

Statewide Watershed Management Effects on Local Watershed Groups: A Comparison of Wisconsin, Kentucky, and Virginia

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(ABSTRACT)

While there are no federal mandates for states to establish watershed management frameworks, many states see the benefits of doing so and have established such approaches. The main advantage of statewide watershed management over traditional resource management is the cost effectiveness and the formation of integrated solutions to water quality problems. Statewide watershed frameworks provide a geographic focus and partnerships in order to develop comprehensive solutions to water quality problems. Watershed management depends on the participation of the local community and its organizations. Local watershed groups formed within in the community become integral members of these partnerships because of their vested interest in the watershed. Federal, state, and local governments recognize the functions that watershed groups serve, and how important they are in developing guiding principles for the watersheds. However, since watershed management at the state level is relatively new and constantly evolving, the exact roles of where watershed groups fit into this framework and the amount of technical, educational, and financial support given to them is not yet fully defined. Because this relationship is not clearly defined, watershed groups often encounter obstacles that may inhibit them from reaching their full potential. There are six common factors shown to be effective in fostering the relationship between the states and local watershed groups. These include: having one central agency in charge of coordinating watershed management activities, state funding support for local watershed groups, state support for research, experimentation, and pilot projects, state facilitation of technical assistance and support, state support for public education on water quality issues, open forums where all stakeholders can voice their concerns and opinions.

This paper outlines the watershed management framework of three states: Wisconsin, Kentucky, and Virginia. It explores the question: What educational, political, and financial assistance do these states offer in order to create a collaborative environment in which grassroot watershed groups have the capacity to make informed decisions affecting the outcome of their watershed? This paper evaluates each state on how well they have incorporated the six common factors into their watershed frameworks.

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Chapter 1

Introduction

A watershed is the land that water flows across or under on its way to a stream, river, lake, or wetland (Bonnell, 2000). Areas of higher elevations, such as ridgelines or divides, separate watersheds. The entire area within these areas of higher elevation is considered a watershed. Watersheds supply water for drinking, recreation, industry, and farming, and at the same time provide habitat for many species (Klug, 2001). In the United States, rapid population growth in many watersheds has led to increased conflict between users of water resources, dramatic loss of native aquatic diversity, and a general decline in the health of landscape ecosystems. Federal Clean Water Act and responding state mandates have traditionally outlined water resource management (Billman-Golemme, 2001). These mandates gave federal, state, and local agencies the responsibility of regulating water resources, but they incorporated little or no collaboration from those who were utilizing the resource. This command-and-control method of managing water resources has produced environmental gains and is still needed (Sexton, 1999). Throughout the past two decades, however, this approach has shifted towards watershed management, an approach which is more comprehensive in nature and takes into account the interface between land, water, and humans instead of looking at each as a separate entity (Stakhiv, 1996). Watershed management is a process that depends on the collaboration and cooperation of those involved in water resource management, land use management, and those living in the watershed. Instead of looking at a specific lake or river, managers look at the entire watershed and work collaboratively

with its residents in order to devise more agreeable and sustainable decisions that benefit all (EPA, February 1996).

Watershed management brings new responsibility to those agencies previously concerned with only the regulation of the resource. While maintaining a regulatory presence, federal, state, and local agencies are obliged to take on the role of facilitator, communicator, motivator, and educator to those stakeholders involved (Sexton, 1999). This is not an easy task. In order to be successful, the process must establish trust and collaboration between citizens and agencies, and participants need to feel that they have a voice in the outcomes that affect the watershed and the lives of those who live there (Knutson, 1999). Watershed groups often span the expanse between regulators and citizens, effectively fostering this collaborative environment.

A watershed group is a group of concerned citizens, usually from the same community, who become organized in order to address specific issues facing their watershed. Watershed groups form for a variety of reasons, ranging from sportsmen groups trying to protect fish habitat to concerned citizens organizing to stop non-point source pollution from entering their rivers, to those concerned about having some control over their property rights (Sommarstrom, 1999). The overall goals of most of these groups are to restore, protect, and enhance the quality of the watershed in which they live. Whatever motives lie behind their formation, whether it be altruistic or purely for self interest, watershed groups typically are action oriented and can garner much citizen support, giving the group political strength and a powerful voice within the stakeholder forum. Federal, state and local agencies recognize this voice and treat these groups as allies in watershed protection (Clements, 1996). However, while the idea of watershed

management is being embraced by all forms of government, it is still an evolving process, and the collaborative environment between the state and watershed groups is not yet fully defined (Adams, 2000). Many states are not quite sure what support they should be give to these groups to foster this collaborative environment. As a result, many groups find themselves lacking the financial and capacity building support needed to reach their full effectiveness in watershed protection and in the collaborative process (Adams, 2000).

This paper investigates the watershed management frameworks of Wisconsin, Kentucky, and Virginia, and explores the questions:

- What financial support do states allocate to support local watershed groups?
- What technical and educational resources are provided by the state in order for grassroot watershed groups to feel they have the capacity to make informed and correct decisions affecting the outcome of their watershed?
- What actions are taken by these states to create a collaborative enviroment where the stakeholders feel that they have a voice that is heard in the decision-making process?

By looking at the case studies and exploring the literature, this paper integrates those features that have been proven effective in creating successful and collaborative relationships between the states and local watershed groups into a framework that describes how states can be more effective in creating these relationships. An evaluation of each state will then be made on how effectively they incorporated those features into their respective watershed management frameworks. The paper strives to serve as an aide to help future state resource management agencies looking to establish a statewide policy towards watershed management. The intent is that they can reference this

comparative evaluation in order to assist in the development of a uniform system of support.

Watershed Approach to Resource Management

Watershed management is an integrated, holistic strategy for more effectively restoring and protecting water resources (EPA, February 1996). Rather than basing decisions on areas defined by political boundaries, this approach focuses on the watershed as a management unit (Bonnell, 2000). To protect water resources, it is becoming increasingly important to address other sources of pollution originating from the land areas within the watershed, because as water drains off the land or leaches into the groundwater it carries with it pollutants from human activities (Bonnell, 2000).

There are nine key elements that make up the framework for watershed management, these include (Clements, 1996):

1. Geographic management units, which are usually entire watersheds or sub watersheds.
2. Stakeholder involvement.
3. Basin management cycle, which creates timelines that schedule events.
4. Strategic monitoring, which gathers data on watershed.
5. Basin assessment.
6. Priority ranking and resource targeting system.
7. Development of management strategies.
8. Creation of a management plan.
9. Implementation of that plan.

One of the major keys to success when implementing a watershed management approach is the coordination and more efficient implementation of programs that influence the impacts affecting water quality (Bonnell, 2000). For this to happen, it has been argued that, the collaboration of key stakeholders in the decision making process is required (Bonnell, 2000). It also presents opportunities for finding creative ways to

enhance the overall health of the aquatic system by fostering greater accountability and involvement for the stakeholders (Bonnell, 2000). The watershed approach to resource management is action-oriented, driven by broad environmental objectives, and is dependent on the collaboration of key stakeholders (Bonnell, 2000). Involving local stakeholders can result in more locally relevant solutions that take into account the community's unique social, economic, and environmental conditions and values. Stakeholder participation is important because it creates a sense of local ownership of identified problems and solutions, ensuring long-term support for the resulting management plans (Knutson, 1999). Some of the most active and vocal of these stakeholders are found within local watershed groups (Bonnell, 2000).

The National Movement towards Watershed Management

Throughout the past 30 years, the United States has moved from a system of water resource management that was based purely on command-and-control strategies of controlling water pollution towards a more holistic approach of watershed management. With the enactment of the Clean Water Act (CWA) in 1972, the nation improved upon its past practices that had resulted in widespread water pollution and committed itself to restoring and maintaining the chemical, physical, and biological integrity of the nation's waters (EPA, February 1996). The Act resulted in many successes in cleaning up pollution from end-of-the-pipe sources (point sources) and the nation saw significant improvements in its water quality. However, despite all of the successes of the CWA, 40 percent of the nation's rivers, lakes, and coastal waters still fail to meet water quality standards (EPA, February 1996). Much of the water in the country is still too polluted for basic uses like fishing or swimming. While the Act concentrated its efforts on cleaning

up pollution from point sources, less emphasis was placed on other sources of water pollution (Billman-Golemme, 2001). The 1972 CWA provided little control of nonpoint source pollution originating from farmlands, urban areas, forestry, total daily maximum loads, and mining operations. Those areas critical to the ecological health of aquatic systems, such as wetlands, were also not adequately protected (EPA, February 1996).

Section 319

In the mid 80's, Congress recognized that there was a need for greater federal leadership to help address the need for more nonpoint pollution control efforts at the state and local level. As a result in 1987, Congress amended the CWA to establish the section 319 Nonpoint Source Management Program (EPA, September 2001). Under section 319, State, Territories, and Indian Tribes could receive grant money for activities designed to reduce nonpoint source pollution, which included technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects (EPA, September 2001).

Clean Water Initiative

In 1997, building upon the strong foundation of the existing clean water programs defined by the CWA, the Clinton Administration created the Clean Water Initiative (CWI) (Copeland, 1999). The CWI proposes a unified approach for managing water pollution and land stewardship. The U.S. Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) worked with other federal agencies and the public to prepare an Action Plan to meet the promise of clean, safe water for the nation. This Action Plan formed the core of the CWI in which over \$560 million in new

resources were budgeted for 1999 for its implementation (Copeland, 1999). Those states that agree to implement the Action Plan become eligible for these funds. The Action Plan proposes new actions to strengthen efforts to restore and protect water resources. In implementing this Action Plan, the federal government agreed to the following (Copeland, 1999):

- Support locally led partnerships that include a broad array of federal agencies, states, tribes, communities, businesses, and citizens to meet clean water and public health goals.
- Increase financial and technical assistance to states, tribes, local governments, farmers, and others; and help states and tribes restore and sustain the health of aquatic systems on a watershed basis.

This Action Plan is built around four key tools to achieve its clean water goals, these are:

1) A Watershed Approach

The Clean Water Action Plan envisions a new, collaborative effort by federal, state, tribal, and local governments, the public, and the private sector to restore and sustain the health of watersheds in the nation. The watershed approach is the key to setting priorities and taking action to clean up rivers, lakes, and coastal waters (Copeland, 1999).

2) Strong Federal and State Standards

Calls for federal, state, and tribal agencies to revise their water quality standards where needed and to make existing programs more effective (Copeland, 1999).

3) Natural Resource Stewardship

Because most of the land in the nation's watersheds is cropland, pasture, rangeland, or forests, the Action Plan calls on federal natural resource and conservation agencies to apply their collective resources and technical expertise to state and local watershed restoration and protection (Copeland, 1999).

4) Informed Citizens and Officials

The Action Plan calls on federal agencies to improve the dissemination of information to the public, governments, and others about the health of their watersheds and the safety of their beaches, drinking water, and fish, because they feel that informed citizens and officials make better decisions about their watersheds (Copeland, 1999).

The Clean Water Action Plan emphasizes the need of involved state agencies and local citizens to work in a collaborative way to make better and more informed decisions concerning their watershed (Copeland, 1999).

States Movement towards Watershed Management

While no federal provisions mandate that states establish watershed management frameworks, many states have either established or are in the process of establishing such frameworks (Clements, 1996). States are beginning to see the advantages if the watershed approach to resource management. The two main advantages that watershed management has over traditional resource management are the comprehensive development of integrated solutions and cost effectiveness (Clements, 1996).

Integrated solutions are needed in resolving water quality problems because, more often than not, solutions to the problems often requires examining the interaction of land, water, and air that transcends political boundaries. Many times, individual agencies lack the authority to fully address the issues. Statewide watershed frameworks are built around a geographic focus and the formation of partnerships in order to develop integrated solutions that address water quality problems as completely as possible (Clements, 1996).

Greater cost effectiveness, compared to traditional resource management, also motivates states to develop their own watershed management frameworks. Watershed management works efficiently because it targets staff and funds to address highest priority concerns, pools expertise and funds from many agencies to solve common concerns among partners, consolidates planning and implementation efforts by watershed unit, and minimizes the duplication of efforts (Clements, 1996). By adopting a watershed management framework, states also become eligible for more federal funds geared towards improving water quality.

Watershed Management at the Local Level

Watershed management depends on the participation of the local community and its organizations (Kerr, 1994). Federal, state, and local governments, and industry bring money and legal and technical expertise into the partnership. The community brings time, labor, their standing in the community, their knowledge of local circumstances, and their attitudes, beliefs, and values (Sexton, 1999). Partnerships are essential for the community, since it is the community who stands to gain environmental, social, and even economic benefits (Sexton, 1999). Local watershed groups formed within the

community are integral members of these partnerships because of their vested interest in the watershed.

Local watershed groups are formed for a variety of reasons and span a full spectrum of timeframes, issues, organization, and composition (Sommarstrom, 1999). Groups can be short-term in nature and focus on single goal, like a group that organizes for a one time clean-up project. Or they can be long-term, have multiple issues that they want to address, and include representatives from other interests, like watershed councils. Whatever the motivation, watershed groups serve many functions, including: increasing public awareness and knowledge; actively doing projects that have a direct positive impact on the watershed; gathering data used by federal, state and local agencies; forming partnerships and raising social capital (Sommarstrom, 1999).

Obstacles to Local Watershed Groups

Federal, state, and local governments recognize the functions that watershed groups serve and the importance of these groups in the guiding principles of watershed management. However, since watershed management at the state level is relatively new and constantly evolving, the exact role the watershed group plays and the amount of technical, educational, and financial support given to them is not yet fully defined. Because this relationship is not clearly defined, watershed groups often encounter obstacles that may inhibit them from reaching their full potential. Some include (L.O.W.P.A. 1997):

- Insufficient funds and resources at the local level
- Insufficient leadership capacity at the local level
- Insufficient coordination of responsibilities and priority setting across watersheds

- Lack of technical guidance and information on which to base management decisions

Six Criteria for Effective Statewide Watershed Management Programs

Overcoming these external obstacles is not an easy task. While each state's watershed management framework is constructed differently, most are built around those nine basic elements needed for effective watershed management. States realize the importance of stakeholder involvement in the decision-making process and the importance of watershed groups in this process. Incorporating these groups into the state watershed management frameworks as completely as possible serves two purposes. First, it serves the state by creating productive partnerships, and second, it serves the watershed groups themselves through added support and recognition. While there are many effective methods used throughout the states for incorporating these groups into the frameworks and fostering a collaborative relationship between the states and local watershed groups, the six that have been shown to be the most effective are:

- 1. Having one central agency in charge of initiating, coordinating, and acknowledging successful watershed management activities (Born and Genskow, 2001)**

Having one central state agency that initiates projects and coordinates activities helps give local communities the incentive needed to start watershed projects. Acknowledging successful watershed projects gives groups the confidence to continue what they have been doing and expand into other areas of watershed protection.

2. Adequate state funding support for local watershed groups (C.B.C.W.W.G., 2000).

Watershed groups need consistent and adequate funding in order to effectively take actions and initiate projects focused on improving the quality of their watershed.

3. Support from the state to initiate research, experimentation, and pilot projects (Sommarstrom, 1999).

Because watershed management is an evolving process and subject to many external influences, it is important that the process be flexible and be able to adapt to unforeseen circumstances. It is a management style that needs to be learned through calculated trial and error, new techniques need to be tried, and those that fail need to be abandoned, while those that work need to be embraced.

4. State provision of technical assistance and support (C.B.C.W.W.G., 2000).

While many groups have good intentions and want to improve their watersheds, many times they lack the technical expertise to do so.

Technical support from the state empowers these watershed groups to do more than they would be able to do on their own.

5. State support for public education on water quality issues (Copeland, 1999).

In order for stakeholders to make informed decisions regarding their watershed, they first need a base of knowledge. This base includes the basic functions that watersheds serve, impacts affecting water quality, and the importance of stakeholder's actions.

6. Having local and statewide open forums where all stakeholders can voice their concerns and opinions (Born and Genskow, 2001).

Effective decision-making results when everyone involved in the decision-making process has an equal voice and an opportunity to be heard.

The following case studies examine the specific watershed management frameworks of Wisconsin, Kentucky, and Virginia. Each case study focuses on the support that is offered to local watershed groups by the states, and will include examples of local watershed groups and their experiences. Finally, this paper evaluates each state's watershed management framework based on the extent to which it addressed and integrated these six factors in their programs.

Chapter 2

Wisconsin's Approach to Watershed Management

Wisconsin's water resources form part of a rich and diverse ecosystem. The state contains over 15,000 inland lakes, 32,000 miles of perennial rivers and streams, 23,000 miles of intermittent rivers, 1,751 square miles of Great Lakes' estuaries and bays that adjoin 1,017 miles of Lake Michigan and Lake Superior shoreline, 5.3 million acres of wetlands and two quadrillion gallons of groundwater (Martin, et al, 2000). These water resources support a major recreational tourism industry, sustain strong agricultural and industrial sectors, and provide a high quality source of drinking water for residents of the state (Martin, et al, 2000).

Wisconsin has historically been very active in water resource management and has given the responsibility of managing these resources to the Wisconsin Department of Natural Resources (WDNR) (Martin, et al, 2000). In 1997, in reaction to the Clean Water Initiative, the WDNR changed its approach in water resource management from a single issue focus to watershed management. The WDNR began integrating many of its programs and bringing together multiple agencies, interests and jurisdictions into a watershed approach, which addresses all parts of the ecosystem. To accomplish this, the WDNR went through a reorganization in 1997 (Martin, et al, 2000).

Wisconsin's new watershed approach provides that stakeholders are central to decision making and implementation and solutions need to be geographically based and reflect the factors that affect the area (Martin, et al, 2000). The new structure of the WDNR reflects an updated management philosophy that puts more emphasis on public participation and partnerships and the need to achieve cost-effective program

management, while implementing a watershed approach (Martin, et al, 2000). The reorganization breaks the state down into geographical management units (GMUs), using the major watersheds in the state as boundaries for each unit. The use of GMUs is meant to strengthen management leadership in the field level and by instituting a team approach to program development enhanced integration and public participation (Martin, et al, 2000). These units are a blend of basin, terrestrial management, and county boundaries; two of the 23 GMUs coordinate activities related to the Mississippi River and Lake Michigan. Wisconsin is further divided into 333 watershed management units. In each of the 23 watersheds, citizens and citizen groups are encouraged to take an active role in the discussion of environmental protection and resource management through citizen-based committees called "Partner Teams" (Martin, et al, 2000).

Map 1: Wisconsin's Geographical Management Units (WDNR, November 2001)



As a result of the WDNR's movement towards integrated management, the creation of teams with the land and water divisions within the agency occurred (Martin, et al, 2000). These teams captured essentially all WDNR personnel having direct land-based or water-based management responsibilities, organizing them into teams that

would work together within one GMU. These teams then created partnerships with the different federal agencies, University Cooperative Extension Offices, and public and private stakeholders in each GMU. These partnerships integrated resource management programs and goals from federal, state, and local levels, which resulted in agencies avoiding duplication of efforts, striving to better meet needs of local citizens (WDNR, 1998). The WDNR committed itself to this partnership approach by budgeting time and money to these external partnerships. It was expected that the GMU partnerships would become self-sustaining and serve as a vehicle for coordinated watershed planning at a larger geographic scale (WDNR, 1998).

Planning Process

WDNR changes are directly reflected in the way the water quality is managed. Regional management teams in each GMU are responsible for developing State of the Basin reports through an integrated planning process (WDNR, 1998). This multi-step process involves utilizing the strengths of the GMUs external partnership teams to identify and manage all aspects of the ecosystem (See Figure One). Each GMU works with their partnership team to identify a vision for the GMU's ecosystem, the existing resource conditions, and impediments to achieving optimum resource health (WDNR, 1998). The resource inventory then uses WDNR data and other available information on water and land resources to develop an accurate ecosystem assessment for each GMU (WDNR, 1998).

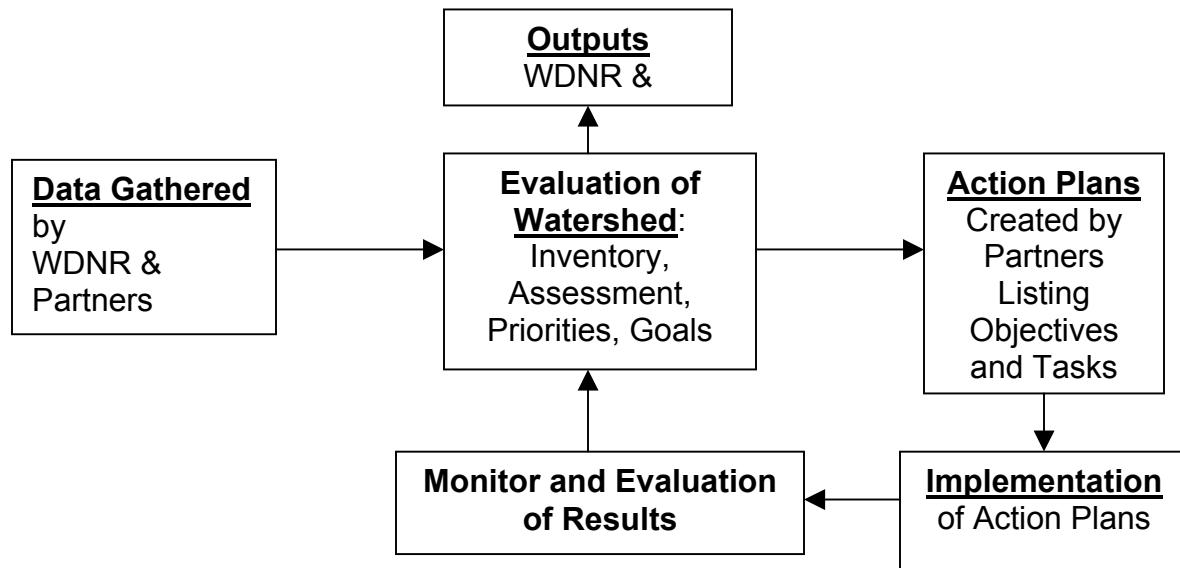
Through the collaboration and planning efforts of the partner groups, documents are written that provides a snapshot of ecological conditions, management needs and priorities within each basin or GMU (WDNR, 1998). This effort is also the basis for work

planning and budget decisions in the various program areas that include fish, wildlife, and water quality. These plans are also intended to satisfy requirements of Section 208 of the Clean Water Act (WDNR, 1998).

The plans intend to (Martin, et al, 2000):

- Highlight priorities identified by the partner group process.
- Provide a concise but descriptive summary of the physical and biological characteristics of the basin.
- Identify GMU-specific water, fishery, wildlife and habitat issues
- Recommend actions to be taken within the GMU.

Figure One: Wisconsin's Integrated Planning Process (Martin, et al, 2000):



Allocation of Resources to Watershed Groups

The State of Wisconsin has many sources of funding available to localities, farmers, and citizen groups for use in environmental improvement projects. Four major grant programs most suitable for watershed groups include The Urban Nonpoint Source

and Stormwater Grant Program, Targeted Runoff Management Grant Program, and the Wisconsin Rivers and Streams Protection Grants Program (Wagner, 2001).

Urban Nonpoint Source and Stormwater Grant Program

Urban Nonpoint Source and Stormwater Grants promote urban runoff management for existing urban areas, developing urban areas and urban re-development. The primary goals include implementing urban runoff performance standards, achieving water quality standards, protecting groundwater, and helping municipalities meet municipal storm water permit conditions (Wagner, 2001). While these grants are more geared toward local governments, watershed groups can solicit funding for projects that address urban nonpoint pollution. Examples include urban streambank stabilization, land acquisition to increase permeable areas for infiltration, and storm drain stenciling (Wagner, 2001). Urban Nonpoint Grants can fund 70% of technical assistance while standard cost-share funds are available at 50% of the project cost (Wagner, 2001).

Targeted Runoff Management Grant Program

Targeted Runoff Management (TRM) Grants are competitive financial awards to support small-scale, short-term projects that are completed by local governmental, watershed and conservation groups within 24 months of the start of the grant period (Wagner, 2001). Both urban and rural projects can be funded through a TRM Grant. Up to 70% of a project can be funded through a TRM grant, to a maximum of \$150,000 in state funding. Project selection is based on watershed priorities, local support for the project, and the ability of the project to control nonpoint pollution (Wagner, 2001).

Wisconsin Rivers and Streams Protection Grants Program

The Wisconsin Rivers and Streams Protection Grants Program sets aside \$400,000. It is a public/private initiative designed to help clean up rivers, better manage river corridors and watersheds, and protect future river health through an investment in community-based watershed stewardship (Ambs, 1999).

Lake Planning Grants

Lake planning grants provide funding for the lake management planning process. Small-scale lake planning grants of up to \$3,000 are available for use in obtaining and disseminating basic lake information, conducting education projects, and developing management goals (Vennie, 2001). These grants are ideal for lake groups just beginning the planning process or for activities that supplement an existing plan (Vennie, 2001).

Large-scale lake planning grants up to \$10,000 per project are available for bigger projects. The intent of the large-scale program is to conduct technical studies to help develop elements of or complete comprehensive management plans that will specify activities related to minimizing the impact of future development, managing user conflicts, improving fishing, or improving water quality (Vennie, 2001).

Educational and Technical Assistance

The educational and technical support provided to watershed groups in Wisconsin has increased due to the reorganization of WDNR and its development of partnerships of different state and federal agencies, and the university cooperative extension offices (Shepard, 1999). As a result of the reorganization, an interagency panel called the Land and Water Education Team was formed that includes cooperating university faculty and representatives from federal, state, and local programs, local watershed groups, and

private citizens. The team's responsibilities include providing a technical support base, coordinating training for all basin educators and local education staff, and coordinating the competitive grant programs (Shepard, 1999).

Local Case Studies

The following case studies illustrate how the WDNR has worked closely with local watershed groups providing financial, technical, and educational assistance where needed. The two examples examining this collaboration are "Friends of Lake Wingra", and a consortium of groups surrounding Big Green Lake.

Friends of Lake Wingra

Friends of Lake Wingra (FOLW) came together in 1998 in response to the designation of Lake Wingra as an "Integrated Ecosystem Management" Project by the Wisconsin Department of Natural Resources (Forbes, 1999). The goals of the WDNR Integrated Ecosystem Management Project are to bring partners together for cooperative water quality solutions, promote public involvement, and to perform public outreach and education (Forbes, 1999).

Lake Wingra is located in the center of Madison, Wisconsin. The watershed is in a very heavily urbanized area, and eutrophication is the major problem facing the lake. Eutrophication is caused by polluted runoff and causes increases in algae blooms, reduced water clarity, and degraded habitat for many species. In recognition of this and other problems facing Lake Wingra, FOLW applied for and received funding from the WDNR Lake Management Planning Grant program (Forbes, 1999). The FOLW, along with the assistance of the University of Wisconsin at Madison addressed ideas stated in

the grant proposal in order to help further their mission: “to promote a healthy Lake Wingra through an active watershed community” (Forbes, 1999).

Friends of Lake Wingra do many types of projects aimed at improving the watershed; however, the majority of programs focus on educating the public on watershed topics and promoting public outreach (Forbes, 1999). FOLW created a slideshow that identifies problems in the watershed affecting water quality and quantity, and identifies individual solutions to Lake Wingra problems. The slide show’s flexible format allows for changes in message, topics, and use (Forbes, 1999).

They also created a website that was designed to provide information on Lake Wingra and area water quality practices, and to provide links to existing information on watersheds and water quality (Forbes, 1999). A bicycle map was created to encourage the exploration of the Lake Wingra watershed. Stops are labeled and described with stories and observations, and the brochure format includes an explanation of the watershed concept. A collection of stories concerning Lake Wingra was also assembled as a way of sparking interest in the history of Lake Wingra and its watershed (Forbes, 1999).

Since FOLW has only been active for the past four years, no quantitative water quality improvement can be attributed directly to the group (Forbes, 1999). However, since the start of group, membership continues to climb and their projects have expanded to address other sources of nonpoint source pollution affecting the watershed (Forbes, 1999). The success of this group can be attributed to the WDNR taking the initiative and applying their “Integrated Ecosystem Management” project to the watershed and treating FOLW as collaborators in the project. The financial, technical, and educational support

along with their help in networking with other sources of support was instrumental in overall success of the Friends of Lake Wingra.

Big Green Lake

Several grassroots watershed groups (Green Lake Preservation Society, Green Lake Association, Big Green Lake Volunteers) situated around Big Green Lake in Green Lake County, Wisconsin, have worked closely with the WDNR, US Geological Service, the Green Lake Sanitary District and other local units of government to implement various lake and watershed protection projects (Dudiak, 2000). Below is a listing of some of the more recent initiatives in this region:

The lake groups surrounding Big Green Lake have prided themselves on their involvement in local planning issues (Dudiak, 2000). Members are familiar with county and local government planning procedure, and lake and watershed issues. Members have been influential in passing shoreland zoning amendments and surface use ordinances and have been involved in the review of proposed shoreland developments and pier expansion projects (Dudiak, 2000). Big Green Lake Groups spearheaded a countywide comprehensive planning effort. Property owners identified problems of nonpoint source pollution from construction sites, which led to the construction of detention basins and the revegetation of certain critical areas (Dudiak, 2000).

The Green Lake Conservancy, a local land trust, in association with the Green Lake Sanitary District and State of Wisconsin purchased several ecologically valuable shoreland-wetland parcels (Dudiak, 2000). Planning grants have funded comprehensive monitoring of Big Green Lake with strategic placement of automatic samplers and gauging stations (Dudiak, 2000). Data obtained on nutrient loading from the surrounding

uplands will be critical in the development of a management plan for Big Green Lake and the surrounding watershed (Dudiak, 2000). This initiative is being driven by the Green Lake Watershed Alliance, a cooperative effort between the cities of Ripon and Green Lake, Fox-Wolf Basin 2000, the Green Lake Sanitary District and Green Lake and Fond du Lac Counties. The Green Lake Preservation Society has organized regular public educational forums and the WDNR on topics related to watershed protection. The Partners with Education Program engages four area high schools and Ripon College in conducting lake and watershed-based research. A core team of trained individuals from the Green Lake Association and the Green Lake Sanitary District visit individual homeowners and provide information on lakefront stewardship (Dudiak, 2000).

The success of the coalition of watershed groups surrounding Big Green Lake can be seen in their effectiveness in positively influencing local policies concerning the lake and the general ecological health of the county. They made informed, sound decisions on the matters at hand that can be attributed to the WDNR'S help in disseminating technical and educational information to the groups concerning their watershed and what could be done to protect it.

Summary

Wisconsin's Department of Natural Resources historically acted proactively to protect the state's abundant water resources. In 1997 the WDNR reorganized itself and adapted a watershed management framework (Martin, et al, 2000). Wisconsin's new watershed approach realizes that forming partnerships with stakeholders is central to decision-making and implementation and those solutions need to be geographically based and reflect the external and internal factors that affect the area (Martin, et al, 2000). The

WDNR considers watershed groups as important members of these partnerships and are supports them greatly. The examples of Friends of Lake Wingra (FOLW) and the groups surrounding Big Green Lake show this support. In both examples, the state has provided funding for projects, educational and technical support. They facilitated the formation of partnerships with the groups, other agencies, and universities. The WDNR also utilizes these groups in gathering data on the watershed, and includes them in the decision-making process.

Chapter 3

Kentucky's Watershed Management Framework

Kentucky's Department of Environmental Protection, Division of Water (DOW) is the agency in charge of managing and protecting the state's lakes, streams, rivers and groundwater (Colten, 1997). In 1995 the state began taking a watershed approach towards watershed management due to a permit program reengineering initiative. One of the goals of the initiative was to improve agency effectiveness and efficiency of the coordination of efforts among the different agencies involved in the permitting system in order to minimize the duplication of efforts (Colten, 1997). In an attempt to achieve this goal, the DOW committed itself to the development of a statewide watershed management program. DOW hired a Watershed Coordinator in February 1996 to lead its effort. A work group was formed to look at the different frameworks of watershed management that other states had implemented, and applied those aspects of each that they deemed appropriate for Kentucky (Colten, 1997).

Kentucky's Approach to Watershed Management

The Kentucky Watershed Management Framework is an approach that is aimed at protecting human health and the health of the ecosystems. The framework seeks to (Colten, 1997):

- Protect and enhance public health and safety.
- Conserve and enhance watershed ecosystems.
- Support sustainable watershed resource use that meets water quality standards and conservation goals.

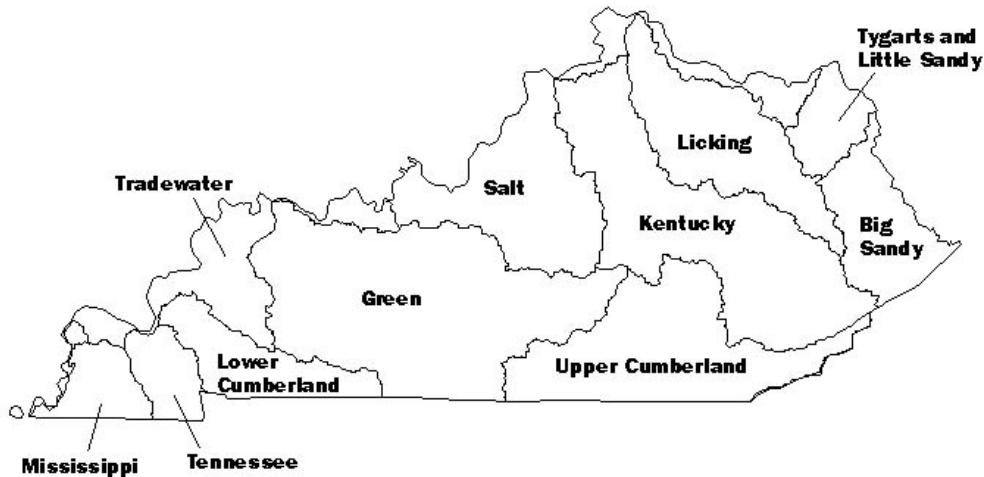
- Reduce or prevent pollutant loadings and other stressors in watersheds.
- Preserve and enhance esthetic and recreational values of watersheds.
- Provide adequate water supply to support sustainable human use and ecological integrity.

The Kentucky Watershed Management Framework consists of five core components: Basin management units, basin management cycle, a statewide basin management schedule, forums to support cooperative action, and Basin Management Plans and Watershed Action Plans (Ormsbee, 1999).

Basin management units

The 12 basin management units are based on Kentucky's major river basins and tributaries that drain directly to the Ohio River. These basin management units provide the spatial basis for coordinating watershed ecosystem protection and restoration activities. (Ormsbee, 1999).

Map 2: Kentucky's Basin Management Units (Ormsbee, 1999)



Basin Management Cycle

Basin management cycles are fixed at five-year intervals to ensure that watershed goals, priorities, and strategies are routinely updated and implemented on an ongoing basis. The cycle is composed of five phases:

1. Scoping and data gathering
2. Assessment
3. Prioritization and targeting
4. Plan development
5. Implementation

The five activity phases of the basin management cycle are repeated in each basin management unit at fixed five-year intervals to ensure that watershed management goals are met (Ormsbee, 1999). The management schedule establishes a statewide calendar for conducting key management activities in each basin management unit and throughout the state. This schedule is meant to use the available human, technological, and financial resources as efficiently as possible by focusing major watershed management efforts on one portion of the state at any given time (Ormsbee, 1999).

Forums to Support Cooperative Action and Public Participation

Kentucky's effort to involve all interested parties in watershed management efforts has led to the creation of a partner network whose purpose is to help coordinate and carry out watershed management activities (Ormsbee, 1999). The Partner Network is made up of agencies, organizations, and individuals who are willing to give their time and resources to learn about watershed management needs, develop and implement strategies to address those needs, and promote public involvement in the Watershed Management Framework (Ormsbee, 1999).

Basin Management Plans and Watershed Action Plans

These plans document management priorities and provide a common reference guide for implementation of the watershed management framework at both the basin management unit and watershed levels (Ormsbee, 1999).

Watershed Management Responsibilities

Coordination of activities Under Kentucky's watershed management framework takes place at three levels: Local Watershed Task Force, River Basin Teams, and Statewide Steering Committee (Colten, 1997).

Statewide Steering Committee

A Statewide steering committee addresses the issues of statewide coordination and policy related to the watershed management framework (Colten, 1997). The steering committee provides a forum for communication among the different river basin teams of the state and coordinates watershed management activities taking place in conjunction of the basin management cycle in all basin management units across the state (Colten, 1997).

River Basin Teams

River Basin Teams provide a forum for coordinating and carrying out watershed management activities in each of the state's 12 basin management units (Colten, 1997). River basin teams are made up of all the local watershed task forces, found within each basin management unit, and a DOW appointed basin coordinator. The basin coordinator acts as facilitator and liaison between each of the local watershed task forces in a basin management unit. The river basin teams work closely with the local watershed task forces gathering data and compiling existing information on the watersheds of the specific basin

management units in order to evaluate local watershed conditions and prioritize watershed management needs. A basin management plan for addressing the highest priority problems within each of the basin management units is then drafted and shared with stakeholders and the public (Colten, 1997).

Local Watershed Task Forces

First, at the community level, local watershed task forces rally public support and encourage pertinent stakeholders to become more active in the decision-making process (Colten, 1997). Every local watershed task force located within a priority watershed provides a forum where all stakeholders can have input in the development and implementation of the action plan that addresses the specific impacts of their watershed. These task forces are made up local government officials, a facilitator from the DOW, and others who will be affected by the outcome of decisions. Local watershed groups play an important role in the task force, because of the loud voice they have in the decision making process and the citizen support that they can garner (Colten, 1997). The task force then assists in determining which problems within the watershed can and should be addressed (Colten, 1997).

Basin Coordinators are hired through the DOW and are assigned to one or more basin management units (Colten, 1997). Their main responsibility is to facilitate River Basin Team meetings and support the Statewide Steering Committee. Additionally, basin coordinators serve as liaisons between local watershed task forces and the river basin teams. They will make sure that partners understand how the Kentucky Watershed Framework operates and are aware of key milestone dates so that the basin schedule of activities stays on track (Colten, 1997). Basin Coordinators also compile information at

key points along the basin management cycle, and bring together specific partners to troubleshoot issues or carry out planning and implementation functions (Colten, 1997).

The DOW employs public information coordinators that are used to help communicate technical and policy information in a way that is understandable to a wide range of audiences (Colten, 1997). They will work closely with the river basin teams, local watershed task forces, basin coordinators, and the rest of the partner network to prepare statements regarding Basin Status Reports, public surveys, draft priority watershed rankings, and action plans (Colten, 1997).

Support for Watershed Groups

Technical, educational, and financial support provided to Kentucky's local watershed groups are outlined in the DOW's Watershed Watch and the Kentucky Water Watch programs (DOW, 2000). The mission of these programs is to coordinate a statewide effort among citizen volunteers and local watershed groups, state and local agencies, and other non-governmental agencies to improve water quality by fully implementing the interim and long-term goals of the Clean Water Act (Cooke, 2001). The programs help establish a support structure for citizen monitoring of watershed health across the state, lends technical support to watershed improvement projects, and also establishes methods to measure actual improvements in the water quality. Kentucky's Watershed Watch and Water Watch Programs are comprised of over 900 individuals and 300 organizations in the State of Kentucky who are giving their time in an effort to improve Kentucky's waterways through a coordinated campaign of water quality monitoring, skills development and advocacy (DOW, 2000). Once individual watershed groups become established, they are incorporated into the mission of these

DOW's programs and are looked on as collaborators in all aspects of watershed management (DOW, 2000).

The DOW provides training workshops in water quality monitoring, regulatory processes, grant writing, and watershed science (EPA, January 1998). They also provide technical assistance to local watershed groups on dealing with the issues raised by their monitoring and assessment efforts (EPA, January 1998). Also, annual watershed protection conferences are given in each local watershed where individuals, community organizations, scientific researchers and agency personnel all come together to discuss the condition of our waterways as revealed by our monitoring (EPA, January 1998).

Another state program that offers technical and financial support to watershed groups is P.R.I.D.E. (Personal Responsibility in a Desirable Environment). P.R.I.D.E. was established in 1997, is the first comprehensive, state wide, local/state/federal cooperative effort designed to directly address the cleaning up Kentucky's watersheds and promoting environmental awareness and education among its citizens (T.C.D.R., 2001). The program awards grants of up to \$50,000 for local watershed cleanup activities, appliance buy-back programs, recycling programs, environmental education, and other watershed restoration projects. These grants are awarded twice a year to local governments, local environmental groups and, civic and community organizations. Since 1998, P.R.I.D.E. has allocated over \$5,663,622 in grant funds (T.C.D.R., 2001).

Other sources of funding for watershed groups from state programs dealing with water quality and watershed management include: The Kentucky TMDL program, the Kentucky Clean Water Action Plan, the Kentucky 319 program, the Kentucky Agriculture Water Quality Act, the Kentucky EQIP program, the Kentucky Division of

Conservation Direct Aid Program and Water Quality Cost Share Program, the Department for Environmental Protection 201 Wastewater Facilities Planning Program and State Revolving Loan Fund, and the New State Water Resource Development Commission (Hockensmith, 2001).

A major source of technical and financial support, other than from the state, comes from Kentucky's Waterways Alliance (KWA) (Blackburn, 1999). The prime objective of KWA programs is to improve the ability of local citizens, schools and governmental organizations to create partnerships and pursue effective watershed education and implementation projects in their communities (Blackburn, 1999).

Local Case Studies

The following case studies show how Kentucky's Department of Water works closely with other agencies and other organizations to help and support the efforts of Kentucky's local watershed groups. The two groups being examined are The Harrods Creek Community Education Project and the Russell Fork Water Watch.

The Harrods Creek Community Education Project

The Harrods Creek watershed covers over drains 69,000 acres of land within Henry, Oldham and Jefferson Counties Harrods Creek has the third largest drainage area of any tributary that flows through Jefferson County and the second largest flowing through Oldham County (Blackburn, 1999). These three counties currently experience some of the fastest growth rates in the state. The Harrods Creek Community Education Project was formed due to the negative impacts this high rate of growth was having on the watershed (Blackburn, 1999). This grassroots program was designed to act proactively to protect the watershed by increasing the community's awareness of the

importance of Harrods Creek and negative impacts affecting caused by the rapid growth (Blackburn, 1999). The project's goal focuses on fostering community recognition of Harrods Creek and its tributaries as an ecological and recreational multi-county resource (Blackburn, 1999).

To help attain their goal, the group published and distributed guidance and informational brochures about the control of nonpoint pollution and targeted those specific stakeholders in the watershed who could make a direct impact on the problem such as homeowners, landowners, developers, and property managers (Blackburn, 1999). River cleanups, watershed fieldtrips, involving the schools in the different watershed activities were also employed to increase the public awareness of the issue and to motivate people to act proactively in the control and prevention of nonpoint pollution (Blackburn, 1999).

The entire project receives support from the Jefferson County Conservation District through a grant from the EPA and the Kentucky Nonpoint Source Program Implementation Grant under section 319(h) of the Clean Water Act. They also received educational and technical support for the development of their educational materials from the DOW. As an educational project, it complements and works toward an increased level of involvement by local, state and federal agencies involved in all aspects of the Harrods Creek watershed management (Blackburn, 1999).

Because the negative impacts caused by the rapid urban growth within the watershed continue, the effectiveness of the Harrods Creek Community Education Project cannot be looked at in terms of quantifiable water quality improvement measures. Instead, its effectiveness has to be looked at as the amount of people they have informed

on the issues facing their watershed. The group reaches a large portion of the local population through informational publication, field trips, and through river cleanups. The support, coordination, and facilitation of the DOW and other partners of the watershed aided these efforts.

Russell Fork Water Watch

The Russell Fork Water Watch located in Pike County, Kentucky has dedicated itself to the natural preservation of the Russell Fork corridor of eastern Kentucky and southwestern Virginia and promotion of ecotourism activities in the region, especially whitewater rafting (Ruth, 2001). In spring, 1995, the group with the cooperation of the Elkhorn City government won a Kentucky Community Rivers and Streams grant to clean the banks of the Russell Fork from the Virginia/Kentucky line through Elkhorn City, approximately 4.5 miles (Ruth, 2001). The grant was matched with in-kind services from the Pike County and Elkhorn City governments. The effort employed local teens and a supervisor through the summer who picked up over 300 tires and 70 tons of highly assorted trash. A portion of the grant was used for water testing equipment, including an incubator to measure E. coli bacteria, which has been donated to the Elkhorn City High School whose science department will monitor the river (Ruth, 2001).

The Water Watch is working with a number of local volunteers to clean the Potter Flats area up Pine Mountain to Pretty Rock House, a cave shelter used by prehistoric natives. This area includes portions of the Breaks Park and Jefferson National Forest. The Water Watch is looking for further funds and assistance to undertake cleanup work on two tributaries coming into the river, and another extensive sweep of the Russell into the Breaks gorge (Ruth, 2001).

The effectiveness of the Russell Fork Water Watch can be seen in the immediate impacts the group had on the watershed through their cleanup and monitoring. Their success can be partially attributed to the support given them by the DOW through funding and coordination of the group in their Water Watch program.

Summary

The state of Kentucky adequately incorporates those features that foster the partnership between local watershed groups and the state. The Kentucky Department of Water's (DOW) Watershed Management Framework consists of five core components: Basin management units, basin management cycle, a statewide basin management schedule, forums to support cooperative action, and basin management plans and watershed action plans (Colten, 1997). It is in the Forums to support cooperative action where stakeholders are identified and partnerships are formed. The state considers watershed groups integral stakeholders and emphasizes their support and collaboration (Colten, 1997). This emphasis is seen in the fact that the DOW has developed programs such as the Watershed Watch and Water Water programs, which support the efforts of watershed groups, and actively involves them in data gathering and in the decision making process.

Chapter 4

Virginia's Watershed Management Framework

The Department of Environmental Quality (DEQ) is Virginia's lead agency in charge of protecting and enhancing water quality (Treacy, 2001). They are responsible for administering the federal Clean Water Act and enforcing state laws that improve and protect the quality of Virginia's streams, rivers, bays and ground water for aquatic life, human health and other water uses (Treacy, 2001). They are also the lead agency in coordinating and promoting watershed planning amongst state and local agencies and the citizens of Virginia. This is done with the assistance of the Watershed Planning and Permitting Coordination Task Force composed of the Directors, Commissioner or their designees from the following agencies (Treacy, 2001):

- Department of Environmental Quality
- Department of Conservation and Recreation
- Chesapeake Bay Local Assistance Department
- Department of Mines, Minerals, and Energy
- Department of Forestry
- Department Agriculture and Consumer Affairs

Virginia does not yet have a fully cooperative watershed management program. Currently the process of watershed management is evolving, with its main focus being the control of nonpoint pollution (Bennett, 2000). The Clean Water Act Amendment of 1987, Section 319, requires states to assess and identify those waters adversely affected by nonpoint sources of pollution. The Act also mandates that states develop management strategies to control nonpoint source pollution. Virginia's Department of Conservation and Recreation (DCR) were given these responsibilities, and in 1988 completed Virginia's first nonpoint source pollution assessment (Bennett, 2000). The assessment

ranked the state's 494 watersheds based on land use, livestock population, forest harvesting, disturbed acreage, best management practices implementation and erosion rates, for potential nonpoint source pollution (Bennett, 2000). The rankings serve as a guide for Virginia's nonpoint source pollution control programs, as well as determine cost-share and Section 319 funding to watersheds with the greatest pollution potential (Bennett, 2000).

In 1999, Virginia updated its Nonpoint Source Pollution Management Program to guide and direct federal, state, local, and nongovernmental groups actions, as well as to outline the protocols for funding and citizen participation (Bennett, 2000). This program update was necessary to incorporate changes in federal and state regulations and programs, and to incorporate President Clinton's Clean Water Action Initiative in order to ensure that Virginia remained eligible for federal program funding for watershed protection (Bennett, 2000).

The update set long-term goals and objectives for each of the nonpoint source pollution categories defined by the state. The first long-term goal of the update was to "Develop and fully implement a cooperative watershed management program that integrates a comprehensive basin management and targeted sub-basin approach to implementing nonpoint source pollution control (Bennett, 2000)." The objectives to attain this goal were laid out as follows.

Objective 1

By 2004, establish well-integrated and coordinated basin planning and management programs that minimize program overlap and leverage program

resources to address contaminants that may pose risks to either the environment or public health (Bennett, 2000).

Objective 2

By 2005, establish well-integrated and coordinated assessment and reporting programs that minimize program overlap and duplication (Bennett, 2000).

Objective 3

By 2003, develop the protocols and data needed to prioritize total maximum daily load (TMDL) development based on severity of impact (Bennett, 2000).

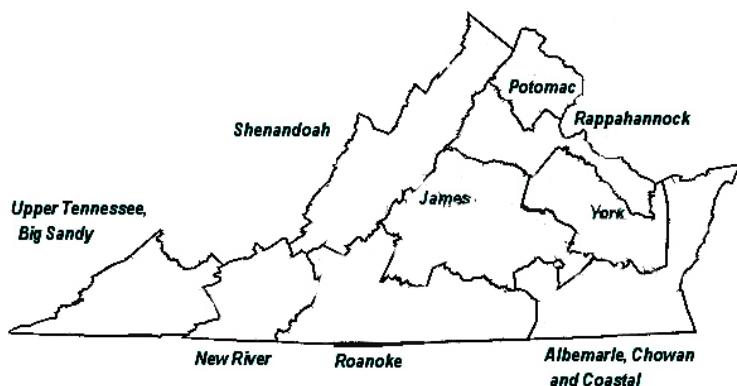
Virginia's nonpoint pollution control effort adopts a watershed approach style to management and is dependent on citizen participation (Bennett, 2000). The DCR feels that by incorporating the public and conservation groups into the decision making process and by offering programs that increase public awareness on water related issues can result in more realistic and sustainable expectations regarding water management (Bennett, 2000).

Watershed Conservation Roundtables

In an attempt to develop these working partnerships at the local watershed level, the DCR developed Watershed Conservation Roundtables, a forum where stakeholders meet to identify watershed needs, target problems, define solutions and provide input into potential management options to restore and protect water quality (Treacy, 2001). These roundtables are formed in most of the major river basins in Virginia. Representatives include representatives of elected officials, local government, Soil and Water Conservation Districts, agriculture, citizens, state/federal agencies, planning district

commissions, conservation organizations, sustainable development, business/industry, silviculture, commercial/recreational fishing and tourism (Treacy, 2001).

Map 3: Virginia's Major River Basins



While the DCR is the lead agency in the coordination and development of the Watershed Conservation Roundtables, other state agencies provide support when needed (Treacy, 2001). Examples of such support include responding to requests for information, making presentations to explain programs and eliciting feedback from roundtable participants to identify topics of interest. DCR then provides updates on the status of the roundtables to all agencies involved. The DCR hopes that once these Watershed Conservation Roundtables become established, they develop into independent entities that require little or no oversight from the DCR (Treacy, 2001).

Financial and Technical Support for Watershed Groups

Virginia offers financial, technical and educational assistance to watershed groups that support projects that address the problems of nonpoint source pollution. Similarly, a number of federal programs provide financial and technical assistance and many non-governmental organizations provide grants for conservation activities. Examples of state and federal incentive programs include (Brickley, 2001):

- Water Quality Improvement Fund
- Virginia Agricultural BMP Cost Share Program
- Virginia BMP Tax Credit Program
- Wetland Reserve Program
- Section 319 Grant Program
- Conservation Reserve Enhancement Program
- Reforestation of Timberlands Program
- Chesapeake Bay Program

In the past three years, the Commonwealth of Virginia and the Virginia's Governor's Office number one environmental priority is improving water quality in Virginia (Woodley, 2000). Governor Gilmore has committed over 80 million to the WQIF and signed a 91 million dollar agreement finalizing Virginia's participation in the federal Conservation Reserve Enhancement Program both programs address point and non-point pollution. The programs funded by the state come from state agency budgets and through non-general fund revenues raised by programs such as sale of Chesapeake Bay license plates (Woodley, 2000). Funds available from the federal Nonpoint Source Pollution Control Program Section 319 grants and the Chesapeake Bay Program enhance the technical assistance, financial assistance, education and research efforts of the state (Brickley, 2001).

Of these programs, the Virginia Water Quality Improvement Fund (WQIF) and the Section 319 Grant Program offer the most funding to watershed groups throughout Virginia (Brickley, 2001). The Virginia Water Quality Improvement Act of 1997 is meant to restore and improve the quality of state waters and to protect them from impairment and destruction for the benefit of current and future citizens of Virginia (Brickley, 2001). The act created the WQIF for the purpose of funding for local governments, soil and water conservation districts, watershed groups, and individuals to implement projects that address point and nonpoint source pollution prevention. One of

the main reasons for the WQIF program was to reduce the flow of excess nitrogen and phosphorus into the Chesapeake Bay through the implementation of the tributary strategies (Brickley, 2001). The program does however, funds water quality improvement projects throughout the state. The DEQ is responsible for administering those grants associated with projects that deal directly with point source pollution, and the DCR administers all nonpoint source grants. The DEQ and DCR also give regular workshops in soliciting grants, grant writing, and requirements (Brickley, 2001).

Role of Non-Governmental Groups in Virginia

Many non-governmental organizations provide other sources of funding and technical assistance to groups addressing watershed concerns. A major source of funding is the Virginia Environmental Endowment (VEE) (Bennett, 2000). VEE was formed as a result of a settlement related to the release of kepone into the James River (Bennett, 2000). Other examples of organizations that provide financial and technical assistance to local governments, community groups, and landowners include the Chesapeake Bay Foundation training and public awareness efforts, and Izaak Walton League of America Save Our Streams and Sierra Club citizen monitoring support (Bennett, 2000).

Citizen Monitoring

Virginia works closely with watershed groups in the area of water monitoring (Brickley, 2001). The DCR and DEQ work in collaboration with The Virginia Division of the Izaak Walton League of America (IWLA), Virginia Save Our Streams Program (VA-SOS), and Sierra Club all support citizen monitoring in order to enhance and support Virginia's ability to protect and restore the water quality while also strengthening

citizen commitments to water quality issues on a local level (Brickley, 2001). This partnership supports citizen-monitoring efforts throughout Virginia for the purpose of collecting useful water quality information and to encourage environmental stewardship (Brickley, 2001). A signed Letter of Agreement defines the roles of both agencies, IWLA, VA-SOS Program, and the Sierra Club. All partners have entered into this agreement with the understanding that the combined efforts are less duplicative and can produce greater and more consistent benefits for the common good (Brickley, 2001).

Local Case Studies

Many communities throughout Virginia, have organized and taken the initiative to clean, protect, and raise public awareness on issues affecting their watersheds. Hands Across the Mountain Inc. and the Middle Fork Holston Water Quality Committee provide two good examples of how the DCR works in a collaborative manner with other agencies and organizations with watershed groups.

Hands Across the Mountain

Hands Across the Mountain Inc. (“Hands”) is a local grassroots organization that is located in the coalfields of southeastern Kentucky and southwestern Virginia (Riggs, 2000). The organization’s main goal is to develop a collaborative relationship between the two states in order to foster economic growth while maintaining and enhancing the environmental quality of the area. In the fall of 1999, the Virginia chapter of Hands learned that several streams in Wise County were on Virginia’s impaired waters list (Riggs, 2000). They formed the Upper Powell River Restoration Project, with the main goal being to reduce the amount of non-point source pollution entering the Upper Powell

River and its tributaries and to improve the overall water quality of the watershed (Riggs, 2000).

The first three programs of the project were a septic-tank pump-out program, funding the cleanup of illegal trash dumps in the watershed, and the development of a watershed information center and educational program (Riggs, 2000). These programs were chosen because of their potential to have immediate, positive impacts on the water quality of the Upper Powell River. Funding for the year 2000 came from the state's Water Quality Improvement Fund and federal 319 grant, in the sum of \$47,243 and was aided by in-kind contributions from the Wise County Health Department, Virginia Planning District Commission #1, the Wise County Clean Team, the Appalachia Clean Team and the Tennessee Valley Authority (TVA) (Riggs, 2000).

The septic-tank pump-out program intends to address the problems associated with aging septic systems in the area. Hands subsidize 75 percent of the cost of pump-out and repair of 125 septic systems along the Powell River in Wise County. Homeowners bear responsibilities for the remaining 25 percent of the cost. The Wise County Health Department is responsible for soliciting and accepting applications from landowners for this project (Riggs, 2000).

Along the Powell River and its tributaries, the TVA mapped more than 20 illegal trash dumps. For the year 2000, Hands set aside \$7,000 to clean up as many of these dumps as possible (Riggs, 2000). To increase community outreach and support, Hands established a watershed information center in the Cultural Arts Center in the Town of Appalachia. Also, an educational program was designed that addressed the water-quality

concerns of the Upper Powell River Watershed and what is being done to address those problems (Riggs, 2000).

In their first year Hands effectively addressed the negative impacts affecting the Upper Powell River watershed through public education and cleanup projects. Their successes are attributed to the hard work done by the group and the support received from the various local, state, and federal agencies of the area.

Middle Fork Holston Water Quality Committee

Middle Fork Holston Water Quality Committee is a grassroots watershed group formed in 1984 in response to concerns the citizens of watershed had about the taste and odor problems of their drinking water (EPA, March 2001). The Middle Fork Holston begins near Marion, Virginia and flows toward Abingdon, Virginia, providing a source of water to these communities. The group's first action was to seek the advice of state water resource management agencies. It was then learned that little was known about the river, so with the state's recommendation they asked TVA's Water Management group to help them review the river's condition (EPA, March 2001).

Middle Fork Holston Water Quality Committee asked the TVA to join an interagency team to evaluate and assess resource conditions (EPA, March 2001). TVA collected monitoring information and conducted aerial inventories of land use and non-point pollution sources. The Water Quality Committee's task main concern at this point was to draw public attention to TVA's results and work on convincing landowners of the benefits of agricultural BMPs (EPA, March 2001). A primary focus for the group was involving all the local stakeholders in process of setting long-term goals. In the Hutton Creek subwatershed, for example, improving the fishery became a meaningful

community goal, since local streams are used more for bank fishing than for swimming (EPA, March 2001).

During their 16 years, the Middle Fork Holston Water Quality Committee engaged in activities such as river cleanup days, school contests for logos and messages, and numerous field days to promote BMPs. The group also hosted three community seminars, pioneered "Adopt-A-Watershed" programs with area teachers, pilot-tested cost-effective new streambank stabilization techniques to sponsoring an innovative "Adopt-A-Watershed" program that pair's high school students and state agencies in activities aimed at solving local water quality problems (EPA, March 2001). Funding and technical support for their projects came from many areas. The State of Virginia along with 319 grants has contributed more than \$750,000. The USDA provided more than \$2.5 million for agricultural BMP assistance, and the TVA invested about \$750,000 in technical assistance and seed money for the initial water quality demonstration (EPA, March 2001). In response to the years of good work The Middle Fork Holston Water Quality Committee has done at improving their respective watersheds, the DCR has acknowledged them as being outstanding watershed groups and has been used as models for new watershed groups to duplicate (EPA, March 2001).

Summary

Virginia's watershed management framework continues to evolve. The framework arose as a way to address nonpoint source pollution (Bennett, 2000). While the lead agency responsible for water quality in Virginia is the Department of Environmental Quality (DEQ), watershed management responsibilities are split between the DEQ and the Department of Conservation and Recreation (DCR) (Bennett, 2000).

With the DEQ being responsible for all point source pollution control activities, while the DCR is responsible for all non-point source pollution control activities.

Chapter 5

Evaluation of the Three Watershed Management Frameworks And Recommendations for Improvement

This paper shows that the frameworks that define Wisconsin's, Kentucky's, and Virginia's watershed management plans vary to some degree. However, each state's program was built around the same watershed management principle, which believes that the best results come through the creation of strong partnerships and collaboration of all stakeholders. Each state recognizes the important role that watershed groups play as both partner and collaborator and realizes the necessity to provide support to these groups in order to aid the groups in their efforts and also foster an effective partnership. However, while the three states all provide funding for their local watershed groups, not all have been fully effective in providing those other factors necessary to foster effective relationships. The other factors include:

- One central agency in charge of initiating, coordinating, and acknowledging successful watershed management activities.
- State support for research, experimentation, and pilot projects.
- State facilitation of technical assistance and support.
- State support for public education on water quality issues.
- Open forums where all stakeholders can have a voice.

The following table gives a general comparison of how well the three states incorporated these six criteria, important to the effectiveness of watershed groups, into their watershed management frameworks.

TABLE 1: A COMPARISON OF THE THREE WATERSHED MANAGEMENT FRAMEWORKS

Criteria for Effective Management	Wisconsin	Kentucky	Virginia
Central agency in charge of all watershed management activities	Wisconsin Department of Natural Resources	Department of Water	N/A
State sources of financial support most applicable to local watershed groups	<ul style="list-style-type: none"> ➤ Urban Nonpoint Source and Stormwater Grant Program ➤ Targeted Runoff Management Grant Program ➤ Wisconsin Streams Protection Grants Program ➤ Lake Planning Grants 	<ul style="list-style-type: none"> ➤ Kentucky Water Watch Program ➤ Kentucky Watershed Watch Program ➤ P.R.I.D.E. 	<ul style="list-style-type: none"> ➤ Water Quality Improvement Fund ➤ Virginia Agricultural BMP Cost Share Program ➤ Virginia BMP Tax Credit Program ➤ Chesapeake Bay Program
Examples of state initiatives taken to improve watershed management through experimentation and pilot projects	WDNR's Integrated Ecosystem Management program	P.R.I.D.E. (Personal Responsibility in a Desirable Environment)	No Specific Program
State facilitation of technical assistance and support	Land and Water Education Team	Kentucky's Watershed and Water Watch Programs	No Specific Program
State support public education on water quality issue	Land and Water Education Team	Kentucky's Watershed and Water Watch Programs, P.R.I.D.E.	No Specific Program
Organized open forums where all stakeholders have a voice	No Specific Program	The Partner Network	Watershed Conservation Roundtables

Wisconsin

Wisconsin has done an effective job in the creation and implementation of its watershed management framework and has been successful in incorporating those activities that foster collaborative and effective relationships with local watershed groups. They are the central agency in charge of watershed management activities and provide adequate financial, technical, and educational support to local watershed groups. They recognize that there is learning curve involved with watershed management and are not afraid to try new and different types of projects, this can be seen in the example of Friends of Lake Wingra and how the WDNR used its “Integrated Ecosystem Management” program to address the problems facing the lake. Wisconsin, however, does lack an organized stakeholder forum where all stakeholders can sit down together and discuss their concern face to face. However, this point is minor due to many other avenues of communications that their watershed management framework has created.

The state lacks of an organized forum where all stakeholders can voice their concerns and opinions like that of Virginia’s Watershed Conservation Roundtables. This is a minor point due to all the other avenues that watershed groups have to voice their concerns. However, if the WDNR were to create an organized public forum that met at regular times of the year where all stakeholders could meet face to face, and voice their opinions and concerns regarding their watershed, the local community and its watershed groups would feel more empowered to take more responsibility in the protection of their watershed.

Kentucky

By looking at successful watershed management techniques used by other states and modifying those techniques for their own use, Kentucky's Department of Water created an efficient and well-organized watershed management framework. The framework acknowledges the importance of local watershed groups by incorporating those activities that are conducive to creating and supporting effective collaboration and strong partnerships. They provide adequate financial, technical, and educational support; are not afraid to experiment with new ideas; and provide open forums for stakeholder discussions. The DOW also networks well with other local, state, and federal agencies; and other organizations in watershed management activities without losing its role as lead agency, which is important in maintaining the confidence of the community and local watershed groups.

Although relatively new, Kentucky has been effective in outlining their responsibilities to local watershed groups in their Watershed Watch, Water Watch, and P.R.I.D.E. programs and creating a watershed management framework that incorporates the local communities and watershed groups into their decision-making process. However, as the framework ages and the state gets comfortable with its successes, avoiding complacency should be the DOW's next priority. The DOW should not be afraid to take chances and try new programs that could positively affect watershed management and the collaborative relationship amongst the stakeholders of the state. Continual evaluation of its watershed management activities needs to be done, and those activities need to be altered when not functioning to their full potential.

Virginia

Evaluating Virginia's watershed management framework is difficult due to the fact that while Virginia's overall method of watershed management is defined, it has not yet been to attain a fully cooperative watershed management program. The DCR and the state have proven effective in providing financial, technical, and educational support to local watershed groups, or in the least directing groups towards different avenues where these groups may receive this support. The DCR does a good job at acknowledging those groups who have proven effective in watershed management activities and uses those groups as models for new groups to learn from.

The most apparent problem with Virginia's approach towards watershed management is the lack of a central agency in charge of watershed management responsibilities. These responsibilities are divided among Department of Environmental Quality and the Department of Conservation and Recreation, along with, The Chesapeake Bay Local Assistance Department, Department of Mines, Minerals, and Energy, Department of Forestry, and the Department Agriculture and Consumer Affairs. This dilution of responsibilities undermines the credibility of the state's approach towards water quality management and bogs down the management process in a quagmire of inefficiency and confusion. One of the advantages of watershed management is that it intends to do away with the duplication of efforts among its stakeholders. Because the state lacks a true lead coordinator, confusion often arises on who is responsible for what. Many times when groups ask for support from the DCR, they are directed to one of the other state and federal agencies working in watershed management for this support. Examples of this can be seen in both the Middle Fork Holston Water Quality Committee

and Hands Across the Mountain. While the DCR did supply some funding and technical support, the majority of support came from other sources such as the local planning offices, TVA, the Department of Mines, Minerals, and Energy; the Department of Health. This split in responsibilities often results in general confusion of the stakeholders on questions of responsibility and accountability of watershed protection actions, while also decreasing the overall management efficiency of the agencies involved. Although networking can be good for watershed groups, too much can instill little confidence in the DCR when they continue to direct groups to other sources of information and support other than giving it themselves.

For Virginia to improve its effectiveness of its evolving watershed management framework, all watershed management responsibilities should be passed onto the DCR, this would improve efficiency and reduce potential confusion among those groups seeking support for water quality improvement projects. The DCR also needs to take a more active role in the position of lead facilitator. Instead of directing communities and groups to other agencies for financial, technical, and educational support, the DCR needs to provide this support directly.

Limitations to the Study and Possible Future Research

This paper realizes that the six criteria used for evaluating each states' watershed management framework are broad in scope and that there are many other important and necessary factors involved in nurturing these partnerships between watershed groups and the states. However, while broad in scope, these criteria have been shown to be the cornerstones needed for effective collaboration essential for watershed management, and as result, create a framework suitable for this evaluation.

Future work to expand this research could examine the overriding reasons why states implement watershed management, and examine the influences that this has on the relationships formed within the process. For example, while Wisconsin's and Kentucky's main goals for implementing a watershed style of management is to protect and enhance water quality, Virginia's goal is more narrowly focused and specifically targeted towards reducing nonpoint source pollution. New research could explore whether the collaboration formed between the states and stakeholders is more effective when states' goals for watershed management are broader in scope or have a narrower focus.

Future research could also take a more quantitative look at water quality improvements directly linked to watershed groups and exploring the state provided support available to them, and how it was utilized. These results could then be compared with those of other states and from there, evaluations and recommendations could then be made based on the effectiveness of the collaboration of the watershed groups and states.

Chapter 6

Conclusions

Today, most states realize that watershed management is the more appropriate method of managing water resources than traditional methods. Command-and-control, end-of-the-pipe regulations, while necessary, no longer ensures compliance with water quality standards. Other sources of pollution and water quality degradation have been regulated to some extent, but not enough. Today, 40 percent of the nation's waters are still not suitable for their intended uses (EPA, February 1996). Many relevant issues such as public perceptions, local knowledge, politics, local history, culture, and applied social science have not been addressed by past water management efforts (Sexton, 1999). Watershed management is an attempt to bridge these gaps between the hard sciences, regulators, citizens, the economy, and culture.

Effective watershed management requires the input, cooperation, and willingness of all stakeholders to form partnerships and make decisions agreeable to everyone (Clark, 1997). These partnerships need to be inviting to the stakeholders and reward community involvement, while making it clear that their influences and impacts ultimately affect others downstream (Clark, 1997). The stakeholders need to feel that they can influence outcomes and have a positive impact on the decisions affecting their watershed.

To go beyond theory and move to action, states need to take initiative to support those partnerships that effective watershed management requires. Watershed management is a collaborative style of management where all stakeholders are asked to contribute, and to help one another. While governments and industry bring money and technical expertise into the partnership, the community brings time, labor, their standing

in the community, and their knowledge of local circumstances (Sexton, 1999). For the community to make informed decisions and to take actions that have positive effects on watershed health, state agencies need to help. For effective watershed management, programs must be carefully planned, driven by water quality goals, and be flexible enough to implement innovative solutions that address water pollution. Also, states need to show their commitment to the local communities and watershed groups by:

- Having one central agency in charge of watershed management activities.
- Providing state funding support for local watershed groups and partners.
- Supporting research, experimentation, and pilot projects.
- Facilitating the dissemination of technical assistance and support.
- Supporting public education on water quality issue.
- Providing open forums where stakeholders can voice their concerns and opinions.

For watershed management to be effective it needs the stakeholders to form partnerships. If these partnerships can get the community, federal, state, and local governments, and other organizations to cooperate and coordinate over time, they can make a major difference. Watershed management, while more complicated and time consuming than traditional resource management, is however, ultimately more effective in protecting the resource by creating decisions agreeable by all who have a stake in the outcome.

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EDUCATION

Virginia Polytechnic Institute and State University, Blacksburg, VA

Master of Urban and Regional Planning – specialization in Environmental Management

Research Topic: Use of handheld computing and GPS technology in volunteer stream monitoring

Graduated: December 2001

University of Wisconsin – Stevens Point, Stevens Point, Wisconsin

Bachelor of Science in Limnology and Biology

Graduated: December 1992

EMPLOYMENT EXPERIENCE

Hands Across the Mountain, Inc., Appalachia, VA

Watershed Educator Intern, May 2000 to August 2000

Established a watershed information center in the Cultural Arts Center in Appalachia, Virginia.

Created an educational program to increase public awareness and community outreach.

Explained the concept of watersheds.

Trained assistants in providing watershed and environment instruction.

Assisted in preparing quarterly reports required to secure funding for grants and budgets.

United States Peace Corps, Guatemala

Agroforestry Extensionist, June 1997 to October 1999

Promoted agroforestry practices among indigenous subsistence farmers.

Emphasized the importance of diversifying agricultural products.

Idaho Fish and Game, Boise, Idaho

Fisheries Technician, June 1995 to March 1997

Gathered biological data on Steelhead and Chinook salmon.

Worked with a DOS database specializing in tracking pittagged salmon.

Entered this information into a database and relayed the data to other biologists throughout the Pacific Northwest.

United States Peace Corps, Philippines

Coastal Resource Manager, March 1994 to April 1995

Worked with the nongovernment organizations, local fishing groups, and the Department of Agriculture in the province of Bohol.

Acted as a liaison between these different groups regarding projects dealing with coastal resource management and secondary forms of income.

PUBLICATIONS AND PRESENTATIONS

Department of Urban Affairs and Planning, *Check Your Success: A Guide to Developing*

Indicators for Community Based Environmental Projects, Graduate Environmental Studio

Project, Virginia Tech, Blacksburg, VA. 2001.