BEAVER AND BEAVER DAM REMOVAL IN WISCONSIN TROUT STREAMS

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ABSTRACT

Beaver (Castor canadensis) dam building activities create many longtern affects on stream ecosystems. Beaver dams may negatively influence trout fisheries by creating physical barriers to spawning areas, increasing sediment retention, and increasing water temperatures. The U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Animal Damage Control (ADC) program in Wisconsin, entered into cooperative agreements with the Wisconsin Department of Natural Resources (WDNR) and the U.S. Forest Service (USFS) on the Nicolet National Forest from June through September, 1988, to remove beaver and beaver dams from priority classed trout streams. Four hundred and eight beaver were removed by trapping, snaring and shooting and 668 beaver dams were removed with explosives. Control activities were conducted on fifteen streams and their tributaries. All beaver and beaver dams were removed from five streams with averages of 1 beaver colony per stream mile, 5.6 beaver per colony, and 11 beaver dams per stream mile. Control costs, which included explosives, salaries, and mileage, averaged $495 per stream mile for the 5 streams.

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INTRODUCTION

The beaver is credited for playing a major role in stimulating the westward expansion and settlement of much of North America. Beaver pelts were a valuable resource for many years and were actively sought by trappers until, in many areas, they were extirpated. In Wisconsin, the combination of extensive logging and fur trapping dramatically decreased beaver numbers near the point of extinction by 1900. In response, beaver trapping seasons were established which fluctuated from a year round season, that began in 1850, to six periods (1893 - 1947) in which seasons were closed from one to 14 years (Pils 1983). A beaver live-trapping and restocking program was initiated and changing land use practices provided for the recovery of aspen (Populus tremuloides) forests preferred by beaver. These factors coupled with a declining beaver fur market and a corresponding decrease in trapping pressure allowed the beaver population to begin a slow increase.

Peterson (1979) found the return of Wisconsin's beaver population was accompanied with associated problems, and the beavers' subsequent recovery to nuisance status was also documented by Yeager and Hay (1955), and Hodgdon and Larson (1980). Data from Payne and Peterson (1986) describes the mean annual number of beaver complaints increased in Wisconsin between 1946 and 1983. Complaints received by the WDNR during these years were categorized by annual complaint summaries of the following damage types: roads (40%), timber (33%), lakeshores (11%), railroads (7%), fish habitat (5%), miscellaneous (3%) (e.g. private dwellings, boathouses, etc.) and agriculture (1%).

During 1975 - 1986, beaver were controlled by 3 methods: (1) removal of beaver and structures by the WDNR, (2) removal of beaver by the complainant under permit from WDNR, and (3) extension of the harvest season and removal of bag limits on waters with recurrent beaver problems. The WDNR contracted with private trappers from 1978 to 1986 to control beaver at trouble spots after the harvest seasons closed. During 1983, WDNR added subsidies to trapping contracts in certain areas (Payne and Peterson 1986).

During May 1988, the APHIS-ADC program in Wisconsin entered into cooperative agreements with the WDNR and the USFS to control beaver and beaver dams on priority classed trout streams. The ADC beaver control programs in Wisconsin operate on a cost-share basis, with funding being provided by both Federal and State agencies. Meetings were held with wildlife biologists and fishery managers from the WDNR, USFS, and ADC to identify and select trout streams severly impacted by beaver. All ADC control efforts were restricted to Class I and II trout streams.

In Wisconsin, trout streams are divided into three classes for fish management purposes: Class I, II, and III. Class I streams are high quality trout waters, having sufficient natural reproduction to sustain populations of wild trout at or near carrying capacity. Class II streams may have some natural reproduction of trout, but stocking is often required to maintain a desireable sport fisher. Class III trout waters are marginal habitat with no natural reproduction occurring. Stocking of Class III streams is required to provide trout fishing and there is no carry over of trout from one year to the next (Kmiotek 1980).

WDNR and USFS Fisheries Managers in Wisconsin generally agree upon the adverse affects which beaver dams create to the trout fishery. Many of Wisconsin's 2,674 trout streams are located along low gradients and can be easily dammed. The average trout stream is 5 miles (Kmiotek 1980). Beaver dams on small trout streams usually produce effects which follow a definite pattern. First, the vegetation flooded by a new pond will decay, fertilizing the water and increasing the food supply. The trout then grow rapidly, and good fishing may result for a period of 1 to 3 years. If the pond area is shallow and exposed to the sun, it becomes warmer than the stream thereby favoring a great increase in minnow abundance. The minnows then eat much of the available food, reducing the production of trout. After a few years, the beaver pond may become quite shallow and warm because of silting, while decomposing organic deposits increase acidity of the water. Thus the pond and its outlet are likely to deteriorate in suitability for trout. Also, good spawning areas may be smothered by deposits of silt or shut off from trout further downstream, if the beaver dam forms a physical barrier to upstream migration. In the long run, the damage to the trout and habitat may far outweigh the initial benefits, and it may take years before conditions improve, even if the beaver leave the area or are removed (Pasko 1969).

Implementation of the ADC beaver control project began in June 1988. Seven animal damage control specialists (ADCS) and 1 wildlife biologist were hired for the project. The wildlife biologist and 2 ADCS began work in June, 2 ADCS began work during July, 1 ADCS began during August, and 1 ADCS began in September. One ADCS possessed a valid Wisconsin Blasters License which authorized the use of explosives to remove beaver dams within the project area. All ADCS worked up to September 30, when our cooperative agreements with the WDNR and USFS ended.

The WDNR and USFS cooperative agreements addressed the methods authorized to remove beaver from the project areas. ADC personnel were permitted to remove beaver by trapping, snaring, and shooting.

The objectives of this beaver and beaver dam removal project were:

1) to identify and map the location of active beaver colonies and dams within the designated trout streams or rivers.

2) to contact all associated landowners with lands containing beaver dams or beaver colonies to obtain their permission to perform beaver control activities.

3) remove all beaver dams and beaver from those lands on which landowner permission to control beaver has been received. The purpose of removing beaver dams is to: allow the natural movement of spawning trout; prevent seasonal water temperature extremes and; prevent the trout stream deterioriation of bank sloughing, siltation of spawning areas, instream cover loss, and channel widening.

4) provide WDNR and USFS with monthly beaver control accomplishment reports.

METHODS

Beaver Removal

The No. 330 Conibear trap was purchased and used because it is both practical and efficient and can be used in a wide variety of sets in shallow or deep water. Mason et al. (1983) discusses field applications of Conibear sets and identifies the No. 330 Conibear dive sets to be superior to dam, lodge, slide, run, or other Conibear sets.

The leghold traps employed in the project were No. 4 Victors. All leghold sets were drown sets made by using a slide wire with a heavy weight of stake attached in deep water and a stake driven into the bank at the other end with the trap attached to a swiveled drowner lock. Miller (1975) describes using leghold traps and drowning sets in detail.

The snares used in the program were the washer lock type or the Butera lock with 3/32 cable. All snares had swivels located on the anchor end. Snare sets were generally used in beaver feeding runs or crawl-overs where there was slight or no movement of water. A useful guide to snaring beaver is described by Weaver et al. (1985).

The shooting of beaver was authorized from one hour before sunrise to one hour after sunset. Artificial lights could not be used to aid night shooting. Most ADC personnel used shotguns with No. 2 or No. BB size shot for control efforts, though several ADCS preferred high powered rifles.

All priority classed trout streams and their tributaries designated for beaver control by ADC personnel were walked or canoed from the stream outlet to the headwaters. When beaver sign and colonies were located, the area was set up with Conibears, legholds, or snares. Shooting of active colonies also occurred, but generally this was practiced when a single beaver or two remained at the time of blasting. All beaver dams were recorded and mapped by the ADC trapper for later removal by the blaster.

The landowners were contacted and a Control Agreement was obtained, which allowed access onto private lands. Landowners were questioned about the locations of beaver or beaver dams on their property. Many of the active beaver dams and colonies had been plotted on maps by the WDNR and USFS during their fall aerial beaver census flights. These flights were conducted during mid October, when lack of vegetative cover allowed observers to locate active beaver colonies by presence of feed beds or active lodges. In some instances, aerial photos were supplied by the County Forestry office.

Beaver removal from a given stream was approached in a general pattern. When a beaver colony, or adequate fresh sign indicating the presence of beaver was located, the area was set up. The type of equipment (Conibear, leghold trap, snare, or shooting) employed was up to the discretion of the individual ADCS. Usually a colony was set up with Conibears, leghold traps, and snares, although some ADC trappers preferred to use only Conibears. After the ADCS had set out a sufficient amount of equipment in the key areas (feeding runs, crawl-overs, etc.), they would proceed upstream until another colony was located. Most ADCS would conduct activities on 2 to 6 colonies of beaver on each stream at a time.

Beaver Dam Removal

Beaver dam removal was coordinated by the ADC blaster and the District Supervisor, through the ADC trappers. To set up each week's blasting schedule, the ADC trappers would contact the District office at the close of each week. When the ADC trapper had removed all beaver from a stretch of stream containing a sufficient number of beaver dams to warrant blasting efforts, then blasting dates were arranged for the upcoming week. For efficiency purposes, we requested from 10 to 40 beaver dams be available for removal each time the blaster arrived. This amount of dams took from 1 to 2 days to remove, then the ADC blaster would follow up on other blasting scheduled with another ADC trapper, and so forth throughout each week.

The explosive components used to remove beaver dams were Kine-stik (Kinepoak Inc., Dallas, TX) and Thermex (Thermex Energy Corporation, Dallas, TX). Both are binary explosives and must be mixed to activate. Holes large enough to accommodate an explosive charge were tapped into each dam to a depth sufficient to reach the compression pan. A 50 grain-per-foot detonating cord was attached and taped to each mixed charge to serve as a propagator. The loaded charges were placed into each hole and the attached lead lines of 50 grain-per-foot detonating cord were connected to the main or trunk line (another 50 grain-per-foot detonating cord). A #6 or #8 blasting cap was crimped to the end of a 36 inch section of safety fuse. The blastng cap was then taped to the trunk line to propagate the detonating cord and charges. A pull lighter was then attached to the opposite end of the safety fuse to initiate the system.

Generally, blasting efforts were conducted with the cap and fuse system. However, if the dams were located near roads or in high public use areas, we initiated the charges with an electric system for added safety. This system consisted of electric detonators, electrical blasting firing line, blasting galvanometer, and a capacitor discharge blasting machine.

The beaver dam removal process continued upstream until the ADC blaster and trapper reached areas that still contained beaver and active dams. At this point, the ADC blaster moved to other scheduled blasting areas and the ADCS continued trapping.

A number of small check dams were removed by hand, though generally dams were removed with explosives.

RESULTS AND DISCUSSION

ADC personnel worked on 15 class I and II trout streams from June through September 1988. Beaver and beaver dam removal was conducted on all priority streams with 408 beaver and 668 beaver dams removed. However, due to the length of many streams, beaver and beaver dam densities, and late program startup, control activities on many of the streams were not completed. Five streams were completed by removing all beaver and beaver dams (Table 1) from their outlet point to the stream's headwaters. The 5 streams totaled 38.8 miles in length. These streams average 11 beaver dams per stream mile. Thirty-eight beaver colonies were identified, averaging approximately 1 beaver colony per stream mile. Two hundred thirteen beaver were removed from these 5 streams, averaging 5.6 beaver per colony or 5.5 beaver per stream mile. Four hundred twenty six beaver dams were removed with explosives. Control costs which included explosives salaries, and mileage averaged $495 per stream mile.

The average beaver dam usually required three sticks of explosives, at an average cost of $16.50. These costs include: the amount of binary explosives, detonation cord, safety fuse, tape, pull lighter, and blasting caps required to remove one beaver dam.

The ADCS employed all control methods available. The No. 330 Conibear was the trapping tool most preferred, followed by snares, leghold traps, and shooting (Table 2). All ADCS had experience with the No. 330 Conibear trap before beginning work on the project. This may account for the high percentage of beaver removed by this method.

The ADCS had no prior experience with snares, as snaring is illegal in Wisconsin. ADC personnel were authorized to use snares for beaver removal under the cooperative agreements with WDNR and USFS. ADC trappers found snares to be very efficient and practical on beaver. Snares are easily set, light weight, and compact sized. A dozen or more snares could be carried into new areas while scouting for beaver. Most ADC personnel gained confidence in snares as they became more familiar with their use.

Leghold traps were very effective on beaver. In Wisconsin, the most productive period for leghold use is during the spring break-up and runoff, as the two-year old beaver are dispersing. During this time the beaver are very susceptibe to leghold traps at scent or scent mound sets. THe legholds proved to be very valuable when working on Conibear- shy beaver.

Both shotguns and rifles were used to remove beaver. Most shooting occurred when a smart beaver was left untrapped at the time of blasting. We found the beaver easier to shoot, if we blew the active dam in the morning allowing ample time for the pond to drain and the beaver to calm before dark. The beaver was removed when it swam or walked up the newly drained stream channel toward the dam site. In addition, the use of dogs in flushing beaver from lodges and bank dens appeared to be very promising. Draining the pond left the lodge and bank den entrances vulnerable to a samll or medium sized dog. Our limited use of dogs in these situations proved very successful.

Table 1. Comparisons of stream length, colonies identified, beaver removed, dams removed, and costs per mile on 5 completed trout streams.

Stream	Strean Length	Colonies Identified	Beaver Removed	Dams Removed	Cost per Mile
Garland Creek	4.5 m.	6	29	59	$455
Siphon Creek	6.7 m.	6	31	64	$424
Salisch Creek	33.6 m.	3	15	72	$668
Coldwater Cr.	5.0 m.	5	31	28	$469
Little Pine Cr.	19.0 m.	18	107	203	$460

Table 2. Comparisons of numbers of beaver removed and percentage taken by each control method.

Method	Beaver Taken	% Total
Conibear	275	67
Snare	68	16
Leghold	36	8
Shot	35	8

CONCLUSION

Intensive trapping and blasting programs can successfully eliminate beaver and beaver dams from specific areas, such as small trout streams. These streams must be maintained to remain beaver free or sustain populations at tolerable levels. Pelt prices will play a key role in determining the amount of trapping pressure that is applied to the overall beaver population. However, due to recent low pelt prices, cold winters, heavy snowfall, poor access, and other factors, many beaver will not be removed by fur trappers. Successful management of beaver populations in Wisconsin trout streams, will require coordinated programs among agencies such as the WDNR, USFS, and APHIS-ADC to operate under defined objectives to assure positive and beneficial control efforts.

LITURATURE CITED

Hodgdon, H. E. AND J.S. Larson. 1980. A bibliography of the recent literature on beaver. Mass. Agric. Exp. Stn. Res. Bull. 665. 128pp.

Kmiotek, S. 1980. Wisconsin trout streams. WI Dept. Nat. Res. Pub: 6-3600 (80). 141pp.

Mason, C.E., E.A. Gluesing, AND D.H. Arner. 1983. Evaluation of snares, leghold, and conibear traps for beaver control. Proc. Ann. Conf. SEAFWA. pp. 201-209.

Miller, J.E. 1975. Beaver damage control. Proc. Gt. Plains Wildl. Contr. Wkshp. 2:23-27.

Pasko, D.G. 1969. Beaver and trout. Conservationist 23(4)p. 45.

Payne, N.F., AND R.P. Peterson. 1986. Trends in complaints of beaver damage in Wisconsin. Wildl. Soc. Bull. 14(3):303-037.

Peterson, R.P. 1979. Nuisance beaver biology and control in north-central Wisconsin. M.S. Thesis. Univ. Wil, Stevens Point. 56pp.

Pils, C. M. 1983. The beaver. WI Dept. Nat. Res. Publ-WM-059. pp.

Weaver, K.M., D. H. Arner, C. Mason, AND J. J. Hartley. 1985. A guide to using snares for beaver capture. Southern J. Appl. For. 9(3):141-146.

Yeager, L. E. AND K. G. Hay. 1955. COntribution toward a bibliography on the beaver. Colo. Dept. Game and Fish Tech. Bull. 1. 103pp.