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Stream: Multiple Commons

Collaborative Watershed Management in the Finger Lakes Region, New York

Introduction

Over the past several decades, scientists and policy makers have turned increasingly to ecosystem management, in which the emphasis shifts from single species' issues to larger scale biological and physical processes operating at regional and landscape levels. An ecosystem or landscape approach recognizes the broader implications of multiple factors and the need to consider biological, social, political and legal influences. While the focus is more holistic, the approach poses numerous challenges. For example, by relying upon political boundaries, legal systems typically do not endorse the concept of ecosystem management (Keiter 1994).

Watersheds, generally considered a type of ecosystem (Lotspeich 1980), typify the complexities facing resource managers. Water flow follows ecologically-determined landscapes, not politically-defined governing units. In order to adequately address water resource issues, managers, therefore, often must consider water use and rights within various regions, ranging from local county to international levels. As a result, collaboration and coordination are key to successful and efficient water resource management. Moreover, watershed and ecosystem management must reconcile the frequently competing goals of maintaining ecological integrity and sustaining human livelihood (Grumbine 1994). Grumbine (1994) asserts the need to grapple with competition between and facilitate coordination amongst various stakeholders, including scientists, managers, policymakers, citizens and the affected species and resources.

This paper presents an overview of collaborative watershed management in the Finger Lakes region of New York State. Keuka Lake will be highlighted as a case study of how one Finger Lake has addressed comprehensive watershed management. The authors have spent over ten years working with elected officials and citizens within the Keuka Lake Watershed to collaboratively develop a management plan which would improve regulations to address water quality problems and ensure proper enforcement of these regulations. This profile outlines the myriad steps and changes adopted along the way in order to incorporate various stakeholder viewpoints and guarantee that the processes and outcomes were ones which produced and built upon consensus. It presents an example in which a collaborative approach resulted in an agreement across municipalities to work together to develop better regulations and stricter enforcement of these regulations. The analysis section following the profile highlights the unique aspects of this case study and broader lessons learned.

Background

In New York State, it is widely recognized that nonpoint sources of pollution contribute 80 percent or more of the sediments, nutrients, and pathogens to the state's waters. Many lakes have been studied to determine the sources and impacts of pollutants and, in some cases, remedial measures have been implemented. By and large, however, very few comprehensive and coordinated watershed-wide programs have been implemented to prevent these nonpoint sources of pollution from contaminating our valuable lakes and streams.

The 7,500 square mile Finger Lakes Region of New York State encompasses eleven glaciated lakes in two drainage basins, the Oswego and the Genesee River, in the western portion of the State. The region provides outstanding opportunities for water-based recreation, high quality drinking water, tourism, rural living and agriculture. The region is primarily dominated by second-growth forests, agriculture, small hamlets and villages, and high density development along the lake shorelines. The current water quality status in most of the lakes is excellent, with the primary usage for drinking water. Many cities, including Rochester and Syracuse, along with thousands of shoreline property owners, use lake water for drinking.

While the lakes are considered to be in very good condition, there are many signs of problems including algae blooms, fish consumption advisories, sediment plumes after storm events and high bacteria levels. The sources of pollution are primarily land use or nonpoint in nature, emanating from such sources as agriculture, roadbanks, streambanks, residential properties and forestry.

There are many long-standing efforts to protect and enhance the quality of the Finger Lakes including regulatory, administrative and cooperative partnerships or coalitions. New York State through environmental conservation law promulgated standards and regulations to prevent pollution from point sources in the 1970's. These statewide regulatory and enforcement activities have largely eliminated the impacts from point source discharges in surface and groundwaters.

Regional Initiatives

Over the last decade, a number of coalitions or cooperative partnerships have formed to provide stewardship of watershed planning and management at both the regional and local (lake basin) level in the Finger Lakes Region. At the regional level, a coalition of 24 counties called the Finger Lakes-Lake Ontario Water Protection Alliance (FL-LOWPA), was formed to improve the health of the region's watersheds based on local, coordinated programs. FL-LOWPA in cooperation with its member counties and local, regional, state, and federal partners, can facilitate cooperative watershed management in the basin by sharing of technical information, public education and involvement forums, community-based strategic planning, local leadership development, and enhance the funding of locally selected projects using state leveraged grants. FL-LOWPA members consist of county-level agencies such as the Soil and Water Conservation District or the planning or health department.

At the county level, water quality coordinating committees were formed in 1992 in all the counties of the state to provide a forum for communication among water quality stakeholders. These action oriented committees meet on a regular basis to discuss watershed initiatives in the county, cooperative strategies with other counties, and funding opportunities. Each year, the state provides a competitive small-grants program which serves as seed money for single or multi-county watershed projects. Since the emphasis of the grants program is to foster watershed

collaboration, multi-county watershed initiatives are encouraged and are funded at higher levels, usually twice the amount allocated for a single county project (i.e., \$10,000 vs. \$5,000).

Lake Basin Initiatives

At the lake-basin level, intensive watershed management planning efforts have been initiated in the last five years on most of the twelve Finger Lakes. These efforts have been locally based; often initiated by a citizen's lake association or by county agencies or municipal government. Lake basin watershed coalitions serve as the organizational structure where stakeholder groups work in partnership to develop and implement a plan. While individualized lake basin plans are being developed for each lake, there are many similarities in the process and steps used by each lake.

Keuka Lake Case Study

The Keuka Lake watershed in the central Finger Lakes region has a long history of watershed cooperation and illustrates some of the common components and process steps taken by a lake watershed coalition.

Keuka Lake is an extraordinary resource for residents and visitors alike. The watershed provides outstanding opportunities for boating, fishing, swimming and picnicking. The lake provides a high quality source of drinking water for about 20,000 people including 10,000 people who live along the lake's shoreline. The economic benefits of the watershed are tremendous. The assessed value of shoreline property is approximately \$600 million with a market value estimated at nearly \$1 billion. For all the municipalities surrounding the lake, the majority of local taxes are derived from shoreline property owners. Since shoreline property values are sensitive to lake pollution, it is important to the value of these properties.

The economic benefits derived from tourism and recreation are also significant. According to the New York State Department of Environmental Conservation, the estimated economic benefits from fishing activities on Keuka Lake alone are over \$5 million per year. The Finger Lakes Association estimated the economic impact of tourism in Yates and Steuben Counties in 1996 was \$15 and \$56 million annually, largely because of the Finger Lakes, which includes Keuka Lake.

Studies of Keuka Lake indicate lake deterioration. Nutrients, pathogens and sediments have been measured to exceed acceptable levels at times, particularly after storm events and spring runoff periods. Although the lake is in relatively good shape, and the main management focus is pollution prevention, it is important to prevent lake deterioration in order to protect public health and the economic benefits derived from a healthy lake.

One of the key strengths of the Keuka Lake watershed is the presence of an active, well organized, citizen-based lake association. The Keuka Lake Association (KLA) was formed in 1956 and has worked closely with the municipalities to foster cooperation and uniform regulations and enforcement for the protection of lake quality. The association has nearly 2,000 individual, family, and business members, representing nearly one-third of the watershed population and therefore has considerable influence on community public policy. The KLA serves as a "nucleus" organization providing the vision, focus for cooperation, leadership, and citizen support needed for watershed cooperation and protection.

Keuka Lake Watershed Project

In 1991, the KLF sponsored a public policy program entitled the Keuka Lake Watershed Project (KLWP) with the purpose of fostering the development of a uniform, coordinated, and cooperative watershed management program to protect the lake. This was not the first attempt at pursuing this goal, in fact, the municipalities, at the urging of the KLA, formed an intermunicipal compact in the 1960s for the purpose of hiring a watershed inspector to inspect septic systems. This program was successful for over a decade, but eventually failed as a result of municipal dissatisfaction with a new inspector.

A second attempt of watershed cooperation was tried in the late 1980s by the Yates County Planning Department and Soil and Water Conservation District using state appropriated water quality funding designated for the Finger Lakes region. The initiative focussed on the implementation of a state-authorized watershed district or commission. While these efforts did not lead directly to the formation of a district, a number of excellent studies were completed on septic systems, water quality and resident perceptions. In addition, a number of public policy forums were held with citizens and elected officials and provided a forum for discussing nonpoint source pollution and what role municipalities could take to address these issues. This initial work helped lay a solid foundation for the KLWP and the effort to bring the municipalities together.

Municipal Cooperation in the Face of “Home-Rule Powers”

Unlike many lake regions throughout the world, Keuka Lake is dominated by private ownership. Nearly 3,000 properties surround the 113 km of shoreline of this 34 km long lake. Only a small portion of the lakeshore and the watershed of 44,517 ha is in public ownership. This pattern of private development is the norm in New York State and is accentuated by the concept of “home-rule powers”. These powers provide that each municipality (town, village or city) in the state has constitutional authority for land use and public health regulation. The Keuka Lake watershed has within its boundaries ten towns and two villages in two counties, each with their own authority for providing or not providing watershed controls. As a result of the inherent landowner patterns and jurisdictional landscape, watershed management for Keuka Lake—and the Finger Lakes generally—is a “grass-roots” and a local defined proposition

Working with local governments on environmental public policy issues is a demanding proposition in New York State. It takes more time than the “gestation of a dinosaur” as one lake association member quipped, and requires considerable human relations and political skills. While some view the strong local government structure a hindrance, public policy developed in the face of home-rule powers are perhaps more reflective of the public’s interest than policy handed down from a higher level of government.

Program Organization

One ingredient essential to successful public policy formation in this setting is an organized, committed, and financially sound nucleus organization. The KLA has more than 2,000 members and raised in excess of \$180,000 from competitive grants, corporate gifts, and individual contributions for the initial two year project. No one on the KLA Board, however, had the time or the expertise to direct the project. When the KLA held a meeting with local, county, state and academic institutions to request their advice on how to proceed, it was evident that additional staffing was needed. The funds were primarily used to hire a project director and support information gathering and educational materials. A hired “point person”, with applicable scientific

and public policy skills, proved to be a critically important action taken by the KLA. The project director could focus entirely on bringing the resources to bear on reaching the project goals and using the existing agencies as support on an “as need basis”.

Membership support is also vital. A 1989 KLA survey indicated watershed program development to be the top priority among the organization’s members. As a result, several specialized KLA committees were formed and strengthened (e.g., water testing committee) in support of the project.

Project Components

There were three fundamental components of the KLWP: 1) information gathering or fact-finding; 2) education and awareness; and 3) institutional cooperation and participation. The program was initiated by having a “roll-out” event, where all the elected officials, agency staff, academic researchers and the press were invited on a tour of the lake/watershed aboard a chartered boat. At the same time, a brochure describing the project was sent to every watershed resident and a point-of-purchase display placed at every business in the watershed. T-shirts, hats, and bumper stickers were also produced as part of the campaign. Almost all of the creative and printing costs were donated by a KLA member.

Scientific information was collected through a variety of programs including water quality monitoring, resource inventory and mapping, septic system sanitary surveys, watershed resident opinion surveys, and economic impact studies. During this phase, mostly existing information was gathered, except for lake and stream sampling and economic data. The gathering of economic data was an important aspect of the project and helped make the connection between a “clean lake” and a “healthy economy”. These data included the tourism and tax base information cited previously along with presenting scenarios of what would happen to the tax base and taxes if the lake became polluted. Making the connection between the health of the lake and the economy helped to convince elected officials that watershed protection was an important issue. Elected municipal boards have a full plate of municipal concerns at each and every meeting. If a new issue such as watershed protection is to get serious attention, particularly if it requires the passage of a regulation or signing of an agreement, elected officials must be convinced the issue is worth spending what could be a considerable amount of time and possibly tax dollar investment.

These initial research results provided the basis for defining existing water quality problems and identifying potential solutions, as well as providing critical information for educational materials. Four more sets of brochures were sent to all the watershed residents based on the findings of the research, status of the project and also inviting comments and participation. These mailings were also donated, highlighting again, the importance of the KLA membership.

Establishment of communication links between the KLWP and existing institutions, such as town boards, Soil and Water Conservation Districts, New York State Department of Environmental Conservation, and New York Water Resources Institute, are vital to the efficient use of institutional resources and avoiding duplication of efforts. These groups were brought together on a regular basis to provide input and support to the project during the first two years.

Public Participation

Central to public policy formation is the method used to identify issues or concerns and solutions. The KLWP used a participatory approach to develop early and local consensus and to open the lines of communication with agencies, municipalities, special interest groups, residents

and academic institutions. The premise is that all organizations or individuals with an interest in or responsibility for the watershed should have an opportunity to “sit at the table” and participate in the decision-making process. To facilitate participation and development of grass-roots support, Town Watershed Advisory Committees (TWAC) were established within the first year of the project. The purpose of the TWAC’s was to provide a legitimate or credible forum in each town where issues of water quality and watershed management could be addressed in light of local concerns.

TWAC participants were appointed by the town boards and included one town resident liaison from the KLA. The KLA liaison communicated regularly with the KLWP director, to update him on progress and make requests for educational and/or technical information. The KLWP director served primarily as a clearinghouse of information about the watershed and committee developments for each town. Important information developed in one town’s TWAC benefited other towns in the watershed, and the KLWP director’s office provided an important information exchange function.

Early Stages of the Keuka Watershed Improvement Cooperative

Town Watershed Advisory Committees met throughout the watershed for approximately six months and resulted in a variety of actions. The role of the project director and the KLA liaison were critical. The project director met with each of the committees and communicated important information generated between the committees. The director also responded to many requests for information and helped to keep the process moving forward. The KLA liaison helped in a number of ways, perhaps most importantly by making the elected officials aware that a “taxpayer” in their town was supportive of the watershed public policy process.

Perhaps the most important recommendation from the TWACs came out of the notion that “pollution does not abide by political boundaries”. All the TWACs suggested forming a single, watershed-wide study committee, consisting of the elected officials and the KLA and other agencies providing technical support. At this juncture in the process, how would the municipalities be brought together? While there was a history of municipal cooperation back in the ‘60’s and ‘70s, the 1980’s could be characterized by mistrust, competition and ill-feelings. The KLA recruited from it’s membership a retired executive with a tremendous amount of public policy and conflict management acumen and ability (it also helped that he and his family were well-respected, civic-minded and third generation on the lake). He took on the unofficial role as “citizen mediator” and proved to be the kind of person that could bring together elected officials and create a sense of responsibility and purpose. His role cannot be overstated, particularly in light of the animosity between some of the municipalities.

The committee was composed of the supervisor or mayor of each of the towns or villages in the watershed and was chaired by one of the supervisors. They called themselves the Keuka Watershed Improvement Cooperative (KWIC), and met monthly for a year, until an agreement was reached. During this phase, the project director and KLA served as a catalyst to keep the project moving ahead by providing information, setting up meetings, recording minutes and generally making it easy for the elected officials to get together and make decisions. The purpose of the KWIC study committee was to work on the development, adoption and enforcement of uniform regulations to protect and enhance the water quality in the watershed.

How decisions were made by the committee in designing the program was agreed on at the beginning to be done by consensus, rather than majority voting. Consensus on a decision was

defined as being in agreement with or, at least not opposed to the decision, by all members of the committee. The idea was that in the development of a cooperative watershed management program each of the supervisors needed to support the program, particularly when they were reporting back to their respective boards on the progress of the program. The supervisors, therefore, were the “gatekeepers” of the municipalities and their support was a prerequisite for the support of the boards. Each of the boards eventually needed to vote by resolution on the proposed program and so the early discussions with the supervisors were critical.

Uniform Regulations

One of the first actions by the KWIC study group was to request the KLWP Director to work with local watershed inspectors to develop a model wastewater law. The model law was then reviewed by state and local agencies and endorsed by the KWIC before sending it to local municipalities for passage. The proposed model law was presented to each municipal board and after public hearings, was passed into local law in all municipalities in the watershed. This was significant and a landmark step in New York State. The law not only required more stringent criteria than the state sanitary code, it also had provisions for an aggressive inspection and maintenance program. All wastewater systems within 200 feet (60 m) of the lake or tributary were required to be inspected and the septic tank pumped once every five years. Holding tanks and aerobic systems required annual inspections. All property transfers also were required to have the inspection performed. In addition, failing or inadequate systems are required to be upgraded or replaced at homeowner expense.

Institutional Arrangements

After the passage of the model law, the issue of uniform and coordinated enforcement was the major focus of the KWIC study committee. The KWIC reviewed a number of institutional arrangements to formalize their cooperation that are available in New York State to provide for watershed management activities. They considered New York State watershed rules and regulations, enabling state legislation to form a commission, county small watershed district legislation, and inter-municipal agreements (IMA).

Many supervisors, the KLA and state representatives were initially in favor of state legislation to form a commission, primarily because it could be made as a long-term agreement. The next best option was the IMA, but many were concerned because this contract was believed to be not binding from one municipal board election to the next. One supervisor and his board, however, was not comfortable supporting the state legislation option and believed somehow using the IMA was possible. After checking with a number of attorneys, he determined that in fact it was possible to bind future boards to an existing IMA contract, as long as you give them a way out.

Inter-municipal Agreement

After much debate, the supervisors and mayors decided to use the inter-municipal agreement (IMA) approach. IMAs are commonly used by municipalities in New York State to share services or equipment under provisions of Home Rule Powers. An IMA can be crafted so that almost anything a municipality can do individually, they can do together with an IMA. The use of an IMA for multi-jurisdictional watershed management is perhaps unique in New York State. The appeal of an IMA for the municipalities was the agreement’s inherent flexibility and

“home-rule” nature. An IMA can be drawn up locally or by municipal attorneys, include only those activities that the municipalities are used to doing, and executed with the signature of the chief executive (supervisor or mayor) after municipal board approval.

The KWIC’s eight page IMA formalized its relationship as a watershed policy body and included several provisions for watershed management. The result was the establishment of a uniform and coordinated approach to solve water quality problems at the time and in the future. The IMA provides for a board of directors, consisting of the chief executive municipal officer from each municipality in the watershed. A professional staff, including a watershed manager, directs program activities. The primary responsibility of the watershed manager, as defined in the IMA, is to supervise the watershed inspectors to ensure uniform enforcement of the newly adopted wastewater law. The IMA also includes provisions to allow the KWIC to handle new problems that may arise in the future, including specific reference to the county water quality strategies for identifying and solving such problems. The provision which allowed for longevity was in the form of a “rolling sunset”. The agreement is for three years, with renewal each year, unless a board members calls for review. If there is a problem, it must be in writing and sent to the board. The board is required to meet and must try to resolve the issue with the board member. If a resolution cannot be found, the agreement will eventually expire, but not until an election has passed (elections are held every two years). The election serves as the voters mechanism to either support and or let the agreement expire. Finally, the agreement contains provisions for settling disputes as they may arise between municipalities represented on the Board.

Program Costs

One of the tricky policy issues was how towns were going to share the costs of the \$80,000 a year program. Each municipality benefits differently from Keuka Lake. Some towns have a high lakeshore tax base and property frontage. Others, like the Village of Penn Yan, have virtually no shoreline property but they derive their municipal drinking water from the Lake. Research on ways to generate income and formulas for dividing the program costs “equitably” were presented. For every method to generate income or share costs, at least two or three supervisors were dead-set against it. What our citizen mediator did was to look at it more philosophically, and he presented the following concept:

share and share alike, because all municipalities benefit from the Lake, but they all benefit differently. Some benefit from drinking water. Others more for tax base. Others more for recreation and tourism. But they all benefit. And the one thing we can agree on is it would be impossible to determine how we benefit individually. So, therefore, since we all benefit in different ways, the one thing that we can agree on is that we share and share alike.

And so program costs, as written in the IMA, are shared equally among the eight municipalities.

In the fall of 1993, the municipalities considered along with the IMA, a package of materials representing the policy and procedures of the KWIC and the uniform wastewater law. The policy and procedures outlined how the KWIC would work and the responsibilities of elected officials, watershed manager, and inspectors under the uniform wastewater law and the IMA. After dozens of public meetings in the eight municipalities, the IMA was approved with

overwhelming and nearly unanimous support from residents and the local boards. The IMA was officially signed in December 1993 and after six months, the KWIC established an office with a watershed manager, inspectors and office assistant.

Watershed Management Plan Development

After the establishment of the KWIC, the KLA received a \$50,000 grant from the Great Lakes Protection Fund in 1996 to pursue the development of a comprehensive watershed management plan. The management plan was a two phase project to develop a state of the watershed report and a management/implementation plan. The initial fact-finding effort from 1991-1993 focussed primarily on existing data and studies, excepting the development of economic and water testing information. The GLPF grant provided an opportunity to go back and review all potential sources of pollution in much greater detail and determine priority subwatershed areas for pollution prevention and best management practice (BMP) implementation.

An important first step of the planning process was to recognize that the study represented a “new beginning” and an opportunity to bring all the stakeholders to the table. A written study agreement was drafted that outlined the vision, goals, objectives, issues and outcomes and was sent to dozens of organizations. Over three dozen organizations, including towns, counties, regional, state and federal agencies and other non-governmental organizations signed the agreement as partners to this stage of the process.

Watershed Project Committee

The KLA established a watershed project committee to oversee the activities of the project. The major focus of the committee was fact-finding and educational outreach. The overall approach for evaluating the health of the watershed is based on identifying water quality impacts, evaluating potential sources of pollution by subwatershed, and developing implementation actions to remediate or prevent pollution. Since the Keuka Lake watershed is fairly large (44,517 ha), the watershed was divided into 29 subwatershed areas for pollution potential evaluation. A number of studies were conducted to evaluate the potential impact of sources of pollution on the lake and within subwatershed areas. Sixteen potential sources of pollution were evaluated including agriculture, deicing salts, hazardous spills/sites, mined lands, petroleum/chemical storage, streambank erosion, point discharges, development, forestry, dumps/landfills, septic systems, roadbanks, and recreation. Each pollution analysis culminates in the identification of priority subwatersheds and/or linear segments of concern. For example, eight subwatersheds were identified high priority for agricultural best management practices implementation based on the research (a more detailed discussion of this process is presented below) and twenty-six miles of “very severe” roadbank erosion sites were identified and mapped from field surveys. These areas are graphically depicted using three-color maps using the Keuka Lake GIS and have been very useful for conveying the research results to the public, decision-makers, and funding institutions.

Keuka Lake GIS

An important analysis and presentation tool was the development and use of a comprehensive geographic information system (GIS). The base data layers (soils, land use, topography, hydrography, roads, political boundaries) were digitized from 1:24,000 scale map

source and were manipulated using a PC ARC/INFO GIS. An important aspect of the development and implementation of the data and GIS was how the program was a cooperative partnership between several organizations, including the Yates County Planning Department, Yates County Soil and Water Conservation District, Cornell Cooperative Extension and the Keuka Lake Association. Bringing together the resources and expertise of a diverse group, sharing the costs and the decision-making for this important analysis and presentation tool helped to create improved products and innumerable ancillary benefits.

The GIS was used for several analysis tasks including derivation of input data for nonpoint source pollution modeling, overlaying thematic maps and deriving sensitive areas to development, and illustrating high priority pollution source subwatersheds and segments.

Agriculture Subcommittee

For many of the potential sources of pollution, a separate subcommittee was formed to oversee the fact-finding and recommendations development. For agriculture, a subcommittee of farmers, industry representatives, agriculture service agencies and agriculture advocacy groups was established. The group reviewed and tested a written survey, reviewed results from modeling, organized two public forums, and developed the recommendations for the plan.

The fact-finding effort included the use of a 124 variable written questionnaire for all (400) farmers in the watershed. The survey was based on New York State's tier I and II risk assessment worksheets and included type and size of farm, animal numbers and management, crops grown and management, pesticide and nutrient management, and future status of the farm. There was a 56% response rate and all subwatershed areas were represented. The responses were coded into a pollution potential rating matrix and the subwatersheds were ranked using the overall ratings. A separate nonpoint source computer modeling evaluation method was used to help verify the survey results. GWLF (Generalized Watershed Loading Functions) was used to evaluate nonpoint source pollution (nutrients and sediments) loading for each subwatersheds. The results were tabulated and used to rank each subwatershed as with the written survey. Four out the top six ranked (highest pollution potential) subwatersheds in both methods were the same and an overall ranking and three-color map (high, moderate, low) was produced.

Public Information

Results from all the research were presented in several public forums. Because of the importance of agriculture, two separate public forums were held for farmers to review the results of the study and present a pollution prevention plan. The plan includes the use of a risk assessment approach to developing a "whole farm plan" for all farmers in the top eight high ranking subwatersheds. The process is currently under the umbrella of "agricultural environmental management" or AEM, and Keuka Lake was established as one of two statewide pilot projects to demonstrate the use of the process.

Agricultural Environmental Management (AEM)

AEM is an exciting new approach to comprehensively address pollution problems on the farm while enhancing the economic viability of the farm. The program is voluntary and incentive based, relying on technical assistance and state and federal funding to help support solving problems identified by the assessment. An AEM planning coordinator was hired to meet with farmers and go through assessment worksheets. The first meeting with the farmer is used to

identify farm mission, goals and objectives and to fill out the tier I worksheet. These worksheets inventory all the activities on the farm and identifies those areas needing further detailed review. A second meeting is used to go over the applicable tier II worksheets. These are specific to all the potential activities and sources of pollution, such as animal management, pesticide management, nutrient management and petroleum storage, and the relative risk of each aspect of the practices. From the tier II worksheet, the coordinator assembles a team of agriculture specialists to visit the farm and review potential problems and possible solutions with the farmer. Tier III involves the development of the plan, which may include engineering designs required to address barnyard water management or the specific strategies involved in a comprehensive nutrient management plan, such as soil and manure testing. The essence of the program is to comprehensively inventory all potential problems and develop plans to address them according to their pollution risk.

Conclusion

The development of a comprehensive watershed management plan has required considerable time and expense by the coalition members. Thousands of hours of planning, outreach, research, and writing by volunteers, agency staff and consultants were dedicated to compile the 600 page management plans. Sixteen sources of pollution, ranging from agriculture to septic systems were analyzed in subwatershed areas using monitoring, modeling, surveys, and GIS. Where appropriate, target areas for pollution reduction were identified based on the research and recommendations were based on these findings. During the plan development, concurrent education and participation activities were scheduled to create awareness about the plan, gather needed feedback, and recruit new committee members.

The watershed management document provides a blue-print of current conditions and options for remediation and other pro-active actions. At the time of plan completion, watershed coalitions developed an implementation process of public policy education to actively engage locally elected decision-makers and the public. This process is significant in that elected officials from the watershed are reviewing scientific findings and making recommendations that are good for their respective municipalities as well as the entire watershed. While the process has been slow, it has revealed the importance of developing partnerships between municipalities, agencies, nonprofits and the public to develop a locally-supported watershed management plan.

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