciously concentrate their dam enlargement and repair activities on, and/or, in the immediate vicinity of their structure. Research has revealed that the sound of flowing water is the stimulus causing beaver to recognize loss of water from their ponds. Because water overflows most beaver dams, this construction activity is on-going. Therefore, in active beaver colonies, any undue loss of water is quickly slowed or stopped. The animals will fill large breaches in the dam in only a few days. Also, conventional pipes and culverts that may be inserted in the dam usually are plugged. The classic three-log drains are handled similarly.

Consequently, beaver respond to any destruction of their work simply by restoring the dams to their original condition. Thus, any device for prolonged passage of water through a beaver dam must have an intake that is: 1) undetectable to the beaver, and, 2) located in the pond and away from the dam. Polyvinyl chloride (PVC) sewer pipes provide a means of installing a system that can be used to manipulate water levels for prolonged periods in beaver ponds.

This device and its installation in a beaver pond is described in the steps that follow.

1. Assemble the following materials (exact quantities will depend on site-specific requirements):
   - PVC sewer pipe (solid-wall, 4-in. diameter, 10-ft. lengths)
   - PVC sewer pipe (perforated-wall, 4-in. diameter, 10-ft. lengths)
   - PVC end caps (4-in. diameter; one for each outlet)
   - Steel, T-type fence posts (6-ft. length; longer lengths for deeper ponds)
   - Post driver
   - Soft wire
   - Carpenter's level
   - Garden fork

2. Inspect the pond and beaver dam to determine the most suitable location to place the drain pipe system. Generally, the clearest and deepest part of the pond is most desirable.

3. Dig a breach 1-2 feet wide through the dam (Figure 1). The bottom of the resulting trench should correspond to the new, desired level of the water surface in the pond after installation of the device (Figure 2). (In other words, dig to the level at which you want the water surface to be after the drain is operating.) A garden fork is especially suited to pulling material from the dam. Water is allowed to drain through the breach until the new, desired water level is attained in the pond.

Figure 1.
A garden fork is used to dig a trench through the beaver dam.

Figure 2.
Enlarge the trench and drain water until the desired lower level is reached.

Figure 3.
The drains consist of solid-wall pipe and perforated-wall pipe.

4. Assemble the drain tubes. Each drain tube will consist of solid-wall pipe for half the length and perforated-wall pipe for the other half (Figure 3). These combined PVC sewer pipe sections should be assembled into one long tube. Couplings are simple, friction-type fittings that permit one end to be shoved into the adjoining end. These long, flexible pipes may be slightly unwieldy. Nonetheless, they can be handled adequately and are sufficiently durable to be moved into position (Figure 4). The assembled tubes should be placed with the solid-wall sections lying through the excavated trench in the dam while the perforated-wall sections extend into the pond (Figure 5). This manner of placement is important.

   Therefore, each drain will consist of a combination of solid sections and perforated (intake) sections. Two or more pipes may be necessary to carry the normal stream inflow. The number of pipes will depend on the size of the pond and the volume of inflow. An examination of the stream current above the pool may assist judging the number of pipes for the drain.

Figure 4.
An assembled drain pipe combination is being moved into place.

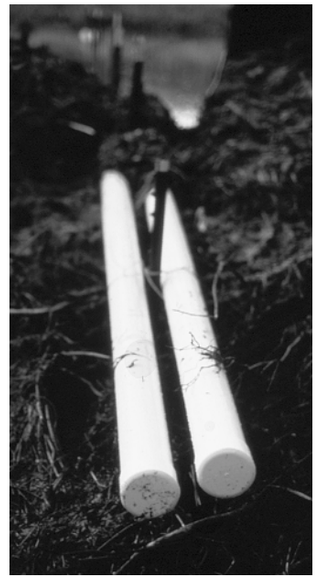
Figure 5.
The solid section is in place in the dam; the perforated section extends into the pond in the background.

5. Using the carpenter's level, adjust the pipes to be almost level, but with a slight pitch favoring outlet flow. Wire them securely to steel fence posts driven into the pond bottom at intervals appropriate for supporting the entire length (Figures 6 and 7).

Figure 6.
Pipes are situated in the pond with a slight downward pitch toward the outlet end.

Figure 7.
T-posts are suitable supports for the drain pipes.

6. Place end caps over the outlets. After the pipes are in place, some of the inflow will begin to flow around and through the pipes at the trench in the dam. If beaver are maintaining an active colony in the pond, they will begin to repair the breach containing the pipes (Figure 8). They direct their repair activities at areas that have water flowing through the damaged portions. This behavior can be used to advantage by placing the end caps on the pipe outlets. All outflow water will then flow around the exposed pipe. This flowing water will stimulate the beaver to fill the breach (Figure 9). In repairing the damage, beaver cover the pipes, making them an integral part of the dam (Figure 10). After this has happened, the drains are ready to operate.



7. When the dam has been restored to the original elevation, remove the end caps from the pipe outlets. This will permit the inflow to pass through the dam via the pipes (Figure 11). The result is that the water level will remain at the new, reduced elevation. Water subsequently may be raised or lowered simply by replacing or removing the outlet end caps according to management needs.

This technique seems to effectively circumvent the repair behavior beaver exhibit toward other types of water control devices in their dams and ponds. However, two potential problems related to installation/operation of the device are notable. First, a beaver pond cannot be completely drained with this method. This would require the intake sections to lie on the pond bottom. When systems are installed with the pipes lying on or near the pond bottom, beaver will stack material over the pipes, thus, plugging the intake sections. Therefore, the pipes must be suspended about 2 feet from the bottom. This prevents beaver tampering with the intake.

Figures 8 (left), 9 (below top) and 10 (below bottom).
Beaver will repair the breach, thus incorporating the drain pipes into the dam. Note the end caps are in place.

Secondly, in a few instances in our trials, beaver have attempted to build new dams around the outfall below the dam. As mentioned above, the splashing water of the outfall is the stimulus causing beaver to recognize the water discharge. This can be eliminated by attaching a flex-hose downspout on the outlet ends of the pipes to allow the released water to pass quietly into the downstream channel.

This technique is routinely recommended and utilized for management objectives serving both wood duck production and enhancement of wintering waterfowl habitat in East and Central Texas. Additionally, the system provides a non-lethal option for application in nuisance situations created by beaver.

Figure 11.
The system is operated by removing the end caps from the drain pipes.