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THE 2005 REVISIONS TO THE MASSACHUSETTS WETLANDS PROTECTION ACT REGULATIONS

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The Revised Wetlands Protection Act regulations became effective on March 1, 2005. The electronic version of the regulations provided at the DEP web site at www.mass.gov/dep/brp/ww/regs.htm represents an unofficial copy of the regulations. Official copies of the revised regulations are published by the Secretary of State's Office and are currently available at the State House Book Store in Boston at (617) 727-2834, in Springfield at (413) 784-1376, and in Fall River at (508) 646-1374. Copies of the revised regulations obtained at the State House Book Store prior to March 11, 2005, when the regulations were corrected, contain errors. Updated wetland forms and instructions which detail the filing requirements under the revised regulations are available at the DEP web site at www.mass.gov/dep/brp/ww/wwforms.htm. The "Preface" to the 2005 revisions, which is provided with the published regulations but does not form part of the regulations, presents a summary of the regulatory revisions and provides a discussion of public comments on the draft revisions and the Department's rationale for the final regulatory revisions.

SIMPLIFIED REVIEW PROCESS

Although a number of revisions were included as part of the current round of regulatory revisions, the most significant is the inclusion of a Simplified Review Process for projects that occur in the outer 50 feet of the Buffer Zone to Bordering Vegetated Wetlands and inland Bank. The Simplified Review Process uses the Abbreviated Notice of Resource Area Delineation ("ANRAD")/Order of Resource Area Delineation ("ORAD") process to allow for optional self-certification of eligible projects with reduced opportunities for appeals. The goals of the Simplified Review Process are to provide the same or better protection of wetlands than was previously provided; provide incentives to move projects further away from wetlands; reduce the numbers of Notices of Intent that are filed and the number of Orders of Conditions that are issued; and to reduce staff work load on Buffer Zone projects so that more effort may be spent on projects with a greater potential to affect wetlands and on enforcement cases.

The regulations that describe this process are found at 310 CMR 10.02(2)(b)2. and state that activities within the Buffer Zone of any inland resource area specified in 310 CMR 10.51 through 10.60 and outside any areas specified in 310 CMR 10.02(1) are not subject to further regulation under M.G.L. c. 131, § 40, provided:

(a) the applicant certifies at the time of filing an ANRAD that the work will meet the applicable regulatory requirements;

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BEST MANAGEMENT PRACTICES FOR BEAVER PROBLEMS

MICHAEL CALLAHAN

ABSTRACT

The North American beaver (*Castor canadensis*) is an important "keystone" species, but its ecologically valuable dam building activities can result in extensive property damage. Traditionally, beavers were managed by trapping; however, this has resulted in the loss of many wetland benefits. Our recent study, reported in the April 2003 AMWS newsletter, demonstrated the efficacy of flow devices as a best management practice for beaver conflicts. This follow-up study expands upon those results, and also compares the efficacy of flow devices to trapping. A total of 482 beaver conflict sites were evaluated in this study. Of this, 413 (86%) sites were selected to be managed with flow devices, and 69 sites (14%) were selected for trapping. The results of this study are consistent with our 2003 AMWS study, and strongly support the use of flow devices as the best management practice for the vast majority of beaver conflicts. Trapping is best reserved for the limited number of conflict sites where flow devices are not feasible.

BACKGROUND

The North American beaver is our largest rodent, and was nearly driven to extinction 200 years ago by the unregulated fur trade. However, the fur trade declined and many abandoned New England farms have reverted to forest. As a result, beavers are common once again. Beavers are aquatic mammals that build dams on small and medium order streams to flood large areas because they are safer in the water than on land. They are second only to humans in their ability to transform their environment to meet their own needs. By creating ponds and opening the forest canopy, beavers create a variety of new habitats. Over many millennia, innumerable other species, many threatened or endangered, have adapted to these habitats and now depend upon them for their survival. This makes beavers a "keystone" species.

Beaver ponds also have other benefits including: aquifer recharge; decreased erosion; reduction of waterborne particles, toxins, and excess nutrients; decreased downstream flooding; maintenance of the water table; sustaining downstream flows during dry periods; and the preservation of open space. However, better known are the problems that beavers sometimes cause: blocked culverts; washed out roads or railroad tracks; the flooding of buildings, wells, septic systems, or farms; and the loss of valuable trees. Traditionally, beaver conflicts were addressed by trapping and killing the beaver and breaching the dam. While this temporarily resolved the immediate problem, many wetland benefits were lost and new beavers would often return to the area and re-establish the colony and dam.

For decades, wildlife agencies and others have attempted to solve beaver conflicts with flow devices (e.g., beaver dam pipes or culvert protective fences) with poor results. In Massachusetts, flow devices were effective only 4.5% of the time (Langlois and Decker, 1997). In New York, a similar 3% success rate was reported (Hamelin et al., 1997). Due to these poor success rates, trapping remained the primary beaver management tool.

More recently, flow device design improvements led to reports of high success rates at Clemson University (Wood et al., 1994); in Ottawa, Canada (M. LeClair, unpublished data); and in New England (Lisle, 1999, 2001, and 2003). In 2003, the largest study of flow devices to date was published in the AMWS Newsletter by this researcher (Callahan, 2003). That study clearly demonstrated that the use of modern flow devices is cost-effective, long-term, and represents an environmentally beneficial solution for most beaver-related flooding problems.

METHODS

The beaver conflict sites in this study consisted of either blocked culverts or high water levels resulting from beaver dams. Each blocked culvert was manually cleared of beaver damming materials, and then a Culvert Protective Fence (see Figure 1) was installed. In some cases, a Pond Leveler Pipe (see Figure 2) was also installed with the Culvert Protective Fence. High water from a free-standing beaver dam was lowered with one or more Pond Leveler Pipes. Some sites were selected for trapping. Data collection was the responsibility of the author, with assistance from Ruth Callahan and Donald LaFountain of Integrated Wildlife Control. All conflict sites in this study

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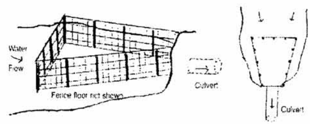

Figure 1. Culvert Protective Fence Diagrams

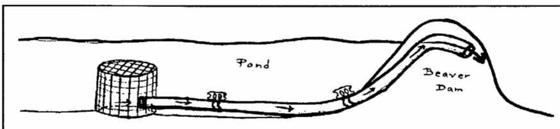

Figure 2. Pond Leveler Pipe Diagram

Beaver (cont'd from Page 12)

were in New England or New York, with the 98 percent of the study sites located in Massachusetts.

RESULTS

All 482 beaver conflict sites the author evaluated between November 1998 and February 2005 were included in this study. A total of 413 sites were managed with flow devices, and 69 sites were selected for trapping (see Table 1). The flow devices were in place for an average of 36.6 months, with a range of 3 months to 75 months. This represents 15,104 months (or 1,259 years) of total flow device operations.

TABLE 1 - BEAVER MANAGEMENT STUDY OVERVIEW

Management Method	Total Sites	Total Successful	Total Failed	Failed < 1 Yr	Failed 1-2 Yrs	Failed > 2 Yrs
Culvert Devices	227	220 (97%)	7 (3%)	5	2	0
Pond Levelers	156	135(87%)	21 (13%)	21	0	0
Cylindrical Fences	30	18 (60%)	12 (40%)	9	0	3
Trapping Only*	69	8 (16%)	43 (84%)	3	34	6
Total	**482**					

Note: Follow-up data was not available for 18 of the 69 Trapping Only sites.

Excellent flow device success rates of approximately 97% for culvert devices and 87% for Pond Leveler Pipes for free standing beaver dams were observed. Cylindrical Fences were installed on 30 culverts in 1999 and 2000. However, due to a much higher failure rate (see Table 1) this design was abandoned. The reasons why other flow devices failed are shown in Table 2. These reasons included a new dam, insufficient pipe capacity, no maintenance, dammed fencing, and vandalism.

Trapping was the sole intervention method used at 69 sites. Typically, trapping was used at "No Tolerance" sites for beavers, which included: reservoirs; areas where the landowner did not want beavers; or areas where flow devices were not feasible due to development or topography issues. There were eight sites where the water level needed to be lowered over one vertical foot where trapping preceded the installation of Pond Leveler Pipes.

DISCUSSION

A typical beaver colony impounds one-half mile of a stream, creating a series of ponds with dams. One potential concern for using flow devices to manage beavers was that new problematic dams would be built once a flow device was installed. Since Massachusetts is the third most densely populated state in the nation, this was a considered a potentially serious issue. Fortunately, new problematic dams were not commonly seen (see Table 2).

Our April 2003 study revealed that where flow devices were used there was only an average of 1.56 conflict sites per beaver colony (see Table 3). This study found that this number remained constant at 1.55 conflict sites per colony despite the passage of two years. Therefore, by controlling a very limited number of conflict sites a large watershed area can be "beaver-proofed" without the worry of many new problem sites developing.

COST ANALYSIS

Beaver-related flooding has occasionally been known to cause tens of thousands of dollars in damage to roads, railroads, and buildings. In addition, repeated opening of blocked culverts with heavy equipment usually leads to culvert damage requiring expensive replacements. Preventing these expenses becomes very important to budget conscious towns and railroads. However, every acre of wetland provides many benefits to man. So an ideal beaver management method would be affordable, prevent costly damage, and maximize wetland acreage. The costs for various flow devices are provided in Table 4. While these methods do have an initial cost, when averaged over ten years, these costs are reasonable, given the above possible alternatives.

Trapping can quickly remove the offending beavers. However, after trapping, a beaver dam will leak and the expanded wetland is drained. In addition, trapping tends to be a short-term solution because the original problem often returns within a year or two when a new beaver relocates to the area. Flow devices, on the other hand, stay in place all year long to control water levels so beavers can safely remain in the area. The long-term prevention of costly flood damage and the preservation of wetland acreage are both achieved with flow devices, but not by trapping. This gives flow devices distinct economic and ecological advantages. Wetland restora-

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TABLE 2 - REASONS FOR FLOW DEVICE FAILURE

Reason for Failure	Culvert Devices	Pond Leveler Pipes
Total Sites	227	156
New Dam	0	11 (7.1%)
Insufficient Pipe Capacity	0	6 (3.8%)
No Maintenance	4 (1.8%)	2 (1.3%)
Dammed Fencing	2 (0.9%)	2 (1.3%)
Vandalism	1 (0.4%)	0
Total Failure Rate	**7 (3.1%)**	**21 (13.5%)**

TABLE 3 - STUDY COMPARISONS

	2003 Study	2005 Study
Flow Device Sites	277	413
Beaver Colonies	177	266
Flow Device Sites per Colony	1.56	1.55
Average Acres/Colony	18.5	18.5
Total Wetland Acres that are Managed with Flow Devices	3,275	4,921

Beaver (continued from Page 13)

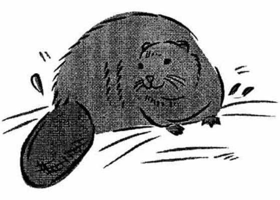
TABLE 4 - FLOW DEVICE COST ANALYSIS

	Average Cost	Annual Maintenance	Annualized Cost (10 yr)
Culvert Fence	$750	$200	$275
Culvert Fence and Pipe	$1,400	$150	$290
Flexible Leveler Pipe	$1,000	$100	$200

tion is important for our economic and environmental health. Unfortunately, the cost per acre of most wetland restoration projects can be quite high and they are not always successful. Beavers have returned to our landscape and are successfully restoring historic inland wetlands at no cost unless a conflict occurs. When beaver conflicts are managed with flow devices, thousands of wetland acres may be restored at an extremely low relative cost.

CONCLUSIONS

This study provides further evidence that Culvert Protective Fences and Pond Leveler Pipes are the most cost-effective, long-term, and environmentally-friendly methods to manage most beaver/human conflicts. When compared to the cost per acre and the lower success rates of wetland restoration by humans, a very strong case can be made for promoting the use of flow devices to maximize restoration of historic inland wetlands by beavers. Nuisance beaver trapping is best reserved for those occasional conflict sites where a flow device is either not feasible or fails, the water level needs to be drastically lowered, or the landowner wants no beavers or ponds on their property.



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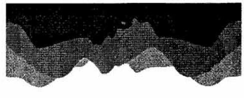
HORIZON



RED SOILS ALL OVER

ARTHUR ALLEN III, CPSS

As south-central New England becomes a focus of land development activities, undeveloped land has become more scarce and prices continue to climb. As a result, in the last decade development of marginal areas that are steeper, rockier, and wetter has increased. Of particular concern to me are areas with Brimfield Schist-influenced soils.

The Brimfield Schist is a rock type that has a high iron oxide content. Iron oxide imparts a red color to the rock. As this rock weathers, it forms red soil. Because of the natural red color of soils formed in these parent materials, it is difficult to recognize the redoximorphic features that are typically seen in soils with seasonal high water tables. As development pressure continues to increase, it becomes imperative to recognize and understand the influence of red soil colors in identifying high water tables and delineating wetlands.

During the 13 years that I have been mapping, interpreting, delineating, and teaching about soils, I have witnessed the influence of red soil colors in Spodosols and Connecticut River valley soils with Mesozoic geologic parent materials. However, I have heard little discussion about the influence of Brimfield Schist parent materials on the soils of the region. In particular, soils in the central portion of Massachusetts, including the towns of Baldwinville, Barre, Brimfield, the Brookfields, Fiskdale, Holland, New Braintree, Sturbridge, Templeton, Wales, Warren, Williamsville, and Winchendon, are

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