

Abstract
Beavers and the Barrett Street Marsh
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Project to explore possible solutions for the issue of flooding as a result of beaver dams built at the Barrett Street Marsh. This project attempts to investigate sustainable options for the management of beavers in the marsh habitat. Seeking to understand specifically, what can be done about the beavers that inhabit the Barrett Street Marsh, and how to restore the sedimentation basin. This assignment has been approached in two ways; information gathering via meetings, and internet research. By this method, the conclusion is that the City of Northampton might consider pursuing reproductive inhibitors, and investment in a sediment vacuum, for multiple purposes. Based on the ideas put forth, a feasibility study may be conducted to consider possible options. If the options proposed in this project are feasible or reasonably sustainable, they may be applied to have a significant impact on the state beaver population, and alleviate local flooding issues.

Beavers and the Barrett Street Marsh

Introduction

This issue has been discussed in numerous public forums and extensive media coverage. Locally the focus has been on property damage and trapping techniques a result of flooding. Numerous complaints have been made and a few lawsuits have been brought against the city. Trapping techniques are alarming to animal rights activists and people who agree that killing beavers is not the solution. However, statewide the beaver population is exploding. In efforts to propose a sustainable solution to the problem of beavers inhabiting Barrett Street Marsh, I would like to recommend that the city pursue testing for an approved beaver contraceptive to be used statewide while continuing short term dismantling of the dams in order to allow the marsh to dry.

In par with my recommendation for this project I would like to focus on the local impacts of the referendum known as “Question One”. The 1996 ballot referendum known as “Question One” made trapping prohibited or restricted. After enactment, statewide trap harvests fell so that “the annual harvest has been 157% below pre-1996 averages” (MassWildlife 2005). This has lead to a massive increase in the beaver population in Massachusetts which has grown exponentially from 24,000 in 1996 to 70,000 (MassWildlife 2005) Today, that number could be significantly reduced following a statewide investment in the reduction of the beaver population.

The Barrett Street marsh area is fed by a channel that drains the watershed. The marsh is valuable for the holding and filtering of storm water, function as a drainage basin, aesthetic and educational purposes. Following a court case settlement the city purchased the property and eventually after the fire station was built, the brook channel

had to be reconstructed to flow north and a sedimentation basin constructed. The marsh regularly receives large amounts of sediment from road sand/salt, and other activities throughout the watershed. At its normal flow rate, the channel that drains into the marsh should deposit sediment in the basin as well as throughout the marsh and by design the area should only be waterlogged seasonally.

Beaver dams were not accounted for before the construction of the sedimentation basin and as a result, unexpectedly raise the water level of the marsh by 3.7 feet. The dams slow the velocity of the water, causing sediment to accumulate in the opening of the basin and water trapped behind the dams drowns the marsh. The sediment accumulates in the constructed culvert while the dams trap water essentially forming a pond that drowns marsh ecology and can flood surrounding properties. The city of Northampton has been responsible for compensation as well as finding ways to restore the marsh's functionality. Current efforts to solve this problem have been taken by the Department of Public Works (DPW) to alleviate the situation. Live trapping then shooting beavers. DPW permitted to remove 1 foot from the top of the dam. Dismantling of the dams allows the marsh to drain but also requires constant monitoring of beaver rebuilding, trapping of beavers, and is considered cruel.

Materials & Methodology

For my research, meetings and correspondence with individuals involved provided me with background information to help me understand the factors that complicate this issue. From these interactions, I began gathering information online and reading reports published by other states. This method has given me a general

understanding of the issue which I applied to a broad search of states dealing with similar problems.

My introduction to this project was at the classroom presentation by Paul Wetzel from the Northampton Conservation Commission, and Bruce Young for the Northampton Office of Planning and Development. Their presentation of the issue summarized the problem at Barrett Street, but also gave a broader understanding of the conflict between beavers and people. This presentation at first motivated me to consider techniques that could be engineered to alleviate the situation, but I had to do more research to understand the what makes the marsh a difficult location to apply other proven techniques.

A meeting at the marsh, Paulette Kuzdeba explained to the group the history of the area, what the complicating factors are, and answered questions. This meeting made me clearly understand the issue with sedimentation basin, limited resources from the City's Department of Public Works, proximity of development, and the conflicting public perception. This meeting also brought to my attention the scope of the problem as it related to the watershed drainage and the sedimentation detention basin. It gave scope to the issue for the factors that complicate and are affected by the habitation of the beavers. When I found time to ask Ms. Kuzdeba about the possibility of contraceptive use to affect the beaver population, she pointed out that the method would not be effective if it needed to be administered by food source as is sometimes done in Wisconsin.

Since I accepted this project, my charge has been to "think outside of the box" so when I found myself reading trapping techniques and beaver deceiver methods I felt as though my research into those areas would not generate any new ideas. For this reason I avoided going through the avenues towards constructing or engineering an immediate

solution as this would be out of my capabilities. Being told to ‘think outside of the box’ and ‘brainstorm’ I considered techniques for population control of deer in Wisconsin. Growing up in the state I could recall a similar dispute between landowners, officials, and animal rights activists over the explosive deer population that became problematic in the urban areas. My understanding of the situation was that the state began shooting the deer with a contraceptive and that the program was very successful. This information may not have been totally correct but it is where I began considering how reproductive inhibitors might be applied to this case.

I met with Bruce Young, March 19th at City Hall, to fortify my understanding of the situation and discuss possible solutions. By this time I had my ‘in the box’ recommendations for ways to clean the sedimentation basin and possibly reduce the amount of sediment that drains into the marsh, as well as my ‘out of the box’ recommendation to look into controlling the beaver population upstream as a means to discourage beavers from inhabiting the urban marsh downstream. This meeting I used to ask questions about the current options for cleaning the sedimentation basin which mostly is a decision about machines, manpower, and money. For this reason, I have not been extremely thorough in researching the types of machines the City might use to clean the sedimentation basin, but I have found a few options to describe as an example. At the end of this meeting I was encouraged to consider ‘sustainable options’ to manage the beavers, and leave the investigation into feasibility to the experts. With this I began internet research to consider other states ‘sustainable ideas’ regardless of cost. From this point, reports published on the web describing efforts to solve this issue in other states, have helped me understand what tactics have been considered for application. This is how I

found information on research into reproductive inhibitors for wildlife populations as well as *evidence* of past studies into reproductive inhibitors for beaver populations specifically.

Results

Resulting from my meetings and correspondences about this issue, a few options have emerged for sustainable use. The first might be for the city of Northampton investment in ‘sediment vacuum’. This machine could be used to effectively clean the sedimentation basin more often and possibly more ease. Its purchase may also be useful in cleaning the City's storm water system. However, my research is leaning towards a solution that might be largely, a responsibility of the state.

It is my theory that statewide efforts to reduce the beaver population would have the local effect of reducing local population pressures which ultimately causes beavers to inhabit areas near human development. Working with this theory, a focus on reproductive inhibitors might prove useful in the long run for dealing with beaver conflicts locally and statewide. For this reason, I recommend that we focus our attention to invest resources into researching the use of reproductive inhibitors and applying this technique as soon as possible.

Reproductive inhibitors are classified as chemosterilants, immunocontraceptives, or temporary, short-term contraceptives. There are currently no reproductive inhibitors are approved by any state or federal agency however, beaver contraception is beginning to be studied as a solution to beaver populations around the country. Reproductive inhibitors are considered an acceptable alternative to lethal control techniques but would take years of research, testing, regulation, and implementation before results are seen.

Reproductive inhibitors for beaver populations have been proposed in the past. Several reproductive inhibitors have been developed for use in beaver populations, such as quinestrol (17-alpha-ethynyl-estradiol-3-cyclopentylether) and mestranol. According to a study conducted in the 1980s, contraceptives were effective in reducing beaver populations by up to 50%, but were considered impractical or too expensive for application (Brown 2002). Other problems with reproductive inhibitors are that after implementation it would take years for the beaver population to decline, the threat to property must be alleviated now, it is difficult to trap and administer the contraception, no beaver contraception has been approved for use by state or federal agencies, and there are potential impacts on beaver behavior, physiological mechanisms, and colony integrity. However, these impediments must be weighted against the negative effects associated with an increasingly stressful beaver population.

Discussion

Though integrated wildlife management techniques hold promise at some specific sites, the Barrett Street marsh proves to be a difficult site for most techniques to be applied. Physical exclusion is not an option because beavers can travel across land and the area must be accessible to the public. Also, refined grates on the waterway that feeds the marsh cannot be blocked without adding a significant burden to the DPW and for little possible benefit. Due to the land stipulations and ecology, there is little that can be done to further alter the habitat or add repellents to the food supply as beavers feed on a variety of sources. Translocation would only allow for more beavers to relocate to the area, and given the urban setting of the marsh, it would not be possible to introduce a

predator without ill effects. Thus, the only method that is applicable and practical is to trap and shoot the beavers, which has been criticized by the public as animal cruelty.

Efforts to target the upstream beaver population may be a significant resolution. Barrett Street Marsh being surrounded by urban development is not a first choice beaver habitat. For this reason, beavers may only inhabit the marsh as a result of population pressures upstream. Thus, alleviating upstream population pressures may cause beavers to abandon the urban marsh. Following restoration of the sedimentation basin the marsh should return to a dryer condition.

The history of deer contraceptive use in Wisconsin can be related to this issue. When deer overpopulation caused numerous car accidents, spread diseases, and damaged economic property, Jay Kirkpatrick director of the ZooMontana's Science and Conservation Biology program developed a vaccine that "prompts a deer's immune system to produce antibodies that block egg fertilization" (Bailey 2001) and this vaccine is injected into doe's via dart guns four to five times over several years. Bailey continues in his article, *North America's Most Dangerous Mammal*, "the vaccine has successfully reduced the number of deer on Fire Island in New York by 50 percent over seven years, and by 40 percent at the National Institute of Standards and Technology campus in Gaithersburg, Maryland, over the past five years" (Bailey 2001).

Similarly, reproductive inhibitors in the news show advancements in the science, as more resources being channeled into this option showing promise of reproductive inhibitors being developed for beaver populations. A few recent news articles from the National Wildlife Research Center (NWRC) give hope to the development of reproductive inhibitors for beaver population control:

- The NWRC hosted the Second International Wildlife Fertility Control Workshop with topics including immunocontraceptive vaccines, reproductive inhibitors, oral formulations and delivery systems, and application of reproductive inhibitors to wildlife populations February 28- March 2, 2006.
- A NWRC scientist is working at Pennsylvania State University on research in a study of immunocontraception for domestic hogs. This study hopes to find an oral contraception for feral hogs by testing the effectiveness of several injectable contraceptive vaccines. Several contraceptive vaccine formulations for white-tailed deer, wild horses, and domestic and feral hogs have also been investigated.
- NWRC scientists participated in a second phase study of the efficacy of immunocontraception in free-ranging white-tailed deer. In measuring the success of this treatment, NWRC personnel will train and assist Maryland Wildlife Services in the field. This field efficacy trial is required by the U.S. Food and Drug Administration as part of the application process for registration of a new animal drug.

(National Wildlife Research Center 2006)

I interpret this finding as a potentially effective resolution that should be investigated. Based on the pursuance of similar tactics in other states, there may be resources to invest in a statewide reduction in the beaver population which has reached stressful proportions. This technique might be pursued while the city temporarily continues to maintain the dismantled dams and monitor the draining of the marsh. Until there is a reduction in the overall upstream population of beavers, there will continue to be an influx of beaver forced to live in this open and exposed 'replicated wetland'. There can be a solution which protects investments in urban development while checking the population of neighboring wildlife.

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