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Challenges to Watershed Management
in Massachusetts

An Interactive Qualifying Project Report

submitted to the Faculty

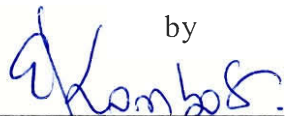
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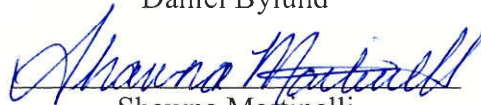
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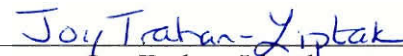
Degree of Bachelor of Science

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Abstract

This report was prepared in an effort to suggest alternative strategies for watershed managers in central Massachusetts, as current management practices are seemingly inadequate. This was achieved through the analysis of information gathered through archival research and interviews with key informants within the five identified watersheds. This analysis allowed us to formulate a list of recommendations designed to aid these groups in their goals to improve and protect the watersheds.

Authorship

All members of the team completed the following tasks:

1. Writing of the Introduction, Methodology, and Results (Introduction and Analysis)
2. Transcribing of Interviews
3. Compiling of Matrices
4. Attending Interviews with Key Informants
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1. Writing of Appendix E

Daniel Bylund was responsible for the following tasks:

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2. Formatting of Individual Watershed Maps and References page
3. Writing of the Abstract, Executive Summary and Recommendations

Shawna Martinelli was responsible for the following tasks:

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3. Contacting Potential Interviewees
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3. Writing of Section 2.2.2 Social and Political Perspectives, Section 2.4 Watershed Legislation, Section 4.1.4 Blackstone River Watershed, and Appendix D
4. Writing of the Abstract, Executive Summary and Recommendations

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Executive Summary

Since the establishment of the Clean Water Act in the 1970's, watershed issues have gained attention at the federal, state and local levels. While the health of water resources within the United States is no longer seriously threatened by point source pollution, continued development and population growth create higher rates of non-point source pollution as well as higher demand for water large resources. Currently, watershed management strategies vary tremendously across the United States, as they do throughout the state of Massachusetts. When attempting to manage such a vast resource, with such a large number of users, there are many social and political complexities. Watersheds can be used as a unit to manage and monitor the overall environmental health of a region and therefore it is necessary to address current watershed issues in Massachusetts.

The goal of this project was to identify overarching problems concerning the current management practices of the watersheds within the central region of Massachusetts and to provide alternative strategies that may increase their effectiveness. We sought to explore the social, political, and environmental complexities of this area by examining five local watersheds, including the Blackstone, French and Quinebaug, Millers, Nashua, and Sudbury-Assabet-Concord watersheds. In order to achieve this goal, we aimed first to understand the regulatory structure of watershed management at the state and federal levels and to differentiate those from the actual methods of management currently being employed at these levels. We gathered this information through a review of current literature relating to the topic and by conducting interviews with key informants within the region. These interviews were reviewed, and information relevant to our research was highlighted. The data were then further refined and formatted into a Microsoft Excel matrix in order to allow for better synthesis of the large amount

of information gathered through interviewing. We then categorized general “positives” and “negatives” once the research and interview process was complete. Positive characteristics consisted of anything that seemed likely to assist watershed organizations and/or the Massachusetts Department of Environmental Protection (MassDEP) in accomplishing their goals in watershed management. Negative characteristics included actions which directly inhibited water quality, as well as anything that disagreed with the watershed organizations mission statements. The compilation of this information allowed us to analyze the data and provide recommendations for local watershed advocacy groups and relevant government agencies.

The first step in providing recommendations was to summarize information about each watershed examined including the individual organizations working for watershed advocacy. This was essential to our understanding of the organizational procedures and the way in which scientific and social dynamics influence the management practices of each watershed. By synthesizing this information, we were able to identify common positive and negative aspects of watershed management.

We found that the current management practices in the watersheds of Central Massachusetts excel in two areas: water quality monitoring and community outreach. On the other hand, effective management is stymied by widespread and serious problems in the areas of staff and volunteer support and funding. We considered current water quality monitoring practices as a positive component because it provides valuable data regularly and reliably to the Massachusetts Department of Environmental Protection as well as the watershed organizations themselves, allowing for a potentially clearer picture of watershed health. We also consider the status of community outreach to be a positive feature within the current management practices because increased public awareness can lead to decreased non-point source pollution.

Volunteers are obviously essential for non-profit groups to function and for water quality monitoring programs to work. These positives were contrasted with the negatives of an overall shortage of people who are willing to aid watershed health, in addition to an overall shortage of funding available to support these efforts. Although we viewed community outreach as a positive aspect, in reality the lack of staffing and volunteers at all levels leaves much to be desired. Therefore, while we positively view the current outreach of non-government organizations, we also recognize that there needs to be a push at all levels for further involvement.

After identifying the problems concerning the current watershed management strategies, we were able to formulate a set of recommendations with the purpose of remedying such problems. These recommendations were made for state government and non-government organizations. We formulated a new structure on both levels, which emphasized the impact of cooperation and collaboration on multiple levels. We also identified methods for increasing funding and public outreach as a means to further improve the abilities of these groups to effectively manage watersheds.

Since watersheds are a unit often used to manage and monitor the overall environmental health of a region, addressing watershed issues is one way to make an effort to improve upon the health of the ecosystem. In Massachusetts, these watershed problems are difficult to quantify due to a lack of people and funding.

1 Introduction

The management of common-pool resources, such as water, is difficult due to a lack of individual ownership and an absence therefore a lack of responsibility on the part of the users. These users consist of an entire population seeking to maximize the resource for their individual purposes rather than for the common good, which requires long-term sustainability of resource use. This lack of responsibility results in a net depletion of the resource that leads to negative impacts on its users. For water resources, the most serious misuses consist primarily of development, pollution from urban and residential centers, obstruction of waterways, and high rates of extraction. This has resulted in an overall decrease of water quality in many areas throughout the country, and improving water conditions has emerged as a national social concern.

As in other parts of the world, watersheds in the United States are subject to high levels of pollution and overexploitation, due to industry, agriculture, and dense residential populations. Specifically within the state of Massachusetts, an attempt has been made to manage water resources from a watershed perspective to remedy these problems. Previously, this watershed approach was considered highly effective as a result of proper funding, adequate staffing, and an overall concern for watershed issues originating at the state government level. A shift in this top-down management approach led to today's current system, which consists mainly of efforts by non-government advocacy groups. While many attempts have been made through the work of dedicated individuals to improve watershed management strategies, the health of the state's watersheds remains in jeopardy.

Although the conditions of Massachusetts' watersheds have improved over the last thirty years, they are still at risk due principally to non-point source pollution. An ever-increasing

population and consequent increases in development are also continually imposing demands on the ecosystem. These demands and the nature of water as a common-pool resource make managing watersheds extremely complicated. A number of laws such as the Clean Water Act have been implemented in an effort to protect water resources. These regulations, however, focus primarily on water quality and have fallen short of clear regulation at the watershed level.

The current system of watershed management employed in Massachusetts is not improving the health of the state's watersheds (C. Peet & S. Tuler, personal communication, August 2005). Problems have arisen between those government agencies responsible for water management and advocacy groups, as well as local governments and communities. These specific issues must be addressed in order to increase the effectiveness of these groups and in turn better the health of the ecosystems in the state. These problems have yet to be addressed on a regional level in central Massachusetts.

The goal of this project was to identify overarching problems concerning the current management practices of watersheds in this region and to provide recommendations for alternative strategies that may increase their effectiveness. The issues were discussed with members of key advocacy groups, as well as employees of the Massachusetts and Connecticut Departments of Environmental Protection. Analysis of this information allowed us to identify universal problems in current management practices and to provide suggestions to stakeholders that may help to improve their current management strategies.

2 Background

In order to perform critical analysis of current watershed management strategies within Massachusetts, understanding the theories behind common-pool resource management is essential and these theories are therefore discussed in the first background section. Next, we provide background information on watersheds and the problems affecting those within central Massachusetts. We then address the historic and current structure of water quality laws in the United States and ways in which Massachusetts works to implement and enforce them. This discussion will provide the background necessary for understanding the complexities of managing watersheds, as discovered through the research and interviewing process.

2.1 *Common Resources*

Water is a natural resource which is most often categorized as a common-pool resource. When examining such a resource, it is important to address the concept of the tragedy of the commons. Simply put, the tragedy of the commons relates to a resource – most often called a common-pool resource – to which many people have access (Ostrom, 2002, p.3). A lack of ownership or regulation leads to problems in sustaining such resources. When individuals use a common-pool resource, they are not entirely responsible for the overall cost or results of their actions (Baden & Hardin, 1977, p.16). Each user of the commons seeks to maximize his/her individual utility, while ignoring the impact of his/her actions on others and the environment. With individuals focused on using the resource to their own benefit without considering the impact on others, the resource is threatened by misuse and even complete depletion (Tientenberg, 2004, p.64).

The nature of common-pool resources creates many management difficulties. One of the most significant problems when managing a common-pool resource results from the fact that stocks and flows of such resources are difficult to clearly define (Ostrom, 2003, pp.3-5). Also, such resources are often fragile and therefore cannot be stored, as is the case concerning fish and wildlife. In addition, common-pool resources are nonexclusive and divisible, meaning they can be exploited by anyone and that the use of the resource by one group subtracts the amount available to others. Use on different geographic scales also causes conflicts concerning management. For instance, local forest users may accumulate benefits when forests are used for timber production, while global users may “benefit from standing trees as they sequester a major global pollutant” (Ostrom, 2003, p.3). The use of these resources may also present negative consequences to those who are not benefiting from their use. For instance, harvesting timber may lead to a deterioration of water quality downstream. The harvester is benefiting from the sale of the timber, while those who rely on the water are paying the cost of the harvesters’ actions. Differences in opinion and uses, such as this, often lead to conflicts in management.

Common-pool resources vary so greatly in geography and patterns of use that researchers have come to the conclusion that no single management strategy can be developed which will benefit their many different conditions. Protecting such a resource from misuse requires that rules regulating its use be established by both users and external authorities (Ostrom, 2003, pp.5-6). Establishing these rules creates the need for the combined effort of a large portion of the resource users. However, in the process users must overcome collective action dilemmas, such as communication barriers and differing interests. While it has been said that no single design will profit all common-pool resources, researchers have agreed on a set of general principles that

increase the organizational performance in managing a common-pool resource (Ostrom, 2003, p.22). This set of principles is as follows:

1. Rules are devised and managed by resource users.
2. Compliance with rules is easy to monitor.
3. Rules are enforceable.
4. Sanctions are graduated.
5. Adjudication is available at low cost.
6. Monitors and other officials are accountable to users
7. Institutions to regulate a given common-pool resource may need to be devised at multiple levels.
8. Procedures exist for revising rules.

As mentioned previously, the nature of common-pool resources varies so tremendously that the management specifics of each also must vary. Nevertheless, having a set of guidelines such as the preceding list may allow for a more effective management plan.

Ostrom claims that compliance to rules regulating common-pool resources is one of the largest obstacles in management. Therefore, if rules are devised and managed by the users of the resource, they are more likely to reflect the characteristics of the resource and its uses. In this case, the users are also more familiar with the rules and therefore more likely to comply (Ostrom, 2003, pp.22-26). Rules that are easily monitored and enforceable also lead to further compliance of resource users. A system of sanctioning scaled to the seriousness of the offense also helps ensure adherence to rules and regulations. When monitoring, enforcement, and sanctions fail to obtain compliance, adjudication serves as the final method to achieve cooperation. Ostrom's principles also state that adjudication should be made available at low cost in order to make this final step more feasible.

Large resources that exhibit high complexity and the use of which result in negative consequences are even more difficult to manage. The design of institutions on multiple interconnected levels is most often the solution to this dilemma. Linking these levels together depends on the nature of the resource, the flow of information across different levels, and the

power of the individual levels. Regardless of the nature of the common-pool resource or the institutional design, procedures for revising the existing rules must be in place. This allows for a process of trial and error in which the most effective rules for a particular resource can be determined.

It is clear that the management of common-pool resources, such as water, presents a challenge. The guidelines developed by Ostrom (2003, p.22) appear flexible enough to be applied to the varying array of common-pool resources yet structured enough to benefit each of them individually.

2.2 *What is a Watershed?*

Surface and groundwater tend to be managed in the context of a watershed. A watershed is a geographical and ecological unit for managing water. When aiming to evaluate the current management procedures of particular watersheds within Massachusetts, it is essential to understand not only the management methods but also the watershed itself. This does not mean that simply knowing the definition of a watershed is sufficient in a project of this magnitude. We must understand the watershed's role within river systems, as well as the many components and features they are composed of. Before examining the current Massachusetts management practices and confronting problems concerning those practices, we must examine what is being managed – the watershed – in a geographic, ecological and sociopolitical context.

2.2.1 Geographic and Ecological Perspectives

In order to fully understand the geography of a watershed, one must begin broadly with an understanding of river systems. A river system consists of “all the land which is drained by a river and its tributaries from the river's start” (Bickford & Dymon, 1990, p.13) to its mouth. The

mouth of a river is defined as the area where the river empties into a larger body of water, such as a pond, lake, or ocean. The river systems themselves consist of several individual watersheds. A watershed is an area of land, typically concave or bowl-shape, in which runoff from precipitation follows the contours of the land to lower elevations where it ultimately drains into a particular watercourse or body of water (Merriam-Webster, 1996, p.1336). Within the United States, watersheds are often referred to as river basins, which may be inappropriate as the two are not identical (Bickford & Dymon, 1990, p.13). A river basin is a particular kind of watershed; one in which all of the water drains to form a river. However, this is not the case with every watershed which may drain not only to form a river, but any other body of water. Therefore, limiting the use of the term 'river basin' to specific instances in which rivers are indeed formed is important to maintain proper clarity.

It is also important to understand the many components of a watershed to attain a better overall understanding of watersheds themselves. These components include streams, which usually maintain a hierarchal order (Towson University Center for Geographic Information Sciences, 2005, *What Are Watersheds?*). Streams without tributaries, often the smallest, are referred to as first order streams. When two first order streams merge, they are referred to as second order streams and so on. Stream ranking continues in this fashion until the highest-ordered channel has been reached.

Aside from ordered streams, watersheds also consist of several other hydrological features, as seen in Figure 2.1. Watersheds themselves are separated by an elevation known as a divide; this is denoted as the ridge in Figure 2.1 (Bickford & Dymon, 1990, p.15). As mentioned previously, river systems are made up of several individual watersheds. However, this does not mean that rivers themselves are not also components found within watersheds.

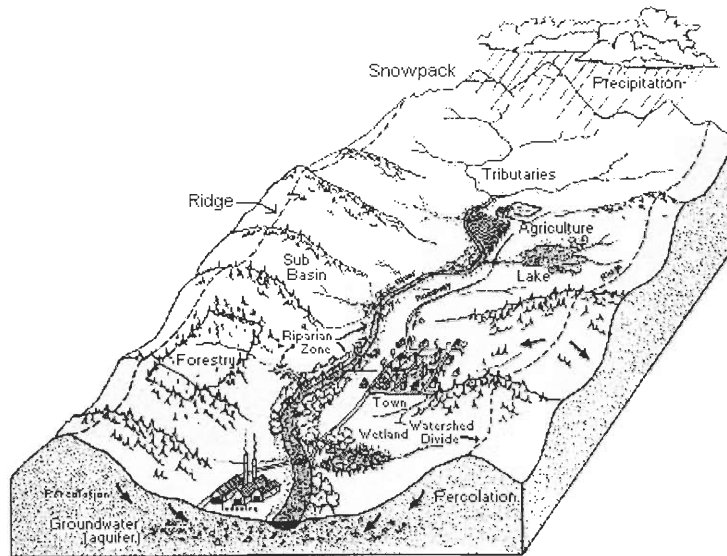


Figure 2.1: Components of a Watershed
(U.S. Environmental Protection Agency, 2005: *Watershed Information Network*)

Entire rivers may be contained within a particular watershed. On the other hand, a river may run through many watersheds, in which only part of the river is within each watershed. The area where a river within a watershed empties into the ocean is referred to as an estuary - an area in which salt and freshwater mix. At times, rivers within a watershed will overflow their banks, flooding the surrounding area, known as flood plains. During periods of heavy rain or snowmelt flooding may also be accompanied by the running of seasonal streams, referred to as intermittent streams (Bickford & Dymon, 1990, p.3). Such irregularities and shifts in river and stream flow can lead to the build up of sediments, which can lead to ‘meandering’ paths that leave an oxbow pond or complete loop within the river.

Springs also play a vital role in watershed ecology (Bickford & Dymon, 1990, p.15). This is an area where groundwater comes to the surface leaving the soil wet year round. Such areas serve as feeding grounds for wildlife during the winter months. Similar to springs are wetlands, which are areas of low elevation where the soil also remains wet. Although wetlands

may freeze during the winter, they are vital homes to water-dependent plants and animals, such as the American bittern, the great blue heron, and the painted turtle.

Perhaps as important as springs and wetlands are to watersheds, so too are vernal pools which serve as temporary bodies of freshwater. Such areas of freshwater are vital breeding grounds for amphibians, insects, and other species of wildlife (Bickford & Dymon, 1990, p.15). Maintaining a clear understanding of these individual components allows for a more comprehensive overall understanding of what a watershed is.

Just as the components within watersheds vary, so do their size, which may be anywhere from less than a square mile to thousands of square miles (Conservation Technology Information Center, 2005, *Getting to Know Your Watershed: A Guide for Watershed Partnerships*). Large watersheds, such as the Mississippi River Watershed and the Chesapeake Bay Watershed, are comprised of many smaller watersheds. These watersheds can be further divided into even smaller areas known as sub-watersheds. It is these sub-watersheds which consist of streams draining into their main channels. These geographic features of a watershed most often determine their boundaries. However, when watersheds are very large or cross many regional boundaries, they can be defined according to the social and political influences at work in the watershed.

2.2.2 Social and Political Perspectives

While many watershed management plans have been implemented on a geographic level, it has been suggested that this method of organization is ineffective, and at times even counterproductive (Tarlock, 2000, p.194). The fact that people have organized themselves socially, establishing political regions with little regard to natural boundaries, has led to

problems in management of natural resources which do not conform to these artificial restrictions. In order to work across these boundaries, political entities such as towns, states, and even countries, must work together to achieve specific goals. This problem is highlighted in the case of the San Juan Creek watershed located in Orange County, California. This watershed has been broken into five separate 'water districts' that have endeavored to work together for water preservation in this dry region. Problems have arisen, however, in the ability of these groups to function in such a way that is profitable, both socially and ecologically, to the health of the watershed as a whole (Blomquist & Schlager, 2004, p.110). This is just one example of how political limitations have influenced management plans, and why each group concerned with watershed management must work in concert with political entities as well as within the geographical confines of the watershed.

Although difficult to establish across political boundaries, "watershed-scale organizations would bring together all 'stakeholders' and produce integrated watershed management, overcoming the undesirable effects of treating resources separately when they have interactive effects" (Blomquist & Schlager, 2004, p.110). This interaction would allow for better management of those issues referred to by Rittel and Webber (1973), as "wicked problems" (challenges such as non-point source pollution that are impossible to deal with through isolation or division).

The largest problem facing watershed managers on a social level is stakeholder and community involvement. Currently, the measure of this problem seems to be based on how much knowledge the community and stakeholders have of the watershed in which they live or have interest. Many watersheds are rather large and because of limited resources, such as money, it is nearly impossible for managers alone to accomplish their goals. This results in the

need for volunteers and improved community awareness. However, getting the community involved is a very difficult task, since many people do not understand the importance of a watershed and therefore do not have the incentive to help out (Davenport, 2003, p.14). The identification of these types of problems aids managers in determining their goals which may include such efforts as increased media attention to attract volunteers.

The interaction between scientists and policy makers is another topic of great concern in watershed planning. Policy makers tend to focus on subjective values such as beliefs, emotions, and perceptions of the public, as well as on deadlines and current events. In contrast, scientists are primarily concerned with obtaining evidence of objective facts by working within the confines of rational data analysis (Letey, 1999, p.604 & p.607). In many cases, scientists view their work as complete when a paper declaring their findings is published. However, policy makers may assume that as stewards of such information, these scientists would argue their points on a social level (Letey, 1999, p.604 & p.607). On a more cynical note, these same policy makers, along with other concerned parties; citizens, business owners, etc. may, for their own benefit, prefer that certain scientific findings remain out of the public spotlight, hidden in journals and seemingly complicated reports (Letey, 1999, p.604). In order to establish plans that accommodate the many users of watersheds – both human, and wild – it is essential that scientists and policy makers work together to “find the best solution that fits within political, social, and economic boundary conditions” (van der Vink, 1997).

2.2.3 Watershed Problems

While individuals question whether to manage watersheds according to their natural geography or in accordance to social boundaries (i.e. town, state, or regional), this problem

relates solely to the definition of watershed limits. Unfortunately, problems concerning watersheds extend far beyond this issue. Watersheds within the United States are being threatened by pollution, urbanization, and sedimentation at an ever increasing rate (Kifferstein & Krantz, 2006).

Water pollution is typically defined as the adverse effects to a water body caused by the addition of large amounts of materials. These adverse effects often lead to the inability of water to be used for its intended biological, residential, industrial, or agricultural purposes. Water pollution is broken into two main categories; point and non-point source pollution. While point source pollution refers to pollutants released directly into a water body, non-point source pollution is much more complex as the pollutants are indirectly delivered to the water body through environmental changes (Kifferstein & Krantz, 2006). Fortunately, through the Clean Water Act (See Section 2.2.5), the work of the federal and state governments along with the efforts of grass-roots organizations, point source pollution in the United States has been successfully regulated through permitting for some time. However, less fortunately, “non-point source pollution is the principle remaining cause of water quality problems across the U.S.” (Ryan, 2002). Non-point source pollution, unlike point source pollution, is the accumulation of the everyday activities of people, animals and industry. This accumulation has very serious and detrimental affects on watersheds and an inability to regulate the sources of such pollution creates the need for discussion of such sources (Ryan, 2002).

While non-point source pollution encompasses any form of pollution which lacks a defined source, the largest source of non-point source pollution in Massachusetts is stormwater pollution. Pollutants from various sources accumulate on the surface of impervious cover and are rapidly washed off during storms. This run off is delivered to downstream waters, where it in

turn creates major water quality problems within rivers, lakes, ponds and estuaries. Increased monitoring efforts have recently shown that regardless of the region of the country being sampled, the same kinds of pollutants are found in most stormwater samples. The most common pollutants are sediments, nutrients, organic carbon, trace metals, petroleum hydrocarbons, pesticides and fecal coliform bacteria (Schueler & Holland, 2000, p.5). While all of these pollutants threaten Massachusetts watersheds, the central region has dealt most heavily with an overabundance of nutrients and sedimentation.

Urbanization creates problems within our watersheds due to the fact that the amount of runoff is directly related to the amount of impervious surface within the region. Imperviousness is often an indicator of the impact of land development on aquatic systems. In this sense, imperviousness refers not only to the sum of our transportation systems, such as roads, parking lots, and sidewalks, but also to the sum of the rooftops under which we live and work. It can more easily be defined as the percentage that is not green, which expands to include all areas of development (Schueler & Holland, 2000, p.7). It is understood that an increase in development leads to an obvious increase in imperviousness and therefore to an increase in stormwater pollution. This can be illustrated by a comparison between the runoff of an acre of meadow due to a one inch rainfall, which would fill a standard sized office to about two feet deep (218 cubic feet), to the same amount of rainfall on an acre of pavement which would fill three offices of the same size (Schueler & Holland, 2000, p.8). It should also be stressed that while an increase in runoff is caused by an increase in development, a decrease in watershed services is also caused by development. The services of watersheds are maximized when the land area within them is maintained within its natural conditions. This is a result of the transformation of the watershed's surface leading to the inability to absorb and store rainfall as it would in its original state

(Schueler & Holland, 2000, pp.1-2). As the negative effects of development and urbanization continue to threaten watersheds throughout Massachusetts, it is important to identify the most prevalent sources in order to better regulate them in the future.

Development is not the only issue currently plaguing water quality in Massachusetts: sedimentation has also become a main concern within these watersheds. Suspended and deposited sediments have varied and potentially devastating effects on ecological communities. Recent biological surveys have also shown that eroded sediments can dramatically affect aquatic biota and that rare and threatened fish species are more susceptible to increases in turbidity (Schueler & Holland, 2000, p.64).

While sedimentation in general is a concern, contamination of sediments also results due to point and non-point source pollution. Four major contaminants of sediments have been listed by the EPA as nutrients, halogenated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), and metals. Depending on the levels of contamination metals, PAHs, and organics, they can be toxic to plants, animals and even humans (United States Environmental Protection Agency, 2005, *Contaminated Sediment in Water*). Organics and metals can also biomagnify, or successively build up, as they travel up the food chain (United States Geological Survey, 2005).

Dredging of contaminated sediments has been presented as a possible solution to the problem. Unfortunately, this creates the risk of further disturbing the sediments and potentially releasing more pollutants. Contaminated sediments also build up behind dams and the dredging of these sediments is even less feasible. Once removed, this dredged material is also difficult to dispose of – the only known use being that of land fill cover. As mentioned previously, regulations have tightened down on point source pollution and in turn the contamination of sediments has decreased over the years. This has led to a capping-off of the more heavily

contaminated sediments with less contaminated sediments, which also creates a resistance to the idea of dredging. However, with the continued channeling of streams and rivers, the possibility of cutting into contaminated sediments leading to further leaching remains a threat (T. Beaudoin, personal communication, October 28, 2005). The EPA is currently working to reduce the risks posed by contaminated sediments, as the issue continues to become more of a concern within central Massachusetts watersheds.

Urban and residential development has also led to a rise in flooding due not only to an increase of impervious surface, but also to a decrease in riparian buffer zones and wetlands. These areas naturally form around rivers to soak up excess water during large rain events and snow-melt periods. As land use increases, runoff that would naturally be caught by these regions increases up to sixteen percent (Purdue University, 2003). It is important to recognize that increases in sedimentation also lead to an increased susceptibility to flooding. The natural state of the watershed is altered as it is filled in by deposited sediments and is no longer able to retain the same amount of water. Such increased threats to flooding have obvious impacts on the health of the watershed. This is due to the fact that large amounts of non-point source pollution are carried into water bodies during flooding.

Massachusetts watersheds also face water quality degradation due to increasingly high nutrient levels. One cause of such high nutrient levels is the presence of large amounts of nitrogen and phosphorous in the fertilizers used on lawns, golf courses and crops. The atmospheric deposition of nutrients to lawns and impervious surfaces, from power plant and vehicle emissions, also contributes to the higher nutrient levels present in storm water run off. Atmospheric nitrogen ($N_{2(g)}$), once it is fixed and assimilated by plants, becomes yet another source of nutrients present within rivers, lakes and streams. The fixed state of nitrogen is

reached as a result of the bacteria found living in the soil (*Clostridium*) and on the roots (rhizobia) of certain plants. For instance, clover is a rhizobium-carrying plant which is capable of producing close to 30% of a lawn's yearly nitrogen requirement. It is obvious that the existence of such plants in lawns or water bodies can in turn result in increased nitrogen levels. Nutrients can also be recovered through the decomposition of grass clippings. Studies have proven that an average acre of grass clippings produces 235 pounds of nitrogen, 210 pounds of potassium, and 77 pounds of phosphorous. These amounts would be sufficient enough to supply the same area of lawn with nearly all of its nutrient requirements. It can be seen that such a supply of nutrients can also contribute to storm water pollution, as grass clippings are washed into near by water bodies during heavy periods of rainfall (Schueler & Holland, 2000, pp.29-32).

Now that several sources of nutrients have been identified, it is important to describe their connection to poor water quality. If the concentration of nitrogen and phosphorous in urban run off is high enough, it can trigger eutrophication, also known as over-enrichment. Certain watersheds that drain into nutrient-poor lakes, in which phosphorous is the limiting nutrient, or poorly flushed coastal waters and estuaries, in which nitrogen is the limiting nutrient, are most susceptible to eutrophication, whereby water bodies receive excess nutrients that in turn stimulate excessive plant growth. Examples of such excess plant growth most often consist of floating and attached algae, and nuisance plant weeds (Schueler & Holland, 2000, p.35). This increased plant growth, or algal bloom, leads to lower dissolved oxygen levels when plant material decomposes. Low dissolved oxygen levels in turn trigger the death of organisms such as fish that may be present within the receiving water bodies.

Since urbanization, sedimentation and high nutrient levels are leading threats to watershed health, the importance of understanding these issues is clear. However, it must also be recognized that these issues are merely environmental and do not address the issues of management.

2.3 *Approaches to Watershed Management*

Now that we have a better understanding of the physical problems which afflict Massachusetts watersheds, we can examine some of the approaches that may contribute to successful watershed recovery. Due to the large scale of watershed issues, many theories exist concerning effective management. Management in general is most often approached from either the top down or bottom up, and attempts to manage watersheds may be identified under these two models. In order to better understand watershed management and identify problems, it is necessary to understand the theoretical ideals as well as recognize that in reality, such ideals are not fully attainable.

2.3.1 Top-Down and Bottom-Up Management

As with any type of resource management, the issues involved in watershed management can be approached from two general perspectives. Here we compare and contrast the top-down and bottom-up approaches and address each within the context of Ostrom's principles for common-pool resource management (Section 2.1: Common Resources).

When a government organization creates standards and rules to be followed in managing a resource, it is referred to as top-down management. This strategy is advantageous for several reasons. With government support, this approach should have the availability of funds and other resources such as scientific expertise, equipment, enforcement, and the ability to change laws.

Through sufficient funding from upper levels of government, a watershed organization has the ability to conduct programs such as water quality monitoring or community outreach which aid in the protection of a watershed.

This model of top-down management may be discussed in the context of several principles presented by Ostrom. The responsibility of establishing and enforcing rules is usually granted to government agencies. This norm is contrary to Ostrom's first principle stating that rules should be devised and managed by the resource users. The government, however, is the primary enforcer on all levels within the United States, and citizens have little standing to establish and enforce laws without the help of these agencies. At times, state agencies do recognize the importance of involving citizens in policy-making and provide avenues for interaction. One example is the case of the Great Lakes states (including Ohio which is discussed in Appendix E) which are working to develop action plans for critical areas of concern around the Lakes. The state environmental agencies participating in this planning process have recognized the necessity of citizen input for laws that will directly affect them, and have established citizens' advocacy groups (CAGs) around the region. These groups are able to "provide public input into the planning process, foster communication between government agencies and special interest groups, and facilitate intergovernmental co-ordination" (Knaap et al. 1998). As is often the case with planning at the top level, as well intentioned as the formation of these groups is, they have been found to have "limited influence on agencies plans and activities, and lack the authority to assure the co-operation of local governments" (Knapp et al., 1998). While this weakness in community input is detrimental to effective top-down management, this method does allow for Ostrom's third (rules are enforceable) and eighth (procedures exist for revising rules) principles to be followed.

When local grassroots organizations or other advocacy groups are formed, bottom-up management is attempted. These organizations must work closely with the community of which they are a part in order to obtain funding and volunteer support. This essential connection with citizens enables grassroots watershed advocacy groups to be effective at community outreach as well as sensitive to local issues within a particular watershed. Organizations that are able to obtain enough funding and stakeholder involvement may become more adept at managing their watersheds on a social and political level as they are closer to the sources of support than organizations that exist at the top of government. This is a classic example of Ostrom's first principle (rules are devised and managed by resource users) in practice. The connection that bottom-level organizations have to the local area also allows for easier monitoring of compliance to rules and regulations (principle two). Despite its advantages, the bottom-up approach to watershed management is again not necessarily effective in practice, as can be observed in the Great Lakes case discussed above. Possible explanations include limited funding and a lack of other resources, such as scientific expertise, and proper equipment, available to a bottom-up management system.

2.3.2 Current Management Approach in Massachusetts

The current setup in Massachusetts is a combination of both the top-down and bottom-up watershed management approaches. Here, local watershed advocacy groups cooperate with government agencies such as the Massachusetts Department of Environmental Protection (MassDEP). This current system of watershed management is called the Watershed Approach and is centered a five-year watershed cycle, under which specific activities are supposed to take place during each year of the cycle (Figure 2.2) (Massachusetts Department of Environmental Protection, 2005, *The Watershed Approach*).

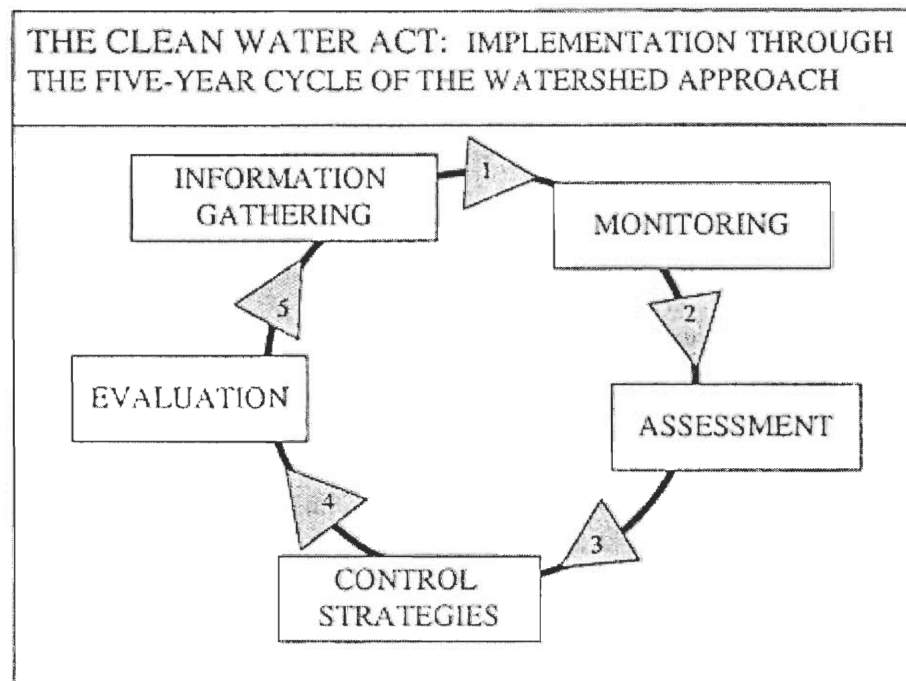


Figure 2.2: DEP's Watershed Approach Five Year Cycle
(Massachusetts Department of Environmental Protection, 2004)

According to the Watershed Approach, year one consists of information gathering and collaboration between the MassDEP and watershed groups, environmental groups, and the general public to agree upon goals and objectives for each specific watershed. During year two,

water quality monitoring is conducted both by the MassDEP and by volunteer monitoring programs run by local watershed organizations. In year three, the MassDEP analyzes the data and makes assessments, and in year four this agency develops an action plan for each watershed. Implementation of the action plan occurs in the fifth year of the cycle, and an evaluation is conducted by the MassDEP to assess the success of the previous years, as well as to identify what needs to be changed (Massachusetts Department of Environmental Protection, 2005, *The Watershed Approach*).

This system of management combines the advantages of both top-down and bottom-up approaches. Regulations and guidelines are organized through interactions between government and local grassroots watershed advocacy groups. In theory, this system should have good sources of funding and scientific expertise (through the involvement of state government), as well as good community outreach (through the actions and visibility of community organizations). Although a management system is in place that combines the advantages of both top-down and bottom-up management, there appears to be a gap between planning and practice, and watershed management in Massachusetts falls short of the goals set forth by those involved. Identifying and characterizing that gap is a matter of great importance and is one of the objectives we will address in the coming sections.

2.4 *Watershed Legislation*

The past and present management strategies implemented within Massachusetts have great bearing on our project, and we describe them in more detail in this section. Many attempts to manage water in the United States have been made through legislation. The earliest laws concerning water revolved around trade and transportation, consequently regulating the use of navigable waterways. As time passed and industry increased, water – more specifically the

nation's rivers – was used as the primary source of both power and waste removal. As these uses increased, water quality decreased and the need for protection of the nation's water resources became clear. Laws initially focused upon protection of drinking water and point source pollution. More recently, however, these laws have been amended in an effort to protect other surface waters not only for human purposes, but also for the nation's precious flora and fauna.

2.4.1 Federal Regulations and Laws

The first major effort to manage water on a government level was initiated by the Federal Water Pollution Control Act (FWPCA) in 1948 to locate and control sources of water pollution. Though millions of dollars were dedicated to this process in the mid-1900s, little was actually done to stop the polluters once they were identified (Environmental Defense & Texas Center for Policy Studies, 2005, *History of Federal Legislation on Water Quality*). In this time period, protection of drinking water became the focus of water-related legislation, and several acts were passed to these ends. The 1956 amendment to the FWPCA provided funds to publicly owned treatment plants, while Congress mandated that states provide standards for interstate waters in the Water Quality Act of 1965 (Kent, 2001, p.352).

As years passed, improvements were made to these laws in correlation with technological advances. Most notably in 1972, and again in 1977, amendments were made to the FWPCA, forming today's foundation for federal regulation of water, which became known as the Clean Water Act (CWA). The stated objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (United States Government, 2004, *Section 1251: Congressional declaration of goals and policy*). It dictates the standards all states must follow in these areas of chemical, physical and biological integrity in order to improve and maintain the nation's water quality. The interim goals of the act when implemented were to

“achieve water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water by July 1, 1983” (River Network, 2006, *Overview*) and to eliminate the release of pollutants into navigable waterways by 1985. In order to achieve these goals, the EPA began requiring permits to be issued for industries and individuals emitting waste directly into waterways. Each state was also required to develop effluent discharge limits for point source pollutants, and a plan was established for states to work toward fishable and swimmable water bodies. As time went on amendments were added to the CWA as water quality improved and scientific advances were made allowing for more stringent requirements. The 1977 amendment to the CWA called for states to target specific toxins in their water quality standards. Through the 1970s and 1980s, funds were dedicated to improvements of sewage treatment plants, and stronger controls were put in place on such industries. These controls were enforced by lawsuits against companies violating permits.

The 1987 Water Quality Act initiated an effort to continue the overall goal of the CWA through stricter control and more clearly defined regulations. These amendments included:

- Non-point source control provisions
- Improved stormwater management practices
- Tightened controls on point sources
- Prohibited dumping at waterside industrial facilities
- Added Section 518, which authorized EPA to treat federally recognized Indian Tribes as States for certain provisions of the Act
- Phase-out of most direct federal grants
- Beginning of state revolving water pollution control funds
(River Network, 2006, *Clean Water Act History*)

It is important to understand the guidelines set forth by the CWA in order for one to identify weaknesses or strengths of the federal program for water protection. The CWA established a number of complex mechanisms to aid states in regulating water pollution and managing the health of aquatic resources. The general steps are outlined in Figure 2.3, while the following section describes six such mechanisms derived from the CWA.

Water Quality Act

To restore and maintain the chemical, physical, & biological integrity of the nation's waters.

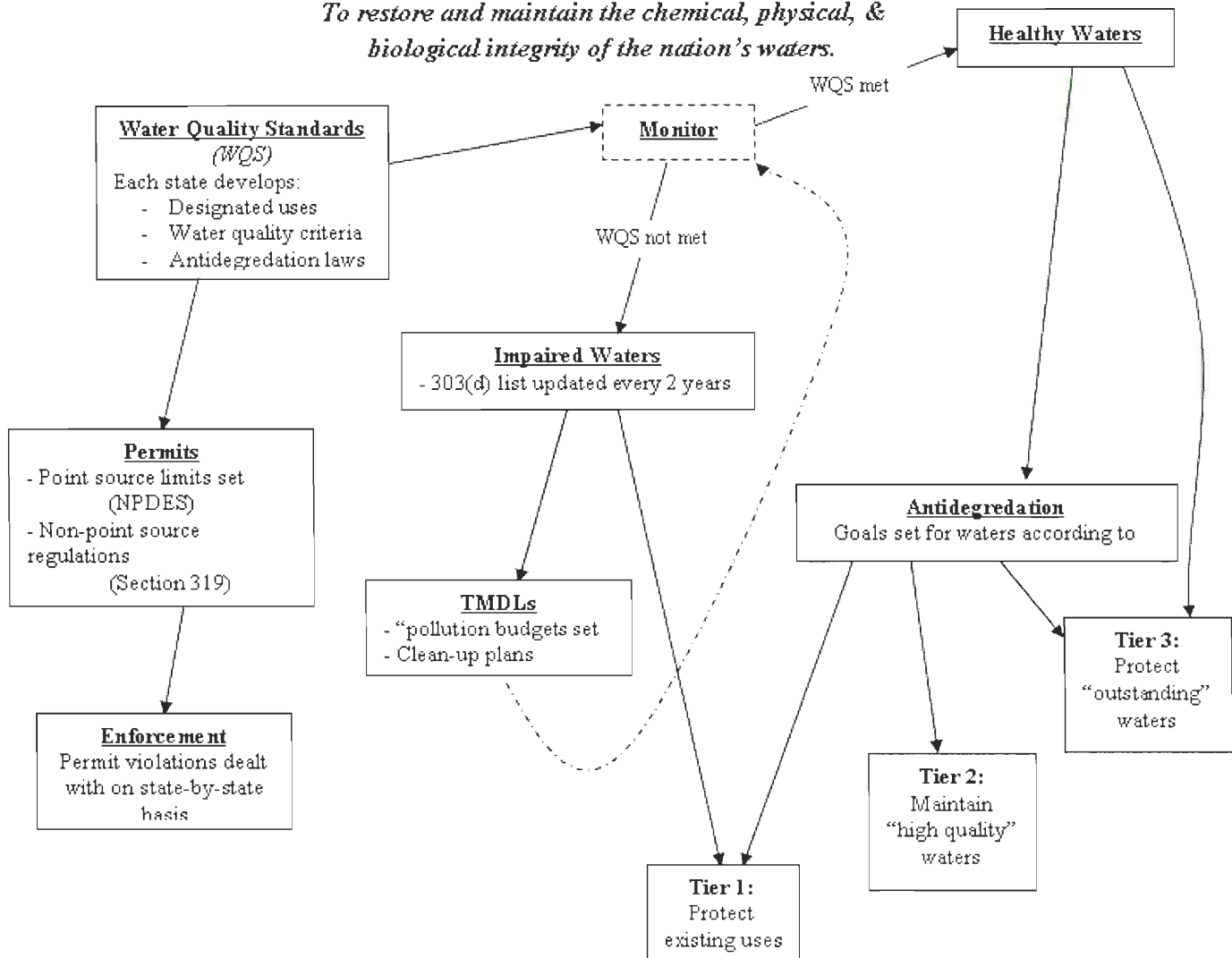


Figure 2.3: Components of the Water Quality Act
(formulated from United States laws)

Water Quality Standards

The United States Environmental Protection Agency (EPA) stipulates through the CWA that each state must make an assessment of its water resources and present the findings to the Agency, the U.S. Congress, and its citizens (United States Environmental Protection Agency, 1994). While each state gathers the

information for its report differently, all must follow the basic evaluation techniques set forth by the EPA. The first step for each state is to define for each body of water a set of water quality standards (WQS) to be fulfilled.

A WQS defines the water quality goals of a water body or portion thereof, in part, by designating the use or uses to be made of the water. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act (United States Environmental Protection Agency, 2005, *Biocriteria*).

The five designations of waterbody use defined by the EPA are: aquatic life, public water supply, recreation, agriculture/industry, and navigation (the specified uses in Massachusetts are detailed in Appendix 3). States are allowed to add designations to this list, as long as they follow the goals of the EPA (United States Environmental Protection Agency, 1994). Each water body is assessed on a three- tiered scale: support, partial support, or non-support. When not enough data are available for full evaluation, bodies are labeled as unassessed.

Antidegradation

Antidegradation laws are the least well known and implemented standards. There are three “tiers” of antidegradation which provide a framework for protecting hard-won gains once use goals are reached for each waterway. These tiers are detailed in Table 1.

Under the CWA a Triennial Review of water quality standards allows public comments on any proposed changes to standards. Any changes proposed by states must be approved on a federal level by the EPA.

Table 1: Antidegradation Tiers

<u>Tier I</u>	<u>Tier II</u>	<u>Tier III</u>
Protect Existing Uses	Maintain “high quality” waters	Protect “outstanding” waters
Permit no activity that would eliminate or interfere with an existing use. (In essence, Tier I reiterates the requirements for designating uses and developing criteria, establishing the absolute floor for water quality protection.)	Avoid – or at least hold to an absolute minimum – any lowering of quality of waters that currently meet or exceed standards.	Give the most ecologically significant and sensitive, the cleanest, and the most recreationally popular waters the strict protection they need and deserve.

(River Network, 2006: *Water Quality Standards*)

Point Source Discharge Permits (NPDS)

Point sources of pollution require National Pollutant Discharge Elimination System (NPDES) Permits issued by state environmental agencies. Components of these permits include, but are not limited to: information on the target waterway, limits imposed upon the pollutants being discharged including specifics about the toxins and how much of each is allowed to be discharged, and requirements for monitoring. Permits must be reviewed, adjusted, and renewed every five years (Cech, 2005). Violations are dealt with on a state basis and fines of up to \$25,000 per day and even jail time are consequences of such violations. These fines may be paid directly to the government agency imposing them (in the case of Massachusetts, this would be the DEP), but the EPA has recently began a program to encourage violators “to fund projects in lieu of payment of a portion of civil penalties that otherwise would be assessed in settlements of enforcement actions” (Goodwin Procter LLP., 2002). These projects are mostly designed by local watershed advocacy groups which apply to the DEP for use of the money for

programs intended to enhance the quality of the watershed. These Supplemental Environmental Projects (SEPs) apply to any EPA violation, not only water-related violations, and in Massachusetts “will not be allowed if its performance will impede a respondent’s ability to comply or perform a remedial measure” (Goodwin Procter LLP., 2002). One example of this program in Massachusetts is the case of Worcester Lincoln, LLC, on which a \$16,000 fine was imposed when the company failed to meet standards. This money was donated to the Blackstone Headwaters Coalition for water quality monitoring purposes (Massachusetts Department of Environmental Protection, 2004, *List of Approved MA DEP Supplemental Environmental Projects*).

Threatened/Impaired Waters Listing – 303(d) List

Once a body of water has been placed in at least one of the five use categories and evaluated, it must be monitored properly. In some areas, the EPA is involved in these monitoring processes, however these procedures fall under the responsibility of individual states (United States Environmental Protection Agency, 2005, *Watershed Academy: Section 22*). In central Massachusetts, many of the watershed advocacy groups have volunteer programs that provide the MassDEP with monitoring data. In order to have these data validated by the DEP/EPA and used in official Water Quality Assessment reports, monitoring groups must write a Quality Assurance Project Plan (QAPP). These documents are specific to each monitoring program from Shoreline Stream Surveys to chemical sampling and detail the entire program. Developing a QAPP can be an arduous process; however the process is useful in that the goals for the project

become well established and those involved in the design of the program may become aware of any limitations or omissions in the data gathering process (Massachusetts Water Watch Partnership, 2005: *Government Help in Massachusetts*). Information obtained from these monitoring efforts must be reported to the EPA over two years, in two sections. The first, known as the Section 305(b) Report, summarizes the water-quality findings for the entire state. The second report, the 303(d) List, catalogs the bodies of water that have been deemed threatened or impaired. Bodies of water that have been placed on this list must have an individual, state-developed plan devised for them so they may be put on track to fulfill Water Quality Standards.

Total Maximum Daily Loads (TMDLs)

Total Maximum Daily Load is the amount of pollutants that a given waterway is able to safely absorb without violating state standards for toxins. Waterways deemed threatened or impaired under the 303(d) list must have individual Total Maximum Daily Loads (TMDLs) developed. “Once a TMDL is established, responsibility for reducing pollution among both point sources (pipes) and diffuse sources is assigned” (Conservation Technology Information Center, 2005, *TMDL Fact Sheet*).

Control of Non-Point Source Pollution - Section 319

Section 319 of the CWA was passed in 1987 to control non-point source pollution nationally. This section generally makes funds available in the form of

grants available through application by individual states or non-government organizations for specific project work. Projects may include protection or restoration of wetlands and riparian areas to target potential non-point sources (River Network, 2006, *Nonpoint Source Pollution Control*).

Point source pollution regulated through technological monitoring has protected the nation's waters from almost 700 billion pounds of pollutants per year, and NPDES permits have controlled the outputs of over 48,000 industrial facilities (United States Environmental Protection Agency, 2002). Water quality standards adopted by all states under the Clean Water Act, however, are not being fulfilled due to the complex nature of non-point source pollutants.

Although the water assessment process is intended to be ongoing and reports should be submitted at set intervals, state environmental agencies have reported that such extensive monitoring is not actually carried out. Therefore, depending on the individual state, only certain regions are assessed thoroughly, or a large number are assessed on a less intensive level. As shown in Table 2, the actual review process covers less than half of the water bodies in the United States (United States Environmental Protection Agency, 2005, *Watershed Academy: Section 22*).

Table 2: Percent of Waterbodies Assessed

Percent of Waterbodies Assessed		
Type of Waterbody	Total Size	Amount assessed* (% of Total)
Rivers (miles)	3,692,830	699,946 (19%)
Lakes (acres)	40,603,893	17,339,080 (43%)
Estuaries (sq. miles)	87,369	31,072 (36%)
* Includes waterbodies assessed as not attainable for one or more uses Note: Percentages may not add up to 100% due to rounding		

(United States Environmental Protection Agency, 2005, *Watershed Academy: Section 22*).

As previously discussed, water sources are extremely diverse throughout the United States. This diversity makes it difficult to regulate each state's resources. Consequently, the EPA's strategy has only worked out broad rules for states to follow, while making the assessment strategies semi-uniform, for increased compatibility.

2.4.2 Approaches to Watershed Management in Massachusetts

While most of the above laws and regulations are initiated at the federal level by the EPA, this agency delegates much of its enforcement power to the environmental protection divisions of individual states. Such is the case of the Massachusetts DEP which "administers state laws and regulations aimed at preventing pollution, protecting natural resources, promoting safe disposal and recycling of wastes, and ensuring timely cleanup of contamination" (Massachusetts Department of Environmental Protection, 2005, *Frequently Asked Questions*). The government agencies of Massachusetts with this power have recently been restructured, leading to serious complications in the management of the state's watersheds. The following section discusses the most recent actions in the state, specifically the Massachusetts Watershed Initiative (MWI) and subsequent watershed-based environmental protection strategies.

December 1993 marked a significant change in the approach to watershed management in Massachusetts in response to previously discussed trends in the management of natural resources, which include holistic ecosystem management and recognition of public and private responsibilities for involvement. A steering committee with members from state, local, and federal agencies, as well as environmental and business interests, was “charged with developing and testing a model approach for how to assess, plan, and make decisions about the state's watersheds” (Watershed Initiative Steering Committee, 1995, p.5). This body devised a set of five overall goals that were used to drive the organization of the initiative:

- Finding the sources of pollution and taking cooperative action to clean them up;
 - Teaching and helping groups and communities to protect and restore their local waters;
 - Expanding communication among local, private and public partners so everyone works together to solve water resource problems;
 - Improving coordination among government agencies; and,
 - Directing resources to critical needs so our limited dollars go further to resolving the most important problems.
- (Executive Office of Environmental Protection, 2002, *A Review of Statewide Management Practices*)

These goals were carried out by members of the 27 Watershed Teams designed around the state’s 27 watersheds and composed of representatives from the private, public, and governmental sector of each watershed region. These teams operated on a five-year cycle “designed to collect and share resources and information, target existing and potential impacts to natural resources, assess impacts to natural resources, and develop and implement activities to protect and improve the Commonwealth’s land and water resources” (Executive Office of Environmental Protection, 2002, *A Review of Statewide Management Practices*). Annual Work Plans were developed by members of the teams and used as a guide during the five year process which culminated in the more comprehensive Five Year Watershed Action Plan. The information contained in this plan gained throughout the five year process influenced “which

projects receive state and federal grants and loans, regulatory decision-making and educational/technical assistance programs to solve the most important environmental problems affecting communities” (Executive Office of Environmental Protection, 2002, *A Review of Statewide Management Practices*).

The MWI was eliminated in a reorganization of the Massachusetts government carried out by the Romney administration in 2004. The current strategy for management is the Watershed Approach. This program runs on a five-year cycle similar to the MWI; however, the restructuring eliminated watershed teams and brought management of watersheds under the jurisdiction of the MassDEP regional offices. As this approach has not been in place for long and is still being formed, not much information is available detailing its structure or effectiveness. Due to this data gap, we found it necessary to collect information on current watershed management practices in the central region of Massachusetts through primary sources in order to adequately understand where improvements could be made.

3 Methodology

The goal of this project was to identify overarching problems concerning the current management practices of watersheds in the central region of Massachusetts and to provide alternative strategies that may increase their effectiveness. To achieve this goal, we identified and accomplished the following objectives:

- 1) To better understand the regulatory structure of watershed management at the state and federal levels. This was achieved through archival research.
- 2) To determine the actual methods of management at a state and local level. To achieve this objective, we conducted many interviews with key informants in each watershed.
- 3) To identify the overarching problems facing the watershed organizations within the Central Region of Massachusetts, as well the discrepancies which occur between the government's expectations and what is actually being done. To achieve this objective we conducted many interviews with key informants in each watershed.
- 4) To suggest alternative strategies that may increase the effectiveness of watershed management in Massachusetts. We analyzed data collected through interviews and archival research to achieve this objective.

We initially gathered information through a review of current literature concerning watersheds and management strategies. We also conducted research of the watershed management strategies currently employed in the states of Ohio, Oregon and California in order to provide comparative data and possible alternative strategies for Massachusetts (see Appendix E). After having a thorough grasp of these techniques we first conducted a key informant interview with Ms. Therese Beaudoin of the MassDEP (

Table 3), with whose help we identified 5 watershed systems in Central MA for further study. These watersheds are represented in Figure 3.1 as the Blackstone, French and Quinebaug (combined), Millers, Nashua, and Concord (SuAsCo) drainage basins. While each of these watersheds falls under the regulations of the EPA and Massachusetts DEP, they vary widely in history, organization, and management procedures. Next, we conducted interviews with key informants within each watershed and acquired literature and educational materials available from each interviewee. These data were then analyzed and compiled into a final set of recommendations.

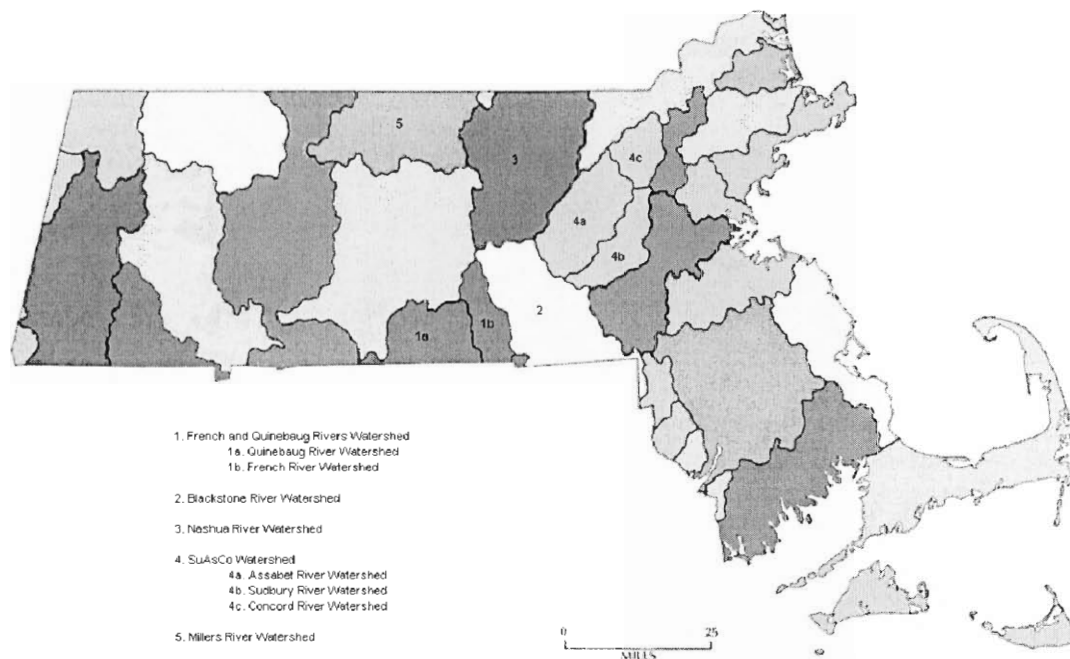


Figure 3.1: Watersheds of Massachusetts
(Massachusetts Studies Project, 2006)

3.1 *Archival Research*

In order to gain a better understanding of the topic, we began by researching the theory of common-pool resources and general watershed management strategies. Initially, we aimed to gain as much knowledge about our topic before proceeding on to more specific cases concerning Massachusetts. While the bulk of this material did not directly relate to the watersheds we

examined, it gave us a firmer background in the subject area and a better overall view of the issues at hand. When narrowing our research, it was important to understand the regulatory structure of watershed management at the state and federal levels. This was accomplished through archival research regarding EPA and Massachusetts DEP policies and procedures both past and present. This also consisted of reviewing the Water Quality Assessments issued by the DEP and any current Action Plans available for the five watersheds of interest. Prior to conducting interviews, we researched each watershed and the organizations directly involved in their management, which allowed us to better prepare for the interviewing process.

3.2 *Key Informant Interviews*

During the research process, we came to the conclusion that narrowing our area of interest was a major priority. We therefore contacted and interviewed the central Massachusetts watershed coordinator of the MassDEP to gain her perspective as to which watersheds we should examine. We also acquired contact information for the key informants involved in each watershed (

Table 3). After obtaining these contacts, we proceeded to research the organizations further, and devised a general list of questions (located in Section 3.2.1) in preparation for each interview.

Table 3: Key Informant Interviews Conducted (see Appendix A for transcripts)

Organization	Persons Interviewed	Position
MassDEP	Therese (Terry) Beaudouin	Watershed Coordinator
	Warren Kimball	Watershed Coordinator
Blackstone River Coalition	Donna Williams	Conservation Advocacy Coordinator, MassAudubon
	Tammy Gilpatrick	Water Quality Monitoring Coordinator
Millers River Watershed Council	Ivan Ussach	Watershed Coordinator
WPI	Professor Seth Tuler	Research Fellow, George Perkins Marsh Institute
RI DEP (Thames River Basin)	Eric Thomas	Thames River Basin Coordinator
Blackstone River Watershed Association	James Plasse	President
Nashua River Watershed Association	Elizabeth Ainsley-Campbell	Executive Director
	Al Futterman	Land Programs and Outreach Director
Blackstone River Headwaters Coalition	Peter Coffin	President
French River Connection	Ken Parker	Co-chair
	Alan Dabrowski	Co-chair
Organization for the Assabet River	Alison Field-Juma	Policy Director
	Sue Flint	Staff Scientist

3.3 Data Analysis

Transcripts of all interviews were made from recordings in order to allow easier analysis and location of information within the interviews (Appendix B). We reviewed these interviews and highlighted important information – positives, negatives, processes (including history and current focus), and future plans – which covered the topics most relevant to our research.

These data were then organized into a Microsoft Excel matrix (Appendix C), further breaking down the information into the following categories:

1. History of the organization
2. Funding of Organization
3. Partnerships
4. Process, including history and what is currently being focused on
5. Problems
6. Proposed changes
7. Interesting comments

This division allowed us to separate general “positives” and “negatives” into the more specific categories listed above. We devised this process after realizing that our highlighting method was too broad to thoroughly point out commonalities and discrepancies between the watersheds.

Although the divisions used initially were not kept for the matrix, we did not feel that this process was useless, as it allowed us to begin thinking about placement within the matrix, while also narrowing our focus when familiarizing ourselves with the details of each interview.

We categorized general “positives” and “negatives” once the research and interview process was complete. Characteristics assigned as positive were anything that seemed likely to assist watershed organizations and/or the MassDEP in accomplishing their goals in watershed management. Those characteristics classified as “negative” were not necessarily actions which directly inhibited water quality, but were expanded to include anything that did not allow watershed organizations to achieve their missions.

4 Results and Analysis

Synthesizing the information within the matrices proved to be rather challenging, as we acquired a tremendous amount of information concerning the watershed organizations and the challenges they each face. We began by first gathering the most important information about the individual watersheds and the organizations directly involved in their advocacy, which is presented in this chapter's Results section. We were then able to identify the overarching positive and negative aspects of the management practices within the region, as are presented in the Analysis section.

4.1 *Results*

Prior to analyzing any of the data collected, we first provide a brief description of the five chosen watersheds and the organizations that correspond to each. Following these descriptions, we discuss specific positive and negative factors that we feel are broadly characteristic of management practices in central Massachusetts. This discussion will provide a necessary foundation for recommendations made in the following chapter

4.1.1 Blackstone River Watershed

The Blackstone River Watershed encompasses all or part of 29 municipalities in the southeastern corner of central Massachusetts and in Rhode Island (Figure 4.1). The river itself flows 48 miles from its headwaters in Worcester, Massachusetts to its confluence with the Seekonk River in Pawtucket, Rhode Island. This river begins in a densely populated area, where the significant amount of impervious surface seriously affects the health of the river downstream. The water treatment plant located in Millbury also has a great influence on the upper portion of

the river. As the river flows south through a more rural region, the water quality improves until the area becomes urbanized once again in southern Rhode Island.

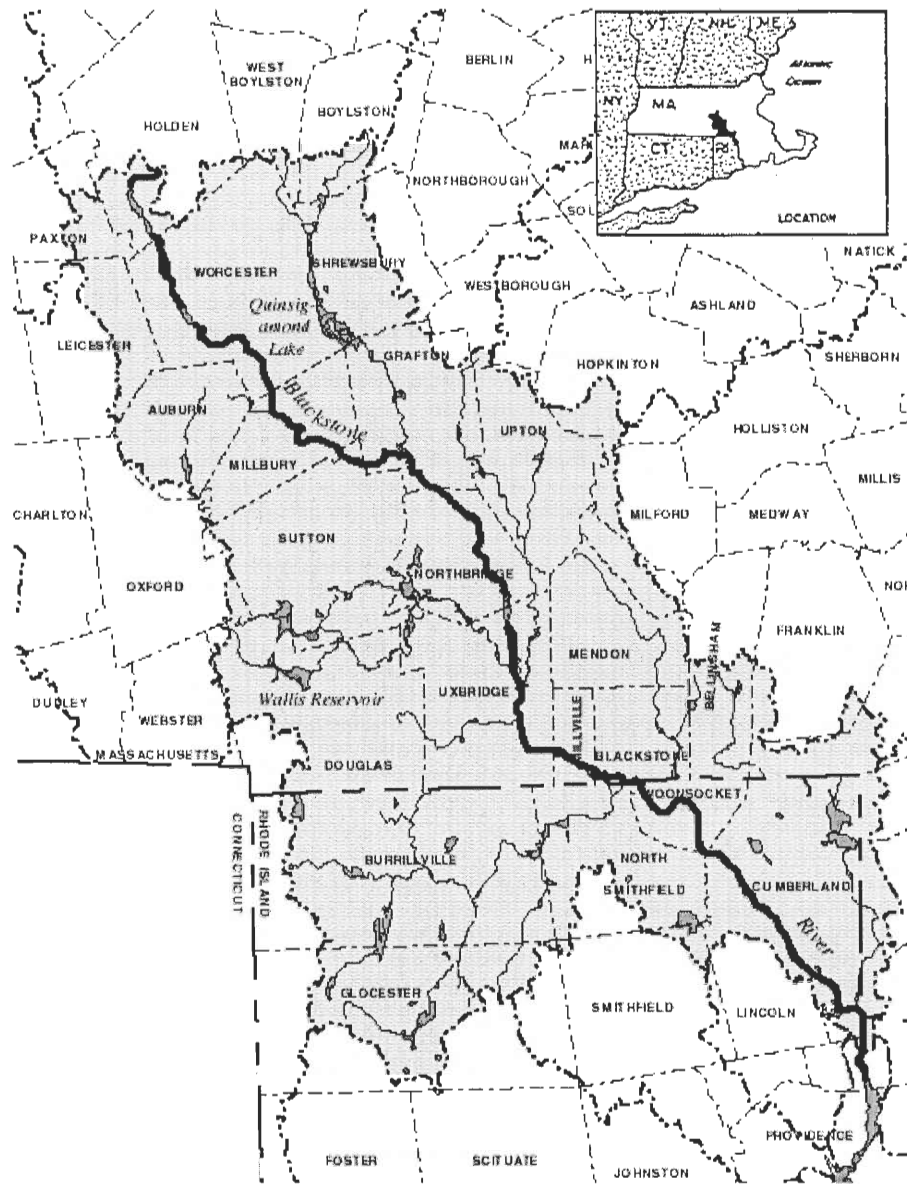


Figure 4.1: Blackstone River Watershed

(Adapted from: United States Department of the Interior, United States Geological Survey, 2003, *Blackstone River Drainage Basin*, and Division of Water Pollution Control, 1997.)

There are several organizations actively working for the advocacy of the Blackstone: the Blackstone Headwaters Coalition (BHC) based in Worcester, the Blackstone River Watershed Association (BRWA) concerned with the main stem of the river in Massachusetts, the

Blackstone River Watershed Council (BRWC) in Rhode Island, and the Blackstone River Coalition (BRC), which brings the previously mentioned organizations together.

Blackstone River Coalition

The Blackstone River watershed is unique in Central Massachusetts in that it has an umbrella organization, known as the Blackstone River Coalition (BRC), which encompasses the three organizations concerned with each section of the Blackstone. The BRC consists of partnerships among many other non-profit, government, municipal, and business organizations currently working toward a Fishable-Swimmable Blackstone in 2015. For six years the Blackstone Headwaters Coalition (BHC) has been monitoring water quality through a volunteer program. Several years ago the Blackstone River Watershed Association (BRWA) and Blackstone River Watershed Coalition (BRC) joined them, and as of summer 2005 there were about 85 volunteers providing the MassDEP with water quality statistics from 72 sites.

Blackstone Headwaters Coalition

The Blackstone Headwaters Coalition (BHC) was established as a watchdog organization for the Worcester storm water system. They began as a compilation of environmental groups including the Massachusetts Audubon Society, the Regional Environmental Council, and the Indian Lake and Lake Quinsigamond Watershed Associations. Currently the BHC is expanding beyond the boundaries of Worcester to the upper third of the river where development near tributaries of the Blackstone is expanding. They are also working towards public education concerning impervious surfaces and non-point source pollution.

Blackstone River Watershed Association

The Blackstone River Watershed Association (BRWA) was established in 1976 as a group of citizens concerned with cleaning the river, which was then extremely polluted. At this time, the BWRA established an annual canoe race open to the community, which brought attention to the river, as well as vital funding sources and new members to the organization. The organization, which employs its President under a grant for water quality monitoring and is run by a volunteer board of directors, works actively in the mid-river region to restore, enhance and preserve the Blackstone River system and its watershed (J. Plasse, personal communication, December 2, 2005). They are currently focusing their efforts on a partnership with the Massachusetts Department of Conservation and Recreation (DCR) to provide access to the Blackstone River through small watercraft access points along the river. The BRWA also is an active participant in the Blackstone River Monitoring program under the BRC, and have also begun work on invasive species education. In the future the leadership hopes to develop a more extensive Stream Team program, which will work with volunteers to survey the river for potential hazards.

Blackstone River Watershed Council

The Blackstone River Watershed Council (BRWC) is based in Pawtucket, Rhode Island, and is a membership organization governed by a four-member executive board, which benefits greatly from the efforts of volunteers. The mission of this organization is “to support awareness, preservation and protection” (Blackstone Valley Tourism Council, 2006) in the Blackstone River Watershed as it flows through Rhode Island. They work towards conservation through education and organize river clean ups, canoe trips, and educational programs. The organization is also

involved in local issues that affect the health of the river and conduct water quality monitoring. Unfortunately, information about this particular group was not readily available, and despite our best efforts, we were unable to meet with anyone directly involved in the organization.

4.1.2 The SuAsCo Watershed

The Sudbury-Assabet-Concord (SuAsCo) River Watershed is located in what is known as the metro-west area of the state and eventually empties into the Merrimack River (Figure 4.2).

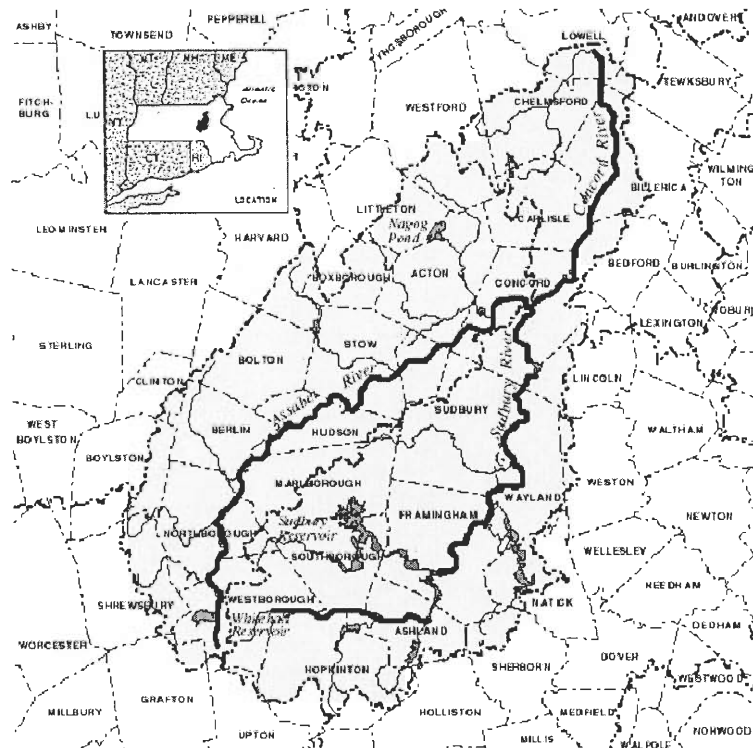


Figure 4.2: Sudbury-Assabet-Concord River Watershed

(Adapted from: United States Department of the Interior, United States Geological Survey, 2003, *Concord River Drainage Basin*, and Division of Water Pollution Control, 1997.)

The headwaters of the Assabet River begin in Westborough and flows north through the heavily urbanized hearts of Northborough, Hudson, and Maynard. The Sudbury River also originates in Westborough, where it flows east toward Framingham. From Framingham, it proceeds north through Sudbury, Wayland, and Lincoln, and finally into Concord. At Egg Rock in Concord, the confluence of the Sudbury and Assabet form the Concord River. The Concord continues north

until it becomes one of the major tributaries to the Merrimack River in Lowell Massachusetts (Executive Office of Environmental Affairs, 2005).

Organization for the Assabet River

The most prominent of watershed groups within the SuAsCo watershed is the Organization for the Assabet River (OAR). This organization was founded in 1986 by a group of concerned citizens and began the first annual river clean up the following year. OAR is a membership organization governed by a volunteer board of directors and employs six part-time staff members, whose mission “is to protect, preserve and enhance the natural and recreational features of the River, its tributaries and watershed” (Organization for the Assabet, 2005: *Our Mission*). The organization has an extensive vision consisting of specific goals for improving water quality, natural habitat, recreation, cultural and historic resources, and education (see bullets below).

- Water- To achieve a river system in which the water is clean enough for swimming, most of the river is returned to its free-flowing state, flow approximates natural cycles, and any manmade impoundments are free of sediments
- Habitat- The Assabet watershed, its river corridor, and tributaries should support the full range of native species typical for a New England river with its flow characteristics and surrounding habitat. Healthy ecosystems in the watershed will directly contribute to a healthy Assabet.
- Recreation- The Assabet River system and areas of the watershed offer outstanding scenic beauty and opportunities for recreation and nature-watching. Our vision is a watershed where scenic vistas are protected and recreational opportunities are abundant, accessible, enjoyable, and safe.
- Cultural and Historic Resources- The Assabet River is tied to a rich literary, historical, and cultural legacy. Our vision is a watershed where this legacy is well-understood, accessible, and integrated into planning decisions.
- Stewardship and Education- We all share responsibility for the care of our rivers and streams and for the watershed in which we live. Our vision is a community where every resident is a well-informed steward of our natural resources. Land areas contributing to the health and beauty of the Assabet River system, including flood plains, wetlands, steep slopes, and groundwater recharge areas, should be managed with sensitivity to the effect on our water resources.

(Adapted from The Organization for the Assabet, 2005: *Our Mission*)

To achieve these goals, OAR has been actively implementing a water quality monitoring program since 1992, which to date consists of 100-200 volunteers collecting data at fifteen sites ranging from the headwaters to the confluence with the Concord. In 2000, the Quality Assurance Program Plan was certified by the EPA, giving their data collection further validity. Around this same time, the Nutrient Outreach program began in an effort to raise awareness about nutrient overload. It focused on simple things, such as detergent use, lawn care and pest waste disposal, that residents within the watershed could pay attention to lower the risk of nutrient overload (S. Flint & A. Field, personal communication, Nov. 23, 2005). In 2002, the StreamWatch program was launched to specifically monitor the smaller tributaries to the river. In the past two years they have pushed for stricter waste water permits which ultimately reduced the phosphorous in the waste water treatment plants effluent (The Organization for the Assabet, 2005: *About OAR: Our History*).

4.1.3 The Millers River Watershed

The headwaters of the Millers River are located in southern New Hampshire, and extend into Ashburnham and Winchendon, Massachusetts (Figure 4.3). While the river's flow initially begins in a southern direction, it becomes more westerly until it finally empties into the Connecticut River. The region is predominantly forest land, with roughly seven percent urbanized area, which consists of the concentrated centers of Gardner, Athol, and Orange, Massachusetts (Executive Office of Environmental Affairs, 2005).

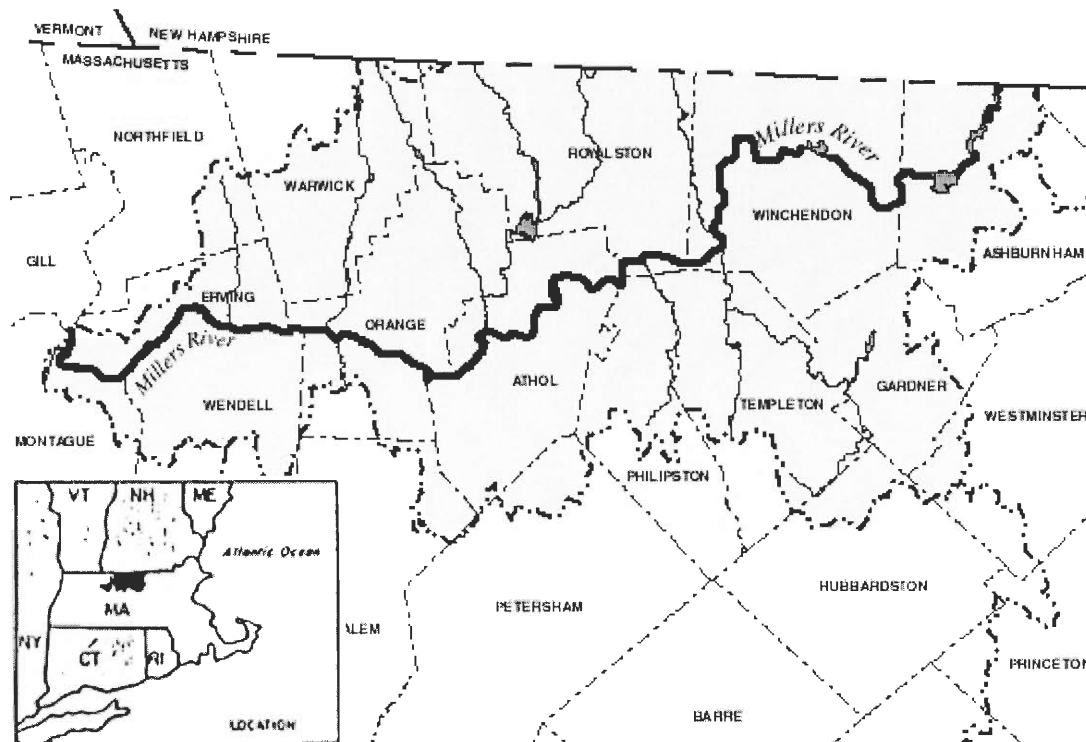


Figure 4.3: Millers River Watershed

(Adapted from: United States Department of the Interior, United States Geological Survey, 2003, *Millers River Drainage Basin*, and Division of Water Pollution Control, 1997.)

Millers River Watershed Council

The Millers River Watershed Council began as an unorganized group of concerned citizens who began identifying sources of pollution along the Millers River in the 1960s. Historically, the organization did not function unless an important issue came up that may have affected the watershed, such as new development or increased industrial pollution. When the state's Watershed Initiative existed, the Council did not function at all. In the past few years, however, they have become more active and recently hired a watershed coordinator who is working towards reorganizing the membership and board of directors. Current activities include several monitoring programs oriented around biological sampling (of macroinvertebrates) as well sight-based observation consisting of midstream, culvert, and shoreline surveys. A unique photographic record is also being kept of points along the river to monitor changes. The MRWC

is just beginning to review the action plan previously developed and is attempting to gather support for the organization from former members.

4.1.4 The French and Quinebaug River Watershed

The French and Quinebaug River Watershed is located in south central Massachusetts and central Connecticut. The Quinebaug River begins in Brimfield, Massachusetts, and flows approximately 19 miles southwest to Dudley where it crosses into Connecticut (Figure 4.4). It then flows 46 miles to its confluence with the French River in Connecticut. The French River flows for 21 miles, including 14 miles in Massachusetts (Figure 4.5).

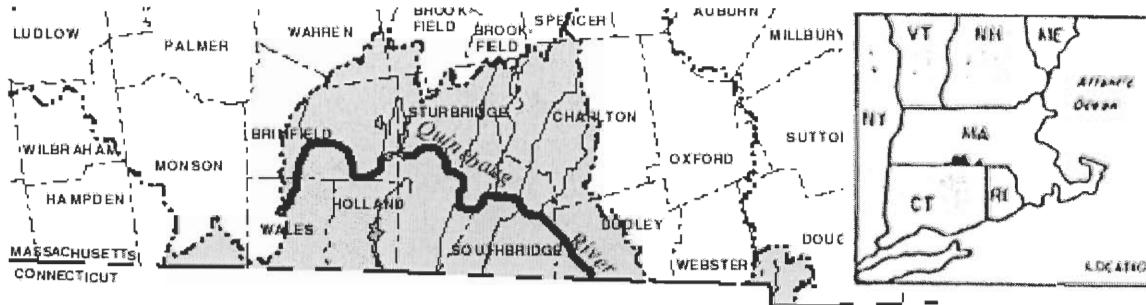


Figure 4.4: Quinebaug River Watershed

(Adapted from: United States Department of the Interior, United States Geological Survey, 2003, *Quinebaug River Drainage Basin*, and Division of Water Pollution Control, 1997.)

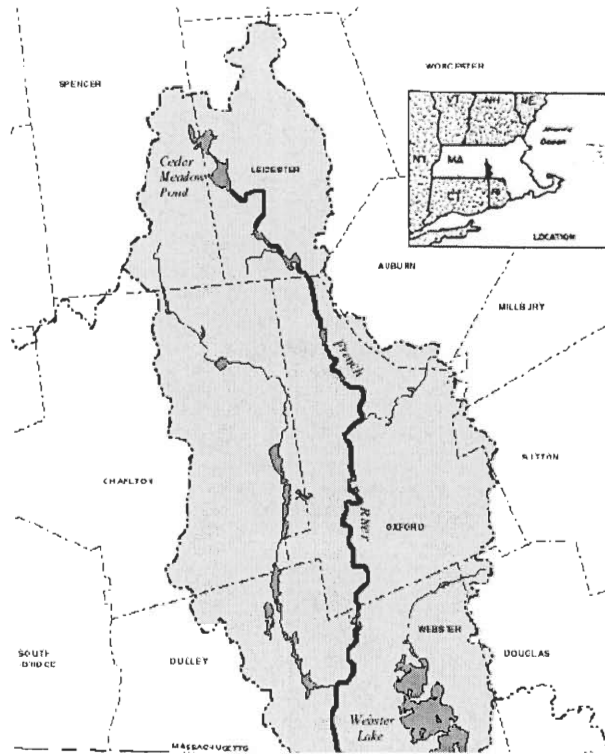


Figure 4.5: French River Watershed

(Adapted from: United States Department of the Interior, United States Geological Survey, 2003, *French River Drainage Basin*, and Division of Water Pollution Control, 1997.)

These two rivers combine to form the Shetucket River, which eventually flows south into the Thames River. All together the watershed encompasses 13 municipalities in Massachusetts. The French and Quinebaug Rivers flow through an area of relatively undeveloped land that stretches from Boston to Washington DC, and is known as the “Last Green Valley.”

The French River Connection

The organization that focuses on the French River is called The French River Connection. The French River Connection is a very recent group that was formed in the spring of 2004. The two founding members, Ken Parker and Alan Dabrowski, met during their own individually run clean-ups of the river and decided to start the group with goals of connecting people and existing organizations to improve and maintain the watershed.

Since its formation, the French River Connection has accomplished various activities to benefit the health of the river. They have continued to perform clean-ups, during which trash is removed from the river; these clean-ups are facilitated by a connection the group made with the manager of a garbage dump in Webster. In addition, a shoreline survey is currently in progress and a grant was just received to help the FRC conduct it. Although the organization is new, they have a pilot water quality monitoring program. However, the equipment they used was loaned to them by the Webster Lake Association, and therefore they were not able to test many sites. The FRC has also looked into dam safety issues and has taken local selectmen on tours of the river to raise awareness. The organization plans to continue activities like these in the future, specifically further expanding the water quality program to include more sites and volunteers from a local high school, as well as continuing their shoreline survey. In addition, the FRC plans on establishing canoe access points with the National Parks Service and National Heritage Corridor, which they hope will increase membership of the organization as well as raise awareness of the river.

The Quinebaug River currently does not have a watershed advocacy group in Massachusetts.

4.1.5 The Nashua River Watershed

The Nashua River is located in north-central Massachusetts and contains thirty-one towns in its watershed (Figure 4.6). The river starts in Lancaster where the North Nashua and South Nashua Rivers combine to flow north-east into Nashua, New Hampshire, and ultimately to its confluence with the Merrimack River. The Nashua River watershed is around seventy-five percent forested and four percent lakes, which protects the health of the river from anthropogenic damage.



Figure 4.6: Nashua River Watershed

(Adapted from: United States Department of the Interior, United States Geological Survey, 2003, *Nashua River Drainage Basin*, and Division of Water Pollution Control, 1997.)

Nashua River Watershed Association

The organization that deals with the advocacy of the Nashua River is the Nashua River Watershed Association. The NRWA is a well-organized and well-established group that has been around since 1965, when it was called the Nashua River Clean-Up Committee. It became the NRWA in 1969 and is still continuing their efforts today. The woman who founded it, Marion Stoddart, has been characterized as a charismatic leader and a classic grassroots organizer who recognized the importance of involving state and federal governments, as well as her friends, to support watershed advocacy (E. Ainsley-Campbell, personal communication, December 19, 2005). In the 1960s, the river was extremely polluted due to various industries such as paper mills. The color of the river would change on a daily basis depending on the dye used by the mills, and foul odors arose from the water. Since this time it has become

significantly cleaner and over 8000 acres of land have been preserved in the watershed through collaborative efforts between the watershed organization, land trusts, municipalities, and federal agencies. The NRWA has set the following goals for protecting the watershed:

- Restore and protect water quality for people, fish, and wildlife
- Conserve open spaces for water quality, wildlife habitat, farms, forests, and recreation
- Encourage careful land use with well-planned development

Due to their relatively long history, the NRWA has become a very well established organization. They have their own headquarters, are very well known in the region, and their twelve staff members hold paid positions. Currently, the NRWA does not devote a great deal of effort to increasing visibility, as they are already quite well known in the area. However, they do invite public participation through educational programs and organized activities such as invasive species removal. As is typical of these watershed associations, the NRWA has an extensive volunteer water quality monitoring program and also publishes a newsletter. The organization has several current projects, which include the Protecting Today's Waters for Tomorrow Partnership Project. This project deals with protecting key land parcels within the watershed as well as educating communities about low impact development. Another project is a rail trail project which consists of creating trails along old railroad tracks to increase use of the watershed. One of the more unique processes the NRWA conducts is the creation of ten-year action plans. These ten-year plans are broken into shorter five-year plans, as well as one-year plans that the organization follows to meet its goals.

4.2 *Analysis*

The interviews we conducted during this project allowed us to gain an inside perspective on the factors influencing the management of watersheds in the study area. We analyzed the information we gathered through the interview process to clearly identify overarching positives (factors that further the goals of the agencies and/or DEP) and negatives (factors that potentially impede progress towards those goals). Through this analysis, we identified several ubiquitous problems in the management process, as well as examples of successful practices, which allowed us to develop a set of recommendations for more effective watershed management. While the information gathered from the watersheds in Central Massachusetts may not be applicable to watersheds elsewhere, they are a sufficient model for those areas specific to Massachusetts, as they represent a range of geographic features, population diversities, and patterns of urbanization. In this section we begin by describing some of the successful management practices currently employed in central Massachusetts, which fall into the more general areas of monitoring and community outreach. We continue by discussing several common problems, in the areas of human and financial resources, involved in the management process.

4.2.1 Successful Programs

During the interview process, the information gathered reflects not only the problems that each of these watersheds faces, but also highlights several of the positive attributes common to the organizations researched. These successful strategies are primarily related to the physical monitoring of the watersheds and the involvement of local communities in the management process.

4.2.1.1 Water Quality Monitoring

Perhaps the most well developed component of watershed management in the central region is water quality monitoring. The procedures followed by each organization vary, but the overall goals of determining the general health of the area's water and pinpointing areas of critical concern are common. Volunteer programs provide vital information to the DEP and the information gathered is considered valid (by the DEP) if they have a Quality Assurance Project Plan (QAPP). The QAPP is a step-by-step manual of standard operating procedures for any program that may be collecting data. Development of these plans also allows groups to identify their goals. According to Tammy Gilpatrick of the Blackstone River Coalition, "It is a good process for us because it helped when we were bringing three different teams together" since each group may have had different ideas or goals. The process of developing the QAPP enabled a unification of procedures and standards for this large umbrella organization. QAPPs have also been developed for the Assabet and Nashua Rivers, and this information is regularly submitted to the MassDEP for inclusion in the 5-year water quality assessments.

While the three aforementioned watershed organizations have extensive programs due to their age and large volunteer base, the French River Connection (FRC) is just developing their program. The FRC does not own the appropriate equipment for water quality monitoring and therefore is not capable of testing to the same extent. However, even at this early stage of organization they have recognized the need for water quality testing in an effort to bring areas of concern to the attention of the proper authorities.

Like the FRC, the Millers River Council is a new organization and has not yet developed a QAPP. While the majority of the watersheds we examined focused their water quality monitoring on quantitative data collection, the MRC focuses more heavily on qualitative data

collection. The surveys completed by the Millers water quality monitor volunteers focus on the observation of the river's appearance rather than scientific testing of the water's condition. The council is currently working on implementing a survey concerning the identification of macroinvertebrates as indicator species, which is just one of the unique aspects of the MRC program. Regardless of this variance, recognition of the need for such a program is vital as the first step in improving water quality is assessing its current condition.

4.2.1.2 Community Outreach

Community outreach is an important factor in successful watershed recovery. According to Warren Kimball of the MassDEP, “One of the best ways of dealing with pollution is to shut it off at the source, which consists of community education” and “the solutions to non-point source problems are non-technical and watershed groups are good at community outreach.” All the watershed organizations we studied have some form of community outreach with the goals of working towards healthier ecosystems and tackling the complex problem of non-point source pollution.

An excellent example of such efforts is the Organization for the Assabet (OAR), which focuses on lawn management, use of detergents, and other forms of nutrient loading. OAR has also proposed grants to develop more extensive education programs. Programs have been run for town officials concerning point and non-point source pollution, and mailings are distributed to citizens in the area.

The organizations dealing with the Blackstone River have similar programs, including newsletters and curricula designed to educate school children about problems within their watershed. Problems caused by recent flooding along the Blackstone River have been used as a tool for expanding community outreach by providing an incentive to local citizens to attend

conferences. These conferences do not necessarily pertain to flooding; however the Blackstone River Coalition has taken advantage of this issue, if only to serve as an introduction to watershed problems in the state. The Nashua River Watershed Association has defined itself as an organization that is already well known and therefore does not conduct extensive amounts of outreach to look for members. They do, however, send out a newsletter to current members and towns in the watershed, as well as offering programs for general education. The Millers River Council and French River Connection are still in the process of either obtaining members or deciding what their membership goals are. The two organizations are, however, already prominent in the media, specifically local newspapers, which they hope will bring them new volunteers. The FRC has also been working towards a program with the local high school, as well as educating municipal employees and politicians about the river's needs.

4.2.2 Areas Needing Improvement

We discovered that watershed organizations in central Massachusetts face a number of daunting problems, most of which are universally challenging to all the organizations we interviewed. In the following section, we synthesize these common challenges into two categories: people and funding.

4.2.2.1 People

In order to understand fully the extent to which people are involved in watershed management, we must examine the involvement of those at the federal and state government levels, the non-governmental organizational level and lastly at the community level. While the interests and concerns of each of these groups may vary, they each have a clear influence over

the effectiveness or ineffectiveness of watershed management. Therefore, their participation and cooperation is vital to the overall success of watershed advocacy.

Beginning at the federal and state level, we have identified clear discrepancies concerning the procedures outlined by the Environmental Protection Agency and the actual practices being implemented in the central region of Massachusetts. On numerous occasions, through both archival research and interviews, these discrepancies were brought to our attention. For instance, the five-year cycle under the EPA's recommended watershed approach in many ways is not being carried out. One very obvious inconsistency with the EPA's approach is the lack of written and implemented Action Plans for those watersheds placed on the impaired watershed list of the Clean Water Act (CWA) (Section 303D, see section 2.5.1). When we inquired about this particular neglect, Warren Kimball of the MassDEP responded "Yes, and it's not done. That's the bottom line... No one has been assigned the responsibility" (personal communication, Nov. 18, 2005). This is not only a disregard for the procedures at a federal level, but also at the state level, as the MassDEP is supposed to follow those procedures outlined by the EPA. The obvious reason for such a failure of compliance is an overall lack of people appointed to positions or assigned responsibilities within these government agencies. Unfortunately, this is not the only major divergence from federal and state outlined procedures.

The water quality assessments are also not done according to proposed policy. These assessments were designed to be an ongoing process during which reports are submitted at set intervals; however, the reality is that the state lacks the staffing and volunteers to carry out such extensive monitoring. As a result, assessment practices vary from region to region and large portions of watersheds go without being assessed thoroughly or sometimes not at all. Another conflict with the prescribed method of assessment is the data bottleneck that is a result of a large

amount of data being compiled by a relatively small number of individuals. The Division of Watershed Management (DWM) at the MassDEP is the “scientific monitoring arm”, and is responsible for compiling all of the monitoring data and publishing the assessment reports. Without the help of water quality monitoring volunteers from non-government organizations, there are only two individuals at the DEP (Kimball and Beaudoin) responsible for gathering the information. These data are then eventually published in water quality assessment reports by the DWM.

Federal and state government agencies are not the primary promoters of watershed management within Massachusetts at this time. Instead, there are a number of non-governmental organizations that focus entirely on the conservation and protection of their local watersheds. One of the many obstacles such organizations face is the need for public support originating within the communities that lie in these particular watersheds. The success of many of the non-governmental organizations often relies on the work of volunteers and members who pay dues but do not actively participate. Such success is clearly unattainable if community involvement, interest or concern is lacking, as it is in much of the central region of Massachusetts. The difficulty lies in raising awareness of the need for such support. The general public is simply not aware of the importance of issues surrounding watershed maintenance and protection. This may be the result of a lack of understanding or due to an inadequate amount of outreach aimed at raising awareness.

One of the problems resulting from this lack of understanding is rampant development. Although many developers are aware of watershed issues, their focus lies in making a profit and since consumers are unaware of these issues the developers are able to exploit the watershed. As discussed previously, development leads to many problems that may be identified at a watershed

level. Destruction of natural habitats and riparian zones increases in impervious surfaces, and consequential increases in pollution rates negatively affect the watershed as a whole.

Development in flood plains not only intensifies flooding rates, but at the same time alters the natural flow of the river and its seasonal changes. As a result of these alterations, specifically destruction of riparian buffers and increased imperviousness, flooding has become a more frequent occurrence. Education concerning these problems and encouraging alternative methods of growth, such as low impact development strategies, have been initiated by a few of the organizations examined. Most organizations in the central region, however, do not focus their scarce resources on this issue due to the limited effects flooding has on the region in general.

4.2.2.2 Funding

Another important and related issue is funding. Clearly interpreting the difference between the issues concerning people and funding is nearly impossible. In many cases, the inadequate backing of people is a result of an overall shortage of funding. For instance, it is difficult for federal and state employees to be assigned specifically to watershed management as there is a limited amount of funding dedicated to environmental management as a whole. Specifically in Massachusetts, recent budget cuts have resulted in the reorganization of the state's environmental programs. This reorganization led to the elimination of the Massachusetts Watershed Initiative in 2004 (see section 2.5.2), which, according to our key informants, was an ideal approach to watershed management. In the words of Donna Williams, of the Blackstone River Coalition:

It's because there was money then. The frustration is we've lost that and it worked. The "MA Miracle" dried up and there was no money. Romney cut the Watershed Initiative. Now we have the five-year cycle, but we don't have the basin teams. It's a broken system.

This budget cut resulted not only in the loss of the Initiative, but also in a cutting back of employees and overall funding for watershed related issues. The understaffing of particular government agencies was also cited as a frustration among the organizations we interacted with. Individuals within OAR referred to this dilemma as the “Swiss cheese” effect in which “they have been under funding and not back filling positions” (S. Flint, personal communication, November 23, 2006). Inadequate funds can also be linked to the limited amount of outreach aimed at raising community awareness. It is difficult to gain funding for such programs because they are unable to quantify the impact they have. The individuals we spoke with expressed a difficulty in gaining grants or external funding for educational outreach because “nobody wants to do just outreach; they really want to see deliverables” (P. Coffin, personal communication, Dec. 7, 2006). It is difficult to raise funds not only for outreach programs, but also on many levels within the non-governmental organizations. In many cases, the money that is received from the state is acquired through small grants, SEPs, membership dues, fundraising efforts, and donations. All such fundraising requires a great amount of effort, through long and arduous application processes, once referred to as the “Spanish Inquisition” (J. Plasse, personal communication, December 2, 2006), or other resource intensive processes. This funding problem is not exclusive to those organizations concerned with watershed management but is in common with most non-profit organizations, which compete for public, private, and government money.

5 Recommendations

This section provides recommendations to non-governmental organizations and the Massachusetts state government with the intent of improving the current watershed management strategies within the central region of the state. We do this by attempting to remedy the areas in need of improvement identified within the analysis as funding, staff support, and community involvement.

5.1 *Watershed Advocacy Groups*

The majority of watershed advocacy occurs through the work of non-government organizations as the “solutions to non-points source problems are non-technical and watershed groups are good at community outreach” (W. Kimball, personal communication, November 18, 2005). Although the systems for watershed management are controlled by the MassDEP, we still feel that the presence of such organizations is vital in the creation of successful management strategies. These groups facilitate bottom-up management rather than top-down, which has been the traditional method of resource management, and we feel that a stronger foundation at the grassroots level will strengthen the relationship between government and community. In the following section we make several suggestions that may help these advocacy groups to meet their management goals.

5.1.1 Network with advocacy groups that focus on issues indirectly affecting watersheds

There is an abundance of NGOs that focus on issues that indirectly affect watershed health; for instance land trusts and other environmental interest groups. If the organizations that focus entirely on watersheds form relationships and collaborate with these other organizations, they will not only broaden their support network, but also their resources. Not only is watershed

health affected by the land surrounding the river, but also by every parcel of land and individual within the watershed itself. Therefore, collaboration with organizations concerned with land conservation and raising environmental awareness will directly and positively influence watershed conditions. This collaboration must also include adherence to the previously proposed methods of the MassDEP. Watershed focused NGOs must also support the efforts of the state government and work toward the common goals outlined by their regional and watershed coordinators. Those watersheds which cross state boundaries should also collaborate with the water agencies of those states. These same organizations must push for further funding, such as 319 grants, from the state and federal government. Requests for funding from NGOs will be better received than those requested by members within the government itself. Citizens who are members of these organizations are also able to voice their opinions and frustrations without risk of compromising their positions.

5.1.2 Make structural changes to increase efficiency and communication.

Upon review of the data collected, we also found areas within the structure of advocacy groups that were in need of improvement. We feel it is important to create a network of NGOs, each of which adheres to a similar structure, outlined below.

- 1.) Establish a regional umbrella organization to which the leaders within each watershed report to and which oversees the actions of each watershed group within the organization (Note: This recommendation is consistent with Ostrom's seventh principle which states that "institutions to regulate a given common-pool resource may need to be devised at multiple levels").
 - a.) Review the goals and missions of each watershed within the organization and establish the regional goals and intended actions.
 - b.) Require quarterly meetings and submission of activities/projects reports of the individual watershed organizations be submitted to the umbrella organization.
- 2.) Establish organizations for each of the individual watersheds within the region.

- a.) Establish separate branches for those watersheds consisting of many rivers and/or large areas (e.g. The Blackstone River Watershed and the SuAsCo Watershed). These branches should form a coalition under which they operate and act as one unit.
- b.) Designate a number of individuals within each of the watershed organizations with specific responsibilities aimed at improving the condition of the watershed. These positions would focus on water quality monitoring, assessments, action plans, permitting, public education, and collaboration with other NGOs. These individuals from each organization would work together to establish a set of goals and an overall mission statement.
- c.) Coordinate with the MassDEP as well as with community volunteers to achieve the goals established by the organization under each particular category.
- d.) Ascertain that procedures exist for revising the current methods. (Note: This is similar to Ostrom's eighth principle which states that "procedures exist for revising rules.")
 - i.) Hold meetings twice a year which assess the current goals and methods of achieving these goals.
 - ii.) Encourage open communication and constructive criticism.
 - iii.) Create anonymous surveys which assess the efforts of the group; discuss survey results at meetings. Surveys will be specific to organization members, volunteers, as well as the public.

This structure seems to parallel the recommendations made to the state government in many areas. However, these parallels are important not only because this increases the effectiveness of their collaboration but also because the NGOs are able to establish firmer relationships with the public. If they are able to join public and government efforts with similar goals in mind, a much tighter and more powerful network of watershed advocacy is formed.

5.1.3 Coordinate community outreach strategies among all advocacy groups

Community involvement is yet another important aspect of watershed organizations that is worked towards to a certain extent; however, not all the organizations use the same outreach techniques. This variation has led us to compile the most useful strategies for acquiring public support. Gaining media attention during instances of permit breaching, flooding, and accidents resulting in increased pollution are excellent methods for increasing community awareness.

Planning events around the river including, walks, picnics, talks, education programs, canoe

rares, or other activities are excellent ways to increase river stewardship. Conducting these events in cooperation with the aforementioned environmental groups will create a broader audience of watershed advocacy. We also noted that more attention needs to be directed towards educating children about environmental concerns, more specifically maintaining and improving watershed health. Developing an environmentally friendly curriculum for grammar school children creates a strong foundation for them to build upon later in life, while raising awareness during the most influential stage of life. Children also serve as liaisons to their families, bringing the ideas learned within the classroom home to be shared and instilled within the home. Taking advantage of such an outlet could serve to further improve community involvement.

Overall, the complete cooperation between government, non-government organizations, and the community is essential in improving the current methods of watershed management. These recommendations reflect this as they are an effort to create a system of watershed advocacy on many levels with sufficient support in the areas of staffing, community outreach, and funding.

5.2 *State Government*

While we feel it is necessary to approach watershed management from the bottom, up, we also realize the importance of government in resource management. In analyzing the data we collected, we identified an overall lack of funding as an area in need of serious improvement. The allocation of funding for watershed-related issues needs to take place at a governmental level, as this will not only alleviate the need for advocacy groups to continually apply for grants and acquire outside funding, but will also result in the increased effectiveness of the MassDEP.

While funding specifically allocated to the MassDEP for watershed management has its obvious advantages, the further funding of other departments within the Executive Office of

Environmental Affairs (EOEA) that also focus on issues indirectly related to watershed health would further strengthen their efforts. For instance, the Office for Commonwealth Development (OCD), which is a division within the Department of Conservation and Recreation, coordinates Commonwealth Capital policies. The goal of these policies is for the state to “invest in projects that are consistent with OCD’s Sustainable Development Principles and partner with municipalities seeking to advance the Commonwealth’s development and resource protection interests” (Massachusetts Commonwealth Development, 2006). It is impossible to protect and preserve watershed health without also taking into consideration the many other elements which directly affect water quality, such as development. Funding for departments within the EOEA which promote actions that positively affect watershed health also have a tremendous impact on watershed related issues.

Another important source of funding which we found lacking through our data collection was funding for alleviating non-point source pollution. The main source of such funding is acquired by advocacy groups through the application for 319 grants (see Section 2.4.1). It has been stated previously that non-point source pollution continues to threaten Massachusetts watersheds, and yet there is only one primary source of funding, and that itself is difficult to acquire. The establishment of new non-point source grants, consisting not only of ‘shovel in ground projects’ but also of public education programs, along with greater availability of 319 monies would positively impact the watershed health.

In discussing the need for additional funding for watershed related issues, there is an apparent connection between funding and staff support. As we previously identified the involvement of people at the governmental, non-governmental, and community levels as an area in need of improvement, we will begin by first discussing the need for greater staff support on

the state level. It is important to keep in mind that such support is directly affected by the amount of funding and therefore the improvement in one area could lead to further support in the other. The problems concerning proper governmental staff support could be remedied by the installation of a new organizational structure for the MassDEP. Ideally, we would recommend modifying the current system, which would allow for greater collaboration among the key players of watershed advocacy and increase the overall ability and effectiveness of the MassDEP. We realize these recommendations are very ambitious and costly and therefore are less feasible than the recommendations made to the advocacy groups. We also recognize that the structure outlined below closely resembles that designed for the non-governmental organizations above. However, this similarity in structure will allow for better cooperation between those groups that operate from the bottom-up and top-down. The following criteria outline the basic structure which we feel would achieve such improvements.

- Establish a regional headquarters specifically responsible for watersheds, using the MassDEP's existing regional divisions.
- Assign a leader to each of the major regions within the state to oversee the watersheds within that region. This leader is responsible for organizing a regional mission, list of common goals and actions, and overseeing the activities of each watershed within the region. Region leaders are required to periodically report all activities within their region to the regional headquarters.
- Assign an individual as the 'watershed coordinator' to each of the 27 designated watersheds within Massachusetts. The watershed coordinators are responsible for reporting to the leaders of their region.
- According to the need of each particular watershed, assign a number of employees to form a watershed team and create specific positions for each aimed at improving the condition of the watershed. These positions would consist of individuals assigned specifically to water quality monitoring, assessments, action plans, permitting, public education, and the involvement of non-government organizations.
- The individual or individuals assigned to the categories above will work with non-government organizations' staff members and volunteers to achieve goals which fall under their specific area of expertise.
- Create regulations and legislation which would enforce the statewide watershed management approach.

From an outside prospective, the current structure of the MassDEP resembles that which is outlined above. However, this system does not exclusively manage watersheds, and those individuals dealing solely with watersheds issues are few and far between. The current structure consists of a couple of regional coordinators assigned to oversee all of the watersheds within their particular region. Our recommended structure would consist of individual teams assigned to each watershed, resembling that of the former Massachusetts Watershed Initiative which was praised for its efficiency. These teams would not only create staff support within the DEP but also collaborate with the existing non-governmental organizations to form a coalition for watershed advocacy.

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Appendices

Appendix A: General Interview Questions

- We are interested in particular with the adherence to the Action Plan and its objectives, can you speak on this. Who is responsible for implementation and enforcement?
- How has the plan implemented in this particular watershed affected the watersheds' health?
- Have obvious improvements/ impairments been made since its implementation?
- Why have such changes to the health occurred?
- What challenges to enforcement have you been presented with?
- What are future plans for improvement?
- Do you feel that this particular watershed is being managed most efficiently? Why or why not? If not what are some impediments and do you have any suggestions for improvement?
- What would you changed about the current management policies/practices?
- What do you feel the best way to manage a watershed?
- Before we ask you more specific questions pertaining to our research, we would like to ask exactly what it is that you do for the DEP concerning watershed management.
- What incentives are they provided with?
- How does the organization which you are involved in interact with other organizations directly involved in the management and enforcement of said watershed?
- How is your particular organization funded?
- What role does the community play in the management of this particular watershed?
- How are the people within the community educated about the need for proper management and use of this valuable common resource?
- How do you promote support of the community?
- What incentives are they provided with?

Appendix B: Interviews

Section 1: Professor Seth Tuler, WPI

Thursday October 26, 2005, 2pm

By: Dan Bylund, Shawna Martinelli, Joy Trahan-Liptak,

IGSD Office, WPI

What has your research pertained to and focused on?

- Public and Stakeholder Involvement in the management process and their cooperation with one another
- Suggested obtaining examples of his work
 - Webler, T. and Tuler, S. 1999. Integrating Technical Analysis with Deliberation in Regional Watershed Management Planning: Applying the National Research Council Approach. *Policy Studies Journal* 27(3):530-543.
 - Webler, T., Tuler, S., Shockey, I., Stern, P. C., and Beattie, R. 2003. Participation by local governmental officials in watershed management planning. *Society and Natural Resources* 16(2):105-121.
 - Analytical delivery process, big picture
 - Webler, T. and Tuler, S. 2001. Public Participation in Watershed Management Planning: Views on Process from People in the Field. *Human Ecology Review* 8(2):29-39.
 - Watershed planners in Massachusetts, deals specifically with our topic

Can you provide us with or lead us to any information that will assist us in forming our own criteria through which we will be evaluating these watershed's management plans?

- You can design your own criteria which may be grounded in theories, such as democracy.
- This can also be done through asking people who are involved in the process what they see as being important and their own criteria based on their perceptions. What they did.
- Criteria will vary from person to person and place to place, as perceptions and opinions change. There is no guideline for a universally correct set of criteria.
- When interviewing, we should present the interviewee with our set of criteria and ask them for their opinion. We should also ask them what else they see as being important to consider which we may not have included in the criteria which we present them with.
- More information to look-up.
 - Tuler, S. and Webler, T. 1999. Voices from the Forest: What Participants Expect of a Public Participation Process. *Society and Natural Resources* 12(5):437-453
 - May be used as a guideline when asking individuals about prioritizing what they see as important.

The interview took more of an open discussion at this point. These are the points we drew from that discussion.

- Again there are multiple perspectives with varying importance due to differing values. Therefore, we will not be able to find an ‘ultimate’ truth, but we will be able to choose a perspective and a way of looking at things. Always remembering to support our assumptions and conclusions from that standpoint.
- Look into similar studies which have been conducted out west, from Leach and Sabatie. We may be able to draw from similarities between the resources and the characteristics of the watersheds. We must be aware of noting why they are being used to support or disprove our ideas by providing reasoning to the reader (i.e. We choose this as an example because of the similar elevation and drainage to that of watersheds within MA.)
- The people we are interviewing people may not be able to prioritize their criteria, but that may not be as important to our project. Also be aware of different applications of criteria. People may have the same set of criteria but look at it differently because of their interests.

Section 2: MassDEP (Therese Beaudoin)

Friday, October 28, 2005, 7:30 am

Interviewee: Therese Beaudoin

By: Dan Bylund, Shawna Martinelli, Joy Trahan-Liptak, Kombosi Bosunga
MassDEP Central Regional Office, Worcester, MA

Q- Are there any particular watersheds which you could suggest for the use in our Project?

A-

Our regular cycle of watershed management is a five year cycle. As part of this cycle every watershed is assessed and a water quality report is written. Right now we are writing the reports for data collected in 2001/02. It is a map of the state with the watersheds delineated on it and the watersheds are colored one of five colors. It depicts watersheds and what things are done in the watershed for a particular year. You could pick things geographically across the state or you could choose whatever suites your skill. It sounds like it doesn't really matter as long as we get a broad spectrum.

We have a pilot program in Central Mass out of this office where we are specifically looking into work that is conducted through volunteer water quality monitoring. When you find an area like this, it means that there is a local group of stake-holders who are very involved and that there is much more work going on. This is because on the state level, we do very specific things as far as watershed management is concerned. We collect data, we asses the data, we report data, we manage permits, and we conduct enforcement on people who are not meeting their permit requirements.

Our strengths do not generally lie in outreach, which I'm sure you realize how valuable education is. What we are finding is that the volunteers are much more poised and have a much better background then we do in how to conduct outreach. Some of the biggest problems facing Massachusetts today are outreach and non-point source pollution. In order to address non-point source there are some things that people can do on an individual basis that would make huge changes in water quality. That is our general goal, to improve water quality which will in turn improve fish habitat and bird habitat (fishing, swimming, boating, pretty much everything we use the watershed for). The state doesn't necessarily do well in addressing people on an individual level and outreach is going to be key for that.

We address point source pollution and do very well at that. We started doing that in the early 70's with the Clean Water Act and the Clean Air Act and we have continued to ratchet down on these things. Now we are looking at individual nutrients for example phosphorus in fresh water systems is the limiting factor. We are looking into reducing levels of phosphorus coming out of our treatment plants, which will defiantly help the health of the receiving water bodies. In many of our streams now we have so greatly improved the discharge effluents that all that is left now is to address what is running in during precipitation events. The federal and state governments are still working on the best way to address these things. So there are things that we can do, like changing people's habits. These are things that are going to be difficult to over come.

Here in the city there are five sub watersheds. In the city we have a lot of impervious surface. There is even a hand book that the EPA wrote (can't remember particular name) and they are rapid watershed assessments. Within it there are charts which indicate the percentage of

impervious surface and it's correlation with water quality. Non-point source pollution is the future, and would get you more bang for the buck in improving water quality.

Beaudoin asks... Is water quality something you are looking at when you are talking about watershed management? That is pretty much what we talk about here. She then gives us a 'great quote'. "The river is the report card of the watershed."

Q-Do any particular watersheds which we could examine come to mind?

A-

My main area has been Central Massachusetts, I have been here for six and a half years and my experience concerning watersheds is basically local. We have other people here whose focus is the entire state, if you are looking outside of Worcester County. We have the Water Quality Assessments for all of the 27 watersheds in Massachusetts so you have that to go for.

A lot has been done here in the Blackstone Valley. They have done studies that show that the water in the Blackstone is anywhere between 40-90% waste water effluent. At low flows, during the summer, then it is 90% waste water effluent. Almost all of the waste water flow comes from the waste water plants in the upper Blackstone, which is up in Millbury. There are five sub watersheds (mostly in Worcester) and because Worcester has so much impervious surface the water is very dirty after a rain event. If it's not raining then it's the waste water treatment plants that define the water quality. The Upper Blackstone is currently in a huge, multi million dollar upgrade. They are upgrading the quality of the treatment as well as the volume. Right now they are capable of treating approximately 56 million gallons per day. They only receive 34 million gallons a day. Which is good but there is a lot of inflow to the system from storm water and they quickly max out in a storm event. In your average storm event, nothing like we had recently. The recent storm has caused the plant to have problems. Therefore, under dry weather the upper Blackstone is the defining factor for the water quality in the entire river. We can limit that to MA because the volume picks up greatly when you reach the Rhode Island border. So if you can address the non-point source in upper Blackstone, which is being addressed, then you can go a long way to improving the river.

There are several levels that you can look at spatially. There is the sub watershed level, which are these five headwater sub-watersheds in Worcester mainly. On that level, there is a big effort that has been going on for years. Are you familiar with the Millbrook Task Force? They are a group of people specifically interested in cleaning up the Millbrook sub-watershed, which is located entirely in the city of Worcester and covers about 20% (the sub watersheds are about the same size). The Millbrook runs North to South right through the middle of the city and is over 65% impervious surface. The MTF is working on outreach and even had a Pond Clean up. (MTF PowerPoint) These individuals are state and local government people. *Chris Schols* (environmental manager for Saint Gobain) is a WPI graduate and worked on an IQP wish list including Bottom composition of Salisbury Pond. Salisbury Pond is the only above ground part of the Millbrook, the remainder of it is underground, in conduits and pipes. This leaves no ability for stream wetland self rehabilitation; for plants to up take the pollutants in the water, for the plant roots to hold the sediment in place. Whatever is in the water is dumped into the pond, while some of it floats out, the heavy stuff settles down. (Talks about the geography and plans for Salisbury Pond for several minutes...this will not be as important to us later on. However this is between minutes 14 – 17). There are some local people involved, people in the area and people

who have money, they are looking to put money into cleaning out the pond. For now we have continued to put them off because we don't now how to best spend their money.

There are people that work for the city of Worcester, there are parks people and there is the sewer commission. The sewer commission is the one entrusted with phase one nipties permits. They specifically have a permit to address storm water run off in the city. They received this permit in 1999 and are on a similar water cycle like us, where they do specific things within each year. In year one, they went out and started identifying all of the sewers and pipes that run into Lake Quinsigamond. They did a great job finding places where pollution had gotten into the storm water system, which should be going into the sewer system. In the city when building was occurring at a fast rate, there were entire communities where the roads where built first and the pipe lines were left on property edges unlabeled. One pipe goes to the storm water while the other goes to the sewer and it was the responsibility of the homeowner to higher a plumber to hook up the building to these pipes. Without being labeled the plumber confused the two pipes, so for a hundred years the storm water was going to the sewer treatment plants and the sewer water was going into the storm system. The city went out and did a lot of testing after finding this out. They have a TV camera with a special fiber optic on a cable that they snake down pipes to trace the sources of these pipes. They also do bacteria sampling to see if there are high levels which they need to track down. (Funny stories about this occur next, again not important to us. Minutes 19.38 – 21.50) So the city surveyed Millbrook as best they could underground and Salisbury Pond, the one above ground plot. The city found many misconnections and developed a program to help people pay to fix the connections. These are called illicit connections and they greatly reduce the pollutant load going into Salisbury Pond.

Non educated people who want to help out can always look for pipes running during dry weather, because this means that there is some connection going on that is not rain water. If it's not rain water and it is flowing all the time then chances are that it is something that should not be flowing all the time. That is an easy thing for the average person to look for and a lot has been done to clean up the water in that way. This is very low tech but very effective.

Q- May we email you to get the contact information for these individuals and organizations involved in these watersheds?

A-

We have the Blackstone Watershed Assessment written from data collected in 1998. That is the most recent one that we have now. It is online, because we no longer have any hard copies. I'll see if I can have a couple copies made for you.

Q- Aside from the Blackstone, are there any other watersheds you would recommend us looking at?

A-

My boss, his name is Warren Kimball, he is the regional watershed coordinator for the Central Regional office, which is mostly Worcester County. We came up with the idea of getting all the volunteer water quality monitoring groups in the Central Region together.

The most advanced watershed organization is the SUASCO which consists of the Sudberry, Assabet, and Concord rivers. The Sudberry and Assabet are headwaters of the Concord river however most of the watershed consists of these two rivers, the Concord itself is not that large. Within SUASCO there is the Organization for the Assabet River (OAR). Sue Flint is the Staff scientist and is a real guru of the OAR group. OAR specifically deals with the Assabet River and not the Concord or the Sudbury. The organization consists of permanent employees and has been sampling since 1996. They collect nutrient information, turbidity, dissolved oxygen, temperature and other things of this nature, and mishmash them together into a large database. This database enables them to literally look up the health of the river and small streams within the watershed in a heartbeat

The second most advanced is the Nashua River Watershed Association (NRWA). This group is an old group that was formed in the late 60's. Some of the earliest members were involved in the passing of the clean water act. I'm not sure what their doing now, Warren knows more. The water-quality monitoring the NRWA conducts looks for benthic macro-invertebrate and looks at biological communities to determine the end result of watershed cleanup. Sometimes it works out that there are places where the water-quality is poor however good populations exist.

The third most advanced watershed is the Blackstone. They started their volunteer water quality monitoring two years ago. I'm am a volunteer and was involved with the selection of sampling sites by developing a large map of the valley displaying permanent discharges and withdrawals of water using GIS systems available to me at the DEP. Using the map we selected sites downstream of point sources or near withdrawal sites for sampling. At Poor Farm Brook which is near Shrewsbury volunteers found that the brook was being run dry by a near by public water supply well. Volunteers bring samples to three laboratories depending on their location. There is one in Worcester one in Uxbridge, and one in Rhode Island. The data collected through water quality monitoring looks for orthophosphates, turbidity, PH, dissolved oxygen and others. 72 sites exist and there are roughly 72 volunteer as well with 3 to 4 people working in each lab. The volunteer group has been growing and this is the second full year of data so far. On the smaller watershed level there is the Millbrook Task Force and then on the larger level the Blackstone goes through too states and its not easy to network. However the Blackstone organizations communicate very well. There are three organizations involved with the Blackstone. The first being the Blackstone Headwaters Coalition (BHC). *Peter Coffin* is the President and can be contacted. The BHC deals with the five sub-watersheds and streams mostly in Worcester but partly in Leicester and Auburn. These include Kettle Brook, Beaver Brook, and Tatnuck Brook all on the western side of the city.

The Millbrook Task Force applied for section 319 money. Which is the storm water section of the clean water act? The money was for "Shovel in the ground" projects for dealing with storm water. 176,000 of federal money and 100,000 in matching money from local groups was collected. Two main brooks flow into north end of Salisbury pond and these brooks carry road sand and other sediments into the pond. The best way to deal with this problem would be to build a large forebay with concrete baffles to collect sediment but there is not enough money. Around 500,000 would be needed for the project. A Vortex separator unit is a device that spins out sediments. There are two in place near Lake Quinsigamond off of Belmont Street. Joe Buckley is a good person to talk with about this. He is with the sewer division of the Worcester Highway Department. He deals mostly with storm-water issues and is an engineer as well as a

great source of information. Kendrick and Weasel brooks are the two brooks that feed into Salisbury pond. Each one needs a vortex. A kiosk is also going to be constructed in the southeast corner of the park for outreach to people on storm-water and other types of information. The city is the abutter for this project and owns the perimeter of the pond. The marsh however is a habitat for species of migratory and nesting birds that are not usually found in urban settings including the Black Crowned Night Heron. This creates a management question should we manage the existing pond or should we take the dam out and let it go back to the original peat marsh. The Pond was originally 5 acres and is now 15 acres in size. There are no current thoughts of removing the dam however and the focus lies in restoring the pond. Also there is discussion of putting a walkway in around the pond. However this would require a bridge over the brooks that may be too close to the marsh. The construction was already supposed to be done but the major bottleneck is that the city is giving the grant not the people who were involved in writing the grant and the city is large and may not have time to worry about a small pond. *Chris Shoal* with two other people wrote this grant.

Problem – no matter where you pick, there are people on the ground with the personal investment of having their backyard cleaned up, or some place they played or fished as a child, but the people who need to help you, don't have that level of investment, so they don't have the energy that you have.

Back to the Blackstone watershed. There is the Blackstone Headwaters Coalition (BHC), and there's the Blackstone River Watershed Association (BRWA) which handles towns in the part of the watershed below the headwaters area and up to the RI border (will give a list of towns, or brochure with map of the 3 areas). The part of the watershed that is in RI is handled by the Blackstone River Watershed Council (BRWC). So they have their own individual concerns and issues for the part of their watershed they also have an umbrella understanding that we need more information on water quality, so they work in concert with the 72 cite sampling program.

So all 3 organizations are on the same page in terms of what they sample for and when they do it, one person, *Tammy Gilpatrick*, is responsible for taking all that data and analyzing it (can get us her contact information as well). This is a paid position, which is relatively important to know, as it gives you a sense of the permanency of these organizations and the funding that they are receiving. Tammy is the coordinator for the volunteer water monitoring program, and is also responsible for making sure that the Quality Assurance Project Plan (QAPP) is followed.

The QAPP is basically the bible of your monitoring program. It tells you where you're going to sample; who's going to do it and how; who's going to oversee the sampling; the procedure for how to collect the samples, and how to analyze them; exactly what methods you're going to use to test, and analyze the data. Everyone has to have [a QAPP] if they get money from the state. They're difficult to write and very painstaking (done them herself), but it's the equivalent of writing the outline for a paper. Once you have the outline done, that's the worst part of it – filling in the gaps is the easy part. Tammy is responsible for making sure that this QAPP is followed, standards have not gone past their expiration date, etc. All 3 groups have decided to use the data to color-code the results. This is where the report-card comes in. Warren Kimball came up with a set of criteria, things that the volunteer groups monitor. For example, pH values, there is a scale to know if it is "good, bad, mediocre, or excellent" so they will use

that information to color code a map. This is very easy for a lay person to understand. We have assessments with tons of information, but we also have a page for our own data, the volunteers have a page that shows where they've sampled, what they've sampled for, and whether it's good or bad. So they can look at this color-coded report card and tell right away what's good, what we need to protect, what's bad, what we need money to clean up or fix somehow. This is a great management tool. The Blackstone is one of the first volunteer groups to use the report card approach (can show/give electronically).

Q - Do you know more about SUASCO, do they have more than one group like the Blackstone does?

A-

Warren is more up to date on that, but as far as I know they do not. It is because of the complexity of the Blackstone that they have these 3 groups. The BRWA was started in the early 70s, which was before the water treatment plants were built, and the river just ran sewer all the time. They did have some manner of treatment since the early 20s but mainly sand filters to filter out solids. The BRWA was formed to do the "gross things" like picking the trash, tires out of the river. The headwaters coalition started later and they have a very different problem than the BRWA. These groups came about at different times, for different reasons, and they do have very different problems. They do have the common interest of being in the Blackstone watershed, they all suffer from the same point source pollution, and they all have the need to gather more data, and target their responses to what they find in the data. The headwater coalition has to deal with the impervious surface, so they have very different non-point sources than the people down in the valley who have more trees and a lot less impervious surfaces. They have very different things to target, to address their problems. However, they should all be working on the same page with some things like this volunteer monitoring program.

Very recently, there was a new group founded, the Blackstone River Coalition (BRC) that is like an umbrella groups for these 3 organizations – Catherine Roberts from Holy Cross, which wants to be involved to provide students and professors to work with the organization. Blackstone River Coalition with a couple of people at the top will help the 3 individual groups prioritize their needs, apply for grants, target grants, problems, and because the BRC is representing these 3 other groups in a bi-state area, they are much better poised to have access to larger and larger pots of money. So there is a value in having this umbrella group formed as well. They will be applying for 501(c)3, which is essential to have for these grants. They already have a lot of things going for them – prior orgs, bi-state situation, etc. which will bring them up on the priority level. The other watersheds don't necessarily have this cross-state issue. SUASCO for example, has a different infrastructure. They have OAR – Sue Flint – and they are specifically focused on the Assabet River. They're upstream, and are not focused at all on the Concord River downstream. On the same level is the Sudbury River, also a large chunk of the Concord River, and they too have very different issues – flows through Framingham and Southborough, places that have a lot of impervious surfaces - Sudbury Valley Trustees. Not sure if they have a group for the lower Concord. They as yet do not have an umbrella group over these 3 sections, and OAR is the only one which has a volunteer monitoring group, and they are working on outreach as well. As far as I know, the Nashua River Watershed Association covers the whole watershed and is not made up of any other sub-watershed groups.

Q- Any others?

A-

There's the Millers River Watershed Association, where there are smaller advocacy groups. They have serious PBC issues from previous industry on the Otter River, not a headwater stream, but near the head. They are at the forefront of looking at watershed management there. They have 3 groups there: Athol Nature and Bird Club and others... Contact Ivan Sach (spelling?). He would be an exciting person to talk to as they have just started.

Also the French and Quinebaug River, they don't have much of a grassroots effort, more going on in the CT part of the watershed, however, about a year ago my counterpart in CT at the DEP got people together to see who was doing what, who was responsible, so they are in the beginnings of forming a new connectedness.

Q- This is very useful... I feel like you think you're talking and we aren't getting anything from it, but we are. Anything that you give us is really helpful at this point.

A-

Blackstone, Nashua, and OAR (the Assabet organization) are the most advanced, the other are up and coming. The most advanced is the Charles River, which is the largest watershed that is entirely in Massachusetts. The Charles River is 84 miles long itself. The CRWA is very involved. They have a permanent full time staff.

Q- Do you think that's because they don't have to deal with these interstate boundaries?

A-

No. I think what makes them so effective is that they are so high profile. The little part that is in Boston draws a lot of importance, all the colleges, residences, esplanade, recreation etc. The geographic location aides them the most. They have their own staff, office space, lab people, without a doubt they are the best funded. They however, focus almost entirely on the lower Charles, in the urban area. No where near as focused on the headwaters. They don't have the same headwater impervious areas as the Blackstone does for example. However, they do have non-point sources, but they don't receive as much as attention. In all fairness, they do have a lot of issues to deal with in the lower Charles. Waltham has been in the news lately, because they have been finding illicit connections. These are things that are running raw sewage directly into the Charles. Truly a shock to find that there are large inputs into the Charles. Would have a lot of information because they are so large and well funded, and have been around for a long time. They had a lot of problems with beach closures, and began a "fishable, swim-able" campaign for 2005 for the entire river. Again, this was focusing on the lower Charles, and they decided to take the band aid approach, and installed a system to protect the beach areas from bacteria, and pollution in the rest of the river. Goal was met, but it wasn't reasonable to have the entire river clean in only a few years.

The Blackstone started their own campaign, Fishable and Swim-able by 2015, which is much more reasonable, they still have quite a few issues to deal with, considering all the impervious surface in the headwaters. The forebay in Salisbury Pond will help a lot with runoff from the highways, and drainage from at least 10% of the city.

There is a group at UMass Amherst that was working with some watershed planning projects specifically with the French and Quinebaug Rivers, and what people could do in their individual towns to improve management. Unfortunately what they came up with was very cookie cutter and was not all that tailored to individual towns, and as far as I can tell, nothing really came out of it. They also had an interest in developing trail networks along the river and at strategic vantage points throughout the watershed with the understanding that getting people out into the watershed will help to foster stewardship for the entire river.

Q- What do you know about Low Impact Development (LID)?

A-

I know that people are trying to get these things going, but it is still slow going from what I've seen. People who are not educated about these issues, all they can see are their immediate problems, which are the cost of residential development on their community. For every dollar they spend in taxes, residential growth costs them a dollar fifty in services. Their taxes have to go up to meet this. Their tunnel vision is that we need larger lots with only one house on them. That is not helping them at all to address the lack of forest cover. As far as I know, there are many people working on this across the country. It is certainly one of the governor's priorities. They have staff dedicated to this, but it is an uphill battle. We have lost so much land in MA, already.

Massachusetts Audubon did a study on this, and they found that we are losing roughly 44 acres of forest per day to residential development of this nature: trophy houses, acres of lawn, and such. The people want them, though. If you have a big house and a big lot that means one family instead of many. Even the people in town who are not even living where these houses are and can't afford them, want them because it's one house on 10 acres instead of 10 to 20 houses on that same acreage. That is less of a drain on the school, fire department, and roads, etc. The fewer people, the less of a drain this is on the individual town. In order to get fewer people, they are not thinking of cluster zoning, which has the same amount of people, with much less disruption. Instead, they are developing the crap out of the land with these huge lawns and trophy houses. The majority of these programs is outreach. The towns just don't know these things.

The other flip side [of the problem] is developers; they don't care. Now what they want is - I'm not a developer, so I shouldn't make these kind of gross statements, I apologize, but the bottom line is monetary - They want to build the kinds of houses people want to buy, that's their bottom line. They have to be able to recoup what they put in on these places so obviously their target markets is people that can buy those trophy houses. They are just not educated about these things. This is a very ivory tower kind of thing.

Boltan specifically requires development of over a certain number of houses to be clustered - As far as I know, that's a very unique situation. They're getting a lot of bang for their buck there. Therefore, they're getting the same number of houses but in much smaller impact area. It's been a problem for a while, that we're allowing that.

(Discussion not relevant to our project ensued concerning cluster development and developer strategies.)

The DLARP students at UMASS did come up with a watershed management plan. I'll see if I can put my hands on it, but it really was more of a "if we do a watershed management plan, this is what we are going to put in it. It won't necessarily be all that helpful for you, but if I can get my hands on it I'll find it for you.

Much of what you see here are files on specific wetland developments, or wastewater, things like that. That's our primary focus here. Warren and myself are the only two watershed focused people here. Everybody else specifically does wetlands, wastewater, or drinking water.

Q- Do you know if there are watershed management plans written? Do you know how we could get them?

A-

Absolutely, they are and I am currently writing one. I will provide you with a copy of those already written. The watersheds, some of them, have put together Watershed Action Plans (WAP). They are in a range, a level, of sophistication, and what they do, is identify first and foremost, what are the top issues in the watershed. Then it prioritizes them in order of whatever they feel is the most important, the most threatening to the overall watershed. And then they have put together a list of action items that they have to do to address these priorities. The Blackstone just did theirs within the past two years. They have a weblink for that and a .pdf that you can download. And I can get a list of the other ones.

Q- When we do decide on particular watershed, should we send you that information?

A-

I have a good idea what you're looking for, so as I go searching I'll get you more. The overwhelming problem is that there is no one regulatory authority that has the authority to regulate the items that come up in watershed action plans, for example. The bulk of the things that need to be done are on an individual homeowner/developer basis. And these are people that are hard to reach. It's not that they're doing anything wrong or illegal. In most cases we give them the benefit of the doubt, they just don't know. Or in the case of the developers, they may know, but they may feel that it's just not feasible for them. They do have kids to put through college and mouths to feed. While they deal in bigger outlays of cash, they also deal in bigger loans and such. These are all big things to overcome, we are very entrenched in what kinds of development we want and what we find acceptable.

As a society, people have always seen things as the world that revolves around people, and people are where you have to justify things too. How does this effect me? What does it matter if it effects you, what does it matter if it effects that whole ecosystem over there. Well how does that ecosystem affect me. As a society, we are so used to thinking of the world as it revolves around us, and that how people still think mostly. So anyway, I lost where I was going... If you can think of what kinds of maps you want, I can pull those together

There's a lot of levels of sophistication with the volunteer groups, the monitoring groups, the watershed groups, they don't just focus on water quality, but that is the bulk of where I interact with them, so that's where I'm coming from. The rest of what they do is what I get incidentally at a meeting, or what I read in the paper. They are also very interested in land preservation. This is a key way in preventing land from being developed. They are much more sophisticated in terms of figuring out how to get land protected without actually buying it, because that is such a huge amount of money to raise and everyone knows certain amounts of cash are available, so they're looking at ways of easement, conservation easements where they buy the development rights, things like that. So this is coming along. There's also the community preservation act, where towns take one, two or three percent of their taxes and set them aside for conservation, affordable housing. Towns can take that money and prioritize where it goes.

Q- It was mentioned initially that the Blackstone was 40-90% waste water, but as we talked about that region more in depth, it appears that this watershed is one of the most developed in terms of management, and well as volunteer groups. So, as we're thinking about it, we are wondering how to evaluate the effectiveness of the management plans if this is happening.

A-

You put your finger right on it, that's the trouble, how do you measure the successfulness of your non-point source actions. Somebody tried to do it, but it can be very difficult. In terms of this forbasing, this is quantifiable you can measure exactly the surface of the roads that are contributing to draining and measure the amount of sediments entering pond however getting people to use pellet style fertilizer instead of liquid style that's harder to quantify – and its fascinating.

There was one more thing I wanted to mention - Total Maximum Daily Load (TMDL) There have been a number of TMDL written for lakes in the Blackstone watershed and I'm not sure that ones for the river itself is done.

The Blackstone River is unique because a huge study was done in the early 90's. This study was called the Blackstone River Initiative (BRI). It consisted of dry weather studies by state, MA and RI. The people conducting such studies don't stop just at the border, which is typical to how MA is regulated. This study [referring to the BRI] was conducted in concert with the EPA and URI. The BRI started by addressing dry weather sources as point sources, as well as non-point sources. There's a lot of studies similar to this [the BRI study], and I'm not sure if they are available online. I will see. I don't even have a copy of the wet weather stuff, but I know that it is available. The Total Maximum Daily Load studies are mandated under section 303D of the Clean Water Act (CWA). This is the list of impaired waters on a national level. Each state is required to come up with their 303(d) list of impaired waters. Each state is also responsible for listing them; 305(b) is the assessment. We are responsible for coming up with a plan that will address individual pollutants. For example, Salisbury Pond is listed for a number of different problems – pollutants. This means we have to calculate a total maximum daily load (TMDL) for each pollutant, which is listed as impacting Salisbury pond. There is a TMDL written that addresses Pathogens in Salisbury pond. The 303(d) list does not include sedimentation as a problem. Because we know it's a problem I managed to get the guy writing it

to put that in... And I forget what else is listed – Pathogens is one, might be nutrients, so there's one study that has pollutants in it, and the history as much as we know of the pollution there, and what we calculate the total maximum daily load should be. That's kind of hard, because some areas we have data, we have data for the Salisbury Pond, but for other areas we don't, so we have to guess. We know that it was this level, we know that the watershed contributing area is this, so we know that we have to limit it to this much because the size of the pond is this. So it can only assimilate this much, but this much is going in, so we've got to get rid of this much. So, there is a TMDL written for Salisbury pond. There's another one that has twenty ponds in it, and at one point they were talking about using the Blackstone River Initiative as the TMDL for the Blackstone River, I'm not sure what they decided to do about that. If they did, then the TMDL for that is done. If they decided no, then the TMDL for the Blackstone River is not yet done.

That's another important management tool, and that's very close to getting what you want. So, between the TMDL's, which specifically address water quality pollution problems, and the watershed action plans, you'll have a pretty good idea of what has been identified as the watershed management plan.

Concerning watershed management plans, there is no one entity that has the authority to regulate all these things. Many of these TMDL recommendations are on things that nobody regulates: we recommend people don't throw their grass clippings in the pond, we recommend people don't throw their tires in the pond, we recommend people don't throw their shopping carts in the pond, people don't use as much fertilizer on their lawns, etc. Nobody regulates these things. Moreover, it would be very cumbersome to regulate them. It would probably be done on a local level. No one has the money to do this; they don't have the policing authority, or staff, or anything – nobody has the resources or authority to implement a lot of these recommendations. So we can write them, we can identify what the problems are, but compliance with these recommendations is voluntary, not mandatory. So that's where outreach is going to be so key; You're going to have to teach people what needs to be done, to make them understand that they have a role, it's on the concept of voting – now, I'm one person in 202 million in the United States, what does my vote count for? What does it matter if I don't fertilize my lawn? Recycling has the same problem – if I don't recycle my plastics, so what? I'm just one person of 202 million in the United States. So what? We are facing the same mentality with non-point sources. People like you guys, key – out there, teach your kids, anybody that'll listen, culture development, make them do it right.

So I have a lot of stuff, I will get you as much as I can. Rather than put it in the mail, I think it would be better for all of us if I just make a stack of things and commit to getting this stuff to you by the end of next week. I have what I have, I know what I have, and I know what else I can get my hands on. Let me tell you, it's better to get me now while I'm focused on you because things come up and I will not take you to my office because my desk is mounded like this because things come up. My boss Warren and I are the only two people in the Central Regional Office that have a background in sampling and designing monitoring plants. Because we have so large a focus, he and I know our designated watersheds like the back of our hands. Nobody else here has that kind of focus, because they're focused on wetlands and public water supplies and things like that, whereas we're focused on surface water.

So what happens is, you probably see it a lot in the paper, that people have been spilling sewage. Because of all flooding that's been going on, upper Blackstone lost about 90 million gallons of raw sewage. It's an act of God, it's not something that they are at fault for. But still, 90 million gallons of sewage went down in the Blackstone River. So Warren and I got sent out

spur of the moment to try to follow this. To identify where it was and where it was going and we're particularly interested in who's going to holler down from Rhode Island so we have to drive from Worcester all the way down to Blackstone roughly, which is not far. But to do it spur of the moment requires a level of preparedness... So that's one of the things we were doing last week instead of cleaning off my desk. Anyway, I want to be addressing your things right away, because I can see where I'm going to be a bottleneck to the things you need to get your hands on. So one of the things I can do right away is send you this contact information, these various watershed people. I'm just assuming that they will not mind taking the time to sit down and talk with you or send you emails. Generally, these people are a good bunch; they've come up the learning curve because they want to, not because of a job or anything like that. That's why we've been able to get them to come to the table and talk to us about what they're doing in their world. Because they have an interest in sharing it, not in just seeing what they can get from the table as well.

Section 3: Blackstone River Coalition

Tuesday, November 15th, 2005; 8:00 am

Interviewees: Donna Williams and Tammy Gilpatrick

By: Kombosi Bosunga, Dan Bylund, Shawna Martinelli, and Joy Trahan-Liptak

Broad Meadow Brook; Worcester, MA

Q- Before getting into our research, we'd like to ask exactly what it is your organization does, and what your role within that is.

A (Williams)-

Mass Audubon is the largest state environmental organization, and we are the first Audubon society since 1896. We have been around for a long time. Our goal is to protect wild life habitat for both animals and people. We now protect over 30,000 acres of land in MA and we have 42 sanctuaries across the state. I am the conservation and advocacy coordinator (Tammy Gilpatrick walks in), and my job is water resource protection in the Blackstone River. I work with a lot of local watershed groups: Blackstone Headwaters Coalition, Blackstone River Watershed Association, in Rhode Island the Blackstone River watershed council, we also have something called the Blackstone River Valley National Heritage Corridor Commission that's an affiliate, we are a designation by the national park service. So the Headwater's Coalition works in this area and the BRWA is pretty much in the middle range, the watershed council is all in RI. What we have done is to pull all these groups plus many others together to create the Blackstone River Coalition (Shawna intervenes referring to the interview with Ms. Beaudoin).

A (Gilpatrick)-

Donna's role is to bring these groups together; everybody has the same goal -- a cleaner river, a healthier river, more diversity -- but there was not a unified vision. We launched a campaign for a fishable and swim able Blackstone by 2015. One of the strong components of this campaign is the water quality monitoring program. The Head Water Coalition through Mass Audubon started a volunteer water quality monitoring program over six years ago now, in a effort to produce stewards and also because all these tributaries weren't being monitored by the Mass DEP because they don't have the resources. So for four years the Headwaters Coalition and Mass Audubon worked together to get that started. Three years ago, Donna and Peter really wanted to make the water quality monitoring wider so that it will be more valuable for everyone. Donna and Peter teamed up with the BRWA in the middle and the BRWC at the bottom (indicating the map) to create teams in the two regions. The success of this program has been that all three of these watershed groups are now working together on one concrete project and they have had deliverable results.

We have worked with the state agencies both in Mass and Rhode Island, the DEP and the EPA to get our Quality Assurance Project Plan (QAPP) approved. This might not be that meaningful to you, but it's a big hurdle you have to overcome in order to get your data accepted by those agencies, so it gives you more validity. In 2003, the two teams were new and started testing their equipment and enlisting the aid of volunteers. At the same time, we thought it would be good for the Headwater Coalition to start using the same equipment. This was a big change for them because their volunteers were going out and doing everything.

A (Williams)-

We had the opportunity to shift away from the old equipment such as the color wheel which was very subjective to get into this much more state-of-the art equipment (hot calorimeters, hand-held units).

In 2004, that was our first year that we operated under a Quality Assurance Project Plan - we all operated under the same protocol and used the same equipment. That was our first year of approved data, which you will find on the website and it can be downloaded in the clickable map. In 2005, we expanded our sites down in RI to get further away from the main stem and just completed it on Saturday...

We will be doing a summit in February and we will let you know about it. My job is to work with each team, as field coordinator, keep the equipment operating, and make sure everyone is following the same procedure of the Quality Insurance Project Plan.

Q- What is the Quality Assurance Project Plan (QAPP)? What are the guidelines of this process?

A (Gilpatrick)-

It (QAPP) is really your step-by-step manual of standard operating procedures, and even more than that it is a basic format that makes you think about your goals; why you are doing it, what you are trying to produce, what kind of results you are looking for, etc. It is a good process for us because it helps when we were bringing three different teams together, that may have had different goals or different ideas, but we did a unifying set of procedures and standards for everyone.

Q- How does your organization interact with other watershed organizations?

A (Williams)-

We have become much more organized. The BRC has been a virtual organization for quite a while. How that came into being -- in the year 2000, we had the Blackstone River expedition which was a four day paddle down the Blackstone River from Worcester to Pawtucket. We had 34 paddlers who went with us. It was a huge event. We took months to prepare for it; we had events and programs all along the river to highlight different issues that are facing the river. We invited important people to come along with us for various segments. We had Matt Amorello from the Mass Highway Department, legislators (Thelma Water) and local officials. We also had an environmental reporter, John Manneham from the Worcester Telegram and Gazette. We had wonderful press coverage; it was the story of the day. That was the beginning of the BRC. It was kind of life changing for most of us. There was a lot of energy right after the expedition ended to form the coalition. We met fairly frequently, but we did not have anything that brought us all together because everybody still had their own interests and were still working on their individual projects.

Three years ago, 4,000,000 gallons of partially treated sewage from the Upper Blackstone River water treatment plant went into the river. This was caused by a power outage. This galvanized the groups; so we really came together, went and talked with the management of the Upper Blackstone and told them how outraged we were. Corrective actions were taken and there was a fine involved. There is a program called the Supplemental Environmental Projects; if there

is a violation, some of the penalty money can be used toward a project that has a nexus with the location of the violation and the content of the violation. The Blackstone River Coalition through Mass Audubon got \$50,000 outright to support our volunteer water-monitoring program. Also \$25,000 was used to rehab a lab on the Upper Blackstone water-treatment property for us to use. We do bacteria testing there. That really helped the BRC to become more organized. Money is the bottom line to make all these things happen.

We all have that common goal but the campaign gave us an umbrella for all our activities. It gives us a common goal for all these different groups. Even though they work locally on their own projects, they are all still working toward this larger goal. We have an action plan and we can get as specific as you want.

Q- Where the BRC does get the money?

A (Williams)-

We have many sources of funding. The SEP is one. Each of the individual organizations need to find their own funding. The Heritage Corridor has been a very good source for funding, that's the federal money that comes through the national park service, so they have given us money also to help fund Tammy's salary, they have given us money to move the campaign forward, we have other SEPs; Polyfoam is a company located in NorthBridge had an air quality violation, they didn't do their paperwork properly. The Blackstone River Watershed Association got money from that fine. Whenever we hear a violation, we are there.

We do have a good relationship with the DEP. The DEP cannot arrange these SEPs. It needs to be between the violator and a third entity. So DEP helps guide it as to what would be acceptable, but DEP can suggest to the violator what to do with the money. We have local foundations, the greater Worcester community foundation, the special license plates in Massachusetts the money goes into the MA environmental trust and from them we apply for a grant, we have little private organizations like the French foundation, the Norcross foundation. The huge benefit that the coalition has is that Donna does a tremendous amount of work, but she's able to do it under her Audubon job that's her work plan. None of us paid are paid directly as coalition employees.

Q- What role does the community play in the watershed preservation? How are they made aware of the proper use of the watershed?

A (Williams)-

People don't get it -- particularly the storm draining system, the catch basins don't go to the treatment plants they go directly to the nearest water.

A (Gilpatrick)-

The recent high waters in the flood and all that, it would not have been considered as a hundred year flood but the problem is because we built up the land so much with impervious parking lots and surface to the point of the river not handling it. We've changed the land surface so much that the river cannot handle it. We will have a flood conference in January. This conference will focus on land use to help communities understand how to do things better regarding both new development and redevelopment as far as storm water management is concerned.

Q- How do you communicate the theory of Low Impact Development(LID) to the community?

A (Williams)-

I put in a proposal for storm water circuit writers. The plan is to have an individual go to each of these communities, work with the town administrators, to bring together the planners in each community, the planning board members, conservation agents, conservation commission, DPW and do a presentation. You probably heard about the Open Space Residential Design. The purpose of this is to reduce the storm water volume by its very design, but really putting all of this information in the concept of the recent floods.

A (Gilpatrick)-

And having all these people together too, for example the DPW might go to a conference and hear about it, they have them all there and thinking about it together,

A (Williams)-

We are inviting them to the conference, but it is hard for people to go to a conference. This is going to be the next step; we are going to teach the community and introduce them to those tools, providing them with technical assistances and helping them in changing regulations, local regulations, bylaws, because it is what they can do.

A (Gilpatrick)-

Those are good questions because we struggled with that a lot too, as we talked about the flood, and how do we capitalize on it, where do we focus in, we always find that we are trying to be everything to all people. So of course we want to get the general public, but we thought that we should start with the town officials and municipalities; an idea was to do a series of articles leading up to the conference that will be in local papers that people will read.

A (Williams)-

We need these moments like the spill, the floods, to focus people's attention toward watershed protection beside other things that they deal with in their daily life. Water pollution is not on the top of their lists. Homeowners can have such a huge positive or negative impact on water quality. We have the top ten things you can do to protect your watershed; using the right fertilizer on your land, picking up after your dog, these are very elementary things, but getting that word out is very important. We do various programs and carry out these rack cards wherever we go. Here at Audubon we have a program of building a rain garden, water garden. Audubon focuses on habitat protection and that's how we aim our watershed workers.

(30:10-37:45) Donna is passing out brochures and pamphlets...on and off chatting on how those brochures and pamphlets are distributed.

A (Williams)-

Every five years, the DEP does the data gathering and sampling in different watersheds. The data go into the central data gathering, the QAQC. It takes years before they get the data back and that data gets discounted because it's too old. The DEP is locked into the five-

year cycle. That is why they have so much trouble looking at our action plan. They are very limited because they only think about what they can do.

A (Gilpatrick)-

In RI, they don't even do monitoring. They pay consultants to do the monitoring and consulting. So I guess we shouldn't complain too much about it.

A (Williams)-

I look at the five-year cycle as a handicap, but they (DEP) need to organize themselves and their workload in some way...

It is frustrating for them to do so much work and have no validity...prior to Governor Romney, the environmental agencies in MA created watershed teams. They sliced and diced their responsibilities differently. Rather than wetlands people covering the entire state, there were wetlands people covering only three watersheds. When we had the Watershed Initiative, things went so much better; there was a basin team leader, Celine Welsh, and she worked with the DEP as the team leader within the EOEA. All the EOEA staff focused on two or three watersheds. There were teams; there was someone within each specialty in each watershed. It was comprehensive. There was funding then and there were round table discussions where team leaders would go, prioritize projects, and get them funded. It's because there was money then. The frustration is we've lost that and it worked. The MA Miracle dried up and there was no money. Romney cut the watershed initiative. Now we have the five-year cycle, but we don't have the basin teams. It's a broken system. The frustration too is that there's the MA DEP, but also the EOEA so it's hard to navigate the system you need approval from both.

The EOEA is all of the environmental agencies. Under the EOEA is the DEP, Fish and Wildlife, CCR. There's also the Department of Commonwealth Development. My wish would be to return to the Watershed Initiative. The secretary of EOEA, Bob Duran, is our hero.

Section 4: French River Connection

Wednesday, November 9, 2005; 1pm

Interviewed: Ken Parker and Alan Dabrowski

By: Dan Bylund, Shawna Martinelli, and Joy Trahan-Liptak

Webster, MA

Q- Before getting into our research, we'd like to ask exactly what it is your organization does, and what your role within that is.

A (Parker)

We are the French River Connection. We got started last March, with some grass root ideas about what could be done to help the French out a little bit. The French is an old industrial river. It is the border between Webster and Dudley. The River has been treated badly by people over the last few decades – they dump stuff in it. And of course in the industrial age, they dumped everything in it and no body cared. You might think that over the 50 or so years since people stopped doing that, the river has healed itself, and it has, but that hasn't stopped people from just throwing garbage in it. So we started by just doing that – by cleaning up places where we knew there was lots of trash. So that's one of our tasks.

Another thing we are doing is what's called a shore line survey. Which is a MassRiverways project that encourages people like us to go out and record what is going on in the river - What's on the bottom, what's on the banks, are the banks uncultured – there are about five pages of things that you check off, and you are supposed to note what the problems are and what the opportunities are for improvement. We are in the midst of a Shoreline Survey that runs from the CT border to {?}. So we take all of the data and ...? We need that because the state doesn't have a good database of what's going on in the river. There has been no shoreline survey of the French – or anything like it – probably for years and years – this section at least.

The third thing we are doing is water quality monitoring, which is done for the season now, of course, but we were borrowing equipment from the Webster Lake Association. What you do is go around and stick the probe that we have in various places where the streams are running into the river so we can get an idea of what is being carried in, and record for the EPA and DEP, who will compile the information for us. Once we got the opportunity to do this testing, and finally got set up this summer we did about 8 sites about 8 times throughout the summer.

The 4th thing we are doing this year is a study with the University of Connecticut - the Last Green Valley. They are the technical arm of the Quinebaug-Shetucket National Heritage Corridor. There are senior landscape architect students at UConn who are doing this study looking at opportunities to make improvements to the river – where could you put a park, where could you put boat access, that sort of thing. They will be done in about 2 weeks

Q- We have some studies done by the DLARP students from UMass on the French, which we got from Therese at the DEP. – we will be sharing the files we have on hand with Ken [since the interview these files have been sent to both Mr. Parker and Dabrowski]. Parker said that he

would love to get his hands on them. He said there are lots of cases where people tell him that they have a study done, yet are unable to produce any evidence of such.

A (Dabrowski) –

We have gotten involved in a lot of other things – there is always something that wants to be done. We have been working on some dam safety issues, trying to protect a section of river that is very wild on the Oxford end. There is a development that is just starting to go in, where it has been untouched for years and years. We're trying to figure out how we could make them have a low impact. That's not going very well. I think that if we had already had information out there and studies done five years ago, we would have had a better shot at making a difference as far as that goes. We have problems with a hydro plant that runs on the North end of town, which generates electricity. His permit is through FERC [Federal Regulation and Oversight of Energy]. It is basically an open end life time permit without any inspection. They gave them out in the 80s, where he is supposed to be following some rules, but he's not, and getting someone to care has been difficult. Basically he drains the top part of the river, as the summer wears on and that's an issue. That is the kind of stuff that people need to work on. Testing the water really doesn't do all that much if there isn't any there.

Q- Is the testing done on a volunteer basis? Also for the shoreline surveys? Do you have certain points at which you test?

A (Parker) –

For the water quality testing we ended up testing eight spots. Several spots were suggested by the DEP to test where water runs in, but we looked to see if the water looked clean at those points and chose a few others, according to where we thought might be good to test (if the water has run through a dump etc.), not to mention issues of accessibility, and how much water was available (this summer things got very dry, so it was more difficult to test). As far as the shoreline survey goes, that is done by walking or paddling the whole thing.

A (Dabrowski) –

We are strictly volunteers. That's one of the problems with this whole thing. We have had people show an interest in a shore line survey, but the interest sort of petered out once we handed the stuff out, and it's been an uphill battle to get the stuff back. When you're dealing with volunteers, you can't expect too much, I guess. We were helped by the DEP a little bit as far as selecting sites goes, but I think they could have helped us more. They basically said test everything coming in and then what is leaving the state.

Q- Are you going to submit that information to the DEP for the next water quality assessment that they put out?

A (Parker) –

We're certainly going to give them our results, and they may or may not include it. We are trying to collect our data in the way that they like it – they have very “anal”

requirements for their quality assurance plan – and we are trying to meet those as best we can however as for the data we got this year, they probably won't include it because we don't have a QAPP – they probably won't take our data seriously. If we do this next year, we will be more careful to follow what they are looking for. This year we started when equipment was offered from the Webster Lake Association – we weren't at all prepared to do this, but you can't say no of course.

In terms of getting more volunteers, we are trying to get our various activities to merge with each other so that maybe the people who do something on the UConn study, or come to our meetings will get enthused enough about the whole river project to help us with the monitoring. We have been to Bartlett High School, and there is some possibility of getting the environmental science class to help us. There are some issues with getting help from high school students in terms of the DEP regulations, but that is a possibility. In terms of getting different equipment, I just got turned down for a grant, so I don't know.

Q- How are you funded? Is it simply applying for grants?

A (Parker) –

Yes, and right now its out of our own pockets, because that's really the only way that you can make any headway – Trying to do a mailing, paying for stamps ourselves etc. We've probably spent 3 or 4 hundred dollars out of our own pockets this year, which is not a lot considering what we have accomplished. We're not looking to make this into a big fundraiser, and getting a million people involved. We're looking for a few quality people that want to do some work, and basically we're just doing the work and not worrying about getting the money for it, but that's probably going to have to change for next year. What we need is probably \$5,000 for what we want to do next year, and right now we've got none of it. What we have found is that it's hard for new organizations to get started because the first thing people want you to be is a 501(c)3, well, it costs 500 dollars and two years to become a 501(c)3, so that's a real impediment. There are ways around it, such as getting people who already have that designation to act as your fiscal sponsor, but you can only go to that well so many times. So it's hard to start.

Q- How, if at all, do you interact with other organizations? – Some discussion as to if there are other organizations within the Quinebaug – none that anyone knows about.

A (Parker) –

We certainly work with other organizations, but they aren't watershed associations like we are, unless you want to say that the Webster Lake Association is. We're working with them as far as the water monitoring goes, as discussed before, and they are acting as the fiscal sponsor for another grant.

We have a really good relationship going with the Blackstone River Association, Tammy Gilpatrick, is great. We had a couple issues with a storm drain down there, and she helped us – came out and did some water testing with their equipment for us. I think we'll end up with a good relationship with them down the road. She's a mentor for us basically.

We also work with the Dudley Conservation Land Trust on issues that have to do with protecting land – they are a new organization themselves (or newly invigorated). We attend meetings of the Thompson Together Environment Committee, since our water becomes their water. They do a lot down there – they have much more of an environmental consciousness. We also go to the Quinebaug-Shetucket National Heritage Corridor water quality subcommittee meetings. We’re trying to make ourselves known to these folks, so that we can work with them.

Q~ Are you working in conjunction with any of the Con Coms in the area? You mentioned working in the Oxford corner of the river to encourage low impact development. Are you working with any other organizations on that? Are you working as an organization on that, or individually?

A (Parker) –

No where near as much as we should. If there were more of us, it would be easier. We have met with Con Coms of both towns, and Webster has given us permission to basically do what ever we want with out filling out a form every time, which is good, we don’t have to file forms that cost money every time. One of the things we did was clean out some woody debris that was preventing people from paddling, and we didn’t have to fill out forms for that. We have been in front of the board of selectmen in both towns (they know who we are). In Dudley we work with the board of health on clean ups. We have a good relationship with the public works guy in Webster. He’s letting us remove trash we pick up from the river for free, which is really good. Dudley has yet to give us the green light on that. We have taken the selectmen on tours of the river – a lot of them have never been out here, and don’t realize how nice it is in sections, so we’ve given them a tour and our ideas as to what could be done for it.

A lot of the problem here is that dealing with the river is a new idea. No one has dealt with the river much over the years, and getting them to pay attention to it now is difficult.

Q- You mentioned that the individuals in CT were really involved. Do you have any contact information for any of these people?

A (Parker)-

Norma O’Leary –

DEP guy down there

They are focusing mostly on cleaning up, and the clean up they do is fantastic. The towns down there have no qualms getting rid of the trash that is picked up in river clean ups, whereas we have trouble here. Different mentality.

Q- Have you made any effort to get members? How do people know about you?

A (Parker)-

We haven’t done a membership mailing. We’re not really a membership organization. We started out thinking that maybe we were, but can we go out and ask

everyone that volunteers for \$10? Not really. Maybe we could, but there are only a few people.

Q- How many people do you currently have involved?

A (Parker) –

Measuring by the size of the mailing list, we have about 40, but don't let that fool you – the number of people who will do anything is more like five.

A (Dabrowski) –

There are folks that say they will come out and help you, but the people who will really dig in and help out for a few hours are not that many, which I can understand – people have other things to do. I'm sure there are other people out there willing to pitch in and actually do a lot of work like we do, but the problem is going out and finding them. Mostly it's Ken and I doing stuff on an opportunistic basis – when something comes up we'll try to do it – make a contact, etc. It's an awful hectic way of doing things, and it would be really nice to maybe get more people and be able to delegate tasks.

As far as people knowing about us goes, we are very visible in the newspaper – there have been stretches where we had an article ever two weeks. We've been heard of and people know how to get in touch with us. In the future, we're going to have to ask for more volunteers through these articles. I'd really like to see a group of a dozen, dozen and a half people that re devoted to doing stuff.

We decided that we didn't want to be the water stewards only. We named our group the French River Connection because we want to be able to connect different groups. Rather than do everything, try to build a group from what is out there already. We're involved in a lot – a lot of stuff is happening. I had a guy from *?office (maybe epa?)* look at the dam here because it's in poor shape and holds back like 2 ½ miles of gorgeous marshland river. Basically he said that there's no money for this, and we can't make the guy that owns it fix it, and oh, by the way, there's a program that's out there that can test the sediments behind the dam, and maybe if its polluted, that will make it a little higher on the list of dams worth taking a look at. This was before all the floods happened in the past couple of months. So I made the phone call to this Riverways program, they have a pilot with USGS to test behind the dams. The guy said that they would put this dam on the list, and they showed up the other day and spent 5 hours testing the sediment on the French River – just from two phone calls. So sometimes you know, you don't need a whole bunch of people, you just need to make the right connections. You just have to take the time to find the right people, make the right calls.

Q- What is downstream from that particular dam? What would happen if the dam did break?

A (Dabrowski) –

Downtown Webster. There is less concern about this however, because the river is contained by another dam just downstream, which is followed by another. It is more of a concern about losing the habitat above it. There is a 2 mile section that is unique to the FQ probably a lot of the BSR. It gets very wide and goes off into the woods into marsh –

tons of wildlife – the coves are a foot and a ½ to 2 ft deep, so the water depth is very critical there, and it's more for the nature that I'm concerned. But what they're saying about the sediment is that you go through the back door, get the sediments to be a problem, and then you have to fix the dam which will help preserve the habitat. So we're learning that there are all kinds of games you have to play.

Sometimes you can call someone for months and months and then all of a sudden they show up and you're like "what happened?"

We're also finding that phone calls from us to government organizations seem to make more of a difference than phone calls from other government organizations. They call each other and they get nothing done, but we call and they pay more attention because it's the public. I don't understand that, but that's what we're seeing.

Q- Everything else that we have questions about involves Action Plans which we are not sure exist for the FQ at this point. We were hoping that you knew something about the 5 year action plans.

A (Parker) –

As you know, each river section does have the 4-5 little "action plan" bullets, but that's all we know about. It's been five years, so the time is up now, and they're supposed to be updated. If there's anything else we don't know anything about it.

DEP in Worcester just started to have meetings to get watershed people together in the region. According to Terry, the idea is to get us all to meet each other to start asking questions and maybe being able to get in on each other's projects.

A (Dabrowski) –

My personal take on the fact that there isn't much on the FQ and there is on the Blackstone is the topography of the area. The road crosses the French in only a few spots, and there are mostly woods and wetlands, so you really can't see the river. So they don't care about what they can't see. And if the people aren't caring the town isn't either. On the Blackstone there are a lot of sections that follow the road and people see it driving around all the time. People don't have access to the river. For six miles after Hodges Dam there are no houses on the river, so no one knows anything about it – no one sees it, so they don't care. Now that there is a lot more development, perhaps people will start to see it. That's one of the reasons I got into this, is because I used to use the section of the river for years and years, by myself, but now I'm starting to see people encroaching on it.

Q- That was actually my next question – how you got involved or interested in doing something for the river.

A (Dabrowski) –

I grew up along the river. My pastime as a kid was to take an aluminum boat with the bike wheels I had contrived, pull it over to the river – spend all weekend over there, fishing, hunting, all of that. When I had kids I kind of took a break from that, being busy,

but now that they're getting older, about 10 years I started going out again, but looking at it a little bit differently. From that 10-15 year gap – there were signs of pollution 18 years ago on the river, you would get these dye blobs, if you stirred up the bottom, it would be oily, but there was still fish, you could still hunt, still just get away. When I went back again after that break all that was gone. Now there's lush plant life in the cove, there's beaver, mink, all that wasn't there back then. So now I start seeing that being bothered by people, and I'm thinking "hey, this has been here all this time, and now all of sudden we're going to lose it?" So, how I met Ken was, there are a few spots that I put in which are favorite spots for people to dump couches etc. So on Earth Day I would pick up the trash, and take some truck loads downtown once a year. So then I met Ken who was cleaning a big pile too. We met at a meeting of people who were interested in cleaning up the river.

A (Parker) –

I moved here about 3 years ago, and the river and dam is right behind my house. We started walking the road back there, and it was filthy. So I figured that there was a group around here that took care of these types of things, so I bided my time and figured they would pop up in the news and I'd go join them. Well, that was a mistake, and I eventually decided there was no such group, so I went to talk to the towns and they kind of looked at me like I had two heads. So I decided that something had to be done, it was just too much of a mess, and I started doing things by myself – cleaning up things, talking to the Board of Health which promised to do something about it, but that never happened. I also started talking to the Quinebaug-Shetucket National Heritage Corridor folks at the WLA? Trying to find who did what around here. Eventually I got some contacts and Alan and I ended up at the same meeting, and from that we started our group.

There was a group that supposedly existed years ago, and we tried to track them down, but they are defunct. The Quinebaug Rivers Association and they are gone.

Q- Do you know what happened with that group?

A (Parker) –

Well, what I can imagine happened – they worked hard, did a lot, but got no appreciation from the towns whatsoever, so said the heck with it, and gave up.

Q- Is this coming from personal experience?

A (Dabrowski) -

You may sense a little there, and you would think that people would be falling all over themselves to help us take the junk away from the river, but they aren't. It's every little thing they are concerned about making the money come out right. In the case of Webster, it's not the town, it's the one person from the DPW who's willing to go the extra mile and give us a hand. In Dudley we talked to the select board and they were reluctantly for the idea, but they handed it to the town administrator, and the public works guy, and basically it was too hard for them. They liked the idea, but not enough to actually do anything.

So it's hard because you're spending hundreds of hours of your own time crawling around in the muck and they can't let us get rid of it. (More concerning the problem with Dudley, and logistics of getting rid of trash...) Part of the issue for us is how much can you keep pushing. So we just go around poking to see what might happen. It would be really nice to have the towns backing you on this.

In Webster, we have 2 selectmen in our corner, but in Dudley we don't have anyone, but they aren't actively against us – just not doing anything. Unfortunately some of the same people on our side of these things in Dudley are the same group trying to save the 1805 house up there on Dudley Hill, and so are therefore politically on the 'outs' over there at the moment – maybe not necessarily the best people to be associated with at the moment. Most of the volunteers are highly interested in what we are doing, but don't really have a lot of time because these are the same kind of people who are interested in other stuff. We need to find people who care about the river, but seeing how there is not a lot of people who have access to the river, that's difficult. It's a cycle too – people think of the river as a dump, and they're right, so they don't go out there, but we need those people to be out there, to see that it's a dump and do something about it. Access is one of our main things. Our way of thinking is that if you can get people out there on the parts of the river that haven't had people paddle on them probably ever.

One of the things that pops out of the Shoreline survey is an action plan for us, and eventually the DEP will get their hands on that. Weather they will do anything with it is questionable.

Talk about how the Blackstone is set up... model for what should be done in watersheds in terms of volunteers etc.

Terry was saying at the meeting that they had that they gather all the information from testing sites, and pass it on to someone, and then they never see it again. Talk about the data gap...

A (Dabrowski) –

Its not only a gap in time as far as information goes, but also, for example, there's a building going in down in Oxford, and in the design, the drainage for the parking lot is going to go right into a gorgeous marsh with endangered species in it, and they have a DEP permit, and the Con Com in Oxford has signed off on it. I approached the DEP to bring it to their attention, and basically what I got for an answer was "we have to wait 'till it's a problem."

Following is a summary of discussion not entirely pertinent to our project:

Spotted turtles have been documented in the area [by Dabrowski] this past year, and papers filed and accepted by The Natural Heritage & Endangered Species Program. This information however has not been updated for some time, so how are the developers and/or the town (whoever is responsible for making sure they aren't harming endangered species), supposed to know that the turtle is there? So why collect the information if they

aren't going to update it? ... more discussion on this topic, concerning why there is an information gap, and information missing.

Dabrowski –

The way these things have to be dealt with is that people have to be right on top of it from the beginning, and I don't think the public is able to do so. They think they have a process to announce planning and zoning and con comm. activities in the newspaper, and that people are going to read those and go to the meetings, have all their research done as if they didn't have just a few days to do it.

I hate to be ripping up the people who help us [DEP], but this is the type of thing that you need to know about if you're going to be doing something about it.

Following is a summary of discussion not entirely pertinent to our project:

Are we interested in Webster Lake at all? Because there is a warrant article to establish a watershed conservation district for the lake at the last town meeting which was about a month ago. It got thrown out of order because it wasn't properly filed, but if you want to see what a watershed protection district looks like, it might be interesting for you. The reason that's being pushed at all isn't the town at all; it's the Webster Lake Association that pushed the Planning Board to put it in.

Another example of not getting anywhere is the power plant...

Dabrowski –

Ken is big about getting this water testing done, but I'm thinking that if you can't even get anyone to be concerned about this dam, or the parking lot, what's the point?

Ken –

To show them that the water is good... so when it's bad we'll be able to tell them that it *was* good.

Study on Perrville pond sediments

Dabrowski –

Basically the only thing that we think can make any difference on this river is to get people out there, get people to appreciate it. We're looking to put in some places for boat access, dealing with the town – there is money out there for this type of thing, but getting the town to cooperate with you on it is difficult. To get the money the town needs an open space plan to get this state money for little parking lots and a boat ramp. All the town needs is to own a little piece of land for it, and have an open space plan. The state will put in the whole thing and fix it in the future as long as you maintain it in the future.

Section 5: MassDEP (Warren Kimball)

Friday, November 18, 2005; 9am

Interviewed: Warren Kimball and Therese Beaudoin

By: Dan Bylund and Joy Trahan-Liptak

Worcester, MA

Kimball

The last 30 years were concentrated on point sources. We used regulatory programs with state controlled permits and cleanups and that is all already done. What's going on now is non-point source which is non-regulatory and so there is no big state presence of compliance and enforcement hanging over peoples heads. The way in which most point source issues are cleaned up is through grant monies. Most non-point source money in Worcester is used for cleaning up lakes. That is why it is difficult for these local watershed groups to get grant money.

Q- What kinds of groups give grants?

A (Kimball)-

We have the state and the federal government, federal government takes the lead and state piggybacks and helps out usually. 319 grant is for non-point source implementation 104b for water quality in wetlands and a 604b which is a non-point source assessment. These numbers refer to sections of the clean water act. Under the watershed approach different grants were developed during different parts of the five year cycle. Right now the main way non-point source pollution is regulated is through going after storm water. There are three ways to go after storm water there is phase one and phase two of the wetlands protection act. Phase one is an NPDES permit for storm water an NPDES permit is a National Pollutant Discharge Elimination Permit and they were given to municipalities and such to build sewage treatment plants and the permit regulates this. Phase one is for large cities, Worcester and Boston are the only cities in Massachusetts considered for these permits, and they were told under these permits that it was not really a game of measuring the water quality of this storm water but rather a hydrologic game. The idea is to limit impervious areas and disconnect these impervious areas from the stream. When impervious area gets above 10% then you are going to have water quality problems if it gets above 25% then you have severe water quality degradation. The idea is to divide your city up into small watersheds and look at the impervious areas and that tells you where potential problems are instead of sampling. You can do a lot of things to disconnect these impervious surfaces which include paving with porous pavement so the rainwater doesn't seep off but runs through or you can collect it and contain it and clean it before it gets to the river. Sometimes in parking lots medians are made of grass so the ground water recharges. It's more of a water quantity game than a water quality game. Worcester is going through this right now mapping there sewer system and fixing illegal connections and systematically going through examining impervious surfaces. Phase two is for other concentrated urban areas. They used census information and came up with about 250 areas that are likely to have a lot of impervious area and they are supposed to conduct similar processes to phase one. These are all called

BMP's or best management practices and are structural or non structural solutions to non-point sources.

What we did here under the watershed approach is we went around to each town and we said here are your zoning laws if you were to build up to your specifications here are the consequences. They found out that if they built all these areas the way they wanted to they actually created traffic jams, water quality problems, and crisis in the schools, they would have to build more schools and a lot of the people who were moving into the towns weren't really paying their share of that single couples who weren't contributing to the school system.

A (Beaudoin)-

What they found was that for every dollar in residential taxes it cost the town a dollar fifty in services. Town was actually going to have to go down hill.

A (Kimball)-

The solutions to non-points source problems are non-technical and these watershed groups are good at community outreach. One of the best ways of dealing with pollution is to shut it off at the source which consists of community education. The Assabet river has issues with phosphorous where they don't have a model to predict whether or not the clean-up of phosphorus rich sediments will be effective enough for the price.

A (Beaudoin)-

The worst problem in the Blackstone River is storm water. Wetlands along the river have all been developed or filled in. The idea is to restore these historic wetlands and grant money has been used to do this. The problem lies in identifying what are the most important ones, which ones will work best after restoration. One of the things the Blackstone needs to do is develop a list of projects (Supplemental Environmental Programs) so when money comes in from one of these sources they can be organized and know which projects can be used for the amount of money collected.

Q- We have a few questions about the five year cycle, these action plans are supposed to exist for every watershed that's on 303d? We found that some don't and we are wondering why this happens?

A (Kimball)-

That doesn't Surprise me.

A (Beaudoin)-

Well we have non-point source plans for every watershed?

A (Kimball)-

Well those aren't really action plans. The clean water act says there will be a continuing planning process 303e not 303d. The 303d is a list of the actual dirty waters.

Q-What I understood is that everything on the 303d list has to have an action plan.

A (Kimball)-

Yea and it's not done. That's the bottom line.

Q~ What are the reason's this hasn't happened?

A (Kimball)-

No one has been assigned the responsibility, up until the early 1980's there was a entity called the Division of Water Pollution Control who used to write the action plans and you could find a management plan for all the watersheds current through 1980 then there was a ten year hiatus from 85 -95 when no one was doing this until they created the watershed approach created a new group under EOEA. The watershed approach only got about half way through the basins when it was cut because of resources. Last few action plans from the EOEA were funded by grants.

A (Beaudoin)-

Like the Blackstone that was funded by special a grant.

A (Kimball)-

So that's where we stand right now they are complete in this process until 85 from 85 to 95 there is a void and from 95 to present only half of them got done. Internally, within the department, there are various plans, the basin plan covers point, non-point and quantity as well. Here's the process how it's supposed to look; first you have to do an inventory of all your water resources and then classify them which are the water quality standards that begins your section 303 of the clean water act. Once you have things classified you start to monitor and one of the things you do in monitoring is compare your data to the classifications that's your assessment and that's called a 305b and the analysis comes in and the list of waters that don't meet the classification are your 303d. Then a plan to prioritize these areas and then some kind of implementation these includes compliance enforcement and grants programs, these are sort of ongoing all the time and then the loop starts over again. This is how the five year process is supposed to work.

A (Beaudoin)-

(Showing us a river "Report Card") everything in the assessment reports can be summarized on the graphic report card. This is Warren's brain child. (Both of them describe report card organization: organized like a chart where red is poor, orange is medium, green is good, and grey is no data.)

A (Kimball)-

A lot of the problems as you can see on the chart (Blackstone report card) are in the headwaters this is where the non-point source problems are located because of impervious sources in Worcester. Back to your question does everything have plans? No but some of them do and all of the most recent ones can be found on the EOEA website if its there it's done if it isn't it's not done.

Q- So who was supposed to continue doing this?

A (Kimball)-

The EOEI hired basin team leaders and they were going to build basin teams but their whole system got cancelled when the new governor came in.

Q- So that process is out of date?

A (Kimball)-

Nope that process is still valid it's just that no one is doing it right now.

A (Beaudoin)-

We are still doing it just not completely we are still doing monitoring and assessments and TMDL's.

A (Kimball)-

These are the big endpoint right now instead of the plans these TMDL's. We still have money and time and priority for them but no one has it on their radar to do plans.

A (Beaudoin)-

The watersheds that don't have plans often don't have the advocacy groups to forward the agenda to even get the plan written you need all the local grassroots to get the local perspectives on where gaps are. The French and Quinebaug are examples of this. They have two people.

A (Kimball)-

You look around and see all the rampant development, that's lack of planning, but if you had an overall plan you could plan who would build where and then it would be clear who could do what and it would be hard to argue. If you're fighting each battle one on one and it's a big company against a little advocacy group the company always wins.

Q- The people we have talked to so far have thought that the watershed initiative was an ideal practice that that was the best way things could be handled do you think they are correct in that?

A (Kimball)-

Yea the concept was to divide things into watersheds and if you made the watershed your planning unit you couldn't go wrong because you'd always be worried about what's upstream and everything would be hydrologic and you would have a grass-roots up approach rather than top down in planning. These are things that they have learned over time that we need to plan and we need to use watersheds as the planning unit and we need to partner to do this because a lot of these things are not regulatory in nature and we need a lot of people helping out. Unfortunately the initiative was resource intensive and so the way it was may not have been that efficient but the idea was good.

A (Beaudoin)-

Some of the watersheds that we are working with already had organizations and were well funded and very politically connected and they felt that they did not need the state to come in and impose the watershed initiative, while watersheds that did not have

well connected groups benefited greatly from the initiative. Much less competitive now because the infrastructure is gone that would spread the money across the commonwealth. It was highly effective when the EOEa watershed teams were around they had specific goals that they had to come up with every year and one of them was to make a yearly plan of what are our top priorities how are we going to address them what are we going to do next year and they had to develop a five year plan so they were very effective in getting both federal and state money and they had projects that we knew about and the grassroots groups knew about and the basin teams were comprised of a mixture of people from these organizations.

Q- Were they employed by state?

A (Beaudoin)-

Yes team leaders were employed by state but all the people who went to meetings varied from a lot of federal agencies local agencies and advocacy groups. (Kimball begins to show us a handout that was later given to us about the EOEa from a book that he put together for organization full of things that have already been generated. Including a history of reports that the DWM has put out which is the monitoring scientific arm. Kimball also shows us a book called Rapid Watershed Planning which is an important book because it was the format that the EOEa teams used to write plans. Book details how they came up with the number for percent impervious surfaces and how it affects watershed health. Copies of several important pages were all given to us as well as titles and other useful information)

Q~ Since the last assessment for the Blackstone was 98 is there another assessment report in the works was all the data collection done on time?

A (Kimball)-

Data collection was done in 2003 I believe.

A (Beaudoin)-

They only collected data that was done through 98 Warren and I did not start until 2000 and they were not prepared to go through the 2000 data. The most recent data is not available and was collected in 2003. All that's available is the sampling plan that shows where they went and why they went there.

A (Kimball)-

So that assessment was due in 2004 so it's a year and a half behind on that.

Q~ So the data that will be published how old will it be?

A (Beaudoin)-

It will be new because when they generate their reports they will include all of the data that they have collected they meaning the scientific branch called the Division of Watershed Management and it is their job to go through the 5 year cycle and they do the bulk of the monitoring and the assessment writing etc. Warren and I have a separate

program that is atypical and we run it out of specifically the central MA region the 6 central MA watersheds.

A (Kimball)-

When the Watershed Initiative blew up they left us as a fragment we were sort of spinning out there in space all alone and they never found us. Since we are in a regional office we are only aloud to deal with 6 watersheds but we have continued the watershed approach and the watershed initiative and nobody has bothered to shut us down.

A (Beaudoin)-

But we have institutionalized the watershed approach in the states government so there is the no need to have the watershed team leaders anymore.

A (Kimball)-

Since the team leaders have gone away and the watershed teams have gone away we have latched onto the local advocacy groups since they are the closest remnants of what was left and we have tried to meet with them as a group and organize them and try and allocate funds in their direction.

A (Beaudoin)-

The DWM, us and them, their next assessment will have there data through 2003 our data they have just finished preparing the database for and the volunteer data will be current through when the assessment is published.

Q~ Someone told us that the data is being published six years after it was collected.

A (Beaudoin)-

That is because of problems inherent in our database.

A (Kimball)-

This assessment is a 1998 assessment and it's the most recent data and it includes data that was collected up until 1998.

A (Beaudoin)-

The problem is internal and managing the data when we get it and they have quality assessment procedures that are very cumbersome....

A (Kimball)-

It's bureaucracy.

Q-Is it a problem that this data is published so late?

A (Kimball)-

It's a problem because according to 305b data that's five years old is considered stale. That's one of the reasons they have a five year cycle to refresh this data. There is

no reason not to publish data on time if you have data there is no reason why it shouldn't be published.

A (Beaudoin)-

We have resource limitations.

A (Kimball)-

(Makes an analogy of a candy factory that is putting out too many candy bars but the quality is no good).

Section 6: Organization for the Assabet River

Wednesday, Nov. 23, 2005, 10am

Interviewed: Sue Flint & Alison Field

By: Dan Bylund, Shawna Martinelli, Joy Trahan-Liptak

Concord, MA

Q- Before we ask specific question about our research, we would like to learn more about OAR and your roles within the organization.

A (Flint) -

Well I am the staff scientist, and have been for more than six years now. I was hired on to run the water quality monitoring program and it sort of expanded to include everything on the scientific end of things. The organization is rather small, including five part time staff. We have an executive director, myself as the staff scientist, Alison is our Policy director, a development director (development consists of raising money), and Don our office manager. So we have to work fairly strategically because of our small staff and reasonably large area. It may not be as large as the Blackstone; we obviously focus on the Assabet River. Our overall goals and everything we measure our efforts against are "Is this going to end up with improvements in the River?". So when we think about projects with short term improvements and long term improvements, a successful project is something that would eventually clean up the River. The organization has been around almost 20 years and is a membership organization. It is based on people within the watershed that become members and pay some dues. A lot of the work done here is not actually done by us but is actually done by volunteers. I should also say that our overall governance is a fourteen member board and indirectly our executive director reports to the board.

A (Field) -

My job is on the policy end of things. With policy you can't always be sure what it is, but I am dealing a lot with the regulations and laws. They sort of start with the Clean Water Act, on the Federal level, and extend to each municipality which will have its own bylaws and regulations. I do quite a bit of commenting on projects that may come up. As far as the Assabet, the issue of waste water is paramount really, because that has the biggest impact on water quality. I deal a lot with the state and federal permitting process. Nipties, I don't know if you are familiar with that, which is quite a lot of the work I do and is the legal and regulatory aspect of things. Then we also do things such as making comments on changes to their management act about how much towns can pull out of the ground water through their wells. We look at water conservation because we are very concerned with the how much water is going into the River and how much water is coming out. And when it goes in, what is the quality of what is going into the River.

Q - How do you interact with other organizations, for instance the Sudbury and Concord?

A (Flint) -

We interact on various levels. When it is appropriate we partner with other organizations to work on projects. We updated this 1986 Upper Assabet Riverway Plan written a couple of

years ago. We partnered with Northboro, Westboro, Marlboro, a lot of the Upper Assabet towns, and the Sudbury Valley Trustees to update the plan and work on that. I just put in a grant yesterday to work on developing educational curricula in Middle Schools in the towns of Hudson and Maynard. When it is important we work with other groups when our interests coincide. We also sit on some of the regional and state wide technical advisory committees and some of the other committees. For instance, the Assabet and Concord community council and the SuAsCo community council. Our director even sits on the River Stewardship Council. The RSC is actually the group that oversees the designated wild and scenic portions of the Sudbury, Assabet and Concord. So we work with the state when it is needed, and we work with Warren when it is needed and even go out and sample with him to see what is going on. We also sit on the technical advisory committee for the Army Corp of Engineers who are working on a sediment and dam removal study. We sit on the technical committee to make recommendations to the state and federal government to make sure it is a fully funded study and gets done well.

A (Field)-

I can talk more on the local level, with the towns. As development projects come up, we like to have some oversight. Then also there are some what informal groups that are called Advocates for Wetlands and Watersheds. A lot of watershed groups send their members to that, Mass Audubon is a part of that. Then there is also another one called MIFT, the Massachusetts Industry Flow Taskforce, which is a similar sort of group dealing with a different “cut” at the issues. These groups are really great places where people are able to share what is going on in their watersheds, as well as issues that they are tackling and see where perhaps those things should be addressed at the state level. From there they can arrange to meet with the commissioner of the DEP or whoever to try and take it to the next level, if that would be useful. So that is a way that we actually collaborate with other people very intensively with other watershed organizations.

A (Flint)-

I think that the other key piece for us is waste water permitting on the River because it really has the largest impact. If we can clean up those waste water treatment plants and if we can get them to meet lower standards (especially lower phosphorus standards). Those are regulated by the NIPTIES process, by both the EPA and the DEP in Massachusetts. So we keep in touch with those individuals through our comment letters when the permits are out as a draft permit for public comment. That is during the permitting process we interact with the state and EPA on those as well.

A (Field)-

At this point Alison provided us with the most recent OAR news letter, referencing the summary of their actions and a section on the appeal of the waste water permits. They also informed us that they are currently appealing two waste water permits.

Q - You have mentioned the permitting quit a bit, are these plants not meeting standards and that is the cause for appeal? Or is it something else?

A (Flint) -

Well, in most cases they are currently meeting their standards, but these standards are not actually protective enough to clean up the River. So it has been a long process, starting with a long study focusing on nutrients and in particular on total phosphorous in the watershed. The results of those TMDL studies are now in the hands of the state (references the large series of binders on the shelf which are the TMDL studies). [We are then shown the report that the state published.] So this is what the state wrote following the study, this is the states allocation of pollutants. It basically said this is what the River can handle and therefore this is the basis for what each plant can release, say perhaps phosphorous, into the River. That information is now used when they issue a new permit, allowing them to only release as much as the study states.

Q - So are you trying to update the permits in a sense?

A (Flint)-

That's not our responsibility; the EPA has to update the permits. The new permits have been issued. The former permits said that they could release .75 mg/L total phosphorous in their effluents. That obviously doesn't meet River quality standards in the Assabet. Following this study, they said that the way to meet standards within the River was to release .1 mg/L and to remediate the amount of phosphorous potentially coming up out of the sediment. As plants grow and they die, and fall back down to the bottom of the River, the nutrients coming down the River in the water column then get knocked down into the sediments. Now you have sediments trapped there providing all of the nutrients for the aquatic life, which can in turn also leach back up to the surface. This led them to submit the .1mg/L release of phosphorous which needs to be met by 2010 and during that time they also must study the sediments. The USGS has actually just completed an initial sediment study, a lot of money is being spent and a lot of studies are being done on the River.

Q - You touched upon funding earlier and you just mentioned money. One of our questions to you is how is OAR funded?

A (Flint)-

We are funded by both membership donations, corporate donations, and we are largely grant funded. For specific projects, we write grants ...and that is about it.

Q - You have members, where as the Blackstone has volunteers. How many members do you have?

A (Flint)-

The most recent counts were of 1,100 members.

Comments on other watershed groups and their small numbers were made here (comparison with the French River Connection, its struggle with protection versus improved water quality).

A (Field)-

This watershed is probably more developed than that. I don't know the French River that well but we have 495 and so we are sort of in the middle of that process. We can see that there is rapid growth and more impervious surface and therefore we can see that that is going to be worse

for the River. So some of the same tools may be useful, such as land use, regulations, incentives and that sort of thing.

A (Flint)-

While hopefully in the next 10 years, when we have come to the point where we are developed enough, then we will have to start worrying about non-point source pollution and green ways along the river. We can't wait until then though, because by then we may have already lost so much.

Q - You mentioned incentives briefly, what role does the community play in the Assabet, if at all? (When silence ensued, Shawna spoke a bit about the Blackstone and their issue with non-point source pollution and community involvement. She followed up by asking if they had been observing similar issues of concern.) Is there community involvement aside from volunteers? You also mentioned volunteers, are those members as well?

A (Flint)-

Those don't completely overlap. We have an active water quality monitoring program, which usually consists of about 30 people a year. I don't always get all of those people to join as members.

A (Field)-

We have done outreach on various levels. We had an outreach on lawn management and detergent, trying to encourage the use of non-phosphorous detergents.

A (Flint)-

We have also had a series of outreach programs to town officials, to try to get them to understand the phosphorous problems from both a point source and non-point source perspective. We have done nutrient outreach as well, as far as sending out mailings to the watershed concerning fertilizers and cleaning up after your pets. A lot of this stuff you can find on our website as well. We also involve the community in supporting the Riverway Stream Teams. Mass Riverways, which is part of the Fish and Wildlife, they try to encourage the start up of volunteer based 'stream teams'. They usually do stream surveys, walking up and down the stream and writing down what it is that they see. They also put together action plans that the community can follow to protect those areas. These teams of course have varying success, from those that start up well and just take off to those who write their action plan and that is it. We have actually done three stream teams within the watershed. They consist of the Acton stream team, who still exist, the Northborough stream team, which is more along the model of I write up the plan and then die, and we did another in Maynard.

Q - Where does all of this data go?

A (Flint)-

It goes to Riverways, it goes to the towns, and in the case that we have sponsored the studies, the information comes to us. So we have the Acton and Northborough surveys here on the shelf. But it really takes local action to move on any of the small projects that they come up with.

A (Field)-

Also with the issue that you were talking about earlier, the impervious surface and paving isn't something that we have done a lot on, but we've done a bit with the Acton Discover Museum. There is a fund being managed jointly with Intel that is to recharge storm water projects mainly through municipalities. One of the projects that we funded was actually for the Acton Discovery Museum to do a demonstration presentation on low impact development techniques. We have done a little bit of publicity on that and encouraged people to go look at their demonstration site.

A (Flint) -

Well we also had a very strong role in setting up that fund, because Intel put in a water management plan request to pump ground water for their new plant, or perhaps an expansion of their plant in Hudson. In the process of commenting on this ground water pull, which would have obvious impact on the streams near by. We worked very hard with Intel and as part of their mitigation for withdrawing all of this water; they set up a fund to put back water in other parts of the watershed. Therefore, Intel is giving out to various sorts of projects.

A (Field) -

It is another source of funding, not necessarily to us, but it is another source of funding overall, and it is fairly innovative. The Assabet is known for having this mitigation, this idea that if you are going to take out water at one place, you need to fund back in.

Q - Initially we were interested in adherence to a management plan, or an Action plan, but we have been coming across watersheds that do not even have one even if they are on the 303 D list for impairments. Where does the Assabet fall in that?

A (Flint)-

Well this would be a pile of some of our plans (references the documents we had been looking through earlier). You have heard about each of the watershed Action Plans that each of the watersheds are supposed to write up, do you have this one? (Ms. Flint references another document, the most recent action plan which we have yet to see.) This is two pieces, this is the Assessment Report and then the Action Plan and this is not DEP. I also put the latest 2001 DEP report on the CD I made for you. The state wants all of the watersheds to write up a watershed Action Plan, so the original contractor of this study was the Watershed Community Council who subcontracted Ambient to do this overall watershed Action Plan. You can feel free to look through it yourselves. It is new, and it's not particularly well focused. It is very scattered, what they did is they took actions from pretty much anyone who wanted input and it appears that they mashed them all together to put them into a document. They did this without sorting for importance or feasibility. So I have to say that it is not the best plan in the world. When I looked over the older Plan, (Upper Assabet Riverway Plan from 1986), it is much better organized. They were sorted and feasible. So I confess to not having read completely through our update of it. We were not the ones that did that; however I think it is much better. I also put that on the CD for you as well. So you can read through that and kind of compare between the plans.

As far as how that guides what we are doing, well we wrote this in cooperation with the towns and the other groups it is very reflective of the things that we think are important for the River (older plan). And within the organization we have done various planning exercises within

our board. As far as what do we think are the most important issues, what do we think is going to get us the biggest bang for the buck, and what do we want to do. Those are the things that usually guide us the most. And of course working with the Army Corp, the USGS and the DEP and trying to fund studies that we think are vital but we can't do ourselves.

A (Field) -

Here is also another study, not to overwhelm you with studies, but here is one done by the USGS looking at ground water flow. It is monitoring the ground water flow to sort of understand what is going on underneath there. For technical understanding, the USGS does some really fine work. So we are very lucky actually to have these kinds of phases of data. Anything else that we want to do is supported by what Sue does in the field and these kinds of studies and then we can really build a strong argument for whatever our position is.

A (Flint)-

This is also part of Alison's role in looking at this data, and saying we have all of these different sources and we can then apply it when we are writing these comment letters. For instance if somebody comments that they will be withdrawing water from here; I won't name names, but somebody recently commented along the lines that this here is an intermittent stream, it is not a major cold water fishery and our wells aren't going to affect it at all. All of which we could say point by point, no, no and no.

Q – As far as these plans are concerned, how are they implemented, or enforced? We have a very different perspective because up until now, as we are conducting our interview, we have only had what the EPA and DEP provide. However, we are finding out that things do not follow their guidelines strictly. Are there ways of actually enforcing these plans or are they merely your goals for the future?

A (Field)

That is a rather tough thing to answer. I think that one thing that is very important to say is that a lot of the value is the process of developing the plan. If you do it well, you work with people and you really build relationships, which are then useful in doing whatever work you are going to do. That is one thing. Whether the plan is ever picked off of the shelf and read and referred to, despite that ever happening, you have hopefully built those relationships and thought together about this issue. This overall helps to focus people. Whether they get implemented, my sense is that once this process has happened and people have thought through what their priorities are they tend to go ahead and carry those things out without necessarily referring back to the plan very much. Except perhaps when the time comes to update the plan and you tend to rethink the process.

A (Flint)-

I think that there isn't really a way to enforce these things. And I think that projects and suggestions really get picked off in a much more random way than you would hope. You know somebody or some organization is inspired to pick up a piece of that and kind of go with it, but it really takes that individual or organizational effort. It needs some kind of direct impact and it really needs an advocate of some kind of variety as well as opportunity and funding. For instance you could say you want to protect a green corridor along the river, well there isn't

opportunity to do that all in one go. But maybe as the opportunity comes up, as we are thinking about what our overall arching goal is, we know that there's a piece of land available along the corridor in Northboro that we would want to direct that to somebody who would want to protect it. We don't buy land ourselves.

A (Field)-

Or we say can you get a conservation restriction put on this land, there is a development proposed. They will say we'll hold back the buildings 200 ft and put a conservation restriction on the land. But I think it also depends a lot on the people in the towns, the residents of those towns to serve on a board and to take these issues and continue pushing and pushing them. That can be very hard to do because there are so many other competing interests. Again, even decisions such as deciding whether to sewer a lot or not can bring in a great deal of technical expertise with that, but a lot of the times decisions are made based on only half of the important criteria or information. That is something that residents really need to be concerned with, and organizations like ours try to inform people when they become members so they know more and more about this. People will ask me questions about things coming up and I will inform them of the issues and even ask them to go to meetings regarding those issues. We try to mobilize people around these issues because otherwise what is in the plan simply will not happen. But if it says in here that this town needs to have protection along the river and then someone comes and takes this and says this is what we said was important we have to do it. Then of course they have to keep saying it, and then it might happen.

The things that are actually legal, for instance the DEP does what they can with the limited resources that they have. And of course we keep pushing that they enforce the laws that they actually have. We make sure that the permits that are issued actually do protect the river. That sort of back and forth.

A (Field)-

And these protect the river, these sort of regulations, like the River protection act says that there needs to be a 200 foot buffer and you try to get it into as many places as you can. If you are really lucky you may even get it into the zoning.

Q – Since you have been here (directed toward Sue Flint), have you seen an improvement or impairments in the water quality?

A (Flint)-

I would have to say that the water quality has remained much the same. I think that the treatment plants had recently gotten some upgrades when I had first started here. But their improvements in water quality have probably been offset by their increase in amount of sewage that they are putting in. So if you are thinking in total load of nutrients, concentration times your flow, so the concentration has been dropped but the flow has gone up leading to the same result. So one could say that it could be worse if the standards hadn't been improved, but as far as in the river improvement, no there hasn't been any.

A (Field)-

I would say that what OAR has been doing has laid the foundation for improvement.

A (Flint)-

They are hopeful that in the next 10 or so years there can be significant improvement in the summer and it won't be stinking and green.

Q – I have a question about the Assessment here, who is responsible for the assessment if it's not the DEP.

A (Flint)-

This is the one contracted by the DEP, the DEP put out money to do these. The SuAsCo community Council took up the interest and challenge to do it and hired a consulting firm to actually do the work, which was Ambient.

Q- The DEP also has their own assessment correct?

A (Flint)-

This is not a watershed assessment. This is a summary of all of the other documents that have been produced and the suggested 'actions' were based off of this.

Q – So why didn't the DEP just conduct the assessment themselves?

A (Field)-

I think that this is an attempt to try to continue some of the work done under the watershed initiative. It was an attempt to continue the community involvement in these plans. Theoretically, when the DEP puts out these projects or prioritizes their projects they are going to look to these watershed Action Plans whether or not their new plans support actions that have already been prioritized in the watershed. In that way, having a 'laundry list' is productive for us because we can then say 'oh yes well that's in the watershed action plan because everything is'. In part, politically it is part of the DEP's divestment in their own responsibilities. You know years ago they did their own water quality testing; they did extensive testing every year in a bunch of the rivers. Slowly they backed off of that and now they put it on the five year cycle. Then they did this watershed initiative bringing together stakeholders and watershed groups to make this all work. After they stopped doing their own water quality testing as much, they started supplying grants to organizations like ours to do water quality testing. Then they scaled that back and they cut that out.

Q – How does OAR work within the entire Concord watershed? How do you work within that larger picture?

A (Flint)-

That is always problematic for our organization because we are the organization for the Assabet and that is the way that we were started and because the state grouped this as a three river watershed rather than three separate pieces. We try to work collaborative where we can. There are smaller groups, such as a two or three person group in the Sudbury and then there is the community council which doesn't do any ground work. They do the river revisions conference every year and they provide some educational materials to towns and then their own

meetings. While down on the Concord there was a volunteer group that has completely fallen apart since the one ‘mover and shaker’ has moved out of the watershed.

So we work a little on the Sudbury side, trying to support them where we can, provide advice where we can, and we try to work cooperatively with the larger land trusts, the Sudbury Valley Trustees. As far as water quality testing is concerned, since there hasn’t been anything down in the Concord we just extended our program down that way.

Q – Do you have volunteers do anything other than water quality testing?

A (Field)-

Office work, we usually have 100-200 people come out for the annual river clean up, so that is kind of a one time deal. We also have site coordinators, most of whom are volunteers. Our board is also all volunteer.

Q – What are the backgrounds for people who volunteer?

A (Flint)-

It varies. I think that some of our most committed volunteers are the ones who have the river in their back yard, the ones who have real personal interest and feeling for the river. Other people are professionals. For the water quality stuff I tend to get people who are consultants and are maybe a little disillusioned by where their environmental career has taken them and perhaps want to give back to the river a bit. They use their expertise in a more productive way.

Q – What is your background? Did you go to school for this?

A (Flint)-

Indirectly, I have an undergraduate in microbiology and a graduate in environmental science. I was actually aiming to do bioremediation, but it didn’t work out that way. So when I took this job I sort of shifted fields a little bit and started dealing with rivers and started adding different kinds of expertise.

A (Field)-

My undergraduate was in microbiology and my first job was working on the wetlands protection act in Welsley which is on the Charles River. (There was mention of how this was a very good first job and high profile river.) When you work for a municipality it is not all that glamorous you work in an old renovated school building and you go out in your car in rain storms and then squash around in the mud looking for wetland plants. But if you happen to like doing that kind of thing it is great, which I did.

A (Flint)-

I think that is kind of why a lot of us get involved in the field. “While I have an undergraduate in microbiology and I like doing out doors stuff. What do I do now?”

A (Field)-

You are also now working with a lot of volunteers and with people who all really care. And that is what is sort of different from being in a lab; you are working with the whole community who cares. And so then from there I got a Masters in natural resource policy and planning. I also worked in dry lands in Africa. The environment functions essentially the same way and you find that the issues are very similar to here.

Q – Typically, we ask those we are interviewing what they deem as being some kind of improvements they would like to see within the watershed. Whether they be feasible or not feasible, what would you like to see happen? What frustrates you?

A (Flint)-

Obviously, we do have our frustrations. I think that this group is run pretty positively; we have got good energy, great staff and good ideas. I feel like we can make progress in this watershed. Frustrations for us are funding and government support. Not to speak ill of the current administration, I feel that the country has had in the Clean Water Act and the Clean Air Act really good legislation on which to base protection. In recent years that has been quietly chipped away at. They have been under funding and not back filling positions, in some places it is almost like Swiss cheese. They are also not backing them up in enforcing their own regulations, and the same thing is happening on the state level with the DEP. On a national level I could see them supporting the EPA and enforcing the regulations that exist. Then they can also be putting more money into monitoring. They spend all of this time writing plans, TMDL's and studies, and then they propose what they call an adaptive management strategy for the Assabet where they will be cranking down the phosphorous levels this much and study the sediments to see if what works and only then will they decide if they need more stringent controls. The only way to know whether all of that is working is if they are going out and monitoring and putting the money up front to do it themselves or pay someone else to do it, they are not going to know. Adaptive management won't work if you look only at the result. I would like to see them put money back into assessing the resource. It is not innovative, it's not on the ground improvement, it's not new and shiny so it is very difficult to fund. It is hard to get private funders to support boring old baseline monitoring.

A (Field)-

I think that what I heard from the watershed initiative is that when that funding was cut it almost killed a number of good watershed associations. That was really, really unfortunate. Organizations are not fat. There is no fat to trim from them, so when something like that is cut they may just simply crash. You lose a tremendous amount of work community building, in involving people, databases and just everything overall. So having that kind of thing I feel is very important. Also this Swiss cheese approach to government staff is very destructive because they just can't do their jobs. There are good things in place; there are really good regulations and laws but if you can't enforce it you're not going to get anywhere. They are all trying to streamline their operations to save money to survive rather than doing a good job. It has nothing to do with doing a good job.

Q – Concerning the 14 board members, how are they selected?

A (Flint)-

They are volunteers, in the sense that they are not paid. I try to select them from a variety of expertise and geographic variety throughout the watershed. Occasionally we have people come to us saying that they would love to be on your board, but that is not typically how we choose our members. We usually try to move people up from our water quality monitoring program or less sensitive volunteer positions so that we get a feeling before hand of what kind of person they are and what kind of work we can expect or reliability. So we try to select from people that we already are in contact with.

Q – How frequently do board members meet?

A (Flint)-

The board meets three or four times a year.

A (Field)-

Then there is an executive board that meets on the off months, which is in charge of making large policy decisions deciding to appeal the permits. That can be a large legal action, which involves hiring a lawyer and needs to be a whole board decision. The board also plans fundraising, gets the word out, serves as representatives of the organization and is very important in policy guiding and decision making. We try not to involve them in the day to day decisions.

At this point, Alison had to exit which led to the end of the interview. They were both kind enough to leave us with their contact information and encouraged ask them any more questions via email.

Section 7: Blackstone River Watershed Association

Friday, December 2, 2005; 9am

Interviewee: James Plasse

By: Dan Bylund, Joy Trahan-Liptak, and Kombosi Bosunga
Worcester, MA

Q- Before we begin with more specific questions pertaining to our research, we would like to ask you what it is you do for the Blackstone?

A-

Well the Blackstone River Watershed Association is responsible for the mid-region of the watershed, and that includes the watershed from Grafton to the Rhode Island border. We are a part of the larger Coalition which is the Blackstone Watershed Coalition, and I hear you spoke to Tammy and Donna. The Headwaters Coalition takes care of the Worcester area, the lakes and ponds association, the Blackstone River Watershed Council is the Rhode Island group. We are trying to promote the human and natural resource. The group was erected in the early 70's, the group was formed because the Blackstone River was severely polluted due to the industrial pollution and sewage directly entering it. They initially began with a yearly canoe race to bring the public's attention to the River. Progressively, laws were passed to stop run off and sewage from entering the River, and a lot of citizen groups took part in River side cleans ups. This is a continuation of the groups work. We still have our yearly canoe race, and we participate in water quality monitoring under the Coalition. We actually monitor 34 of the sites. We also just started an outreach program called the Stream Team which was developed by the Massachusetts Fisheries and Wildlife. They get citizen groups together to take responsibility for a small stream or river within the watershed and become advocates for it, these are usually people that live in the area. We also put together town meetings and get speakers to speak about things, about things like wise water use and how maintaining your septic system can help keep the waters clean in the watershed.

Q- Have the Headwaters group been around as long as your group has?

A-

I don't think that they have been around as long. I really can't say, you would have to ask Peter Coffin who is the chairman.

Q- Was this organization the first concerned with the Blackstone?

A-

It was the first in Massachusetts. You know I have only been with the organization for 3 or 4 years and this was over 30 years ago. I think that they may have been associated with the Friends of the Blackstone in Rhode Island. The Friends of the Blackstone used to have a canoe race.

Q- How did you get involved with this group?

A-

I used to live in Billerica which is the Shawsheen River and I got involved with the Shawsheen River Watershed Association there and started doing water quality monitoring. Then we moved to Blackstone Massachusetts and we gave a call to the BRWA about joining. We joined and became water quality monitors and then they said "Would you like to come to one of our board of directors meetings?", and all of a sudden my wife and I were on the board of directors. So I have now just been elected president of the organization because the president stepped down and there wasn't a rush of people to fill the position. And so that is how I became president. The Shawsheen River is a small river that runs into the Merrimack River, and I worked for the Air Force at the time. The headwaters for the Shawsheen were actually at Hanscom Air Force base and the Air Force was trying to get local people on the base involved. They are trying to help.

Q- I am actually amazed that the Air Force was involved in that. I'm impressed that they showed an interest in that. It just seems a bit out of the ordinary.

A-

Well actually it wasn't, because the base was headwaters, which meant that all of the fuel run off and everything else was going into the ground. They had no idea how much was in there so they were a big supporter of the water quality monitoring program, because they wanted to know what their responsibilities were.

Q- Are any of the positions within this organization [BRWA] paid, or are they all volunteer based?

A-

In the organization, there are three paid positions. Right now we have one woman who is an administrative assistant who works 10 hours a week and is paid on salary. And there is a water quality monitoring field coordinator position, I am paid out of that. That is a grant, and I get paid as a contractor for that. The grant is paid out of the NEIWPCC, the New England Interstate Water Pollution Control Commission, which is getting paid from the states of Rhode Island and Massachusetts to fund the water quality monitoring programs. There are a lot of water quality monitoring coordinators who are paid out of that. Well actually three field coordinators and the coordinator can get paid, so for the BRWA I am the only one paid out of that. We have also hired as a contractor a woman as an environmental outreach coordinator who will be manning our Stream Team effort.

Q- How are those positions funded?

A-

The NEIWPCC funds my work and the new outreach coordinator position is funded by a grant that we received by UniBank. The administrative person is paid in part by a grant from the French Foundation and from our canoe race. This is because she is responsible for membership outreach and we are also trying to get her involved with invasive species control because she has an interest in that area.

Q- How many members do you have?

A-

This past year, there were about three hundred members. It was in the annual report, I can't remember exactly but it was up near three hundred.

Q- Are most of those members involved directly, or do they just sort of send in their dues? Are they the people that are actually out volunteering?

A-

Usually it is the same fifty people who show up. A lot of people just kind of send their dues in, or they join the canoe race or something like that. We do have over a hundred people involved in that, a hundred boats, so that's about a hundred and fifty people who take part in that and pay their dues and send a check in every year. Usually it is the same people who show up for water quality monitoring also show up when they do the invasive species control work and when they do the river clean ups during the year.

Q- What are those river clean ups like?

A-

We usually have one big clean up a year and this year we did it in conjunction with the Blackstone Valley Chamber of Commerce, so we really had a lot more people to help out. The Blackstone Valley Chamber of Commerce was able to get people from other industries and other member groups involved. We had a big group there; we had several hundred people there.

Q- Is this an actual physical clean up, where people are out there pulling out tires and things like that?

A-

Oh yes, they are pretty good. We had two giant dumpsters filled by the time we were done. Well the whole area along there is a dirt road that follows the river along the old canal path and people are using it as a place to dump washing machines, refrigerators and other trash. So it was really good, we filled up these two giant dumpsters, which we initially thought were overkill. They were both piled to the top when we were done. It was pouring rain that day and we thought no one was going to show up because it was such a lousy day.

Q- How do you go about getting volunteers to join?

A-

We leave little pamphlets in libraries and places. Pamphlets like these that we leave in libraries, state park offices, and visitor's centers and places like that. People pick

them up. Plus, it is also word of mouth, people just show up. Plus when we have these volunteer things, the clean up and water quality monitoring, we send out press releases which surprisingly get a lot of people to call in. We send out post cards to people who have previously been involved, as well as all the membership stuff. We are trying to do a better job of it this year, by going out for more people. We are also going out to town conservation commissions and that sort of thing to get people involved.

Q- Are people and these town boards receptive to that?

A-

Sort of. Well they say they would be. We had to reach a lot of the con coms (conservation commissions) because we were putting in canoe access sites. We have a contract with the National Park Service to develop canoe access boat launch sites. You know public access sites to the River, and we have to go before the con coms. Usually they say "Oh yes, we are very interested in keeping track of what you guys are doing and keep us informed.". Of course we do and we never hear from them again, but then of course they are busy too with other things.

Q- What are your member's backgrounds?

A-

Many people are involved because the River is near their backyard. Some of the people work for state agencies. It is all different people; some are students and high school students who are interested in this sort of thing. It is a wide variety of people and a wide variety of ages. There is a range in ages of our volunteers. The water quality monitors that I am aware of range in age from fifteen, who go with their parents, all the way up to people who are in their seventies.

Q- Is there some kind of training before you send them out for this monitoring?

A-

We hold a class every year. This class provides information on how to do the testing. We also have a shorter remedial refresher course that we give. We try to limit the testing. We do water temperature measurements, pH tests, we measure the dissolved oxygen in the water, the turbidity, and the nutrients in the water, the phosphates and the nitrates. Those are done in the lab.

Q- Does Tammy work with that? Is all of this data compiled for each site?

A-

Well we have three labs. There is a lab at the Mass Audubon, for the head waters people. There is one at the Tri River Medical Center, which is near River Bend Farm in Uxbridge.

The data are compiled and sent to Tammy Gilpatrick, who has the data spreadsheet from this year.

Q- They must be sent to the DEP as well.

A-

They do go to the DEP and they can also be found on the Coalition website. You can go to their website and go to water quality monitoring they have a map of the Blackstone. This map has all of the water quality monitoring sites. Go to their website go to water quality monitoring and they will have a map of the Blackstone all the way down to Providence and there is a map of all the water quality monitoring sites and if you click on each site you can get all of last year's data.

Q- Now does this information go to the DEP and do they use it?

A-

Yeah actually, they do use it. I was surprised to hear that. We had a man from the DEP talk to us at our annual meeting and he knew about all of our sites because they don't have the people to do it themselves so they rely a lot on information they gather from non-governmental sources.

Q- Do you provide volunteers with appropriate equipment?

A-

We provide them with a kit (I should have brought one here). It's like a tackle box and it has chemicals in little bottles for dissolved oxygen has a thermometer it has a ruler as well for measuring water-depth at that location, they are supposed to pick a flat rock on the bottom of the river so they can measure the depth and come back to the same spot next year. In addition, there is a pole so they can do a grab sample out in the river. They get a plastic bottle to bring back samples to be tested for turbidity and PH.

Q- What do the stream teams do, are there any yearly events?

A-

We did a prototype stream team not this past year but the year before because we had a graduate student doing it. She obtained a full scholarship in the middle of this process and therefore left. We were able to do a prototype stream team on the Mill River, and a couple of small streams like beaver brook. She did a report on it afterward. As far as they got were shoreline surveys of the area and mostly they were looking for outflow pipes into the river. She will be coming up with an action plans for the stream teams and we will try to get people to participate. I hope that we will get some of the same people back.

Q- Do you follow the action plan that the coalition put together.

A-

Yes, we do. We were supposed to be doing water-quality monitoring and shoreline clean up and we are doing that. We were supposed to be doing stream teams as

well but this process failed. We are restarting it again. We are following it but there are some parts of the action plans that we find difficult to follow. For instance, we don't know how to go about removing sediment or if this process will ever happen. Worcester was a large industrial area and because of this there are many heavy metals in the sediments. There are also many dams along the river and the problems are as those dams break then these mill ponds drain and then the river cuts a channel through there and all of these metals start leaching into the river. As far as cleaning up the river the state of MA has done a really good job of keeping peoples septic systems clean and keeping bacteria out of the water. As far as nutrients trying to control the nutrients as well as cut down the algae levels in the water. You can fish in it now but we are trying to make it so fish can really thrive in it. We are trying to make a fishable swimmable Blackstone by 2015. Well people aren't dumping stuff in the river anymore I mean it used to be raw sewage into the river. However now it's becoming a problem because this used to be a rural area but now it's becoming a big suburban sprawl.

Q- Have there ever been any efforts to try and prevent these developments? Is there anything you can do to stop it?

A-

That's the DEP's job, they make sure that all the run-off from parking lots goes into catch basins where the water settles into the ground not directly into the river.

Q- So the organization doesn't take part in going to the conservation commission or the town and saying this shouldn't be here because it's going to pollute the river.

A-

Well people do it as individual citizens. We have not really done it as a group. We are not really all that against development. We are just trying to encourage responsible development. They are going to build shopping centers and homes no matter what we do. We recommend to people building houses to have their roof runoffs going into the ground instead of going to the street. Most of the towns around here use well water and therefore have the need for higher level of groundwater.

Q- Are there any frustrations within your organizations? Is there anything you would like to change?

A-

Well I would like to get more of the local people involved because we can always use more citizen support.

Q- Are you happy with the support you receive from the state?

A-

Well the former president is a DEP employee and we have in the past gotten grants from the Heritage Corridor. We are acting as the contractor for our river access project so we are getting paid for that.

Q- How is the river access project coming along?

A-

We have four of the nine sites approved. Four of them happened to be on state land so right now its stuck with the Department of Conservation and Recreation with their engineering people because the National Parks Service is going to pay for the work but the state has to bid it and everything. The work is going to be all contracted out. Right now there is a dirt trail going down to the river with no parking in most locations but they want this all to change. We have two that are on private land owned by Riverdale mills and he doesn't want us to use the land. Another is a piece of property that the National Park service may end up buying so that's where we stand on that. I was hoping it would be done this fall but it didn't happen. We keep trying to push them by calling them and emailing them but still it's a slow process. But overall I think we are moving along pretty well.

Brief discussion of other people we have interviewed and how they seem to have many more problems than were discussed in this interview.

Comment (Thompson)

We have lots of problems, but maybe I'm more of an optimist, maybe they're a little more pessimistic than I am. But, no, I think we're moving along pretty well.

Q- Is there anything that you would change?

A-

Yes – get more people involved – We need more people, more citizens to show up at these things. But it's like that every where, people are too busy to do this stuff. People are busy, they have two jobs or whatever, but then there are other people who do work two jobs and are really involved too.

Q- Do you do outreach to local schools?

A-

We did one this year, Julie our administrator used some time to go to a class that is using beetles to help control purple loosestrife. The Army Corps of Engineers has a program in which schools are given kits to raise beetles to be released into local wetlands, because that and the Asian water chestnuts are overgrowing most of the waterways in the area. We are working on ways to get rid of them, either through harvesting or bringing in a predator.

Q- Would you say that people know about your efforts concerning the canoe access pints? When that's all done, do you plan to advertise it?

A-

We have a newsletter (printed about 600 copies) which we send to our members, state reps, the towns in the watersheds, plus we send them out online. We try to send them out 3 times a year.

Q- How is that funded? Is it through a grant, possibly from the French Foundation, and concerning that, what is the French Foundation?

A-

The French Foundation is a small private grant which happens to be with the family of Donna Williams' husband, so we are easily able to get money from them because all she has to do is write a one page letter and they give us about \$5,000 a year. It's not like some of these grants where you have to go through the Spanish Inquisition to get anything out of them. Mostly the newsletter is paid through dues, which are \$10 for individuals, and \$25 for families. We don't raise a whole lot of money through dues, but corporate dues do have a better profit – about \$100 for them. The biggest grant we've gotten was actually from the Polyfoam Corporation which was fined for pollution, and we were able to get the money from that. That's how we funded the 2004 water quality monitoring program. This year we were able to get the NEIWPCC grant and extend it into next year.

Our newsletter is done by one of our board members – she's a technical editor, and is a stay-at-home-mother and does this for us. There is a company in Northbridge that used to print for no cost, but billed us this year, which was only about \$250. Its only 11 cents to send it out at bulk rate, but we are also working on getting more people to use e-mail which is more

Q- Are we losing water in the Blackstone valley? (question in response to an article in the newsletter we were provided with)

A-

Yes we are. We're losing ground water as a result of build-up, more impervious surfaces. Whenever it rains, it goes right into the streams and rivers and eventually ends up in Narragansett Bay, whereas it used to fall, and sink into the ground, replenishing the aquifer. We get about 44 inches of rain a year in Mass, and about ½ of that is lost in runoff. What we need to do is try to get water back into the ground, and what you have happening is that people are drawing water for their wells, and eventually there isn't going to be any water table left.

The EPA has mandated that new roadways that are built need to have catch basins and leaching beds, so that water can sink into the ground more effectively.

Q- Concerning water monitoring, do you ever have a problem with trespassing? Any opposition from abutters etc.?

A-

We only had one or 2 this year, but in general people are receptive, willing to help us. My wife and I actually run into fishermen and people using the river on occasion which gives us a chance to talk about what we're doing to other people. One of the fishermen told us about an old car that had been abandoned downstream.

Q- How do you handle state border issues?

A-

We work with the watershed association down there, because they're part of the coalition, so we all know each other. [Talked about the car, and how it took while to work between states and organizations to get anything done about it because it was right on the border.]

Talked briefly about our own personal interests in environmental topics, as well as the upcoming 30th annual canoe race.

Q- Is there anything that we should specifically look at as being an issue or emphasize in the course of our research project?

A-

We've been trying to make our groups more effective, and involve more people in them, but we also want to keep them small. We have this dilemma within our groups; Is it best to have a small group with only a few hundred members, and have a bunch of small groups so that the people feel attached to the rivers, or do you want to have this big group for the whole watershed or the whole Blackstone River which may end up becoming some type of 'bureaucratic monster' and leave the individual people feeling unconnected. That's why we've been trying to keep smaller groups that help in connecting people with the water they may have around them, for example through the Stream Teams.

We're trying to form all these groups into umbrella coalitions, so that they can actually have some political pull in the state. One of the problems is that the river is in two states, and more or less, the people downstream don't care about what is happening up in Worcester whereas the people living in Worcester don't care about what is happening all the way to the bay. What we would like to do is to group these people into a coalition so that they can still keep that 'touchy feely' relationship with the river, but at the same time have their voice heard. That's the only way to get politicians to hear you. So we'd like to have the political clout of a large organization but keep the smallness of the original group.

Section 8: Connecticut DEP

Friday, December 2, 2005; 9am

Interviewee: Eric Thompson

By: Shawna Martinelli, Joy Trahan-Liptak, and Kombosi Bosunga
Worcester, Massachusetts

Q- Before we begin with more specific questions pertaining to our research, we would like to ask your organization does and your role within it?

A-

First of all, I work, as you said, as a watershed coordinator assigned for the Thames River Basin, which also includes two other river basins in south eastern Connecticut along the shore line. I am one of five full time positions that were created back in 1998 to help evolve the watershed management program into a broader and more holistic resource management program within our bureau of water management. I have been in this position for that length of time – 6 years. The five positions do have one full-time supervisor and we are nested, within this bureau of water management, which covers a wide range of water issues, regulatory, enforcement, etc. Our program is within 1/3 of that overall bureau that is referred to as the “planning as the standards division”. We deal with a lot of planning issues and water quality standards. Part of my role is to be a liaison within the water bureaus of the multiple programs to provide a kind of information clearing house, factual information, kind of a repository for reports and publications that deal with water issues within my basin area. I am a representative in both the agency as well as a liaison to a lot of external partnerships who are either agencies or NGOs outside of our state government that deals with issues we are involved with. I work both internally and externally within our bureau.

I’d like to point out that our watershed positions really do address watershed issues, but we report within the water bureau. We don’t have a full overriding position that goes into other bureaus like waste or land management or other areas, although I do have relationships with those other programs, but most of my the things I work on do focus specifically within our water bureau.

Q- How similar are the DEP procedures concerning watersheds within Connecticut to those in the Massachusetts DEP?

A-

I’m not sure if I can answer that well. I know Terry and Warren well because of our overlap across the issues of the French and Quinebaug River, but I cannot really relate what we do here to what they’ve set up in the central region. I am the only person for my entire quarter of the state - Eastern Connecticut. There are four other people who do the same thing as me, and we work as a team assigned to five geographic regions of Connecticut, which is understandably much smaller than Massachusetts. We really only have one person – there are no other staff affiliated with us. What we do is basically out of our own desk, but we do try to pull together resources, technical funding, and administrative resources from other parts of our agency and we try to leverage that

through grant and loan programs with towns and NGOs. We probably have some differences; for instance, I know that Terry and Warren deal largely with the smart water quality monitoring work. In my position, I don't do any technical resource or inventory work, so I don't do any water quality monitoring work at all. I am not involved with the biannual water quality assessment project 303(b) assessment work, which I know [Terry and Warren] are. However, I do have a relationship with that program which is actually nested within a small division – the planning division, but they wear that hat. I don't do any TMDL work or toxicity, but I do work with those programs. You can probably figure out from that simple answer how that may be different or similar to Massachusetts.

Q- Can you speak about the water quality-monitoring program in Connecticut? Is it different from the Massachusetts one? Who gathers the information on water quality monitoring?

A-

First of all, our monitoring assessment program within our water bureau, like Massachusetts perhaps, has evolved over time and is now in transition to another potential framework, which I am not familiar with, although it's in the process of being approved at this point. I can't really forecast on what it's going to do. However, I will say that – if this helps you – similar to our watershed management program, there is a monitoring and assessment team, and we have a full program with several dedicated staff and dedicated supervisors. They collect their data, which is a combination of a rotating basin approach that is not that different of the Massachusetts on one level. They are focusing on a particular drainage system on our state on a five year basis. They come back into a basin for relatively intensive monitoring and then assessment reviews. That has changed in the last couple of years where, based on some EPA requirements, probably just like in Massachusetts, we modified that to try to cover a lot more of the water bodies across the state of Connecticut to be assessed on a full basis. I think that our new monitoring program will be kind of a hybrid of the two of those – we are supposed to be rolling it out sometime in 2006.

The program that collects and analyses that information does issue the biannual report to congress – what we refer to as the 303 (b) report. That group works closely with an additional group that takes the subset of water bodies that are listed as impaired and creates what we refer to as the 303 (d) list. We have this relationship between the monitoring and assessment people and the other group of people that deal with that small subset list, but again we are all working within the same division, so we share data, and input, we review proposals and look at the final listings, and then we all work toward implementing strategies including funding grants and loan programs to address whether they are impaired water bodies or whether they are fully supporting water bodies.

Q- How do you interact with other watershed management entities, as in the case of the French and Quinebaug Rivers, which cross state boundaries? How do you deal with these cross boundary issues regarding watersheds?

A-

On a basic level we exchange our monitoring assessment data with those other agencies, which of course is available electronically. On a New England, region-wide

basis through the EPA and through the New England region entity known as the NEIWPCC, I think our respective state agencies people are working, or at least collaborating on a lot of different program levels. There is a good web of relationships between the agencies and between states. There are also interstate compacts, and informal relationships that have been worked on for a number of years. So, between Massachusetts and Connecticut, we haven't done anything new in the last couple of years that I'm familiar with in the basins you're asking about. One thing that may be a little bit different is that we are trying to correspond more frequently with my counterparts in Massachusetts with issues with the French and Quinebaug. When Massachusetts did have their watershed initiative program, the French and Quinebaug basin team was formed by Massachusetts staff, and I was one of the Connecticut representatives to that basin team. For the two or three years that I was involved, there was somewhat more of a formal relationship that way, which I don't think existed before then, but as you know by now, that whole thing has been completely dismantled, and there is, in that particular basin, as far as I know, no continuing broad watershed initiative from Massachusetts, so that relationship level has broken down, and where I can try to catch communications, data sharing, even some pilot projects that Terry may or may not have mentioned to you... there isn't as formal or as close as a communication as we had a few years back.

Q- Is there any particular information concerning the French and Quinebaug River?

A-

I will mention two things. In the Quinebaug River Basin, in 1997, there was a diversion permit request by Millennium Power Partners, in Charlton, Massachusetts. They brought up water from the Quinebaug River to cool down their energy production plant.

(Discussion as to why we haven't heard about this yet – due to the fact that there are very few people involved with the Quinebaug)

This private development, which was a power generating company known as Millennium Power needed a wet cooling tower, and needed to divert up to 3 CFS out of the Quinebaug River in the Charlton, Sturbridge, and Southbridge area. Through existing federal and state permitting requirements, Connecticut found out essentially at the 11th hour that both Federal Army Corp of Engineers, with what is called the section 404 permit, and Massachusetts DEP, which would issue the state water quality certificate; the 401, were about to issue those respective permits with some conditions. Connecticut felt that, when we learned about this late, that agencies were not taking into consideration the potential impact to water quality standards once the Quinebaug River flowed into Connecticut downstream. So, through some very late discussion, an agreement was reached between the major parties of Millennium, the US Fish and Wildlife service, EPA, and Connecticut DEP, that kicks in a multi-year set of water quality studies, most of which took place in the Massachusetts part of the Quinebaug; however part of that study included the section in Connecticut, in the area of West Thompson Lake. That study area, which we referred to in this project as "Phase One" had a focus, or a series of focus

areas, on very intense in-stream and habitat studies, and the final reports were just issued after more than 5 years. They are available in hard and electronic copy. You can find executive summaries, or maybe contact the researchers to get into it more, but you would learn quite a bit about water quantity, flow issues which are a very intricate focus of why these studies were held, because the bottom-line permit, or request for diverting water from the Quinebaug would have, in some people's opinions, lowered the flow at inopportune times, which would have affected water quality down here in Connecticut. So we collectively now know a tremendous amount more about flow, flow regimens, and how especially fish communities respond to those in the Quinebaug, not only in Massachusetts, but also in Connecticut. A lot of that reporting is available through a researcher at UMass. If you search for "forever wild" you should find postings of the technical reports there. Phase One is finishing up now, in fact we just had a meeting Thursday. There is a management team now which reviews and discusses the ongoing research, and we are now charged with transitioning into a "Phase Two" where a set of money is supposed to be set aside by Millennium to fund projects that will implement the recommendations from Phase One. That implementation will be very interesting for your team to look at because it will (depending on what the management team decides) in the next few months highlight what is wrong in the river system, what could be corrected, and what needs to be prioritized in order for it to be protected. There are some blinders to that research – it does not truly look at full watershed issues like flooding, riparian corridors, or habitat restoration, however some of those issues are related to what is being looked at. Right now, as far as I know, that is one of the 2 major pieces of research going on in the whole Quinebaug River system.

The second piece is that here in Connecticut our biannual water quality assessments, or so-called 305(b) listing and its subset of impaired water bodies has for a number of years identified nutrient enrichment as an issue that relates to subsequent problems that are affecting the designated uses in essentially the entire river system in Connecticut, and with the French River in Massachusetts, in addition to the other tributaries all the way down to where the Quinebaug eventually flows into the Thames down in Norwich. Because of the work that has been done over a number of years, we have decided that this is a very complicated system, we have the nutrient issue, flow issues because of the number of impoundments controlled by the Army Corps, hydro plants, agriculture base which may be contributing nutrient sources, there are some urban pockets that are causing run-off issues... the complicated system can probably not be dealt with through one or two small projects which tend to be the focus of TMDL work elsewhere. We have decided to look at this in a pretty much system-wide basis, which is causing a lot of gray hairs for a lot of people. It's not easy, and it's going to take a long time, but people are looking for more immediate results which are not going to happen. That being said, Connecticut is going to try to focus, for a couple of years at least, a small amount of funding we have – both state and federal – to cobble together a set of prioritized investigations to find out nutrient loading concentrations in streams, looking at historic nutrient trends in the upper French system, and trying to figure out, based on what we understand for management, why this works the way it does, and what we can try to do to improve some of the impairments so we can bring back some of the designated uses.

So, Connecticut has worked very closely for a number of years with the USGS here in Connecticut, and they just recently submitted through a grant contract, a report to us called the Thames Science Plan. I can send you a web link for the report. From a scientific perspective, the federal agency is giving the Connecticut DEP a suggested framework for pursuing fairly specific investigations both in the fresh water part of the Thames Basin and the estuarine part. Information through these studies will give us, as a regulatory agency, the information we need to know to develop TMDLs and other management strategies to restore these water bodies that are impaired. There is a fairly lengthy report with flow charts, and color graphs so that something like your team could read through some of the information and get a sense of the hierarchy of what we think we need to know, and the short, mid, and long-term goals, as well as the kinds of investigations that agency feels we need to do first in order to build up the knowledge base to then start some management actions, look at how the response in the watershed occurs, and then change our management strategies in terms of funding, and what the data is showing us. I think that report which is truly based on the Quinebaug and the French and the upper Thames is probably something your group would be interested in looking at. I will say that it has been submitted to us, and we have approved it, but we don't have our state agency's blanked approval, so that's not necessarily going to be our template to follow. We are reviewing it internally, and believe that there are good quality pieces that we actually have been pursuing already for the last 3 years, including funding USGS and some other work at West Thompson Lake which is the 1st priority-discrete area that we are studying, which is identified in this report, and it happens to be the first major water body that is receiving Quinebaug water from Massachusetts. That is something that might be of interest because we are fairly frequently sharing the available information from these studies with our Massachusetts counterparts in DEP. We're also sharing it with Army Corps of Engineers, and other stakeholders, even though the data hasn't been fully accepted. This is the area we are kind of incrementally trying to develop a watershed prospective of what is going on and the tough parts will include looking at the permits that both Massachusetts and Connecticut are issuing for waste water discharges, those are the things that will require knowledge to be available well in advance of asking some of the hard questions, so at least we are sharing that data right now. So I think collectively we are trying to build up a watershed view of what is happening, and what Connecticut is doing on the Quinebaug, which is by far quite a high priority right now as far as watershed pursuits in the entire state of Connecticut – its one of the focus areas – and the fact that Massachusetts has benefited from this Phase One from the Millennium Project, along with other studies, I would think those are two big pieces that show on a current level what we're working on in that basin.

Discussion of internet links to be sent, NEIWPC, DLARP...

I can't speak for the other Massachusetts basins that you're looking at, but here in the Quinebaug and the French we have really complicated water management overlaps between the Army Corps of Engineers with flood control projects, relatively small hydropower projects that are sometimes peaking??? operations that environmentally really throw off appropriate flows for systems for fish and other wildlife in the river, and all kinds of other issues. We have a federal, state, and local matrix of a lot of different

agencies, we also have a lot of interesting, nearly 300 year old history and culture of how we collected, impounded, and utilized water in the French/Quinebaug Basin. That's not unlike other basins in Massachusetts, but with that as a backdrop, along with the more current flood control, hydropower stuff, and major changes in how the public is demanding water on a special and temporal level, things have really changed in New England in the past 30 to 40 years away from manufacturing and the way we discharged raw waste water. People have a lot of in-stream needs, whether it's for fishing, boating, recreation-type needs, golf courses, or a variety of other factors which have greatly changed the landscape, and how people demand water. Sometimes, in these two basins you have situations where people have traditionally stored water and extracted water, and they aren't necessarily in the places people live anymore. With the population spreading out into what were once rural areas, we now have problems with distributing water away from the centralized areas into the areas that used to not need water. This is one of the contemporary issues that we have to deal with, and is obviously not limited to the French/Quinebaug.

Q- Is the funding for the Millennium study at all similar to the SEPs that we have in Massachusetts?

A-

No, there was no SEP involved with the project. There was a legal agreement developed prior to that point, between Millennium Power and some of the state and federal agencies. The agreement was that Millennium would set aside up to \$1 million to use for the Phase One study. In phase two they are supposed to set aside up to \$3 million for implementation work. I can say that phase one is essentially complete, and they have spent the million dollars, and we are now going to be expecting the payment for phase two and the management team is just starting to grasp the reality of what details and administration is going to take place – who will hold the money once Millennium pays it, how that money will be attached to particular priority projects. This will take probably a few to several years for phase two to play out.

It sounds like a lot of money, but I can tell you that there was some excellent academic work in this first phase that cost a lot of money. In phase two that 3 million will be used in chunks over the next several years. Any kind of implementation work is included, such as dam removal, permitting, removing sediments from behind these dams, possibly some fish passages. Although 3 million sounds like a lot, that money could quickly be erased. There is a hierarchy of 5 different types of projects that really should be prioritized. That may be a good thing for you to get a one-page idea of what we think is most important in this basin, due to the impact or potential impact of Millennium. The first one is essentially restoration of natural flow, which will apparently not be possible. The water does not really exist in the basin anymore to augment low-flow periods without causing pretty extensive social and cultural impacts because housing has been built around impoundments in the watershed, and these people do not want the water bodies to be dried up during the summertime to provide better flow in the main stem of the Quinebaug. So although academically on paper, we could find the gallons of water per minute we need to remedy the low-flow issues, in reality its not going to be socially

and politically acceptable. So we need to look at some other types of high priority strategies which we are basically going to tweak with the low-flow problem that we have and that's where we're really developing the gray hairs trying to figure out what we're going to do with all that. That's what water resource management is all about!

Q- How does the Connecticut DEP deal with other organizations involved with watershed management, if at all?

A-

To some extent, we do have the same relationship as Massachusetts DEP does with grass roots organizations; however we have not had a top-down, agency bureaucracy support for what Massachusetts did a few years back with their watershed initiative. We don't have that kind of consistent, helpful state agency/grassroots relationship, or data assessment, or true watershed work on a state-wide basis. I will say however that there are some examples in Connecticut where what you just mentioned like the Blackstone is somewhat in place. When the watershed management program started here in 1997/6 there were 2-3 initiatives started up, one in the basin called the Norwalk which is in southwestern Connecticut. Another basin in the south-central part, known as the Quinnipiac in the New Haven area, and there were 1 or 2 other basins in the state including, on a much lesser extent, the Thames River Basin, where some state agencies, as in DEP staff and programs, and some other agencies made some commitment with the EPA and NRCS (Natural Resource Conservation Service) to get a partnership developed in each of those basins to do some watershed planning and to hopefully build some capacity for some local efforts to continue. There were varying levels of success in each of those, and certainly we have some very good lessons-learned reports from some of them. A couple of those continue today, evolving into kind of a different makeup. The DEP with our really limited resources hasn't continued with our intensive involvement as we did those first couple of years, but our watershed coordinators and some other staff here still do work with those grassroots organizations, or with the partnership in those areas. We are trying to learn as much as we can from them and where they seem to work for our purposes for the watershed. We're trying to encourage those be replicated with locally based changes in many other parts of the state, but I can't say that we have significant funding for staff or technical resources on a really coordinated level. We would like to, but we are doing what we can. I think in the next couple of years we'll probably go to another level of...

TECHNICAL ISSUES – The conservation was cut here due to a glitch with the phone, however no substantial information was lost.

Q~ How important would you say that watersheds are to the Connecticut government? Is funding on a watershed level a priority?

A-

The funding piece is certainly not there as a priority for watershed-based management and planning work. That being said, it's not really fair to judge clearly, and make an exact point that Connecticut doesn't hear about watersheds. There are many

other places in state government where we do have a priority policy, and implementation strategies that do make watershed scale planning and management work a priority. One way to point that out is here in Connecticut every 5 years we have a super-state agency – in Massachusetts it would be like the EOE, here in Connecticut it is referred to as the Office of Policy and Management; it's a broad, almost governor-level cabinet position – essentially what happens is that every 5 years they produce a document referred to as the Policy and Plan for Conservation and Development (plan of conservation and development) that rolls out policies and planning strategies on a five year basis. It's been issued every five years for the past 20 or so years, so about 4 versions have come out. The most current adopted version came out about a half year ago. The first major progression that that document has made is looking at growth management on a broader integrated approach. There are a lot of different programs at the state levels. One of the guiding principles in that growth management document does try to encourage watershed based planning framework to be used for natural resource and environmental concern issues, and I think that with time the implementation and the strategies that it plays out probably highlight the state's priority in that work, but currently I can't say that we have a dedicated funding stream that will implement that type of work as a high priority as compared with some other work.

Although we don't have the finding and technical work, and high priority basin-wide approach that we'd like in some cases, I think there are a lot of different pieces that have been worked on whether it be water quality monitoring on a basin approach, whether it's looking at some water resource management on a basin approach. Here in Connecticut one of our really important issues right now that have been required by our general assembly at the governor's level is to develop a new set of stream-flow regulations which will need to be addressed at essentially a basin-wide approach. This is probably one of the very top priorities in our department for any issue. We have eleven months to develop these regulations that our agency will be involved in implementing. I think that kind of through the back door, in a year or so we will start to see water allocation and in-stream regulation, which are part of watershed management, become more of a priority in some of the work, and perhaps that will translate to funding and some implementation strategies; however right now we are trying to establish some regulations and those will be followed by some river basin screening work, and then we will be looking at potentially changing diversion permits, discharge permits, reallocation of funding in technical work for either watershed protection or restoration work. I see that happening probably in the next several years, so I think we are at the cusp of a new approach.

Q- Are there action plans for every watershed placed on the 303(d) list in Connecticut?

A-

No, there are not. In Connecticut we didn't have funding for that, and it wasn't a priority. We didn't even have a requirement or a mandate to pursue that. The basin set-up is different from Massachusetts, in that where Massachusetts has 27/8 watersheds, we have 44 basins, and we can't even begin to scratch the surface on the highest priority ones, which we are doing. We think at some level that watershed resource management work really has to be done at a minimum on a sub-basin level, so we kick that number up

to about 150 sub-regional levels, so we just don't have the mechanism in place for handling all of those sub-regions. What we can do, and what we are doing, is try to build capacity at the local level for local partnerships and alliances to develop at a regional or possibly sub-regional level, and as a state agency we hope to kind of stick onto the local works, support them with mini-grants, technical packages, maybe some sort of interface where we can coordinate permitting, enforcement, planning, implementation, policy work. We're trying to do that, but we have a lot of work ahead of us. I think we are going to rely, in the foreseeable future, on a lot of locally developed work, which frankly, like Massachusetts, Connecticut has a very strong home-rule environment for legislation and governing on the local level. There are a lot of things that at the state level we do not have any opportunity to pursue for watershed-based planning that would be truly effective on the ground. Most environmental decision making really happens within each of the 169 towns in Connecticut, so with the limited resources and efficiency, we are trying to promote training, education, and outreach to those local towns. We're trying to make sure that local towns look outside their political boundaries at a watershed scale, and we're moving ahead in that area. There is a state-wide entity, the Rivers Alliance of Connecticut that is supporting a lot of that work and doing things that frankly we can't do. We support Rivers Alliance with some grants, and they redistribute the funds. That's one approach that we're working on. Some of those are developing action plans, which was your question, but I would say that if I had to count action plans on a basin level in Connecticut, I would say there are only about 6 or 8 of them.

Both of our states are responding to federal requirements because the great majority of water management focus, or mandates here in this department, are based on the Federal Clean Water Act, and a lot of that financial support, as well as requirements – reporting or program priorities are based on federal EPA requirements and/or guidance, and in that respect, in the last few years, there have been changes that basically sets the tone of how we pursue funds through the clean water act, basin work, and action plans. The EPA has a template of watershed based plans that have the so-called nine basic elements listed as what we refer to as items A-I. There is a planning document that came out around 2004 that really is, for our limited federal funding for watershed work (which tends to be for impaired water bodies) that is administratively driving watershed management action plans. So the format that they turn out will have that basis to them. We're trying to broaden and improve some of those basic EPA guidance bullets, but the funding that we get really has to address those, so we're being somewhat restricted in some of the approaches we would like to take, but we're also trying (and we are) advocating very strongly, for some other approaches for some other amendments to the federal requirement, and where we can find funds, we think a lot of that can be done at the local level. We'll just have to keep plugging away and see how it all works out. The first success stories, or the so-called management or action plans that are locally developed and supported and have true ability to be implemented we're going to push those as much as possible, not caring that our agency won't be the top author on those, and frankly that's not what we're interested in doing. Similar to Massachusetts, communities and state agencies being in challenging financial times, we have to figure out the best way to pull that off with the diminishing resources that we have available.

Q~ If you could change anything within the current practices and procedures, what would you change?

A-

Ideally it would be fundamental for any success for watershed based work to work locally with state and federal guidance that would be sustainable between the local and state relationships that we have. The significant change would be that local communities that are probably here for the foreseeable future (I don't see any major change in local governments are addressed in the state), ideally it would be good to have a regional approach to a lot of the work we are trying to do, especially where water resource management is involved. Ideally that would not necessarily be done by state regulations, but by the local understanding that everyone lives in the watershed and the water resource issues for the most part, including most ground water issues, occur in a watershed frame, and it's a framework in which locals could be more efficient with their resources rather than compete with adjacent towns for property taxes or development patterns, or land acquisition efforts, but working regionally within the watershed would really get a lot further for the resources we have and ultimately the local natural resources would be improved by that. I think some places that is already in the works, but we have a lot more to go. A regional approach would be an ideal world, and it might even be somewhere obtainable. There are other parts of the country that do it, but here in Connecticut and southern NE it's a pretty tough thing to fight.

Section 9: Blackstone Headwaters Coalition

Friday, December 7, 2005; 10am

Interviewee: Peter Coffin

By: Dan Bylund, Joy Trahan-Liptak, and Shawna Martinelli

Mass Audubon's Broad Meadow Brook Conservation Center and Wildlife Sanctuary

Worcester, MA

Discussion began concerning the interviews we have been doing and what exactly our project is about, as well as what we have found through our data collection so far. This included the feeling that watershed groups are not necessarily the problem with a lack of management and that the state/federal agencies may have more to do with issues concerning watersheds.

A-

We can argue it in both ways. It was set for the state and they funded it and they staffed it, and each one of the watersheds, I bet has an action plan that was done, a five year plan; you know, the first year was gathering the data, the second interpreting, and the third assessment, and the fourth kind of planning, and the fifth is supposed to be implementing. All of this is supposed to be on a cycle. So I bet each one of the watersheds went through those first five years.

Brief discussion about this not being the case for all the watersheds in MA, specifically the French-Quinebaug.

A-

Lynn Welsh used to be the coordinator for the Blackstone, and she still works for the DEP. Anyway, that's kind of like the background, who's is responsibility it is to do watershed management. It is being recommended from the top down, EPA, federal with the Clean Water Act that's the legislation that our rivers shall be fishable and swimmable, well how are we going to get there? Let's break it down into smaller things. They have a lot of programs such as permitting, discharges, they really cranked down on that and have gone about as far as they can on that, but are still pushing. What they are finding out is, in order to reach that level, you have to do more than just tighten up industrial discharges and the permit, you have to have non-point source regulation, and you have to implement things in the ground to clean it up, which takes big bucks. So who's going to do it? So the EPA pushes it to the state: "it's your job, you're the one responsible for setting the standards. So 10 or 8 years ago, the state geared up for this watershed initiative and brought in this five year cycle and one of the problems was, that this was done on the state wide level by the Executive Office of Environmental Affairs, which is more than just DEP; it's parks, roads and high-ways and to really do watershed plans you've have to be looking at that whole holistic view - where you're going to grow, where you're going to develop, where you're going to spend your money, where is your infrastructure? They in essence took the responsibility from DEP, which had always looked at watersheds from a water quality prospective, and had teams set up to analyze it, they said no we're going to do watershed by watershed. They took out some of the best people and assigned them to watershed management so the DEP which is getting cut from staff, it's their job, but water quality is being taken over by this larger bureaucracy, so yeah we will work with you, but there was never a 'working together' relationship, because of limited resources, and limited staff. Then when the watershed initiative

doesn't get funded after working for five or six years, a lot of that staff go back, but they're burnt because they have this big opportunity with lots of responsibilities, but now they are stuck back in the bureaucracy and other people are in charge. So I think that there is kind of some bad blood there as a result – a little frustration. That's this kind of general background. That's my perception of why the watershed initiative didn't really take off. Now in each watershed some were very successful; for instance, the Charles River has always been pointed to as being a very successful watershed association, as well they are. And it's a function of money and who the people are. It's a very high profile area, and a lot of people are using that river for recreational purposes. They are using Boston Harbor to get rid of their sewage. The EPA said "no you can't do that" they had to spend megabucks to pump it out further, they began looking at fixing up the city... so that organization has been around for 20/30 years, they got a dynamic leader, they got staff, they're doing more water quality testing, well they are doing everything right, so they continue getting funding, they get grant money so everybody wants to be the Charles. But everybody doesn't have Boston, Harvard, MIT, etc. People aren't using the other rivers as much. So that has been a major challenge for the Blackstone.

The challenge in the Blackstone is it's an industrial corridor, it is an industrial river, it's the birth place of the industrial revolution...so the bad side of that is that it was abused for many years, and people living around it - they got use to it not being a nice resource. They would never think of swimming in it, fishing in it, they know better etc. As of 30 years ago that was kind of the perception, and Worcester is a great example of that, that's again why the Blackstone is different, because there is usually a big city at the bottom of the river. The water comes in and by the time it hits the city there is a lot of water in the river and it can dilute the pollution that the city generates and usually it goes into the ocean. Big cities that are right there, like New York, Philadelphia, Boston, New Orleans, and Los Angeles - there is a reason why they are by the coasts – not only because of trade, but they have the added benefit of getting rid of their pollution. But the Blackstone is very small. It starts in Worcester, which is a big city, so it has a greater impact on the streams and the river. It is unusual that a river starts off dirty and then ends up clean, but that is what happens with the Blackstone. In summer, Worcester's treatment plant is about 70-80% of the river's flow, so the water quality is only as good as the treatment plant. The good news however is that the treatment plant does a pretty good job. By the time it leaves Massachusetts, as other major tributaries come in [to the river] it has gotten fairly cleaner. Then it hits Woonsocket and another treatment plant, and goes through an industrial corridor in RI in Pawtucket, and enters the Upper Narragansett, but it doesn't hit Providence, so it doesn't get the major attention from RI because it doesn't hit the big city. The Blackstone is more on the back side – the industrial port towns of RI, so it doesn't get that big interest from RI.

The other major concern for the Blackstone when you try to develop a management plan is all the dams along the river, and behind all the dams are the contaminated sediments from generations of industrial uses. So even if the water was crystal clear coming out of Worcester, what are you going to do about all those sediments? No one has any idea. Cleaning those up is going to cost big, big money. So the solution is that there's nasty stuff behind those dams, but there hasn't been new nastiness for about 30 years, so the sediment that is covering now is pretty clean. So what you have is the contaminated sediments getting capped by the new, and they are best left alone. The problem is that there is still moving water and channels being carved into that sediment, and those contaminants leak out a little at a time. You can do all this water quality

testing – and they have on the Blackstone; dry weather, wet weather, involving people from URI, color/3D graphs – and you can see the slug of pollution that goes down the river in wet weather, and the general hypothesis is that pollution is coming off of the streets of Worcester through non-point source pollution. But looking at the model, some of that may be re-suspended heavy metals, and we really don't know what percentage of that is coming from the streets and what is coming up from the bottom of the river. The science isn't necessarily there yet – you have to look at it in more detail, and no one has really done that. So that is one caveat to the model – they don't know the portion of recent sediment contamination. What is the answer to that? No one really knows.

From a watershed management perspective, you have to set your goals – what are you standards? What are you managing it for? Are you managing it for a fishable, swimmable, or drinkable? Not going to be class A it's supposed to be Class B, Fishable Swimmable. We've gotten hung up on those standards, what exactly does fishable swimmable mean? From the DEP's perspective it means can you eat the fish, and swim in the river. I'm trying to push fishable for more than just eating the fish; because you're not really supposed to eat any fish anywhere even up in the Adirondacks because of mercury and other heavy metals. My issue is that there should be a healthy population of fish, you should be able to catch fish, and that there is a desire to fish and that the river smells right and you wouldn't mind getting into the river, but is that fishable and is that swimmable? Well, swimmable they look at *E. coli* and fecal coliforms and they look at sometimes turbidity they should be able to see because if somebody is drowning you want to be able to see them. More parameters include a healthy biota, and states have never set nutrient standards, and this has been a big issue with the Blackstone and its getting pushed nationwide everywhere because there are more and more nutrients from point-sources and non-point-sources that's washing down the rivers and into the oceans and in shallow bays this has become a problem. Too many nutrients are having an affect on sea life in these shallow bays. This is an issue that is being pushed from the federal level. It's sort of like global warming no one can point to one factor and it will cost a lot of money but its getting there. As they building these models and are starting to set standards for these nutrients. Scientists are telling us that this low oxygen problem is caused by too many nutrients. I was always led to believe that in a salt water environment nitrate is the limiting pollutant, not enough oxygen is a function of too much plant life and too much plant life is caused by too many nutrients. Only limiting factor for plant life in water is nutrients because there is plenty of water and plenty of sunlight. In the saltwater it's usually nitrate that is the problem, but in freshwater phosphorus is the limiting factor. So if you want to reduce plant life in freshwater ponds don't worry about nitrate, but concentrate on the phosphorus, as the plants grow and die off they rob the oxygen. Well now they are saying sometimes phosphorus can be the limiting factor in salt water and nitrate can sometimes be the limiting factor in freshwater. So they really have to look at both science is really quite there yet to say it's got to be x y and z. That's the way the law is set up bureaucratically you set up these standards, fishable swimmable, and then its up to the state to say well to achieve this standards according to the models we can only have a certain amount of nitrate, phosphate and whatever and that's supposed to tell the permits ok they have to do a waste load allocation they have to say ok to avoid eutrophic in this body it can only take so many pounds of phosphates and then they determine where this phosphate is coming from and then they allot so much to come from sewage treatment plants and from not point source pollutions and this is the waste load allocation which is supposed to drive these permits. That's why the regulators can only point to the

permits, they can't say: "ok town of Lincoln, you have to limit the amount of phosphate coming off your streets because there is no measure for this and there is no permit." So there is an opportunity there. I have heard that in the Nashua River, EPA encouraged them to do some trade-offs. Rather than telling the city of Nashua now you have to go to the next level of treatments which is going to cost millions of dollars, if you can show more than a 1 to 1 more like a 2 to 1 you can take half that money and do some other improvements to reduce phosphorous by doing some off site improvements or maybe some farming improvements that they would allow the city to do that.

For me that's the framework, if the science is good enough and the modeling that you should be more cost efficient by finding the biggest bang for your buck. So if you can define alright the problem is phosphorous first you have to find where the phosphorous is coming from and then you need to crack down on the easiest source to tackle. The problem is there is no money or no budget to do this so the perimeters continue to just crank down on the biggest and obvious which are the waste treatment plants but I think they are going to hit there limit. Even if the upper Blackstone takes out all there phosphorous they may find that there is still a lot of phosphorous just sitting behind all of the dams that it's not going to solve the problem in upper Narragansett Bay.

But what does a non-profit group do? Well you do a lot of things, you try and keep the state encouraged in continuing what they are doing, to be a watchdog of the permits that are out there, and then try and do what everyone talks about but knows its hard to do, the public education those non-point sources maybe it's a little bit here but if you get a lot of people to do a little bit that's a significant amount but how can you show that you actually did it and achieved it and documented it and to prove so many pounds of phosphorus was removed because I tell school children not the wash their car on the pavement. Its kind of tough to get funding because they want engineers to figure out the best management practice and figure out how many pounds of phosphorus are removed so the scientists there are doing extended detention ponds, but you can't build a big enough detention ponds they need to build thousands of little detention ponds. The opportunity lies in new construction to have them do this, but usually detention ponds are usually for flooding purposes but no one really looks at this from a water quality perspective. It could be the conservation commission if they wanted to because it does impact the water quality but it's new to them, and they are not scientists and engineers and the developers don't want to do anything they don't have to.

Great case study in Worcester is Salisbury pond. When I heard about you doing this project I thought maybe I could use this to reenergize the Salisbury pond task force because someone who had my position like five years ago wrote a good grant to install sediment controls in Salisbury pond and they got 250,000 and matched by the state 300 400 thousand. That wasn't enough money for the settling pond that needed to be of a certain size to handle everything that comes into the twin culverts, because upstream of Salisbury pond there is a fairly significant watershed, one is Kendrick and one is Weasel brook and that's basically all of what Norton's is now. So basically it's the whole northern third of the city. So the city joined and wrote this grant and then they sent it to the engineers and they said that in order to handle that amount of water coming in you would need a detention pond so big, well they don't have an area big enough, but lets do it anyway but it turned out to be more money then what they had. Ok well

let's use the money to design the settling pond plan and then use the rest of the money to install vortex separators at the entrances. These vortex separators are only going to slow down the rate of sediments. Its already filled in it was dredged 15-20 years ago and now it needs to be re-dredged no one is going to want to re-dredge it every 15 years. If you could tell people we got a handle on the new sediments coming in lets dredge it out. WPI can have its tug of war over part of the pond again. Ponds should be fishable swimable. I'd like to think that Salisbury pond is important enough to the city of Worcester to make it fishable swimable. There had been the task force pulled together called Millbrook task force, and they were successful and they did what they could, but now they are kind of hanging in limbo. Well I was thinking that out of this report you could get people to keep fighting that fight, I guess that would be my recommendation to you, to focus on the mill brook it's smaller and easier to focus on. I think WPI should be a player in Salisbury Pond.

Then the other thing is that looking at Salisbury Pond as the bottom of a watershed, then looking at the area that drains to that. And then you can try to find opportunities for small retro fits, if you will, that might be more do-able, rather than looking at the whole watershed, which would be over powering. Then, one specifically, as the Blackstone Headwaters Coalition, we started out as the watch dog on the city as they had to do their storm water permits. There were only very few cities that had to do a Phase one storm water permit, Boston and Worcester among them, so the city had to do a lot of work looking at their storm water, and they did, via Joe Buckley, who works for the Department of Public Works. If you get a chance you should speak with him, he is very knowledgeable, but before you do talk to him, you should get a copy of the city's storm water plan. It is actually up for renewal, so they have to do a lot of testing. So looking at Salisbury Pond as a watershed, basically as the Millbrook watershed, up stream from that is Indian Lake, and Indian Lake has a very active and successful watershed association, and their focus is on the recreational use of Indian Lake, which has always been used for boating and swimming. So they have always been successful at getting monies for weed control and they are doing innovative stuff, so that could be just looking at that small water body, their watershed management plan because that is for a different purpose, that's for more recreation. Then there is a small stream, which comes into Indian Lake, and it comes from a small pond up near Assumption College, and there is an Armenian church near Kiver Pond there. Well near Kiver Pond, there is a little damn, but it's not operable, and it's probably leaking sediments out of that pond and that watershed, and as Assumption is proposing to put new fields, and it is up on a hill, you know there's a case study that you can go after new development. It is harder to go after new development, which is also contributing a lot of sediments. I guess the opportunity that I was thinking was that the church would like to clean up that pond, they have no money, but they own it, and they are willing to work with someone to write a grant, to help fix the damn, so you could raise and lower the water, and do what is called a draw down, which helps manage the weeds, and would also help manage the sediments. So in essence, turn Kiver Pond into a settling basin. So that is kind of a project that could be done, and your help in doing the engineering study could help write a grant to actually get that done. So that would answer your question of actually doing something. I see not only getting that grant done as a good thing, but also revitalizing people, and getting them to see that Indian Lake is part of the Millbrook watershed, and it's not just Indian Lake that is going to help, but everything that is downstream as well.

Well watershed management is a lot, and I guess we are beginning to focus more on storm water, because it has become more and more of an issue. Cities and towns are supposed to have a plan, well you can have a great plan, which is probably what you are finding is that all of these watersheds that you are looking at have great plans, but are they implemented, I don't think so.

Reference to that being one of our questions is made, which finally leads into our prepared questioning.

Q- Initially, we wanted to know what exactly your position within the organization was?

A-

The Headwaters Coalition was started by a Worcester resident who wanted to watch dog the city of Worcester as they did their storm water. She pulled together various interest groups and created this kind of informal group know as the Coalition. And the Mass Audubon was here, and the REC, Regional Environmental Council, and the hope was all these smaller watershed associations (ie. Indian Lake, there is Lake Quinsigamond Watershed Association, there is a Leesville Pond Association) and those are really the only ones trying to focus on the storm water, but also feeling that rivers and streams weren't being as well protected as they could have been in Worcester. So she was there for about three or four years, at that time I was working for a UMass extension, on funding from USDA agriculture for the Narragansett Bay estuary program, there was funding for both Rhode Island and Massachusetts to try and get a handle on, or do some innovative stuff on non-point source. So I was working in Massachusetts, my office was in Worcester, but I was focusing on the Mumford River, because it's a large watershed and I was trying to get locals to do something. But I was participating with the Coalition, and she left to go to Nebraska, they hired somebody to take her place. He worked for two years and is now working for MDC, and one of the things is that there were several sub committees, one was water quality testing, because I think as you look at the Blackstone River Initiative, they all focus on the main stem of the River. There isn't enough money to test all of the small tributaries and second and first order streams, and in the case of Worcester, those are most of the streams. It doesn't become the Blackstone until the Millbrook joins up with the Middle River, so station one was right there. Well, what happens to Tatnuck Brook? What's the water quality in the Millbrook? Nobody is testing, nobody knows, so we felt that we should start volunteer monitoring. So we got some grants, and some equipment, and volunteers, and developed a testing plant, and that has really grown and we have done pretty well on expanding that, getting better quality control, getting better equipment so that water quality has grown almost too much. But that has been our focus, on doing the testing. I'm not sure if Tammy has talked about it much that is her job principally. So that has been successful, and yes it is good to get the science and the base line data. But I am more into creating the awareness and getting the volunteers who will also be eyes and ears, and maybe go to the planning board, and get involved, and maybe become advocates for the river. That is how I desire to use the program, not just for the science, but advocacy. So my position is very much part time, it is really only 10 hours a week I have to do that. Now recently, we have written some grants, and we have expanded more than just the city of Worcester, there are opportunities at Fishersville (NAME), which is where the Blackstone and Quinsigamond River join. So basically the Worcester Head Waters has said, while it's not

just the city of Worcester, it's the upper third really, and the Quinsigamond River is a great contributor, and the river is a great source so geographically that is how we chose our boundaries. There is a redevelopment site there, so we have gotten some monies from the EPA, so we will be doing some outreach at Fisherville. So that will crank up my time to maybe half time. So it is still very much a part time job, but it allows me to keep my hand in, and to be an environmentalist, which is what I like to do. So my position is the coordinator, which means anything and everything. And it implies, it is not an executive director because this organization has the ability to do x, y and z, no, we are trying to coordinate the Tatnuck Watershed Association or the Indian Lake Watershed Association, help them do their job at the local level, but also to help them fit into the larger picture of the watershed.

Joy-

That sounds along the same lines as the reason for the French River Connection naming themselves the connection rather than something else.

Coffin-

It's this Coalition and partnership, where nobody can do one thing, and then with the watershed it's really what gets people excited. It is usually the stream in their back yard, or the pond that they use. It's not the larger river that's five miles away.

Q- Well, our next question was actually how does this work fit into the larger picture of the Blackstone?

A-

I think that it's key because Worcester is the big city, so there are more opportunities because there is more money there, or because they had to make the first step. It is also because it is the beginning of the River, so what ever improvements there are there you can get credit for them downstream, as well. And there is this identity of the Blackstone, with the Heritage Corridor, there is some pride in the region. So building on that pride of the region, that region has defined itself as a river, as a valley. So you can use that and the Nation Park Service, and there has been significant funding there, so there are opportunities to tie in the water quality. But now it becomes more along the lines of recreation, or tourism, so there is more opportunities, but it kind of gets away from the specific engineering of the water quality.

Q- How does the organization interact with other organizations?

A-

Well, now you sort of get a coalition of coalitions. We are a subset as the Headwaters, and then you take that to the whole larger picture which includes two states. So I think that it is kind of nested, so that everyone is sort of doing their own thing, but is part of this larger thing, but can still support each other, but is still doing their own local thing. There is strength when it is seen as part of this larger thing. Now you can tap the federal monies to clean up Narragansett Bay. You know, how would Indian Lake tap the big pot? You are able to use the strengths of local energies, but also tie it into the bigger picture of funding for bigger efforts.

Q-How is the organization funded?

A-

Some of our funds are similar to that of the Coalitions and the other groups within it. So there would have been funding from the Heritage Corridor, and it is easy to fund a program that you can point to as deliverable. So it has been relatively easy to get funding for the water quality testing, because you can show what you are doing. It is harder to get money for general advocacy, and to pay me to be here talking to you. Who is going to pay me for that job? I am not a teacher. So, the Greater Worcester Community Foundation helped a lot in the beginning, especially with paying this particular position's salary for two or three years. That also got funded through the MET, the Massachusetts Environmental Trust, you know the special license plates and the penalties for fines sometimes go into this big pot that can help fund special things. We have gotten some 319 monies. We have some membership, not as much as we should be focusing on. And then, the kind of interesting one is what are called SEPs (Supplemental Environmental Projects). I'm sure you have heard of those. They make the punishment suit the crime, sort of. So we were successful in getting one from the Coal Mine Brook in the upper Blackstone.

Let me just say something, because another opportunity comes to mind. The Upper Blackstone is looking at their permit being revisited, their permit from five years ago, which forced them to do major expansion, was based on this water model that was done by the Blackstone River Initiative. All the waste water treatment plants complained saying, "No, the models not accurate enough, and it's forcing us to do greater phosphorus than is really needed. We don't think it's right." So they appealed to Washington, and Washington looked at the board and said, "Yeah well there are some findings, but it is good enough to justify the permit." Well, they decided that they wanted to do their own modeling and they hired Camp, Dresser & McKey, and they are hiring water quality engineers out of UMass to develop a more sophisticated water quality model that I think that they think will help to justify their reasons why they shouldn't have to meet new expanded, more stringent permits. So you have the two states and the EPA saying that they aren't going to play that game, while Upper Blackstone is spending major money doing this model. I'm feeling that that model should come out with good stuff, people should participate in that model, and yes you can always question certain assumptions, but it is important to get educated, so that you know what the scientists and engineers are using to make those assumptions. So let's use this to educate people about the health of the river, and what the various inputs are, or could be. So, you get the regulars saying "No we don't want to get involved," well as a non-profit I can do whatever I want, as long as I can bring my board along. Those board members could also say, well you are going to get sucked in, and those engineers are going to fool you, and you will lose your credibility. But part of me says that they are our key players, and we want to work with the treatment plants and hopefully create this partnership of working with, as apposed to against.

Q- How is the community educated about the proper use of this resource? Also, how do you go about funding outreach programs? How do you promote support?

A-

There's a lot of ways that has been done. And there is this whole sort of public education, we have been encouraged to do media, and getting time on the television, and there are catchy ads, and even magazine pictures. The question is, it's money. Is that the way we should spend out money? Well, we are looking at a budget of 15 to 20 thousand dollars, and three quarters of that pays my salary. Should we be spending that? We should probably be writing grants to pay for that, but nobody wants to just do outreach. They really want to see deliverables, and some grants, there might be some grants out there, and we should probably do better at tracking those few down. The other is signage, again it costs money, but there is opportunity to get signs that say "Please don't feed the ducks." The real struggle that I find is that watersheds are a very complicated subject, but you've got to be able to put it on a bumper sticker. So you have to say, "Well what can people do?" And then we are encouraging them to do this because they can, but is that going to result in a fishable swim able? Not by itself, so it's this balance between the best use of our money, and focusing. So now our efforts are more focused on cold water fisheries and sediments. So that is something that people can do something about, and that people have a purpose, and there is regulation to tie into, and we try to focus that message.

Section 10: The Millers River Watershed Council

Wednesday, December 14, 2005; 10:30 am

Interviewee: Ivan Ussach

By: Joy Trahan-Liptak, Shawna Martinelli

Athol, MA

Q- Before we get into our research, can you define for us what it is that you and your organization do?

A-

Ok, well the watershed council has tended to rise up every time there has been a serious issue concerning the water quality, and of course I am giving you my perspective from having started a year ago. So the council hasn't really operated day in and day out, year in year out, it rises up and sort of sinks back down. About five years ago, I guess around the time of the Watershed Initiative, when a framework for all watersheds had been created (Action Plans etc.). so that initiative had gotten started in the Millers and then the watershed council was not in a very high level of activation. While another organization, the Millers River Environmental Center had been around a long time, but they never really had a home. And then five years ago the town basically leased this building, so the Millers River Environmental Center was created and became a physical space. The Bird Club and the Environmental Center kind of picked up some of the slack for the watershed council. They were there, but not in a high profile way. As of last year, the Bird Club really wanted to focus on what the bird club did. So that is when I got involved in the Watershed Council first, and technically my title is watershed coordinator. I work part time, I am paid a few hours a week by the Bird and Nature Club and the goal for the Watershed Council is to ultimately take over. I am actively promoting the watershed council now. That is unusual given it's history and is sort of a new role for the watershed council. But of course that is the more traditional role. When I was hired, I was hired specifically to control the meetings of these groups (very hard to understand the recording here). Once the watershed initiative was cut, there was no formal entity to keep that dialogue process going. The Bird Club had kind of been working to keep the momentum going, between the Bird Club and the Council. So I have been doing those two things for the past year or so.

I actually began working as a volunteer. I volunteered for a few months and like the people and what was going on here and then I was able to put time into this stuff. So I have been doing those two things and at the same time, because of my own background which was very broad in the environmental field, I was excited to be able to work locally at the watershed level. As a result, because of my natural curiosity and interest in everything, there was a lot going on in the watershed and I can't just ignore what is going on just because I'm not getting paid for it so I end up volunteering a lot of extra time. Because I am interested and aware of things going on that may affect the health of the river or are liability issues. I come from a background of thinking about and working on those things. So I am obviously interested in a lot of things beyond that finite scope. And of course people will call us up and tell us "Someone is dumping something along the road, can you come take a look at it?". It of course could be going into the water and you can't ignore that, or I guess you could. So I end up doing a lot of things.

My goal is to have a very comprehensive program where we really have people who want to be very involved with the individual municipalities and have a more formal relationship. So I am beginning my second year here and some time down the road we will hopefully have a very solid program.

Q- How do you interact with other organizations, if at all?

A-

There are many actually. This region that we focus on is the Millers River Watershed, it also corresponds with the North Quabbin region, the Quabbin Reservoir is right here. There is an association of organizations North Quabbin Regional Landscape Partnership, they are five entities, some of whom are non-profit groups some of whom are on a state and federal level. They are basically all of the groups that are working in some ways on land protection, and open space. There is a lot going on when you look at the work that all of those different groups are doing. We basically fit into that framework, so that anything we do or are interested in we eventually call the US Army Corp of engineers; Warren and Therese, I feel like they are very close allies; the people in the Mass Riverways programs; the Mount Grace Land Trust is major player; we feel very much that there is this kind of family of groups. I had been feeling like a lot of decisions are made locally, towns make their decisions without really logical thinking like "Let's start reaching out to the towns more. Let's look more on the municipal side of things." We haven't been able to make much of an impact on that just because our watershed organization is starting from almost nothing again and we are building up slowly. However, the Mount Grace Land Trust has a very large grant foundation that has identified Western Mass for protection and basically had a few million dollars to donate. The Mount Grace Land Conservation Trust was a great place to give the money to because they do great work. They are in the process of now hiring four additional staff people. One of those people, their job is going to be, for the first time, the North Quabbin Regional Landscape Partnership part of their job will be to coordinate with the towns. The focus of all of that is going to be on open space protection, but it kind of ties in with where we want to be going in terms of our thinking of submitting a grant. You can see here in a lot of the areas of the Action Plan where those kind of things are identified, but nothing is really done about it.

Q- How does this North Quabbin group meet?

A-

Since the North Quabbin Regional Landscape partnership has been an informal association for several years has been meeting approximately quarterly. They have been coordinated mostly by the Mount Grace Land Trust ... (poor recording, lost part of interview) Half of the watershed that you are involved in is in Worcester County and the other half is in Franklin County. Massachusetts doesn't use a County government, as a result of that we developed the FRCOG, the Franklin Council of Governments. Basically it is about all of the towns in Franklin County and it operates as a county, things such as organizing waste disposal, just kind of working on a 'countyish' level. So they are one of the big players in that one of the people was putting energy into and are still involved with us.

Q- You mentioned that you are paid part time, how is the Council funded, if at all?

A-

The Council has a war chest of money that it has been sitting on in it's bank account, basically that money is protected money. So technically when I came in we had no money, but early on we tried to reactivate the old membership list. There is some money coming from that and there needs to be a lot more work done to sort of mold the membership into something. So those are probably the two main sources. The Bird Club/ Environmental Center contribute, I am technically paid by them, but they are all interconnected. It's the same thing, it is a combination of small grants that have been written.

Q- Can you speak about your water quality monitoring program? Is it volunteer?

A-

It is all volunteer based. I can give you one observation that I came away with from my meeting with the other watershed groups, all of the other groups were doing quality assessments while everything we have done is more observation. What we are doing is similar to what was done during the watershed initiative, it is basically the same survey and that's called the midstream survey. We have training for that where they are looking at a segment of the river. There is also the shore line survey which we do (wasn't on the tape but I remember this part and he goes on with the third thing in the next audible sentence so im assuming its in there). The third survey we do is called the culvert survey which identifies all of the road way crossings. The fourth program that we innovated is from the idea that if there are many places throughout the watershed of interest or concern, that we should have volunteers fill out a photograph form (not sure about this name, again poor recording quality), which allows people to identify photographs from that area. While that may sound easy, it's not the easiest thing for people. They have to be able to take photographs from the four main compass angles from the exact same spot each time. But the idea is to gradually build up an extensive record of important sites in the watershed over time. Our basic approach is to encourage people to get involved and out their in their watershed and of course there is tremendous value in the information they are generating. Lastly we are working on a survey involving macro invertebrates. (also not clear...going off of what little I can understand and what I remember). One of the things I had in the piles of papers that came is his (never hear who he is) initial report. We went out and did an initial sampling run, with the DEP. Do you know what a QAPP is? So this was QAPP approved. And those monthly meetings that I mentioned, he's going to be at our next meeting presenting. That's five survey programs, and then we do have access to a hydro lab. We have a technical person who is willing to (can not hear) do the work and I have actually done some testing. So we have been able to get some level of quantitative testing going.

Q- What kind of testing do you do? Is it turbidity, pH, those kinds of things?

A-

Yes, it's just a few of the basic parameters.

So those are the kinds of things we are looking at. Well we had about 25 people come to our training; we had a very packed small room. It was very exciting, and then for various reasons a lot of people just never made it out. The actual results were less than expected. I'm still trying to get in touch with people to see what they have actually done. That is something I need to focus on. So that's important to note as we work with volunteers. I thought I had been very helpful in giving people what they needed and telling them to GO. But some people don't have confidence in going out, or for what other reasons it may be. It's a little bit frustrating, but rather than looking at it negatively I can learn from the experience.

Q- How many volunteers would you say you have?

A-

So I'd say about two dozen generally, but not all of them are doing stuff.

Q- When do you have them monitor and how frequently?

A-

The winter is obviously not a good time. We generally offer the trainings in the late second half of the Spring. The feeling was that the surveys could be done once, but that quarterly was desirable for the others. The documentation is designed to be done quarterly.

Q- How many members do you have?

A-

While the Bird and Nature Clubs work on the watershed it's not the main thing that they do, we do benefit from their membership. The Watershed Council when we had a membership list was about 80, which is not bad. But on it's own terms it needs expansion.

Q- Where does all of this information go? You mentioned the QAPP, does that mean that it will begin to go through the DEP?

A-

Initially I was thinking there would be a single data base. from the point of view of designing a data base, we basically decided that River ways has the shoreline data; we have a preliminary data base that we designed to handle that and for the macro invertebrate. But at the same time, I do think it's important for us to have some kind of a map or visual entity across the watershed where the different types of monitoring are going on. And not just the location, but also something about the kind of information that is being generated. Getting that going by 2006 is one of my goals. It's inspiring to people who see it.

Q- Aside from volunteers, is there a lot of community involvement? Do you try to raise awareness to stop non-point source pollution?

A-

That is just the kind of stuff that these work shops we have address, some of them are water quality related. The Bird and Nature Club does a ton of basic programming on a variety of

topics. The Watershed Council would like to be doing more and are looking in that direction, depending on whether or not we get that grant. Either way we are trying to do it on some level.

Q- Is this the Action Plan? (referencing document on the ground)

A-

This was the Action Plan that was basically the state initiative to develop an Action Plan. It was written with state funds I believe initially.

Q- My impression was that state funding had been cut for these kinds of things?

A-

There's still money for each watershed (NOT SURE THAT HE IS CORRET IN THIS RESPECT). I am guessing that the official body is the committee mentioned here. It says that the report was prepared by this committee with technical assistance from...if you take a look at the committee you see that they are a collection of people from towns, state agencies, and non profits.

Q- Is this very technical, because the Action Plans that we have seem are very varied?

A-

This actually is a great document, even though it is very technical, but it is also all in here and some of it is summarized. Some of it is difficult to those who are not highly technical, and it is also fairly overwhelming just because there is so much of it. Like I started reading it and taking notes and I just found myself taking so many notes that I was almost rewriting the document.

Q- When we first started we were very interested in adherence to the Action Plan, if at all. Can you speak on this for us?

A-

I was concerned initially that I wasn't going to be able to give you a good answer. A few months ago, I'm not sure how it got into my head, I must have seen or read something in reference to how the Action Plan is being implemented, it got into my head "I wonder how the Action Plan is being implemented? How can I find out?". So I called a few people who I thought might know and I kind of got "There's no one working on implementation, you guys should do it because you are the logical choice." The thing is when I looked over the initial list, and in my conversations I kind of got a sense that no body is doing anything, there is no money, nothing is being done. But the reality is that a lot of the things that are on the list, their normal mission, "They're not doing it because it's in the Action Plan. They're doing it because it's what they do." So it turns out that a lot of the stuff in the Plan is actually being worked on, in one stage or another. And I don't have a detailed break down, but we recently went through the recommendations bullet by bullet. What motivated me to do that was to see to see how it related to implementation. So Sue Clutteir, who is the director of the Environmental Center, we went through bullet by bullet, kind of quickly, and rated on a level of low, medium, high activity or nothing being done. Most of the bullets did have some level of activity. So even though there

isn't implementation being done in a coordinated way, there is implementation being done at a fairly significant level.

Comment - "We have come to see that most often that seems to be the intent of them even putting together an Action Plan, because a lot of the organizations don't necessarily sit down with the aiming to go through everything step by step, while pushing every idea. It seems like the purpose is for them to get on the same page, to be aware of their priorities and then to push in their own individual directions. They don't ever seem to pick it up and so we have to do this because it's in the Action Plan, but it got them on that common ground." S.M.

Response-

I actually feel a lot better about it now, I wasn't depressed but I was kind of like "We have no money, nothing is being done!". I sort of knew intuitively that it couldn't be quit that bad, but I was starting to think "Oh no!".

Comment- We have found that some of them really are that bad. (Conversation trails off into other examples which aren't relevant to this particular Organization.) We have also seen problems where the current quality of the River doesn't seem to be the problem, but rather protecting it is. And these agencies are kind of saying "Well it isn't a problem now, call us when it is.". So they just don't seem to be getting much support.

Response-

Exactly that is the environmental paradox. I ended up getting involved with a local group that did a lot of work with tropical forests, and it actually became a fairly large group. I found that having that sense of urgency, the worst the situation is perceived to be, the better the beast. Which is understandable, because given competing demands, people or going to currently have that overarching thread. That is kind of the situation that we are in. We do have various issues, but how do we get out there when there's no single thread like that.

Q- We have also seen several issues concerning contaminated sedimentations. Does the Millers also have sedimentation concerns?

A-

There is a stretch of the Otter River, where there are several industrial plants. That stuff is still in the sediment. If we try to get rid of it we will most likely just mobilize it and so the stuff is just pretty much there. I also have a few studies people have done, and apparently the levels seem to be lessening over the years. (References made to the contaminated sediments being capped off by the 'good' sediments here by Joy and Shawna.)

Yes people seem to have recognized this as being an issue but it's not like they are looking to do anything about it. And I think it is similar to mercury. Now a lot of the local issues in the Millers and they are sort of localized in the sense that you won't find them anywhere else, there are turbidity issues. That's why if we get our hydro lab running it will be helpful.

Q- Now are the assessments that are done in this document done by this group of people or are they done by the DEP? (Refereeing to Action Plan)

A-

While the water quality data in that document for the most part is based on the five year water quality assessment done by the DEP. There is also this (pointing to map in Water Quality Assessment) and a lot of the data on non-point source pollution comes out of this. The way the state works their five year cycles is that the actual sampling is only done one out of those five years, the other 4 steps have their specific purpose. By the time the reports are printed, the data is several years old. So this is a 200 water quality report, while it came out in 2004, the data is from 2000. In other words, the 5 year cycle for this would have been from 1999-2004. They started in 199 with the "What should we do, where should we sample?" and then in 2000 did the sampling. And Warren has talked about why there is such a back log in the time that it takes and it has to do with the DEP bottleneck and their smart monitoring, it doesn't make it into a report for five years. But that's just the way it is.

Q- You mentioned that the Council was originally created because there were obvious water quality issues, have there been any improvements or impairments in the water quality throughout the years?

A-

The return of the fish, the lack of a prevalent odor, there are several quantitative parameters that would indicate an improvement.

Q- If you could change anything, what would it be?

A-

Well, you know that money certainly helps to do the kind of things that we want to do. I do think that to have implementation of the Action Plan, if I can avoid sounding like a free spending liberal, because that's the first thing is always money, is important. The state has done a great job, the implementation is happening, but it's happening slowly. And then when you look at the people side, you can always say I wish people would be more involved or aware, but I am leery of saying that. I say that because I really do think that everyone is constantly making risk assessments of what they need to do. Plus, people who are naturally outdoorsy already kind of get it. But I think it ends up coming down to money in the sense that, with more resources there is more of an opportunity for them to connect with the outdoors. We are also very lucky in the Millers in that a large portion of the region is undeveloped. I mean outside the mill towns of Orange, Athol and Gardener, I think the watershed is close to 90% undeveloped. There is also some energy going into economic, ecologically benign development (low impact), I kind of feel like that is the cutting edge. The reality is, that with some initiative in this region, with some federal funds, it could happen, more economic development. You know, and more at the level of the individual towns, a broader sense of communication within the watershed you could say is a factor of a group like ours having the resources to get things done. It is understandable, when you live in a small town, not to do that. My training however, is to see the bigger picture, and I actually look to the larger region. Then again just because I see things that way, doesn't mean

it's correct to expect everybody else to do the same. Those are a few areas, money, money, money.

Section 11: The Nashua River Watershed Association

Friday, December 19, 2005

Interviewed: Al Futterman & Elizabeth Ainsley-Campbell

By: Kobosi Bosunga, Dan Bylund, Joy Trahan-Liptak

Groton, MA

Q- What are each of your positions?

A (Campbell)-

I am the Executive Director.

A (Futterman)-

I am the Land Programs and Outreach Director.

Q- Could you expand on what each of those entails?

A (Futterman)-

At this particular point in time about 65 percent of my time goes toward an EPA grant, which is being used for our Protecting Today's Water for Tomorrow partnership project. The overall goal of this project is to protect water resources by conserving land parcels. It also includes educating communities on low impact development. Another large project I am working on is the rail trail.

A (Campbell)-

I manage the staff, receive finances, and conduct program work. As well as other executive activities.

Q- Are there other organizations at all? Or volunteers?

A (Campbell)-

We have as part of our association a special project that does both restoration and maintenance of the watershed. We also have many partnerships in the region. We have 800 volunteers and about 100 corporate or small businesses in the area who are our partners.

Q- How is the organization funded?

A (Campbell)-

We are funded by the government through grants, also we have fundraising through events and we have program fees as well as membership dues.

A (Futtermann)-

An example of partnership is a land protection campaign. Often people who may be part of another organization are looking to hook up with us to try to get our help in stopping developments they see popping up. The NRWA is not necessarily against development we are just trying to encourage responsible low impact development. The landowner has the right to do what he wants to do, given the town's by-laws.

Q- How do you reach out to the community?

A (Futtermann)-

We are well enough known in this area that we don't really have to reach out - people always approach us. However like I mentioned earlier we do try to do outreach to communities in general to educate about low impact development.

A (Campbell)-

In terms of the general outreach we are very visible, but in terms of increasing that visibility that is what we try to do through all our events and projects.

A (Futtermann)-

I have fairly regular education programs here on various topics on the environment. If someone is interested in the environment, chances are sooner or later they will end up here. We also have a fairly strong volunteer water quality monitoring program and they are basically obligated to continue doing this.

A (Campbell)-

There are volunteers who are very involved on just some of our specific projects rather than being a member of the whole watershed association. For instance there are people who are part of the rail trail project who specifically work on that and nothing else. We do various clean up activities as well, including a water chestnut pull.

Q- How many staff members are there in the NRWA?

A (Campbell)-

Around twelve. If you look at our annual report that we just published this fall you will find here (gives us a copy of the report) a list of folks names and titles, if that helps you.

Q- How did you get to this point where people just know about your organization and it's no longer a struggle to get people involved except for the people who live right on the river?

A (Campbell)-

Well, back when the organization was started the river literally was a different color due to the dyes from the paper mills, so it was an extremely evident problem that people were interested in. A citizen moved into town - Maryanne Stoddard - who was a charismatic leader and she was and still is a classic grass roots organizer and she also knew to involve the federal level, the state level, and her friends to work with her. They had a very evident and serious problem and a charismatic leader so there was interest by the state and federal governments to help out. Those beginnings were with some ingredients that really supported growth. There were very good board members and staff members.

A (Futtermann)-

Well, to make comment about your reference to people living on the water, the focus of our association is not just the river, it's the watershed, so it involves everything and therefore the watershed is in everyone's back yard.

A (Campbell)-

We are very fortunate right here sitting in our headquarters in Groton to be surrounded by people who care and who are knowledgeable about watersheds but there are a lot of people out in the 31 communities who don't know about it at all especially in those communities where the river does not run through the center.

Q- Do you follow your action plan?

A (Campbell)-

We do follow our action plan and we do keep it in mind. When the organization started they had ten year plans which were large overall plans that laid out the general strategy. Today we still have those ten year plans in addition to five year plans which are more specific, and on top of that we also have a one year action plan. From doing this we make sure to stay on schedule with our plan and at the end we review these plans to see what we have accomplished. We may not accomplish everything in the plan however we never really vary from it.

A (Futtermann)-

This organization is good because when we apply for grants for projects they always ask if this is part of our action plan.

Q- Have there been improvements since the beginning of the organization?

A (Campbell)-

Well that's difficult to say because essentially rivers do clean themselves and who's to say whether or not our organization has actually influenced the water quality? But it is

significantly better than it was in the beginning of the organization. One of the things that has probably helped and was a result of planning is the fact that there have been good efforts to maintain a ribbon of undeveloped land along the banks of the river.

Q- Do you get any money from SEP's?

A (Campbell)-

We had one small one a while back and we actually had three this year but we don't really rely on SEPs for funding like the Blackstone does. But it does give us opportunities to do various things like purchase equipment and things for our various projects.

Q- Do you think that the watershed initiative was a positive thing?

A (Campbell)-

One of the things that was important about the watershed initiative was that it was done on the sub basin system. And now towns and communities don't necessarily think on that level. I would like to see the reinstitution of something similar to the watershed initiative but not necessarily the initiative itself. The initiative did not really help us make contacts with people or anything because we already had been doing that. However there were many other watershed associations that may have ceased to exist when the initiative was cut. One of the things that I would change in the state's government are some of the land use laws.

Appendix C: Matrices

Matrix 1: MassDEP (Therese Beaudoin)

Massachusetts Department of Environmental Protection				
Central Regional Office				
Interviewee: Therese Beaudoin (Watershed Coordinator)				
Procedures	Future Plans	Positives	Problems	Comments
The DEP is responsible for the TMDLs which are mandated under section 303(d) of the CWA. They have to calculate a total maximum daily load for each pollutant (Study includes pollutants, pollution history, and determined TMDL).	You're going to have to teach people what needs to be done, to make them understand that they have a role; it's on the concept of voting.	Generally, these people are a good bunch; they've come up the learning curve because they want to, not because of a job or anything like that. That's why we've been able to get them to come to the table and talk to us about what they're doing in their world. Because they have an interest in sharing it, not in just seeing what they can get from the table as well.	Concerning watershed management plans, there is no one entity that has the authority to regulate all these things. Many of these TMDL recommendations are on things that nobody regulates. Even if they were being regulated, the process would be very cumbersome, probably on a local level. No one has the money to do this; they don't have the policing authority, or staff, or anything to implement a lot of these recommendations. They have been written, and problems have been identified, but compliance with these recommendations is voluntary, not mandatory.	Therese commenting on LID- I know that people are trying to get these things going, but it is still slow going... All people who are not educated about these issues can see are their immediate problems, which are the costs of residential development on their community...Their tunnel vision is that we need larger lots with only one house on them. That is not helping them at all to address the lack of forest cover.
The Upper Blackstone is currently in the middle of a multi-million dollar upgrade, consisting of an upgrade in treatment quality and the volume of water.		They feel confident that if the non-point sources in the Upper Blackstone can be addressed, it will have a positive affect on the remainder of the river (these issues are currently being addressed).	While the treatment plants in the Upper Blackstone can treat more than they receive on a daily average, there is a lot of inflow to the system from storm water and it quickly maxes out in storm events. The water in the Blackstone is 40-90% waste water effluent depending on the river's flow (coming mainly from the waste water plants located in the upper Blackstone).	"Between the TMDLs, which specifically address water quality pollution problems, and the watershed action plans, you'll have a pretty good idea of what has been identified as the watershed management plans."
DEP has water quality assessments for all 27 watersheds in Massachusetts.		There are people interested in funding clean up of Salisbury Pond.	The large amount of impervious surface in Worcester is a main contributor to the poor water quality within the Blackstone.	
The sewer commission has been working on identifying the sewers and pipes the run into Lake Quinsigamond and cross connections.		The sewer commission has done a good job of identifying pollution that had been going into the storm water system rather than the sewer system. The city of Worcester devised a program to help people fix the misconnections.	The recent floods have created problems for the treatment plants in the Upper Blackstone.	
The Millbrook Task Force is working on outreach and a Pond Clean Up. (Millbrook is located entirely in Worcester and is 20% of the entire watershed)		The organization consists of permanent employees and has been sampling since 1996. They collect nutrient information, turbidity, dissolved oxygen, temperature and other things of this nature, and mishmash them together into a large database. This database enables them to literally look up the health of the river and small streams within the watershed in a heartbeat	Problem – no matter where you pick, there are people on the ground with the personal investment of having their backyard cleaned up, or someplace they played or fished as a child, but the people who need to help you don't have that level of investment, so they don't have the energy that you have.	
The QAPP is basically the bible of monitoring programs. It dictates where to sample; who does it and how, who oversees everything.		We have assessments with tons of information, but we also have a page for our own data, the volunteers have a page that shows where they've sampled, what they've sampled for, and whether it's good or bad. So they can look at this color-coded report card and tell right away what's good, what we need to protect, what's bad, what we need money to clean up or fix somehow. This is a great management tool. The Blackstone is one of the first volunteer groups to use the report card approach	There were many cross connections allowing pollution to get into the storm water system rather than the sewer system (this is currently being worked on).	
Therese only deals with the water quality aspect of the organizations assessments, she hears about the other aspects incidentally in meetings while reading through the paper.		The water-quality monitoring the NRWA conducts looks for benthic macro-invertebrate and looks at biological communities to determine the end result of watershed cleanup. Sometimes it works out that there are places where the water-quality is poor however good populations exist.	Construction at Salisbury Pond is at standstill because it is the city that is giving the grant, not the people involved in writing the grant, and the large city may not have the time to deal with such a small pond.	
The Central Regions office focuses mostly on wetland development and wastewater.		Therese was involved with the selection of sampling sites by developing a large map of the valley displaying permanent discharges and withdrawals of water using GIS systems available to me at the DEP.	Mass Audubon did a study and discovered that we lose roughly 44 acres of forest day to residential development (trophy houses, acres of lawn, etc.).	
		Volunteers bring samples to three laboratories, which are located in Worcester, Uxbridge, and Rhode Island. The data collected through water quality monitoring looks for orthophosphates, turbidity, pH, dissolved oxygen and others. There are 72 sites and roughly 72 volunteers as well, with 3 to 4 people working in each lab.	The QAPPs are very difficult to write, and everyone has to have one to get money from the state.	
		Warren and Therese came up with the idea of getting all of the water quality monitoring groups in the Central Region together.	Due to the fact that Salisbury Pond is the only above-ground part of the Millbrook watershed, there is no room for stream wetland self rehabilitation.	
		The treatment plants in the Upper Blackstone are capable of treating 56 MG/D, while on average they only receive 34 MG/D.	As a society, we are used to thinking of the world as it revolves around us, and that is how people still think mostly.	
		The Blackstone organizations communicate and collaborate very well, thanks to the Coalition.	Measuring the successfulness of your non-point source actions is very difficult.	
		Bolton requires a specific number of homes to be clustered.	The 303(d) list does not include sedimentation as a problem.	
		The watershed groups are also interested in land protection, and are rather good at figuring out how to protect it without actually buying it (conservation easements where they buy the development rates).	The history section of the TMDLs is difficult to write because they do not always have past data, "so we have to guess".	
		She sees the preservation act as also being a source to draw money from, where the town sets aside 2 or 3% of its taxes for conservation and affordable housing.	Warren and Therese are the only ones in CRO with a background in sampling and designing monitoring plans. Everyone else in the office is focused on wetlands and public water supplies.	
		The Millbrook Task Force got \$276 for 'shovel in the ground' projects dealing with storm.		

Matrix 2: Blackstone River Coalition

Blackstone River Watershed							
Blackstone River Coalition							
Interviewees: Donna Williams and Tammy Gilpatrick							
History: The BRC was fully established in 2000 after the Blackstone River Expedition (canoe event from) that brought people together. There was a lot of energy to create the coalition, but people still had their individual goals. They were galvanized however, by a sewage spill in 2002. The Headwaters Coalition through Mass Audubon started the volunteer water quality monitoring over 6 years ago.							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed overall changes	Comments
The BRC relies most heavily on SEPs from industry violations throughout the watershed	National Park Service Heritage Corridor	The basic function of the Blackstone River Coalition is to bring the groups (headwaters, watershed association, and watershed council in RI) together.	Donna has submitted a proposal for storm water circuit riders which would work with town administrators to bring together groups in each town (conservation committee, planning board, DPW, etc.) with the goal of reducing storm water volume.	There was a problem with the state boundary, and the fact that there was no single action plan. They worked with the 2 state agencies and combined the state's action plans.	Lack of community involvement - people don't understand the problems that are being faced (storm water draining, catch basins, etc.)	Bring back the Watershed Initiative	The existence of a QAPP may not seem like much at first, however it's a "big hurdle that you have to overcome in order to get your data accepted by [DEP etc.], so it give you more validity.
	Blackstone River Headwaters Coalition						
	Blackstone River Watershed Association						
SEP from sewage spill - \$50,000 which established the volunteer water quality monitoring, as well as \$25,000 for the lab	Greater Worcester Community Foundation	Manage the water quality monitoring program - maintain the QAPP for this program. Over the past 3 years Donna and Peter (headwaters) have teamed to create teams in the lower regions of the watershed. All 3 groups are now working together on one concrete project.	The coalition is working to capitalize on the floods that took place this past fall. They are putting together a flood conference that will "focus on land use to help communities understand how to do things better regarding both new development and redevelopment as far as storm water management is concerned."	Operating under a QAPP so the information is valid and "goes somewhere"	Have a good relationship with the DEP. The DEP cannot arrange SEPs, but they do help to guide violators to fund NGOs.		Therese said that the three groups within the BRC came about at different times, for very different reason, and they have very different problems. While they do have the common interest of being in the Blackstone watershed with the same point source pollution, the same need to gather more data, and target their response to what they find in the data.
	Worcester DPW				Lack of governmental support		
	DEP (Warren & Terry)				Trying to be all things to all people.		
Mass License Plates (money goes into the MA environmental trust from which the org can apply for grants)	Department of Commonwealth Development			Large sources of funding	Data gap within the DEP		The 5-year cycle has it's own limitation in that the DEP does data gathering in a limited way, they don't have the resources to do a lot of monitoring. The 5-year cycle is looked at as a handicap, but the DEP does need to organize itself in some way.
Heritage Corridor (federal money that comes through the National Park Service) - used to pay Tammy	Fish and Wildlife		Fishable/Swimmable in 2015	The water quality monitoring program has brought all 3 groups together to work on one concrete project.			I look at the five-year cycle as a handicap, but they (DEP) need to organize themselves and their workload in some way. It is frustrating for them to do so much work and have no validity. Prior to Governor Romney, the environmental agencies in MA created watershed teams. They sliced and diced their responsibilities differently. Rather than wetlands people covering the entire state, there were wetlands people covering only three watersheds. When we had the Watershed Initiative, things went so much better; there was a basin team leader, Celine Welsh, and she worked with the DEP as the team leader within the EOEA. All the EOEA staff focused on two or three watersheds. There were teams; there was someone within each specialty in each watershed. It was comprehensive. There was funding then and there were round table discussions where team leaders would go, prioritize projects, and get them funded. It's because there was money then. The frustration is we've lost that and it worked. The MA Miracle dried up and there was no money. Romney cut the watershed initiative. Now we have the five-year cycle, but we don't have the basin teams. It's a broken system. The frustration too is that there's the MA DEP, but also the EOEA so it's hard to navigate the system you need approval from both.
	Mass Highway Department						
Other SEPs including Polyfoam Corp.	Audubon						
	CCR						
	Rhode Island the Blackstone River watershed council						
Greater Worcester Community Foundation	Blackstone River Valley National Heritage Corridor Commission that's an affiliate						
	Army Corps of Engineers French Foundation						
Norcross Foundation	Audubon - Donna is paid through them						
	Other smaller grants						

Matrix 3: French River Connection

French River Connection							
Interviewees: Alan Dabrowski, Ken Parker							
History: Started officially in spring of 2004. Basically 2 guys who met cleaning the river.							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed overall changes	Comments
Funding has been out of their own pockets - about 500 so far.	Quinebaug-Shetucket National Heritage Corridor	Shoreline survey as part of a MassRiverways project.	Membership?	Have been very visible in the press	In dealing with the town government, people need to be prepared to protest as soon as something comes up, and that's very difficult for the public - to get the facts straight immediately.	Not many were discussed, as this organization is in the beginning stages; however funding is always a problem as is staffing and contact with the state organizations.	Part of the issue for us is how much can you keep pushing. So we just go around poking to see what might happen. It would be really nice to have the towns backing you on this.
They just received a grant from the Greater Worcester Community Foundation - Water and Land Stewardship Fund	Webster Lake Association - borrowed the water quality testing equipment from them	The major goal of the organization is to connect people and the organizations that already exist to improve and maintain the river.	Develop the water quality monitoring program further - write a QAPP so that the information can be used by the state.	The river has healed itself since the heavy industry has subsided, and has become a good habitat for many different species	They are strictly volunteers, and are basically the only ones fully committed to the river. People show an interest in projects, but that interest peters out quickly. Interest is represented by the mailing list which is about 40, but in reality there are about 5 steady volunteers.		It's hard for the dedicated volunteers to be doing so much work and not getting much out of it. It would seem that state/town governments would be jumping at the chance to have volunteers do things for them, but that's not the case here.
They currently do not feel comfortable asking the volunteers to join them as dues-paying members	Several people in CT are involved in river clean ups in that state and have worked with the FRC a little on border issues (trash that affected both states) - Thompson Together Environment Committee	Physically cleaning up places in the river where they know there is a lot of trash.	Further develop the shoreline survey project	Have made connections especially with the USGS testing behind the dam.	Dealing with the river is a new idea. Many people don't even know that a river flows through their backyards. In the past it has been perceived as contaminated etc. and therefore people have tended to steer clear of it. Consequently people are unaware of what needs to be done to keep the river in its current, pretty healthy condition.		"Ken is big about getting this water testing done, but I'm thinking that if you can't even get anyone to be concerned about this dam, or the parking lot, what's the point?"..."To show them that the water is good... so when it's bad we'll be able to tell them that it was good."
	DEP	Have taken selectmen from the towns out on the river to show them what is in their backyards.	Possible canoe access points in conjunction with the NPS/Natural Heritage Corridor.	The DEP in Worcester just started having meetings of all the people concerned with watersheds in the area.	If studies had been done previously and data was available, it would be easier to make a difference as far as development impacts go.		
	Dudley Conservation Land Trust - work on issues that have to do with protecting land which in turn protects the river	Have been working on some dam safety issues trying to protect a section of the river on the Oxford end while looking at how development in the area can have a low impact	Want to focus on getting people out to the river so they can see what needs to be protected		There is concern about a dam that is in poor shape close to downtown Webster. They are concerned about it breaking because it would destroy important habitat upstream, but since a breach would cause little problem within the town itself, no one is all that concerned.		
	Dudley Board of Health (clean ups)	Water quality monitoring - pilot program this year (2005) using equipment from the Webster Lake Association, which was not that effective considering it's designed for deep water. So far they have tested 8 sites	working on getting a plan together to work with Bartlett HS in Webster on water quality monitoring		There has been no shoreline survey or any type of survey (as far as we can tell) for a very long time.		
	Blackstone River Association - have worked with Tammy Gilpatrick on water quality monitoring (mentor)	Study on the Last Green Valley with Upon - the technical arm of the Quinebaug-Shetucket National Heritage Corridor. The study is looking at ways to make improvements to the river - parks, access points, etc.	They believe that about \$5000 would help them greatly with what they want to get done in the next year.		A UMass Amherst group was working on some watershed planning project, "unfortunately what they came up with was very cookie cutter and was not at all tailored to individual towns...nothing really came out of it". Terry		
	Webster Department of Public Works- letting them remove the trash from the river for free	The major goal of the organization is to connect people and the organizations that already exist to improve and maintain the river.		The DEP is very "anal" with the regulations for monitoring. Putting together a QAPP is a lot of work, and on a volunteer basis it's difficult.			
	MassRiverways			Currently dealing with problems with a FERC permit at a hydro plant in Webster (drains part of the river, causing reduced flow downstream)			
				Dealing across state boundaries is difficult.			
				There is no organization that relates to the Quinebaug			
				Apathy from town boards seems to be a recurring problem.			
				Difficulty in contacting people within the state and actually getting them to follow through on issues that come up			
				Concerning the water quality monitoring, they did not get much help from the DEP			
				Difficult for new groups to get started - process of getting 501 (c) 3 status takes a lot of time and money.			
				They are not working nearly enough with conservation committees to encourage LID. They realize this, but do not have enough people to do so.			
				The state doesn't have a good database of what is going on in the river.			

Matrix 4: MassDEP (Warren Kimball)

Massachusetts Department of Environmental Protection							
Central Regional Office							
Interviewees: Therese Beaudoin (Watershed Coordinator) & Warren Kimball							
History: For the last 30 years, the DEP has concentrated mainly on point source pollution sources. They used regulatory programs with state controlled permits and clean ups. This is complete. No one has been assigned the responsibility [to develop the plans], up until the early 1980's there was a entity called the Division of Water Pollution Control who used to write the action plans and you could find a management plan for all the watersheds current through 1980 then there was a ten year hiatus from 85 -95 when no one was doing this until they created the watershed approach created a new group under EOEA. The watershed approach only got about half way through the basins when it was cut because of resources. Last few action plans from the EOEA were funded by grants.							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed Overall Changes	Comments
		Currently focusing on non-point sources of pollution, which is non-regulatory, and so there is no big state presence of enforcement hanging over people's heads.		What they found was that for every dollar in residential taxes it cost the town a dollar fifty in services - this discourages development?	It is difficult for the local watershed groups to get grant money because most non-point source money in Worcester is used for cleaning up lakes.	Would like to have a list of proposed projects for the Blackstone that can be used when SEP money becomes available.	The idea is to divide your city up into small watersheds and look at the impervious areas and that tells you where potential problems are instead of sampling. You can do a lot of things to disconnect these impervious surfaces which include paving with porous pavement so the rainwater doesn't seep off but runs through or you can collect it and contain it and clean it before it gets to the river.
		319-Grant: non-point source implementation		The solutions to non-points source problems are non-technical and these watershed groups are good at community outreach.	Non-point source pollution is non-regulatory and therefore there is no state presence of enforcement.		One of the best ways of dealing with pollution is to shut it off at the source which consists of community education.
		104B: Water quality and wetlands		Have a report card system that gives a visual picture of the water quality	When impervious area gets above 10% then you are going to have water quality problems if it gets above 25% then you have severe water quality degradation.		If you're fighting each battle one on one and it's a big company against a little advocacy group the company always wins.
		604B: Non-point source assessment			Wetlands along the rivers have been destroyed through development and water running off is not able to filter as it would naturally, bringing the pollution right into the river.		These are things that they have learned over time that we need to plan and we need to use watersheds as the planning unit and we need to partner to do this because a lot of these things are not regulatory in nature and we need a lot of people helping out. Unfortunately the initiative was resource intensive and so the way it was may not have been that efficient but the idea was good.
		Phase 2 is for other concentrated urban areas. They used census information and came up with about 250 areas that are likely to have a lot of impervious area and they are supposed to conduct similar processes to Phase one. These are all called BMPs (best management practices) are structural or non structural solutions to non-point sources.			No one has been assigned the responsibility to develop [the plans]... The watershed approach only got about half way through the basins when it was cut because of resources. Last few action plans from the EOEA were funded by grants. The plans are complete up to 1985, but there is a gap from 85-95. The watershed approach only got 1/2 of them done before the initiative was cut.		Here's how the process is supposed to work; first you have to do an inventory of all your water resources and then classify them which are the water quality standards that begins your section 303 of the clean water act. Once you have things classified you start to monitor and one of the things you do in monitoring is compare your data to the classifications that's your assessment and that's called a 305b and the analysis comes in and the list of waters that don't meet the classification are your 303d. Then a plan to prioritize these areas and then some kind of implementation these includes compliance enforcement and grants programs, these are sort of ongoing all the time and then the loop starts over again. This is how the five year process is supposed to work.
		Non-point source pollution is regulated is through storm water. Phase 1 is the National Pollutant Discharge Elimination System (NPDES) permitting process - permits given to municipalities to build sewage treatment plants. Phase one is for large cities, Worcester and Boston are the only cities in Massachusetts considered for these permits.			The EOEA hired basin team leaders and they were going to build basin teams but their whole system got cancelled when the new governor came in.		Some of the watersheds that we are working with already had organizations and were well funded and very politically connected and they felt that they did not need the state to come in and impose the watershed initiative, while watersheds that did not have well connected groups benefited greatly from the initiative.
		In this area under the watershed approach they have gone to each town and made them aware of how the zoning laws are affecting the water.			The watersheds that don't have plans mostly don't have advocacy groups to push the plan process through.		EOEA watershed teams were around they had specific goals that they had to come up with every year and one of them was to make a yearly plan of what are our top priorities how are we going to address them what are we going to do next year and they had to develop a five year plan so they were very effective in getting both federal and state money and they had projects that we knew about and the grassroots groups knew about and the basin teams were comprised of a mixture of people from these organizations.
		Working on monitoring assessments and TMDLs			Concerning the Blackstone data gap: They only collected data that was done through 98 Warren and I did not start until 2000 and they were not prepared to go through the 2000 data. The most recent data is not available and was collected in 2003. The assessment was due in 2004 and is now a year and a 1/2 late.		When the Watershed Initiative blew up they left us as a fragment we were sort of spinning out there in space all alone and they never found us. Since we are in a regional office we are only allowed to deal with 6 watersheds, but we have continued the watershed approach and the watershed initiative and nobody has bothered to shut us down.
		Warren and Terry have an atypical system run out of the central office for 6 specific watersheds			The volunteer data is the most recent that will be published with the watershed assessment. The DEP data will be much older due to internal problems: they have quality assessment procedures that are very cumbersome.		

Matrix 5: Organization for the Assabet River

Organization for the Assabet								
Interviewees: Alison Field (policy director) & Sue Flint (Staff Scientist)								
History: The organization has been around for about 20 years								
Funding	Partnerships	Procedures	Future Plans	Positives		Problems	Proposed Overall Changes	Comments
Membership organization - 1100 currently	Advocates for Wetlands and Watersheds	Governed by a 14 member board. 5 staff part-time members (executive director [reports to the board], staff scientist, policy director, development director, office manager).	In the nest 10 years when the are is more developed, they plan to start worrying about non-point source pollution and greenways along the river.	Outreach: lawn management and detergents, programs for town officials concerning point and non-point source pollution concerning phosphorus), nutrient outreach (mailings concerning cleaning up after pets)		There is a summary of documents that was funded by the DEP and the SuAsCo Community Council took the initiative to do it. They subcontracted the project to Ambient, and the actions in the action plan were based off of this document.	Increased funding on a state/federal level	Membership and volunteers do not necessarily overlap.
Corporate Donations (Intel mitigation - see processes)	Working with the towns of Hudson and Maynard to develop a middle school education plan.	Overall goal is to affect improvements in the River		Lucky to have various phases of data collected by the USGS		Concerning the action plans (see comments): "I think that there isn't really a way to enforce these things. And I think that projects and suggestions really get picked off in a much more random way that you would hope."		Concerning the recently developed action plan: "Whether the plan is ever picked off of the shelf and read and referred to, despite that ever happening, you have hopefully built those relationships and thought together about this issue. This overall helps to focus people. Whether they get implemented, my sense is that once this process has happened and people have thought through what their priorities are they tend to go ahead and carry those things out without necessarily referring back to the plan very much. Except perhaps when the time comes to update the plan and you tend to rethink the process."
Grants	Assabet and Concord community council	Grants proposed to develop education programs		People ask the organization about what is going on in the community and they work to mobilize people around the issues.		The treatment plants have been upgraded, but possible improvements have been offset by increase in amount of sewage put in.		How much gets done "also depends a lot on the people in the towns, the residents of those towns to serve on a board and to take these issues and continue pushing and pushing them."
	SuAsCo Community Council (do river revisions conference and provide educational information to towns while holding their own meetings)	The key focus is waste water permitting on the river and they are currently appealing 2 wastewater permits.		Have 100-200 volunteers working on the water quality monitoring program.		OAR has issues with the fact that the state has grouped the 3 rivers into one watershed and it is difficult for them to work with the other orgs.		Concerning sewage outputs: "one could say that it could be worse if the standards hadn't been improved, but as far as in the river improvement, no there hasn't been any."
	River Stewardship Council	Sit on regional and state-wide technical advisory committees.		Paid staff		There is not an organization for the Concord River (OAR has just extended their water quality monitoring toward that area)		"[The new action plan] is not particularly focused. It is very scattered what they did is take actions from pretty much anyone who wanted input, and it appears that they mashed them all together to put into a document. They did this w/o sorting for importance or feasibility."
	Army Corps of Engineers	Water Quality Monitoring		The country has really good legislation to base protection on (CWA).		Under funding and not backfilling positions (on a government level - Swiss cheese effect). This chipping away of staff/money has led to the EPA (as well as the DEP) not backing up the laws they have in place.		"I think that some of our most committed volunteers are the ones who have the river in their back yard, the ones who have real personal interest and feeling for the river. Other people are professionals. For the water quality stuff I tend to get people who are consultants and are maybe a little disillusioned by where their environmental career has taken then and perhaps want to give back to the river a bit."
	Mass Wildlife; Mass River ways (responsible for volunteer based stream teams - complete surveys and write action plans based on these findings. Have existed in Acton, Northborough, and Maynard)	TMDLs - not sure if these are actually done by OAR, or the state.		As part of the mitigation process for withdrawing large amounts of ground water, Intel set up a fund to put water back into other parts of the watershed. The fund is managed jointly with OAR, and they are currently working on a project for the Acton Discovery Museum to do a demonstration on LID.		Therese mentioned a downfall being that OAR is focused solely on the Assabet, neglecting entirely the Concord River downstream. Therese is also unsure of an organization for the lower Concord. The SUASCO lacks an overall umbrella organization as well, with OAR doing the only water quality monitoring.		"I think that this group is run pretty positively; we have got good energy, great staff and good ideas. I feel like we can make progress in this watershed. Frustrations for us are funding and government support."
	Partnered with Northborough, Westborough, Marlborough, several other towns, and the Sudbury Valley Trustees to update the 1986 Upper Assabet River way Plan.	They keep in touch with the EPA and DEP through comment letters when permits are out in draft form for public comment.				"a lot of the times decisions are made based on only half of the important criteria or information. That is something that residents really need to be concerned with, and organizations like ours try to inform people when they become members so they know more and more about this."		
	Massachusetts Industry Flow Taskforce							
	DEP - Warren & Terry							
	Acton Discovery Museum							
	Intel							
	USGS							
	Sudbury Valley Trustees							

Matrix 6: Blackstone River Watershed Association

Blackstone River Watershed Association							
Interviewee: James Plasse – President							
History: Started in the early 1970s. It was created as more of a physical clean-up group back when the river was very polluted. Also started with people coming together for the annual canoe race which brought public attention to the river.							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed Overall Changes	Comments
Grant from NEIWPCC pays the president as a contractor for the "water quality monitoring field coordinator", as well as the program that ran this year.	Grant from the National Heritage Corridor - the organization is acting as the contractor for the canoe access points	Participate in the Coalition's Water Quality Monitoring (have 34 of the 72 Blackstone sites). The coalition has 3 labs: Mass Audubon, Tri River Medical Center, and one in RI.	Invasive species work (current administrator is interested in this area and they would like to develop this aspect further) - education outreach dealing with purple loosestrife and Asian water chestnuts	Have a paid staff (water quality monitoring field coordinator, outreach coordinator, administrator)	Lack of community involvement - they find that the same people show up to do work over and over (a core of about 30)	Increased community involvement - getting more local people involved - they can always use more citizen support	Question: do you take an active role in talking to conservation commissions/town governments to regulate development? Answer: "Well people do it as individual citizens. We have not really done it as a group. We are not really all that against development. We are just trying to encourage responsible development. They are going to build shopping centers and homes no matter what we do."
Unibank grant pays the outreach coordinator position	Headwaters	Have organized town meetings - speakers on wise water use and septic maintenance to protect watershed	Trying to increase the membership through increased publicity.	Trying to stay local so that people keep a "touchy-feely" relationship with the group.	Lack of state involvement	Increased funding	
French Foundation pays the administrator position.	Council	River clean-ups including a large annual project. This year they partnered with the Blackstone Chamber of Commerce, and were able to get more corporate people involved, as well as people from other organizations.	Finish canoe access points	Over 100 people are involved in the canoe race.	Lack of funding		EPA has mandated that all new roadways have catch basins and leaching beds.
Administration is also paid in part through monies from the canoe race.	Coalition	Stream Teams developed by Mass Fish and Wildlife - this process has previously failed, but they are working on developing them more.	Increase Stream Team work	Send a newsletter out 3 times a year to members, state representatives, towns in the watershed, and they are available online. They are working on getting more people to use e-mail to get the newsletter which will decrease the cost even though it is minimal (\$250 this year for printing).	There are specific communication problems with NPS concerning the canoe access points (this work was supposed to be finished fall 2005 but isn't yet). "We have four of the nine sites approved. Four of them happened to be on state land so right now it's stuck with the Department of Conservation and Recreation with their engineering people because the National Parks Service is going to pay for the work but the state has to bid it and everything. The work is going to be all contracted out...We keep trying to push them by calling them and emailing them but still it's a slow process."		"We've been trying to make our groups more effective, and involve more people in them, but we also want to keep them small. We have this dilemma within our groups; Is it best to have a small group with only a few hundred members, and have a bunch of small groups so that the people feel attached to the rivers, or do you want to have this big group for the whole watershed or the whole Blackstone River which may end up becoming some type of 'bureaucratic monster' and leave the individual people feeling unconnected. That's why we've been trying to keep smaller groups that help in connecting people with the water they may have around them, for example through the Stream Teams."
Canoe Race generates some funds, as do membership fees (near 300 this year).	NEIWPCC	To generate membership: pamphlets, press releases, word of mouth, postcards to people who have previously been involved.	Fishable/Swimmable in 2015	As far as water quality monitoring abutters go people are generally interested in helping them and they only had 2 conflicts this year.	Grants are difficult to get - "going through the Spanish Inquisition"		
Membership dues (\$10 individuals, \$25 for families)	Blackstone Valley Chamber of Commerce	Attend conservation commission meetings (mostly concerning the canoe access points).	Need to try getting water back into the ground - decrease the runoff/impervious surface		People who look to them to find out about what is going on, and seem to be interested in helping out are often not heard from again.		
Corporate Dues ~ \$100	Mass Audubon	Canoe access points			The DEP relies a lot on the information they get from NGOs such as this organization.		
SEP - Polyfoam Corporation - this funded the 2004 water quality monitoring	NPS (working on canoe access points)	They did a prototype stream survey.			Heavy metal sediments in area mill ponds are a concern, but nothing seems to be really being done concerning this - this may be because nothing much can be done.		
	Unibank, French Foundation	Canoe Race			Losing ground water as a result of build up. About half of the rainfall in MA ends up as direct run off.		
	DEP NPS (working on canoe access points)						

Matrix 7: Connecticut DEP

Connecticut Department of Environmental Protection					
Thames River Basin					
Interviewee: Eric Thomas					
Procedures	Future Plans	Positives	Problems	Proposed Overall Changes	Comments
5 positions have one full-time supervisor, and they are nested within the bureau of water management.	Trying to build up a watershed view of what is happening, and what Connecticut is doing on the Quinebaug.	Watershed positions really do address watershed issues, while reporting within the water bureau at the same time.	Lack a full overriding position that goes into other bureaus like waste or land management, most of the things that Eric is directly involved in are within the water bureau. (although he does have a relationship with the other bureaus)	To work locally with state and federal guidance.	There are a lot of things that at the state level we do not have any opportunity to pursue for watershed-based planning that would be truly effective on the ground.
The Bureau of Water Management covers a wide range of water issues, regulatory, enforcement, etc. Also deal with planning issues and water quality standards.	Examining new times of high priority strategies	We do try to pull together resources, technical funding, and administrative resources from other parts of our agency and we try to leverage that through grant and loan programs with towns and NGOs	Mr. Thomas is the only person for his entire quarter of the state (Eastern Conn.).	Regional approach regulated by the state.	"What we can do, and what we are doing, is try to build capacity at the local level for local partnerships and alliances to develop at a regional or possibly sub-regional level, and as a state agency we hope to kind of stick onto the local works, support them with mini-grants, technical packages, maybe some sort of interface where we can coordinate permitting, enforcement, planning, implementation, policy work."
We have not had a top-down, agency bureaucracy support as MA did a few years back with their watershed initiative. We don't have that kind of consistent, helpful state agency/grassroots relationship, or data assessment, or true watershed work on a state-wide basis.	The monitoring assessment program is now in transition to another potential framework. It will be a hybrid of the old and new programs and should be rolling out in 2006 (E.T. isn't aware of this because it is part of his role).	We are all working within the same division, so we share data, and input, we review proposals and look at the final listings, and then we all work toward implementing strategies including funding grants and loan programs to address whether they are impaired water bodies or whether they are fully supporting water bodies.	The water does not really exist in the basin anymore to augment low-flow periods without causing extensive social and cultural impacts, because housing has been built around impoundments in the watershed, and these people do not want the water bodies to be dried up during the summertime to provide better flow in the main stem of the Quinebaug. On paper, we could find the gallons of water per minute we need to remedy low-flow issues, in reality its not going to be socially and politically acceptable.	Look at water resource issues from a watershed framework.	"Most environmental decision making really happens within each of the 169 towns in Connecticut, so with limited resources and efficiency, we are trying to promote training, education, and outreach to those local towns. We're trying to make sure that local towns look outside their political boundaries at a watershed scale, and we're moving ahead in that area."
Thomas is a liaison within the water bureaus of the multiple programs and provides an "information clearing house". Also serves as a liaison to external partnerships - agencies or NGOs outside of the state government that deal with similar issues.	Developing a new set of water allocations and stream-flow regulations on a basin-wide level, which Thomas hopes will translate into funding and more implementation strategies.	State agencies people are working and collaborating on a lot of different programs.	Since the Watershed Initiative, the formal and close relationship that Conn. and MA once had has broken down since the cut.		
Work as a team assigned to five geographic regions, only one person per region.		There is a good web of relationships between the agencies and between states. There are also interstate compacts and informal relationships.	Flow being diverted in the upper Quinebaug has lowered the flow which has in turn affected the water quality in Connecticut.		
Does not do any technical resource or inventory. This work is done by a smaller division nested within the planning division.		The Conn. DEP is trying to correspond more frequently with their MA counterparts concerning issues with the F&Q.	The water uses in New England have really changed over the past 30 - 40 years; away from manufacturing and raw waste disposal toward in-stream needs and distributing water away from centralized areas to areas which never needed water. (not limited to the F&Q)		
The monitoring program consists of a monitoring and assessment team and a full program with several dedicated staff and supervisors. Their data is collected using a rotating basin approach similar to MA.		Receives money from Millennium Power as part of mitigation due to their diversion of 3cfs out of the Quinebaug River in Charlton, Sturbridge and Southbridge area. This money is put toward a multi year set of water quality studies.	In the French and Quinebaug they have really complicated water management overlaps between the Army Corps of Engineers with flood control projects and small hydropower projects.		
The monitoring program has changed recently, based on EPA requirements, they now try to cover a lot more of the water bodies across the state to be assessed on a full basis.		They have learned a great deal more about flow and flow regimes as a result of the studies done by Millennium Power.	Limited resources have led to a lack of intensive involvement with grassroots organizations (used to).		
After the monitoring program has collected and analyzed the data, it issues the biannual report to congress (303d report).		They have been working closely with the USGS for a number of years, and they just submitted through a grant, a report called the Thames Science Plan.	They're trying to encourage those be replicated with locally based changes in many other parts of the state, but I can't say that we have significant funding for staff or technical resources on a really coordinated level.		
CT exchanges the monitoring assessment data with those other agencies; on a New England, region-wide basis through the EPA and through the New England region entity known as the NEIWPCC.		Share with the MA DEP, Army Corps of Engineers, and other stakeholders the results of studies being conducted through Millennium Power mitigation.	Funding is not a priority for watershed-based management and planning work!		
Trying to learn from the grass roots organizations and figure out where they seem to for their purposes of the watershed.		Federal, state, and local matrix of different agencies, we also have a lot of interesting, nearly 300 year old history and culture of how we collected, impounded, and utilized water in the French/Quinebaug Basin.	"Currently, I can't say that we have a dedicated funding stream that will implement that type of work as a high priority as compared with some other work."		
The Bureau of Water Management is 1/3 of the Planning as the Standards Division.			There is not enough funding for an Action Plan to be written for every watershed on the 303d list. There is no requirement or mandate to pursue that either. "We can't even begin to scratch the surface of our highest priority [watersheds]"		
They have similar relationships with grass roots			On a state level, they don't have any opportunity to pursue watershed-		

organizations as MA does.			based planning that would be truly effective on the ground.		
The Office of Policy and Management (CT super agency) issues a Policy and Plan for Conservation and Development on a five year basis.			Only six to eight actual Action Plans		
Broken into 44 watersheds; 150 sub-regional watersheds.					

Matrix 8: Blackstone Headwaters Coalition

Blackstone River Watershed							
Blackstone Headwaters Coalition							
Interviewee: Peter Coffin (President)							
History: The Headwaters Coalition was established to be a watchdog for the city storm water systems. They started out as a compilation of groups - Mass Audubon, Regional Environmental Council, Indian Lake, Lake Quinsigamond Watershed Association, there is a Leesville Pond Association.							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed Overall Changes	Comments
Heritage Corridor grant	National Park Service Heritage Corridor	They are expanding beyond the city of Worcester to the upper third of the river (Opportunities have opened up at Fishersville and where the Blackstone meets the Quinsigamond River). They are doing outreach at Fishersville because there is a redevelopment project going on there.	He feels that they (EPA) have done a good job cranking down on permitting and discharges but need to start working more on NPSP.	They are able to build on the pride of the region with the help of the NPS to acquire more funding which also allows them to tie in water quality issues (because it becomes more along the lines of recreation and tourism it steers a little bit away from water quality).	The science isn't good enough to start cranking down on these nutrient problems so they continue to work on regulating treatment plants, but that can only go so far. Even with this regulation, you can only go so far, and the nutrients that exist in the river (sediments) now are still having an effect.	Bring back the Watershed Initiative	First year was gathering the data, the second interpreting, and the third assessment, and the fourth kind of planning, and the fifth is supposed to be implementing. All of this is supposed to be on a cycle. So I bet each one of the watersheds went through those first five years.
Greater Worcester Community Foundation	Blackstone River Coalition	Public education effort, we have been encouraged to do media, and getting time on the television, and there are catchy ads, and even magazine pictures.	Would like to have a healthy population of fish, a desire to catch the fish, and for people not minding "getting into the river."	Since Worcester is a big city so there is more money available, but because it's the beginning of the river the improvements you see as a result in the headwaters also help downstream	One of the biggest problems in the Blackstone is that the headwaters are located in Worcester where the impervious surface is extensive.		The constant changing of procedure has created bad blood between the agency and employees.
Mass Environmental Trust	MA DEP (Warren & Terry)	Public Awareness	Blackstone is working on re-doing its permitting. They don't agree with the new model and they are doing their own.	They are able to use the strength of local energies while tying it into bigger funding for larger efforts.	It is hard to tell whether pollution is coming from the streets of Worcester or if its coming from the sediments that have been there for a long time. The science isn't there for a way to tell yet.		A problem with the watershed initiative was that it was done on a state level by the EOEa which is more than just the EPA.
Section 319 Non-point Source Grants	Blackstone River Watershed Association			It is relatively easy to get funding for the water quality monitoring because it's deliverable.	In summer, Worcester's treatment plant is about 70-80% of the river's flow, so the water quality is only as good as the treatment plant		EPA pushed the responsibility for setting standards to the states.
SEPs – Coalmine Brook				There is an identity with the Heritage Corridor, and there is pride in the Blackstone	When the river goes into RI it hits another industrial corridor, but its on the back side - the industrial port towns - and not through Providence and therefore doesn't get the big-city attention		No one has any idea how to clean up the sediments, but it is beginning to be capped off by new "clean" sediments and many people feel it is better left alone.
				Working on the new model that Blackstone treatment plan is working on - cooperating with them in an effort to educate.	There are a lot of dams and a lot of contaminated sediments behind them.		Cities and towns seem to have great plans but they lack implementation.
					It is unusual that a river starts off dirty and then gets clean as it goes, but that is the case in the Blackstone		
					States have not set nutrient standards. The build-up of nutrients is having a negative effect on the sea life in shallow bays (eutrophication).		
					The Blackstone is in an industrial corridor and is an industrial river. Was used for many years by the people around it and they got used to it not being a good resource.		
					It's tough to get funding for things like educational outreach because there is no way to show that because you talked to kids about NPSP that pollution was reduced by X amount - there is no concrete way to show these changes so they don't like to give funding.		

Matrix 9: Millers River Watershed Council

Millers River Watershed Council							
Interviewee: Ivan Ussach (Watershed Coordinator)							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed Overall Changes	Comments
Ussach is paid by the Athol Bird and Nature Club as well as partially from the Association. All the clubs are funded by small grants that are interconnected and end up being pretty much the same money.	The center has strong partnerships with many organizations and has been stabilized through the years by the organizations connected with the Environmental Center.	The center has strong partnerships with many organizations and has been stabilized through the years by the organizations connected with the Environmental Center.	The center has strong partnerships with many organizations and has been stabilized through the years by the organizations connected with the Environmental Center.	They have a paid employee	A lot of decisions are made locally without any logical planning	More money	The economy of the towns the Millers runs through is not all that great. As the economy picks up however, the thinking is that more people will be able to get involved, and interest in the river may increase, leading to better protection.
The council has a "war chest" that has been sitting in the bank for a while, it is protected money used only for certain projects.		North Quabbin Regional Landscape Partnership - the millers deals with the same area.	The goal is to have a very comprehensive program where we really have people who want to be very involved with the individual municipalities and have a more formal relationship.	Cooperate well with many other organizations	They haven't been able to make much of an impact so far because the council is just getting established	With more money there are more resources	QAPPs - The Midstream Survey and Photo-Doc Survey protocols, which are initiatives created by us, are being reviewed by our technical advisory team, with the goal of having them state approved. Our Macro-invertebrate monitoring program, which is in design stage, will be submitted to state for approval. Culvert study coordinated by UMass Waterwatch Partnership --not sure if it has a QAPP --we just submit data
		Franklin Council of Governance - operate at a county level organizing waste disposal and funding	In the process of applying for a grant	Improvements are indicated by the return of fish populations, as well as the lack of a prevalent odor.	There were about 25 people who came to the monitoring training, but they haven't gotten much back from them yet.		Action Plan - Developed by a consortium of stakeholders going as the Millers River Watershed Advisory Committee, with technical assistance provided by the Franklin County Regional Council of Governments and the Millers River Environmental Center. Funded by the Mass. Exec. Office of Env. Affairs (EOEA). It was "approved" by EOEA --not DEP.
		Millers River Environmental Center	Would like to have a map (by 2006) that shows the different types of monitoring going on across the watershed, and the state of the water quality in those areas.	Mt. Grace Land Trust has received a grant that targets Western Mass for protection. They are currently in the process of hiring 4 new people with the few million dollars available.	People are mobilized when there is a problem. It's difficult to get people concerned when there is not an "emergency"		
		Mount Grace Land Trust	The watershed council would like to be doing more and looking in the direction of outreach, but that is dependant upon a grant coming through.	A lot of the bullets in the action plan are actually getting done, but not necessarily because they are going through the plan and specifically targeting these. They have gone through bullet-by-bullet and have found that they have touched upon many of them.	There is a stretch of the Otter River which has very polluted sediments. People have recognized as an issue but it's not like they are looking to do anything about it.		
		MassRiverways		They have some basic programming concerning pollution put on mostly by the bird and nature club	The DEP information bottleneck is a problem		
		DEP (Warren & Therese)			Therese noted that they have serious PCB issues from previous industry on the Otter River.		
		US Army Corps of Engineers					
		Athol Bird and Nature Club					

Matrix 10: Nashua River Watershed Association

Nashua River Watershed							
Nashua River Watershed Association							
Interviewees: Elizabeth Ainsley-Campbell (Executive Director) & Al Futterman (Land Programs and Outreach Director)							
History: When the organization began, the water was literally a different color due to the dyes from the paper mills, so it was an extremely evident problem that people were interested in. A citizen moved into town - Maryanne Stoddard - who was a charismatic leader and she was and still is a classic grass roots organizer. She knew to involve the federal level, the state level, and her friends to work with her. They had a very evident and serious problem and a strong leader so there was interest by the state and federal governments to help out. Those beginnings really supported growth; there were very good board members and staff members.							
Funding	Partnerships	Procedures	Future Plans	Positives	Problems	Proposed Overall Changes	Comments
Government grants	100 corporate or small businesses that are their partners	65 percent of Futterman's time goes toward an EPA grant, which is being used for our Protecting Today's Water for Tomorrow partnership project. The goal of the project is to protect water resources by conserving land parcels, educate communities about low impact development.	Trying to increase their visibility through the events and projects that they are currently working on.	Well enough known in the area that they don't really have to reach out, people always approach them (very visible). They are "very fortunate to be sitting in their headquarters in Groton and surrounded by people who care and who are knowledgeable about watersheds."	There are still a lot of people out in the 31 communities who don't know about the organization at all - especially in those communities where the river does not run through the center.	Campbell would like to see a reinstitution of something similar to the watershed initiative but not necessarily the initiative itself.	Campbell opinion - One of the things that was important about the watershed initiative was that it was done on the sub-basin system. And now towns and communities don't necessarily think on that level.
Fundraising events		Futterman is also working on a rail trail project.		Today we still have those ten year plans in addition to five year plans which are more specific, and on top of that we also have a one year action plan. From doing this we make sure to stay on schedule with our plan and at the end we review these plans to see what we have accomplished. We may not accomplish everything in the plan however we never really vary from it.		Campbell: "One of the things that I would change in the state's government are some of the land use laws."	Campbell's opinion- The initiative did not really help us make contacts with people or anything because we already had been doing that. However there were many other watershed associations that may have ceased to exist when the initiative was cut.
Program fees		Campbell manages the staff, receives finances, conducts program work and deals with other executive activities.		"This organization is good because when we apply for grants for projects they always ask if this is part of our action plan."			
Membership dues		There is a special project that deals specifically with restoration and maintenance of the watershed.		Roughly 800 volunteers			
3 SEPs this year		LID education outreach		There have been good efforts to maintain a ribbon of undeveloped land along the banks of the river.			
		Hold regular education programs on environmental issues that are opened to the general public.		Water quality is significantly better than when the organization began.			
		They have a fairly strong volunteer water quality monitoring program.					
		Some volunteers are involved in certain projects, while not actually being members of the organization.					
		Conduct various clean up activities (i.e.. water chestnuts)					
		roughly 12 staff members					
		3 SEPs this year					

Appendix D: Waterbody Designations in Massachusetts

In accordance with the EPA, Massachusetts also designates its water uses in five categories; however they are referred to as: aquatic life, fish consumption, drinking water, primary and secondary contact, and aesthetic uses.

- Aquatic Life Use

This designation refers to the water's ability to sustain a natural range of aquatic flora and fauna. This is most commonly measured through a combination of chemical tests, as well as biological monitoring for indicator species such as macroinvertebrates. In some cases, tests are also conducted on the fish living in the waters, testing for noxious chemicals such as dichloro-diphenyl-trichloroethane (DDT), and polychlorinated biphenyl (PCB). From the compilation of these findings, the body of water is rated as supportive or impaired (United States Environmental Protection Agency, 2005, *Section 26*).

- Fish Consumption

A determination of 'impaired' for fish consumption use indicates that pollutants are at a level that has been deemed harmful to people. Chemicals such as mercury present in the water easily invade the fish population, making consumption of all fish species hazardous. Many areas of the nation have issued warnings about such harmful chemicals, which encourage women of childbearing age, and young children to limit intake of certain fish species. Supportive fish consumption would allow for utilization of all fish resources (Massachusetts Department of Environmental Protection, 2004a).

- Drinking Water

Drinking water use is considered one of the most important evaluations by many people. Public drinking water sources are carefully evaluated on a federal level through the Safe Drinking Water Act (SDWA) which was enacted by Congress in 1974 and currently monitors sources of water such as lakes, rivers, and ground water wells (United States Environmental Protection Agency, 2005, *Safe Drinking Water Act*). These water sources may also be subject to more severe regulations on a state-by-state basis (United States Environmental Protection Agency, 2005, *Section 37*). Drinking water supplies are generally monitored through end-use or finished water coming from a tap. Tests are completed for the major categories of contaminants established in the SDWA: bacteria, volatile and synthetic organic compounds, inorganic compounds, and radionuclides (Massachusetts Department of Environmental Protection, 2004b).

- Recreation

Use of water for recreation falls into two categories: direct, sustained contact (e.g. swimming), and secondary contact (e.g. boating). Waters are tested for bacterial levels, including, but not limited to fecal coliform bacteria (Massachusetts Department of Environmental Protection, 2004b), as well as harmful substances such as oil. Waters designated primary contact areas are

obviously monitored more closely than those solely used for navigation. Boat use, however increases the risk of contamination by oil products as well as adding to debris accumulation in waterways.

- Aesthetics

The last aspect of water evaluated for is aesthetics. Waters that have visible pollutants such as oil slicks, or floating debris, as well as high turbidity do not support aesthetic use. Unpleasant odors, or tastes, in addition to scum, and discolored water are also characteristics that do not support this use (Massachusetts Department of Environmental Protection, 2004a). A water body in support of aesthetics has a preserved natural character and an “untouched” appearance.

Appendix E: Case Studies

We feel that comparisons between the Massachusetts watershed approaches with other states' management plans may be informative for our project. In this section, we explore Ohio, Oregon, and California watershed programs as they are implemented from the statewide watershed plan suggested by the EPA. The statewide watershed plan is a set of recommendations that will allow sustainable watershed management (United States Environmental Protection Agency, 2002). US EPA developed steps for watershed managers of each state to follow when designing their own watershed plans.

A review was conducted to investigate states' experiences in implementing the statewide approach to their respective watershed management. The major condition for states to be considered in this review was a two-year period of implementation of the proposed watershed management strategy. Kentucky, Massachusetts, New Jersey, North Carolina, Ohio, Oregon, Texas and Washington all met this condition.

This review revealed that these states use one of two models, the basin-planning approach or the local watershed/government-driven planning approach. The states of Kentucky, Massachusetts, New Jersey, North Carolina, Ohio, Texas and Washington adopted the basin-planning approach, whereas Washington and Oregon adopted the government driven approach (United States Environmental Protection Agency, 2002). Even though they are called by different names, these models present similar approaches that involve participation of stakeholders, involvement of local groups in decision making and completion of watershed management activities (e.g. monitoring, planning).

In the following sections, we review and critically discuss the watershed approaches employed by three representative states: Ohio, Oregon, and California. Our choice of Ohio and

Oregon was based on their experiences in implementing the statewide watershed approach. Both states emphasize a community-based management approach and pursue of Non-Point Source (NPS) pollution alleviation in their watersheds. By contrast, we examine the beneficial use of Best Management Practices in California to preserve its coastal watershed.

Watershed management approaches in Ohio

Ohio EPA has developed an innovative program that would achieve decontamination in the eight Great Lakes. In the following section, we examine the application of Remedial Action Plans and strategies for community-based management as applied to the Ohio watershed system.

Ohio's Remedial Action Plan-RAP

As mentioned earlier, Ohio has adopted the basin planning management approach. In 1985, the International Joint Commission (IJC), through the Water Quality Board, suggested the creation of Remedial Action Plans (RAPs) that would reduce pollution in the Great Lakes region (Figure 1). The IJC is an international entity that deals with transboundary water-related issues “between the United States of America and Canada under the *1909 Boundary Waters Treaty* and pursues the common good of both countries as an independent and objective advisor to the two governments” (International Joint Commission, 2006, *What is the Boundary Waters Treaty?*).



Figure 1: Great Lakes Region
(The Great Lakes Information Network, 2006, *Remedial Actions Plans (RAPs) for the Great Lakes Areas of Concern*)

Ohio's RAP program consists of watershed management strategies that focus on the most polluted watersheds. RAP programs address ways of reducing pollution while promoting the participation of the public in preserving Ohio's natural resources (Great Lakes Information Network, 2006, *The Great Lakes*). RAP programs also emphasize the necessity to regulate non-point source (NPS) pollution in reducing the pollution levels in the Great Lakes regions. "NPS source pollution, which includes habitat alteration is now responsible for most water quality problems in Lake Erie and its tributaries" (Ohio Department of Natural Resources, 2006, p.2).

Prior to the inception of Ohio RAPs, the Great Lakes region and its surroundings were still being polluted despite the regulations and policies that were in place (Ohio Environmental Protection Agency, 2006).

In 1987, Ohio EPA initiated informative meetings relative to the development of RAPs, and brought to public attention the issues that Ohio's natural resources face. The community response to EPA's meetings was enthusiastic. This resulted in the formation of local groups in every Area of Concern, known as AOCs (Ohio Environmental Protection Agency, 2006). "An AOC is an area where water uses are impaired or where objectives of the Great Lakes Water Quality Agreement or local environmental standards are not being achieved" (Maumee Area of Concern, 2006, p.2).

Four RAPs have been established throughout Ohio (Figure 2): the Ashtabula River, the Black River, the Cuyahoga River, and the Maumee River.

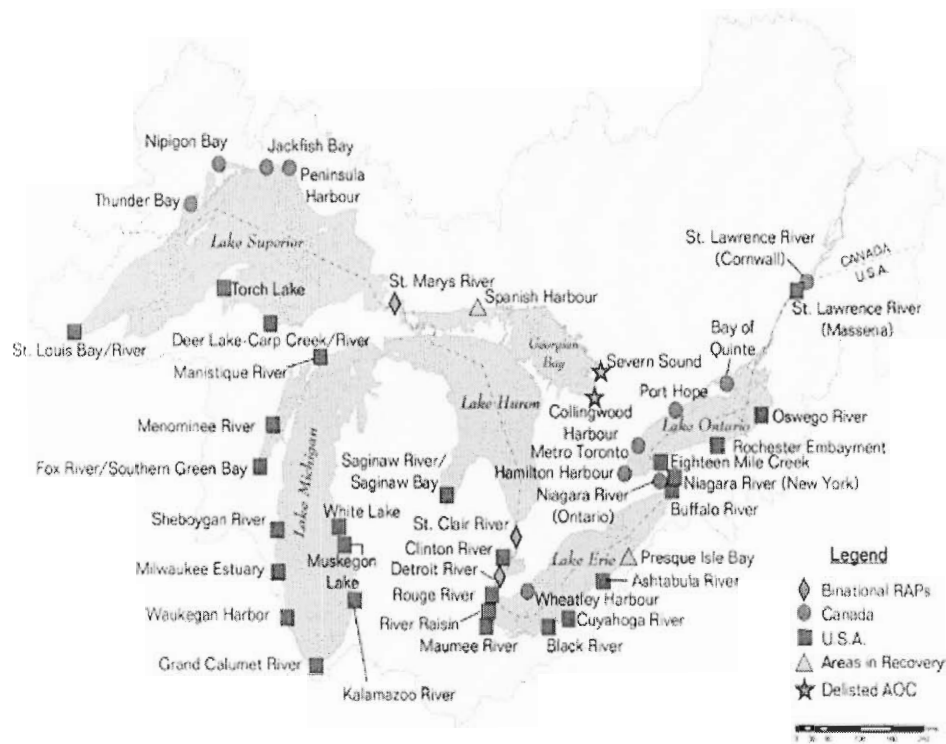


Figure 2: Great Lakes Areas of Concern
(Environment Canada, 2006, Areas of Concern in the Great Lakes Basin)

Each of Ohio's RAPs uses an ecosystem approach that enables the preservation of all biological resources within each watershed and supports the socioeconomic health of the community (Ohio Environmental Protection Agency, 2006). RAPs investigate the origin and consequences of the AOC's problems and implement innovative actions to restore the profitable uses of AOCs. These RAPs are all under the supervision of the Ohio EPA (Ohio Environmental Protection Agency, 2006).

Ohio EPA is the primary source of funding. As a result of this support, each RAP uses consultants and employs program coordinators and environmental experts. Other more technical assistance came from Ohio water divisions and districts (Ohio Environmental Protection Agency, 2006). The success of Ohio's RAP program sheds new light on the usefulness and applicability

of several of Ostrom's (2003) principles for common resource management mentioned in Section 2.2.

Ostrom's (2003) first principle states that "Rules are devised and managed by resource users", and Ohio's RAP program has applied this principle by promoting the participation of local communities in managing natural resources (Ohio Environmental Protection Agency, 2006). Such participation establishes a sense of ownership necessary for preserving a common resource. The large participation of the community brought enthusiasm, dedication, and creativity among individuals in preserving Ohio's watersheds.

The constant communication at all levels also emphasizes the accountability of users as well as of state officials (Ostrom, 2003, p.22). Ohio EPA (2006) has demonstrated a constant effort in keeping the public informed about issues that face Ohio's watersheds. It consults on a regular basis with professional planners in order to develop strategic planning. Outcomes of these consultations are presented to the community for approval, allowing the Ohio EPA to stay away from unrealistic goals (Ohio Environmental Protection Agency, 2006).

The concept of Ohio RAPs reflects successful management through a balance between the "top-down" and "bottom-up" approaches discussed earlier in section 2.3.1. Local communities are organized in small groups to address issues that face each local watershed. We are particularly interested in the role of local communities (the "bottom-up" component) in this successful management example, because we feel that this may have great bearing on management strategies in central Massachusetts. In the following section, we focus specifically on the role of community-based management in Ohio's RAPs.

Community-Based Watershed Management in Ohio's RAP program

For many years watershed management was considered as a government affair only. Even though governments possess means to support and implement watershed plans, they are very limited in their ability to regulate non-point source (NPS) pollution (United States Environmental Protection Agency, 2005). The increasing need to regulate and control practices that cause NPS pollution arose. Watershed managers recognized that it “is not solely the responsibility of government agencies and conservancy districts” (Ohio State University, 2006, *The Ohio State Fact Sheet*) to regulate such pollution, but each community's responsibility as well. This new perspective in examining watershed management led to the development of community-based management systems in Ohio.

The Ohio community-based approach consists of the direct involvement of landowners, farmers, and local government officials in water monitoring and planning. This is often referred as the bottom-up approach elaborated in section 2.4.1. This involvement appears to be valuable in building a sense of responsibility in users of common pool resources as suggested by Ostrom's principles (Ostrom, 2003).

In community-based watershed management, “the rights of those participating in the common pool resource management institution” (Rowland, 2000, p.5) are legitimized and set apart from ‘top-down’ procedures elaborated in section 2.4.2. Therefore, the monitoring and planning processes take place with the public consent and each individual participating in the decision making is held accountable (Ostrom, 2003).

Similar to Massachusetts, Ohio EPA has limited power to regulate NPS and to establish regulatory practices concerning land-use (United States Environmental Protection Agency, 2002). As mentioned in section 2.2.3, non-point source pollution results from non-specific

runoff from many activities and practices, including “agriculture, mining, forestry, home septic systems, and contaminated runoff from urban landscapes” (United States Environmental Protection Agency, 2005). Concerned about this issue (Ohio State University, 2006, *The Ohio State Fact Sheet*), local groups in Ohio, including government agencies and officials, educators, scientists, and other concerned stakeholders, came together in order to identify and address improper land-uses and other activities that contaminate local water resources or modify their condition. Stakeholders in Ohio reviewed current water practices and suggested new approaches to land use to facilitate the decontamination process of their water resources. The new regulatory “programs to reduce NPS pollution are meeting with success in Ohio” (United States Environmental Protection Agency, 2006, *Section 319 Success Stories, Vol. III*).

Ohio watershed groups work in partnership with diverse stakeholders to tackle common water issues encountered in local watersheds (United States Environmental Protection Agency, 2005). The relationships among community-based management organizations appear to be a key reason for the success of Ohio’s watershed organizations.

Each local group interacts with others to set common objectives for preserving their watersheds. “The State of Ohio shares responsibility with local agencies and organizations in the implementation of watershed protection projects” (Ohio Department of Natural Resources, 2006). Resource managers and other stakeholders bring their different approaches together, provide an effective way to address each local watershed issue, and implement possible solutions (United States Environmental Protection Agency, 2005).

To address these issues effectively, Ohio’s watershed groups use scientists and other experts in the field of water conservation (United States Environmental Protection Agency, 2005). Experts’ analysis and recommendations are presented to the public to explore their

feasibility, and if there is public support, they are implemented. Programs based on scientific views alone often fail when they are implemented without the community support (Ohio State University, 2006, *The Ohio State Fact Sheet*). Therefore, resource managers and scientists combined their opinions to develop programs that would be likely to have public support. This process is referred as an “adaptive management style”, which is “an experimental approach to management in the sense that participants must be prepared to learn from their mistakes and to adapt their management strategies to changing conditions” (Ohio State University, 2006, *The Ohio State Fact Sheet*, p.3). Ohio’s watershed managers determined that there is no single approach to dealing with water issues.

Multiple factors have to be taken into account when dealing with water resources. Ohio’s managers not only determined the physical and biological aspects of their watersheds but also analyzed the social and economic factors that influence water management. They therefore emphasized that “the goal of community-based watershed management is to protect and restore watershed functions while considering the variety of social and economic benefits of those functions” (Ohio State University, 2006, *The Ohio State Fact Sheet*, p.3). Referred as the “whole-system perspective,” this approach allowed both the implementation and integration of rules/laws regarding watershed management in Ohio. The whole-system perspective confirms Ostrom’s (2003) principle on rules appropriation; new rules must suit the community need and interest to ease their integration (Rowland, 2000, p.4). The whole-system perspective achieves the bottom-up approach in emphasizing the community contribution toward achieving sustainable watershed management. The success of the “bottom-up” component of watershed management in Ohio may have great bearing on management strategies in central Massachusetts.

Watershed Health Program- Oregon Plan

While Massachusetts and Ohio have adopted the basin-planning approach, Oregon adopted the local watershed planning approach. Oregon has further developed this approach in implementing the Watershed Health Program (WHP) to restore the health of Oregon's watersheds. By examining the Water Health Program and the Oregon Plan, we intend to examine the approach of community-based management in developing a specific program to deal with specific water conditions.

The Oregon Watershed Health Program (WHP) was created in 1993 by Oregon's governing body to restore water quality in Oregon (Holst, 2000). The WHP enabled the formation of local watershed groups. While composed of Oregon state agencies' representatives, the WHP assists local groups in developing programs that promote healthier watersheds in Oregon, and these programs are then managed by local watershed groups.

Local watershed groups organized in councils are composed of local stakeholders and other individuals having the common objective of preserving watershed functions in Oregon (Holst, 1999). Similar to Ohio, watershed councils work jointly with state and federal agencies in addressing Oregon's watershed issues, and in developing plans that suit the preservation needs of their respective areas. Even though it allows a strong community involvement, the WHP was still considered too broad to deal effectively with managing endangered species in and around Oregon's watersheds (Holst, 1999).

Federal officials brought to public attention the threat faced by Coho salmon species in Oregon and California. The threatened status of the salmon was established under the Endangered Species Act, which enables "the conservation of endangered and threatened species of fish, wildlife, and plants..." (United States Fish and Wildlife Service, 2006). Under the

governor's instigation, the Oregon Plan for Salmon and Watersheds (OPSW) was created in 1998. The main goal of the OPSW is "to restore the healthy function of Oregon's aquatic systems by protecting and restoring watersheds through locally driven and voluntary efforts" (Holst, 1999, p.33).

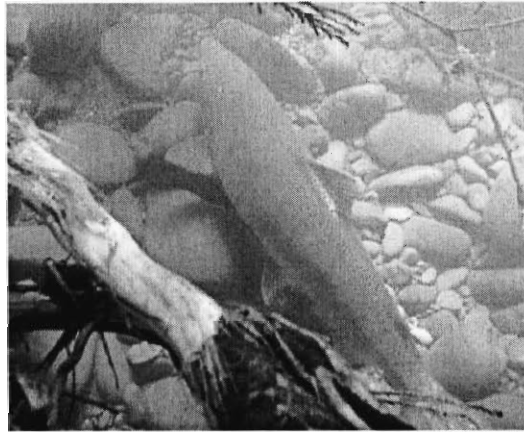


Figure 3: Oregon Salmon
(State Symbols USA, 2006, *Oregon State Fish*)

As established in the previous section, the health of a watershed impacts the stability of natural populations living in the water and its surroundings. The Oregon Plan does not focus only on the preservation of salmon, but considers several elements that support wildlife and habitat (Oregon Plan for Salmon and Watersheds, 2006). To achieve this end, three approaches were taken: the coordination of state programs, community-based involvement, and regular water control (Holst, 1999).

The state programs were coordinated by watershed councils in permanent relationship with the state agencies and government officials. Each step taken toward the accomplishment of WHP projects was based on constant public input. Similar to Ohio RAPs, rules and strategies for their implementation were made with public agreement and support. The monitoring processes were agreed upon with community participation and the results made available to state agencies, landowners, and stakeholders for examination.

As a result of this public participation process, four teams were established to execute the monitoring process: the science team, the coordination team, the public outreach team, and the independent team. Each of these teams was assigned a particular task (Holst, 1999); the *science team* is in charge of identifying watershed in need of care, and set standards that will probably lead to the success of the plan. The *coordination team* ensures that all local agencies are working to produce the same outcome. The *public outreach team* encourages watershed councils in the design of new approaches for watersheds' restoration. Finally, the *independent science team* composed of scientists analyzes all proposed projects and provides feedback on their probable success.

The combined efforts of state agencies, working through the monitoring teams, and community members in conserving and restoring habitats appear to be successful. New resolutions are established with low economic cost. This management strategy upholds Ostrom's fifth principle, in that a member of an organization and their officials can without problems establish common policies that will benefit their common properties (Ostrom, 2003).

One other aspect of Oregon's programs is the financial and logistical support provided by the Oregon government through the Governor's Watershed Enhancement Board (GWEB). The GWEB provides grant money and other logistical support to local groups organized into watershed councils (State of Oregon, 2006). In a one year period (1996-1997) the GWEB provided \$5.5 million to support WHP projects. Amazingly, \$2.6 million of this fund was obtained from lottery revenues. In the future; \$32 million was allocated for the expansion of the Oregon plan (State of Oregon, 2006).

By examining both Oregon and Ohio watershed management practices, we feel that the interactions among state officials, local groups, and community members may have important

implications for management in the central region of Massachusetts. We aim by this examination to establish the impact of a strong bottom-up component as a necessary element in developing successful watershed management strategies. The bottom-up approaches provide the particular benefit that users, who are most directly affected by the deterioration of a common pool resource, are able to participate in the management of their own resources.

Ostrom refers to such participation as ‘collective choice arrangements’ in which “individuals affected by the operational rules can participate in setting and modifying the operational rules” (Ostrom, 2003, p.22). New rules and/or new management practices are to achieve water decontamination and protect areas such as coastlines that often are subject to polluted runoff and other human practices that alter water quality along coastlines. In the following section, we examine the making of rules and practices beneficial in protecting California’s coastline.

California Coastal Commission- Critical Coastal Areas

The state of California presents a long and varied coastline. Although each part of the coast has its particular landscape, they all face water pollution due to human activities and runoff along the coastlines (Figure 4). These activities alter water quality, often to the detriment of local ecosystems. In 1972, the California Coastal Commission (CCC) was established to regulate water practices along the coasts of California and control polluted runoff. Composed of twelve members established by the governor, the senate rules committee, and assembly speakers, the CCC insures the execution of California’s Non-Point Source Pollution Control Program (California Coastal Commission, 2006, *Who We Are*).

Several species, including aquatics, are endangered due to a conflict between urban development and natural resources conservation. California was the second state in the US to list

an aquatic species in the Endangered Species Act (United States Fish and Wildlife Service, 2006).

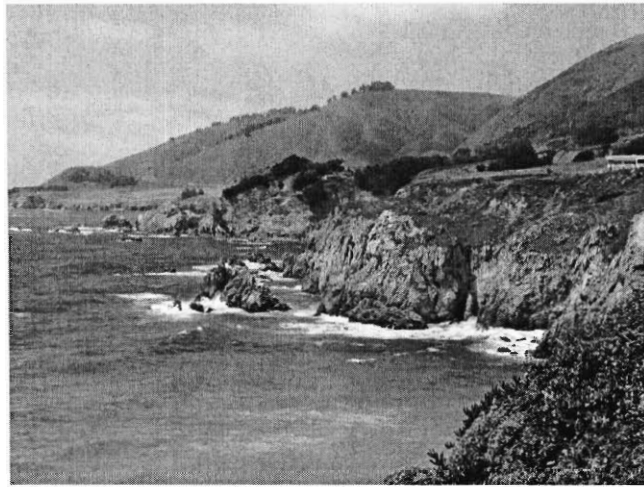


Figure 4: California coast
(Urban Achiever, 2006)

Similar to Massachusetts, Ohio, and Oregon, NPS pollution is the major concern of watershed groups in California and throughout the US. Sometimes referred to as polluted runoff, NPS pollution endangers water quality, causing “beach closures, resulting in risks to public health and significant impacts to local economies” throughout the US (California Coastal Commission, 2006, *Introduction*). Even though each of these watershed groups has the common goal of reducing NPS pollution in California, it was still difficult to develop a program that will control and regulate such pollution due to the multitude of local and regional groups. To reach this end, The NPS Plan created the Critical Coastal Area (CCA) program.

Critical Coastal Areas (CCAs)

Similar to Ohio RAPs, Critical Coastal Areas (CCAs) are defined areas where water quality is impaired due to NPS pollution (California Coastal Commission, 2006). CCA focuses on the control of NPS pollution caused by runoff. Being a California state agency program, the CCA encourages Best Management Practices (BMPs) in NPS prevention (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*).

“BMPs are effective, practical structural or nonstructural methods which prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water...” (State of Hawaii, 2006, *Best Management Practices*). Given their effectiveness, BMPs are applicable for different management target such as agriculture, forestry, urban areas, marinas and recreational boating, etc. In spite of their targets, BMPs appear to be effective in managing NPS pollution. “By implementing best-management practices, American Samoa reduced *E. coli* levels in Samoa’s Afuelo Stream by 90% and total nitrogen and total phosphorus by 58% and 43%, or 2649 and 2088 pounds annually, respectively”(United States Environmental Protection Agency, 2005, *Health Risks Reduced in American Samoa*).

The CCA programs strongly refer to BMPs in developing programs to reduce the effect of NPS pollution to California coastlines. Twenty-five CCAs were established in 1995 by the CCC to accomplish watershed planning (Figure 4).



Figure 5: California's Critical Coastal Areas
(Coastal Conference, 2006)

These CCAs were referred to as “coastal zone portions of watersheds which drained into impaired and threatened bays and estuaries listed on the Clean Water Act (CWA) Section 303(d) list” (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*, p.3). One such zone was the Elkhorn Slough, classified in 1996 as a priority region in need of a planning program. The CCC developed strategies to improve water quality in this California region. These strategies include the participation of landowners, local governments, and technical experts in the design of a permitting program (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*, p.4). “A permit is an authorization, license, or equivalent control document issued by the federal, state or local government or other agency to implement” (California Association of Resource Conservation Districts, 2006, p.1). new management practices that meet the need of NPS control of a watershed portion. Thirty-nine permits resulted from this process leading to the creation of the NPS plan.

The NPS control plan supports the ‘stewardship ethic’, which allows each community member to participate fully in management decisions and implementation (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*, p.3). This management approach complies with Ostrom’s first principle that “Rules are devised and managed by resource users” (Ostrom, 2003, p.22). The CCA program has applied this principle in establishing “the partnership between the state and local government as stewards of California’s coastal resources” (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*, p.3).

The CCC staff constantly review newly adopted land use and other management practices to determine their effectiveness in keeping Californian coasts clean. One review was performed

on sixteen Local Coastal Programs (LCPs) to determine their consistency in pursuing goals and regulations established by the California Coastal Act. LCPs are “the basic planning tools used to carry out the partnership between the state and local government as stewards of California’s coastal resources” (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*, p.3). LCPs are developed by each local California coastal group to manage the coastal region under their influence. LCPs that meet the requirement of the Coastal Act are certified and therefore empowered to complete planning and permitting procedures (California Coastal Commission, 2006, *Protecting Coastal Waters: Critical Coastal Areas Draft Strategic Plan*). Such management (explored in section 2.3.1) appears to be effective for the Coastal Commission in its effort to establish Best Management Practices (BMPs) in diminishing the impacts of NPS pollution.

Given that the origins of NPS pollution are diverse, a thorough selection of BMPs is required in order to reduce the effects caused by such pollution. As stated in the Federal Water Pollution Act amendments of 1972, public law 92-500, every watershed management plan throughout the US should adopt BMPs that best suit their particular water resources to eliminate pollution due to NPS (State of Hawaii, 2006). Through the application of BMPs, the CCA developed a planning process based on two stages: the assessment of each individual section of coastline and the implementation of an action plan. This plan addresses the impacts of NPS pollution, while specifying ways of improving water quality along California coasts (California Coastal Commission, 2006, *Who We Are: Program Overview*).

By providing the California example of watershed management, we intend to stress the beneficial use of BMPs in preserving watersheds. Supported by EPA (United States Environmental Protection Agency, 2005, *Protecting Coastal Waters: Critical Coastal Areas*

Draft Strategic Plan) as being a way of preserving stream courses, reducing runoff and stopping the migration of pollutants into water, we feel that BMPs may be of great use in dealing with NPS pollution in the central region of Massachusetts.

Conclusion

By examining both Oregon and Ohio watershed management practices, we establish the interaction between state officials, local groups, and community members as being an important factor while implementing watershed management programs. The community involvement added to a strong partnership is beneficial for the management of common pool resources. The impact of the bottom-up component in such management is a necessary element in the development of new watershed management strategies for it provides the particular benefit that users, who are most directly affected by the deterioration of a common pool resource, are able to participate in the management of their own resources.

NPS pollution is currently the major concern of watershed organizations throughout the United States and therefore requires the attention of these organizations. NPS pollution alters the health of watersheds and natural species that depend on such resource.

The CCA used BMPs to regulate NPS pollution along California coastline. Through the California example, we reaffirm the necessity of developing BMPs to control and regulate NPS pollution in any watershed. We feel that the bottom-up components in management of common resource the use of BMPs are necessary elements to consider in the development of watershed management strategies. We feel that these elements can bring successes in managing NPS pollution in Massachusetts water resources.