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TEN STRATEGIES FOR SUCCESSFUL SOURCE WATER PROTECTION

PATH TO PROTECTION



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PATH TO PROTECTION

TEN STRATEGIES FOR SUCCESSFUL
SOURCE WATER PROTECTION

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Introduction

Over the past five years, the U.S. Environmental Protection Agency's (EPA) Office of Ground Water and Drinking Water funded five national nonprofit organizations to launch source water demonstration projects in communities around the country. The purpose of the projects was to build on state Source Water Assessment Programs (SWAPs) in order to move communities from planning to implementing protection for drinking water sources. Successful pilot projects could then be replicated by state and local governments and water suppliers around the country.

In order to glean the lessons learned and identify best practices, the Trust for Public Land (TPL) led a joint review of the five grantees' source protection demonstration projects during the spring and summer of 2004. The five grantees were the Clean Water Network/Clean Water Fund/Campaign for Safe and Affordable Drinking Water, the Groundwater Foundation, the Environmental Finance Center Network, the National Rural Water Association, and TPL (in partnership with the University of Massachusetts and the U.S. Department of Agriculture [USDA] Forest Service).

Each of EPA's grantees took a different approach to advance source water protection through its pilot project.

◆ **The partnership of Clean Water Network/Clean Water Fund/Campaign for Safe and Affordable Drinking Water** worked with hundreds of voluntary and nonprofit watershed associations around the country to help them advocate more effectively for source protection as part of a larger goal to achieve fishable and swimmable water.

◆ **The Groundwater Foundation** supported suppliers working to advance new tools for wellhead and groundwater protection.

◆ **The Environmental Finance Center Network** helped local stakeholders develop and implement source water protection plans for sources

that cross jurisdictions and/or are shared by many water systems.

◆ **The National Rural Water Association** hired technicians around the country to assist small rural communities design and implement source water plans.

◆ **The Trust for Public Land (in partnership with the University of Massachusetts and the USDA Forest Service)** worked with local communities in multijurisdictional watersheds to integrate land conservation and forest management into comprehensive source water protection efforts.

This report summarizes findings based on experiences of the five pilot projects and proposes ten strategies that will help put more state and local governments on the path to protection. Each strategy includes a case study of a state or local entity that has successfully implemented some or all of the action steps included in that strategy. *(Note: The case studies are independent of the pilot projects of the five grantees.)*

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Our key observations are the following:

- 1.** In order to implement source water protection plans, states must commit to sustaining their programs even though there are few federal regulatory mandates linking the watershed to the tap. Leadership will be needed for determining new state and local roles in drinking water protection. In some cases, state staff and resources are drying up, and it is not clear whose job it is to take the plans to the implementation phase.
- 2.** Suppliers must become more active leaders in their watersheds. The grantees found many examples of suppliers who diligently monitor what comes in and out of their treatment plants and meet their regulatory goals, but these suppliers are not sure of their role in influencing landuse activities — including buying and managing land for conservation — in the larger watershed. Also, landuse planners using state-of-the-art analysis are typically not considering source protection in their local plans.
- 3.** There are opportunities, where programs and partners exist, for integrating source protection efforts. Our findings highlight many bright spots regarding partners, existing land conservation funding, water program resources, and some practical suggestions on revamping current water quality programs.
- 4.** A systematic approach to an action plan is often lacking. Many local governments or state

agencies are already acting to develop and implement plans; but too many times, critical steps are not taken. For example, if a particular constituency is not identified and recruited to the cause, progress slows.

- 5.** Most important, the key to progress is a closer relationship between local practitioners and the state agencies that could support them. States can play an important role in integrating clean water and landuse goals with a good state framework for action and dedicated funding for watershed protection. With the assessments now complete, local and state agencies have a great opportunity to take advantage of this knowledge base and momentum by reshaping their programs to encourage local source protection.

Taken individually, none of the findings are new or surprising. But together they clearly demonstrate that, in order to be truly successful, source protection must be integrated into all of our land and water programs. At one time, developed lands were far removed from source areas. Today, these areas overlap. Water suppliers must now work more closely with local landuse planners to consider how to protect source water before it reaches the treatment plants. States must support that work with data, incentives for protection, and technical assistance. And clean water advocates must strive to build a more informed constituency to support this work.



TEN STRATEGIES FOR PROTECTION

1. Make source water protection a high priority. Articulate the benefits of source water protection, including financial benefits, and demonstrate how successful protection can cap or reduce treatment costs over time.

Challenge

Today, there is insufficient public support for investing in source water protection, in large part because many state and local governments and even water suppliers fail to emphasize to the public the critical need to protect source water. Also, information on the costs and benefits of source protection — despite its importance in making sound long-term investments — is practically nonexistent. There are few regional or national studies that point to consistent long-term cost savings from investments in source water protection, even though anecdotal evidence indicates that such savings are occurring in many areas.

Local Role

Make source water protection a high priority and demonstrate commitment to action. Share lessons with other communities.

Protecting source water and the long-term safety and health of the water supply is ultimately a local responsibility. Local governments and water suppliers must take the lead on making source water protection a high priority and invest time and resources to demonstrate their commitment. This includes making sure that source areas are considered in landuse plans, land conservation priorities, and clean water programs. Their leadership will foster the involvement of other stakeholders, raise public awareness around the need for protection, and ultimately lead to a greater commitment of public and private resources for source water protection.

Communities need to share with their neighbors their experiences protecting land and encouraging more sustainable development patterns for source protection. Supplier studies that show the cost-benefit of source protection versus increasing treatment costs must be shared broadly and used as the basis for new source protection plans.

State Role

Make source water protection a high priority and create policies and programs that support and encourage local efforts.

While landuse and source protection are primarily the domain of local governments, state governments shape those activities significantly. State leadership leads to local action. States should create a framework of policies and programs that give communities the flexibility, funding, and technical assistance they need to plan and implement successful watershed initiatives. Besides providing the state Source Water Assessments, states should initiate research that provides local governments and suppliers with other data they need to make critical decisions about where to invest limited resources to maintain a safe and viable water supply.

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2. **Clearly identify the most critical threats to source water and share that information to involve and motivate a broad constituency.**

Challenge

Source protection is largely voluntary and unfunded. Consequently, the leadership of water suppliers alongside watershed associations, land trusts, and other nongovernmental organizations, which can leverage additional private and public sector resources, needs to be strong to guarantee successful source protection.

Local Role

Use SWAPs and other source area data to identify the most critical threats and share them with local stakeholders, including local landuse planners as well as the general public.

Local municipalities or other water providers must gain a clear understanding of the primary threats to both the quality and the quantity of drinking water and share that information with a broad set of stakeholders. This step is key to motivating individuals and organizations to invest time and resources in source protection and to help focus their efforts on the most critical threats. Source areas are often large, crossing multiple jurisdictional boundaries, with a complex mix of land uses and potential pollutant sources. This complexity is often the root cause of inaction. Clear and simple presentation of the most prevalent threats, and the

consequences of failing to address those threats, is essential.

State Role

Actively distribute data and findings from SWAPs as broadly as possible in an easily accessible format.

SWAP data should be easily accessible to the public to encourage citizen engagement in source water protection. This need for data must be balanced against the need for water system security so that the information is available without compromising the safety and security of the water system. From personally delivering SWAPs to local suppliers and planners, to posting information on Web sites to creating password-protected sites, states are increasingly seeing the value of widely distributing data.

The following types of information should be considered: (1) the delineation of the source water area, preferably in Geographic Information System (GIS) format, (2) the existing and potential threats to source water from both point and nonpoint sources of pollution, and (3) updated state assessment data that are current and accurate. The more complete the information local stakeholders have about threats, the more effective and efficient they can be about addressing those threats. States that have made their SWAPs thorough, precise, and readily available to the public will experience much greater local participation and private investment in source water protection, with or without state or federal funds.

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CASE STUDY

The Hamilton to New Baltimore Groundwater Consortium

The Hamilton to New Baltimore Groundwater Consortium is a model of interjurisdictional cooperation for building public support around protecting the region's groundwater supply. Created in 1967, the Consortium was formed to promote dialogue about source water among the six major public, private, and industrial groundwater producers in southwest Ohio. It comprises the cities of Cincinnati, Hamilton, and Fairfield as well as Southwestern Ohio Water and Southwest Regional Water District.

Initially concerned with preserving the water table, Consortium members decided, in the late 1980s, to expand their mandate to protecting the aquifer's water quality as well. The Consortium performed wellfield delineation in 1991 to help Fairfield and Hamilton create a Wellhead Protection Plan (WHPP), required as a condition for bringing new wells into service in those two cities. The entire consortium participated in the WHPP process because they believed all members would someday need a WHPP and also because they were interested in understanding the groundwater capture zones and identifying the most critical threats to source water. They began targeted groundwater monitoring that continues today.

The Consortium meets with elected officials, local planners, Ohio EPA, and U.S. Geological Survey representatives to coordinate the technical and regulatory aspects of groundwater stewardship. For example, the group drafted a model ordinance for wellhead protection with significant input from stakeholders. Passed almost verbatim in jurisdictions represented by the Consortium, the ordinance levied the same rules across local borders and made it possible for regulators to share information and staff for purposes of education and enforcement. The Consortium coordinator helps administer the ordinance by taking inventory of area facilities and visiting businesses to discuss the ordinance and answer technical questions.

The Consortium also encourages wellhead protection in nonmember communities that overlay the aquifer. Numerous communities import groundwater from neighboring townships instead of directly extracting water from the aquifer, but contamination in their townships can eventually migrate to the drinking water source. The Consortium works to induce overlying communities to take responsibility.

Consortium representatives explain time-of-travel (TOT) zones based on detailed studies and the financial trade-offs of adopting best practices now versus paying to mitigate contamination later through rate hikes. They also discuss draw-down levels and explain the connection to pumping, using historic data they have collected from groundwater monitoring stations. Two neighboring communities, Saint Clair and Ross townships, have passed groundwater protection ordinances at the urging of the Consortium.

The Consortium conveys a strong message based on sound science. The Consortium installed groundwater monitoring wells and initiated a sampling regime to document changes in water level and quantity over time;

to understand the connection between groundwater and surface water; and to develop TOT equations for chemicals moving into the hydrologic system. They have used this information in meetings with current and future decision-makers, and speaking in boardrooms, civic halls, and schools throughout the region. Demonstration tools vary dramatically, from sand-tank models to wellhead protection videos.

Consortium member fees and grants from the Ohio Water Development Authority, Ohio EPA, and U.S. Department of Energy have paid for the scientific/technical work and development of educational materials. The Consortium also pays for a full-time Consortium coordinator. The annual budget is generally about \$140,000. Member fees are based on the historic share of groundwater extraction.

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3. Develop a constituency to champion the cause, and provide resources and technical support to ensure sustainability.

Challenge

The engagement of citizens, nonprofits, elected officials, and other stakeholders will raise the profile of source water protection and lead to greater investment in and commitment to protecting water resources. Simply having communities understand where their water comes from will prompt more involvement in protection.

Local Role

Identify local leadership and create or identify a forum for organizing local efforts.

Developing a strong local constituency to champion the cause requires identifying leadership — the “driver” or “spark plug” — and creating or identifying a forum for organizing local efforts. Ideally, leadership should come from water utilities, but it can also come from motivated residents, watershed associations, land trusts, elected officials, or others with an interest in clean drinking water.

The driver, an individual who takes a leadership role in promoting source protection and engaging local stakeholders (such as water utilities, watershed associations, land trusts, or elected officials), is key to leading a community discussion on source protection. Communities

should identify or create a new forum, such as a task force, commission, or nonprofit watershed association that specifically addresses the interests and capacity of volunteers to lead source protection planning efforts. Forums are critical to any source protection effort because they can attract essential technical and financial resources.

Because of the voluntary nature of source protection, a separate forum for attracting and organizing interested citizens to advocate on source water protection issues can be key to advancing the issues.

State Role

Provide capacity-building grants to local groups to help locals lead watershed and source water protection.

States should play a significant role in building the capacity of local groups and in sustaining source protection efforts. They can fund capacity-building activities and staffing, and they can provide technical assistance — all to encourage resource-based planning and protection. They can also help identify or provide funding to sustain implementation as local efforts mature. Often, minimal public investment in building the capacity and sustainability of watershed associations and land trusts can attract significant private investment, both in-kind and financial. These efforts are key to mobilizing and sustaining these community-driven efforts.

CASE STUDY

The Marion County Wellfield Education Corporation

Indianapolis discovered that “drivers” working on community-wide education and public awareness campaigns can build local support for source protection plans that benefit the entire area.

In 1994, Indianapolis was faced with a heated dispute over the siting of a gasoline service station near a public drinking water well. The partially unified city-county government came to understand that it needed a comprehensive solution to such disputes because the underlying aquifer would be the sole source of future public drinking water.

The Department of Metropolitan Development (planning department) established two consecutive study committees to evaluate alternatives while a separate technical committee conducted field assessment and modeling of potential regional groundwater contamination. Based on recommendations of the second study committee, the administration selected a two-pronged approach for its groundwater protection program: (1) regulatory action to protect the land within the five-year TOT zones of the public wells and (2) an education initiative, managed by a nongovernmental entity, to help the public understand the importance of groundwater and how to protect it.

In 1997, the Marion County Wellfield Education Corporation (MCWEC) was established to launch a public awareness campaign. Funded by a county fee on water connections (about \$70,000 per year), the campaign has provided an opportunity to bring together “drivers” who include members of the group’s Board of Directors as well as active nonvoting meeting attendees. Under the founding charter, the Board of Directors must have as members a county public health officer, water suppliers, and other leaders from business, education, civic, and neighborhood organizations. Initial appointments of the mayor and city-county council included individuals who had served on the study committee. Others who had been loosely affiliated with the study committee were also recruited.

The government provided clear direction by setting two specific goals for MCWEC.

“ **1)** Increase by 50% the public’s awareness of the importance of groundwater drawn from the designated wellfield protection areas in supplying drinking water to central Indiana businesses and residents, and

2) Achieve knowledge of ‘appropriate behavior’ in a wellfield by 50% of residents living in the one-year and five-year time-of-travel zones established in the county zoning ordinance and by 10% of residents in the remainder of the county.”

Having set measurable objectives, MCWEC gauged a baseline level of public awareness through an 800-person survey. The organization then devised a strategy to improve on this baseline. Outreach efforts focused on the general public, while also targeting area businesses, and a subsequent survey confirmed success. However, a limited budget combined with the high cost of mass-media outreach, the complexity of the subject matter, and differences between wellfield districts persuaded MCWEC of the need for targeted face-to-face, in-person meetings and appearances at various kinds of venues.

For the first few years, MCWEC’s executive director, along with a public relations consultant and volunteers, made presentations at neighborhood organizations, health fairs, and Earth Days, and they visited homes and businesses located in the wellfield TOT



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zones that were potential contaminant sources. They also used print and multimedia outlets on a limited basis to reach the general public.

Within three years, MCWEC had achieved its mission of doubling public awareness. The board then hired a contractor who now performs confidential free site assessments and provides free spill kits to potential contaminant source site operators within the wellfield protection areas. More than 50 sites have been serviced so far, comprising about 10 percent of all potential contaminant sources.

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4.

Partner with those who have the authority to make change such as elected officials and agricultural and industry representatives.

Challenge

Without a regulatory mandate for protection, states, local governments, and water suppliers need to build successful partnerships with those who have the authority, resources, or credibility to create change. These partnerships should occur particularly when source areas cross jurisdictional boundaries, require private stewardship, and/or in cases where the water system is a nonmunicipal entity.

Local Role

Partner with those who have the resources and credibility to create change, particularly those with a local constituency key to implementation.

Local entities should partner with those who can provide a variety of perspectives and lend local source protection efforts much-needed manpower, technical expertise, and financial

support. A partnership can collectively convey a consistent and clear message about the threats to source water to a broad audience while building a constituency around addressing those threats.

Water utilities are the key partners in source protection and can be the drivers for change. They are typically aware of the biggest potential sources of contamination, the challenges of treating those contaminants, and their threats to public health. They also have a vested interest in protecting their systems from contamination. Landuse planning entities are increasingly important partners to water utilities. Although few suppliers have the authority to directly control activities on land in their source area, most have the ability to plan and partner with other communities and stakeholders who can directly influence landuse and land management. Water utilities may also have the ability to contribute resources and technical expertise to source protection efforts. Partnerships with watershed associations, land trusts, or other nonprofit organizations make it possible for utilities to guide and encourage source protection efforts for which they otherwise may not have the staffing, resources, or authority.

State Role

State source water offices should partner with other state offices that have implementation funding or regulatory tools to advance source protection goals.

Many states, in addition to having created departments to carry out their regulatory mandates for clean water and safe drinking water, have set up watershed management offices. These offices are facilitating new relationships across land and water policy programs to link and inform place-based action. Programs and policies — such as those around forestry and agriculture, smart growth and low-impact development initiatives, or stormwater, flood control, and estuarine programs — often have funding, resources, and advocates that can help attract leadership for source protection. Land conservation funding, the largest and fastest-growing area of support, is available in more than 35 states, and it should be earmarked for source protection.

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CASE STUDY

Vancouver, WA

Through trial and error, the City of Vancouver has developed a cutting-edge process for formulating water protection measures that brings different perspectives to the debate as well as resources for building a constituency to support these measures.

Located in the southwest corner of Washington State, the City of Vancouver Water Utility draws on 39 wells from two aquifers to provide drinking water to 153,000 people. In the 1980s, two local chrome plating shops, which had leaked hexavalent chromium and volatile organic compounds into Vancouver's drinking water aquifer, were designated Superfund sites.

Public concern was high as city officials labored for eight years to come up with a groundwater protection ordinance. They reviewed groundwater models from the Portland/Vancouver area, estimated various TOT figures, assessed potential sources of contamination, and proposed an elaborate permitting system to regulate these sources. However, the ordinance was met with public criticism from regulators, environmentalists, and business owners and was soundly rejected by the City Council. The staff went back to the drawing board.

The city planners took an entirely different approach the second time around. They asked those who had opposed the first ordinance to take part in developing a new source protection plan. The process was as simple as it was disciplined. All were welcome to participate as long as they were committed to consensus. Their commitment to the project was strengthened as each group realized that no provision would be written into the proposed ordinance unless it had unanimous support. Starting with the rejected ordinance, the group met about once a week at first, then circulated drafts by e-mail and convened only to discuss particular sections.

Although their positions initially seemed at odds, committee members soon realized that they were not irreconcilable. While the citizens and environmental advocates wanted all potentially hazardous sources addressed so water resources would be protected, regulators focused on getting provisions that could be enforced with appropriate legal authority and realistic staff time, and the business/industry folks pushed for reasonable and effective regulations if they were proven necessary and were not

unduly burdensome to meet.

Within a year, a new ordinance bearing little resemblance to the old was approved by the committee. The proposal went to a Planning Commission hearing for more public input. In November 2002, the City Council unanimously approved the new ordinance.

The ordinance is a tailored watershed approach for source protection in Vancouver that addresses both surface water and groundwater. For surface water, the ordinance incorporates the National Pollution Discharge Elimination System (NPDES) stormwater permit's Phase II requirements. For groundwater, it designates all land within the city a Critical Aquifer Recharge Area, naming the entire aquifer beneath the city a potential source of drinking water, regardless of TOT zones around water wells. It prohibits several types of activities within city borders, such as chrome plating operations and disposal of hazardous, radioactive, and municipal waste. It regulates certain activities across the city such as pesticide/fertilizer use and hazardous material handling. Additional restrictions apply to landuse within 1,900 feet of municipal drinking water wells.

The city hired an inspector in 2003 to visit businesses with potential contaminants to make sure they were following Best Management Practices and to respond to complaints and referrals. By the end of 2004, about 50 percent (125/250) of the businesses with potential contaminants had been visited. The inspector routinely provides technical assistance, explaining vulnerabilities specific to the site and recommending action items to address them.

The program also funds public outreach and water quality monitoring activities. A Geographic Information System (GIS) map identifying industries of concern and the known and suspected contaminated sites within city boundaries will soon be available to the public on the city's Web site. Information on the facility database is already shared by program staff and local agencies to track inspections.

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5. **Build on existing issues and programs, integrating source water protection into high-priority initiatives such as stormwater management and land conservation.**

Challenge

If source water protection is not the primary issue that motivates action or attracts funding at the local or state level, source water protection advocates can build on other high-priority initiatives with funding or regulatory mandates.

Local Role

Find ways to meet the needs and overlapping interests of potential partners, dove-tailing on their initiatives whenever possible.

Source water protection may not be the primary issue that motivates local players, particularly if the people who live in the source area do not get their drinking water from that

source. The key is to identify local issues that will drive action and build on those issues while also clearly communicating the benefits of source protection, such as the cost savings of keeping contaminants out of the water so they do not need to be removed through treatment.

For example, by preserving undeveloped land around reservoirs, recreational water users may benefit from improved fish habitat and safe swimming opportunities while local suppliers and municipalities meet requirements such as stormwater regulations or Total Maximum Daily Loads (TMDLs). Simply finding a way to help a partner address a nagging local issue or achieve related goals could make a project successful. The benefits that may be gained by all groups must be emphasized and clearly communicated.

Individuals and organizations will often contribute to source protection projects if these projects support initiatives they already have under way and provide information they need to guide their actions. Finding ways to meet the needs and overlapping interests of potential partners will lead to greater commitment on their part.

State Role

Revise criteria or eligibility for existing programs, such as land conservation or stormwater management, to prioritize source water protection.

Funding criteria for existing state programs that protect land or water resources should be updated to better address source water protection and other high-priority water resource threats. For example, land conservation programs can give funding priority to conservation efforts that protect source water. Likewise, state stormwater regulations can target source areas to institute more stringent stormwater controls. State programs that link source water protection with other state and local goals, such as preservation or habitat protection, will attract greater support and funding from the public and elected officials.

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CASE STUDY

Connecticut Department of Public Health's Drinking Water Division

By opening lines of communication between programs and merging source protection with other relevant policies, Connecticut is setting an example for other states moving to prioritize water protection initiatives.

Between 2000 and 2003, the state of Connecticut created a SWAP program to assess its sources of public drinking water and tasked a Drinking Water Source Protection (DWSP) Unit with developing a five-year action plan to minimize risk to public health by bolstering drinking water source protection. The action plan calls for integrating SWAP findings into state, regional, and local policies and encouraging source water protection activities at the state and local levels — all of which requires coordination at the state level.

One of Connecticut's goals is to link SWAP reports to the following: planning processes; public water system and source water inspections; environmental assessments for proposed development projects in source water areas; siting processes for new sources of supply; and water quality monitoring requirements. To facilitate this massive data coordination, the state's Drinking Water Division is using one master GIS database, which is linked to the U.S. EPA's Safe Drinking Water Information System. Better known as SDWIS, this database contains safe drinking water regulation compliance history for individual water suppliers. Connecticut's drinking water staff can review, use, and update its GIS database in real time within its new intranet application.

To encourage local and regional stakeholders, first, to use the SWAP information and, second, to prioritize source protection at the local and regional levels, the state is working on many fronts. The DWSP Unit shared SWAP findings with the chief-elected official in each of the state's 169 municipalities. The DWSP Unit held forums with the state's regional planning organizations and met with local health directors. It has also reached more than 100 public water system operators through a continuing education training module that instructs operators how to use SWAP information.

The DWSP Unit is working with other state agencies and local stakeholders to revise criteria and eligibility for existing programs and mandates. For example, the "1985

Connecticut Plan" was amended in 2002 to require individual water supply plans to evaluate current source protection measures using the SWAP reports and to identify opportunities for improvement. The DWSP Unit is crafting amendments to compel stakeholders to incorporate SWAP information into regional water supply plans as well.

The DWSP Unit uses existing authority under Connecticut's public health laws to help prevent proposed local developments and future state agency activities from degrading drinking water supplies. For example, the DWSP Unit controls all permitting requirements for water company-owned land, which accounts for approximately 110,000 acres or 3.5 percent of the state's land area. In Connecticut, many public water systems own large parcels of land around drinking water sources, and the state requires that they get approval from the DWSP Unit before changing landuse, implementing recreational uses, and transferring or assigning ownership interests of their properties within source water drainage areas. The DWSP Unit wants suppliers to consider SWAP information in their landuse plans.

Central to the DWSP Unit's mission is information exchange and cooperation. With open lines of communication, the state can get better information about what is happening on the ground and support local efforts to protect public drinking water sources.

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6.

Create a viable action plan that guides and motivates implementation.

Challenge

Watershed and source protection plans are often written with great enthusiasm and vision only to remain on a shelf because implementation requires having a practical action plan that prioritizes strategies and provides a clear path for achievement.

Local Role

Create an action plan that prioritizes strategies that are feasible to implement, identify who will take the lead, include a financing plan, and map out a timeline for action.

Local governments and local water systems are well positioned to take the lead on a draft action plan for source protection. An action plan should include a list of strategies for immediate implementation. The plan should also identify who will take the lead and provide an estimated cost or budget as well as potential funding sources. Starting small and successfully implementing one or two high-priority strategies early on builds commitment to and confidence in instituting a longer-term plan.

One way to prioritize strategies for implementation is by developing a matrix of action items. The Groundwater Foundation

recommends categorizing source protection strategies based on those that are (1) easy to do and yield a major improvement, (2) difficult to do but yield a major improvement, (3) easy to do but yield a minor improvement, and (4) difficult to do and yield a minor improvement.

Successful implementation is more likely if the action plan focuses on a small area. For surface water resources, a sub-watershed, or stream reach (fewer than 100,000 acres if possible) can be chosen for targeted resources and to demonstrate quantifiable change through monitoring. Measurable results will lead to additional resources and more effective action. Successful action will provide a stimulus for the proliferation of additional efforts.

State Role

Support local implementation through staff participation and technical assistance.

States need to create more flexible technical assistance and support programs that can move from broad regulatory compliance assistance to place-based strategies. GIS can be a useful tool for helping state and local agencies prioritize their efforts. Some state and federal agencies, such as the Natural Resource Conservation Service or state soil and water districts, have good experience with landowner outreach and linking public water quality goals with landowner needs and benefits.

CASE STUDY

Schuylkill Action Network

Initiated as a pilot project, the Schuylkill Action Network (SAN) has produced a multi-jurisdictional grassroots action plan for addressing threats facing the Schuylkill River, the region's primary source of drinking water.

Armed with a SWAP that covered nearly the entire Schuylkill River, the Philadelphia Water Department (PWD) and the U.S. EPA partnered to develop a watershed-based coalition that has developed specific action steps for source protection. A cross-jurisdictional approach makes sense because the Schuylkill River travels approximately 130 miles through 11 counties in southeastern Pennsylvania and has 52 drinking water intakes supplying water to 1.5 million people.

Among the many suppliers drawing from the Schuylkill River, PWD provides drinking water to 725,000 people. Rather than artificially demarcate its drainage area for the SWAP requirements, PWD considered the whole watershed its source water. As a result, PWD identified major threats all along the river. Because it lacked authority to address many of them, PWD solicited help from the U.S. EPA (USEPA) Region 3 to develop a source protection plan.

In the spring of 2003, USEPA convened SAN as a pilot project for stakeholders developing and implementing multijurisdictional source water protection strategies. State agencies, local watershed organizations, water suppliers, local governments, and the federal government were invited to collectively plan local solutions for this shared resource. Besides USEPA outreach, many groups that had already been contacted by PWD as part of the SWAP process volunteered to join.

With 260 members and more than 60 agency and business partners, SAN has a structure that facilitates the implementation of a grassroots action plan. A Steering Committee and a Planning Committee are staffed by representatives from USEPA, the Pennsylvania Department of Environmental Protection (PADEP), PWD, and the Delaware River Basin Commission. In addition, four workgroups craft solutions for each of the four primary threats to source water (agricultural runoff, acid mine drainage, pathogen/compliance issues, and stormwater runoff). Approximately 15–20 participants serve on each workgroup, each with his or her own expertise

and unique perspective on how to address the threats. Additional members contribute to the network through a list-serve. Two other teams, a Data Team and Education/Outreach Team, meet the workgroups' common needs.

As the largest water supplier in the network, PWD — with input from USEPA, PADEP, Aqua Pennsylvania, and others — compiles information on water quality, stream impairment, landuse, source activities, compliance, funding, and protection activities that have been used to prioritize areas for restoration and protection. The workgroups review this information to determine what actions are needed to address priority sites and how they can be integrated with existing initiatives.

Since 2003, each workgroup has established discreet objectives and tasks to mitigate the threat for which they are responsible. For example, the Pathogens/Compliance workgroup set 24 milestones to accomplish in 2004, including identifying point source dischargers upstream of drinking water intakes and ensuring compliance. On a regional scale, SAN is establishing a water quality monitoring network and has developed a new Watershed Land Protection Collaborative to preserve natural lands that have high value for water quality.

Costs to implement the action plan are covered by a variety of sources, including a \$1.5 million National EPA Targeted Watershed Initiative Grant. In addition, the Schuylkill Headwaters Association Inc. received \$200,000 from PADEP's Growing Greener program to develop a hydrologic budget for the Pine Knot-Oak Hill Discharge Tunnel, which is a leading source of metals in the Schuylkill River.

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7. **Actively promote successful source water protection efforts to build momentum and encourage replication.**

Challenge

Source protection happens at the local level often through a series of seemingly disparate, low-profile actions that go unrecognized by media or the general public. As a result, the public may be unaware of local efforts or the need for source protection. The opportunity for building momentum in source protection is lost as is the chance to encourage replication in other source areas.

Local Role

Implement source water protection strategies that have high visibility, involve large groups of people, or lend themselves to “storytelling,” and publicize them broadly.

Early demonstrable successes that can be recognized and praised build momentum and attract resources. Activities or events that involve large groups of people or lend themselves to storytelling are excellent choices for early implementation. Local governments and local source water protection groups should promote, through local media and targeted events, successfully implemented strategies such as protecting an important piece of land or forming a new watershed association. Cultivating reporters and helping them to

understand the importance of source protection should be a high priority.

A Public Awareness Campaign Kit may also be useful. The Groundwater Foundation created a Public Awareness Campaign Kit (PACK) that includes fact sheets, sample presentations, and media tools such as press releases, radio spots, and talking points for a myriad of health and source water-related topics. The PACK is available online at www.groundwater.org/pe/pack.html. The International City-County Management Association also developed source water media campaign materials that can be accessed through the Local Government Environmental Assistance Network Web site at www.lgean.org.

State Role

Promote successful local source water protection efforts statewide and support replication.

States should play an active role in encouraging replication of successful source water protection efforts on the community level. As they finalize their source water assessments, states can use the relationships they have formed with suppliers and municipalities, as well as their role as a resource to communities, to identify successful efforts and share lessons learned. By facilitating information exchange and networking among drinking water suppliers and local governments, states can help communities learn from one another and can encourage innovative approaches to protection.

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CASE STUDY

Illinois Environmental Protection Agency, Groundwater Section

Illinois' support of local groundwater protection planning provides an excellent model for other states committed to advancing community-wide source water protection.

In 1987, the Illinois legislature passed the Groundwater Protection Act requiring the Illinois Environmental Protection Agency (IEPA) to establish priority groundwater protection planning regions and a committee in each area to rank groundwater concerns. By 1995, IEPA had established four regional planning committees and was providing technical assistance and other guidance to community groups and suppliers interested in groundwater quality protection. Based on its early successes, IEPA developed a model for working with communities as well as case studies demonstrating its techniques and methodologies, which the agency began marketing to other communities.

For example, in late 1992, IEPA worked with the City of Pekin and its privately owned water supplier to develop a groundwater protection plan. The city also passed a groundwater protection overlay zoning ordinance to reduce threats to the underlying groundwater. IEPA promoted this project in a variety of forums, including the first Groundwater Foundation national conference and American Water Works Association's Opflow newsletter. In response, IEPA received numerous requests for copies of Pekin's groundwater protection ordinance, and it has become a model for other communities.

IEPA's Groundwater Section promotes local groundwater protection programs by producing and distributing learning tools, participating in groundwater protection and education field days, and holding teacher-training workshops sponsored by the regional groundwater protection planning committees. In coordination with the Montana Water Center of Montana State University and the Illinois Rural Water Association, IEPA shares technical knowledge and stories about successful local efforts through the *Guide to Developing a Source Water Protection Plan*. This publication includes information on what a source water protection plan should look like, a plan template, and four case studies illustrating methods that work. Geared to water supply owners and operators in Illinois, the interactive program is available free on IEPA's Web site



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or via CD-ROM from the Midwest Technical Assistance Center, the initiative's sponsor.

IEPA is an excellent resource for science-based research and guidance. For example, IEPA works closely with suppliers to develop protection plans, maintains a statewide ambient groundwater monitoring network, and assists with reports and inspections. At no cost, IEPA provides delineations of five-year TOT capture zones for all unconfined aquifers in the state. The Groundwater Section also coordinates an ambient lakes monitoring program for lakes and reservoirs that serve as public sources of drinking water.

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8.

Create financial and regulatory incentives to build commitment of local stakeholders, especially around multijurisdictional or resource-based planning efforts. Support or create public funding programs broad enough to include source water protection, and make funding easy to find with one-stop shopping for water-related funding sources.

Challenge

Source protection is largely voluntary and lacks a dedicated funding stream or incentives that encourage local stakeholders to implement source protection measures. As a result, local governments, water suppliers, and nongovernmental organizations must rely on a wide variety of funding sources not specifically targeted for source protection. While funding that can be used for source protection may exist, identifying and accessing it at the local, state, regional, and national levels can be a tremendous

challenge. Also, local entities often need financial or regulatory incentives to encourage meaningful participation from other jurisdictions that share a water resource.

Local Role

Create local funding sources and institute financial and regulatory incentives that will spur long-term source protection and leverage state and federal resources while maintaining local control.

Successful source water protection efforts often require funds from a variety of sources — federal, state, local and private — and build upon a dedicated local source. Source water protection groups should tap into a range of sources to create a funding “quilt” and avoid reliance on a single, potentially unpredictable revenue stream. Voters across the country, for example, have supported over 80 percent of new local land conservation measures in the last ten years, many of which have included funds for clean drinking water.

Project partners can participate in identifying funding sources, securing local funding, and preparing grant applications. The partners can also assist in describing the need for the projects and the benefits they will provide. Local governments can provide monetary, regulatory or recognition incentives for instituting source protection measures.

State Role

Create new state funding sources, or improve access to existing funding sources, for watershed protection that will leverage new programs as well as more protection dollars.

States that have made source water protection a priority are creating new funding sources or improving access to existing ones for watershed or aquifer protection. They are revising existing program criteria to prioritize projects that protect source water and are linking state and federal funding sources. Linked programs can create incentives for source protection activities such as alternative repayment options, a streamlined application process, or lower interest rates on loans. States should also offer Web-based funding guides that allow applicants to search multiple sources simultaneously.

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IN FOCUS

USING STATE REVOLVING FUNDS FOR SOURCE PROTECTION

Under the Drinking Water State Revolving Fund (DWSRF) and the Clean Water State Revolving Fund (CWSRF), the federal government provides annual capitalization grants to states that agree to match the grants by at least 20 percent and allocate those federal/state dollars as below-market interest loans to local communities. States must approve a source of loan repayment as part of the application process (developer fees, recreational fees, drinking water fees, dedicated local tax revenues, and nonprofit donations, for example).

Federal rules allow these state revolving funds to be used for a wide variety of water quality projects, including land conservation. Through the DWSRF, states can make loans to water systems to acquire critical lands and implement protection measures. The CWSRF program provides assistance to communities, water systems, and others — including land conservation organizations — for projects that protect source water and enhance water quality. In addition to the CWSRF, the Clean Water Act funds the Nonpoint Source Grant Program and the Estuary Program.

Some states have innovative funding strategies, using state revolving fund dollars to maximize protection of local source lands and minimize the impact of potential pollution sources. Techniques include:

- ◆ **California:** Allowing private borrowing and maximizing protection dollars. Nonprofit land trusts, for example, can leverage additional private resources for water quality improvement. Funding from California's CWSRF helped The Nature Conservancy of California purchase a 12,362 acre portion of the Howard Ranch in southeast Sacramento County, one of the largest land acquisitions ever funded in the United States under the federal CWSRF. The California State Water Resources Control Board and the EPA coordinated an \$8 million low-interest loan for the Conservancy to complete the \$13.6 million fundraising target.
- ◆ **Maryland:** Providing flexible interest rates and establishing linked deposit plans. Maryland's linked deposit program allows the state to enter into partnerships with community lending institutions, providing a simple and convenient way for borrowers to access nonpoint source capital improvement dollars.
- ◆ **Wisconsin:** Linking source protection with brownfields remediation when abandoned brownfields sites are contaminating drinking water supplies. The state of Wisconsin has a strong track record of remediating local brownfields with the support of CWSRF dollars. In the early 1990s the state adopted legislation that provides incentives and regulatory flexibility for local clean-up efforts. Funding came a few years later when a special committee identified the CWSRF money and linked it to brownfields remediation.
- ◆ **New Jersey:** Creating an integrated priority ranking system. By integrating the CWSRF, the DWSRF, the Nonpoint Source Grant Program, and/or the Estuary Program, and prioritizing funding decisions based on identified water quality threats, states can fund a wide variety of projects. Consider the New Jersey case study on page 21.
- ◆ **Ohio:** Establishing incentives for nonpoint source protection programs. Ohio's Environmental Protection Agency offers greatly reduced loan rates to utilities and local governments for traditional wastewater treatment if they implement or "sponsor" a watershed protection or restoration project. Sponsored projects include partnerships, land trusts, park districts, and others. For example, the City of Massillon, Ohio, received a low-interest loan of over \$6.7 million through Ohio's CWSRF program. A portion is dedicated to water resource restoration projects, including the purchase and preservation of high-quality wetland bogs and riparian and forested habitat; restoration of agricultural lands and 30 miles of river; and development of a free-flowing stream to bypass a dam to help fulfill state TMDL requirements.

9. **Add source water protection goals into existing plans and criteria for Clean Water Act and other state programs. Encourage drinking water and clean water program integration and partnering across state programs.**

Challenge

State clean water and drinking water programs are often housed in different departments or, in some cases, different agencies, which may result in diverse program objectives that provide little incentive for coordination. As a result, source water, watershed and groundwater protection efforts may be conducted in isolation from one another even when these efforts are directed at the same resource. When local practitioners try to protect a shared resource, dissimilar water quality standards, funding criteria, and program goals may frustrate their efforts.

Further, clean water and drinking water programs are often far from the center of discussion on voter-supported land conservation programs, the fastest-growing new source of environmental funding in the country. Since voters primarily support land conservation to

advance clean water objectives, these programs should be a priority for drinking water managers.

Local Role

Create a knowledge base for adding source water protection goals into state Clean Water Act plans and criteria.

Local entities can promote source water protection in Clean Water Act regulatory programs by taking advantage of various opportunities to comment on proposed state and federal actions, sharing data and information that can help inform state actions, and recommending priorities for these programs.

Local entities should use monitoring data and information collected on the quality of source water to augment existing state knowledge and underscore the importance of making source water a criterion in Clean Water Act planning. This information, together with public review of reports and planned actions, can inform and leverage state Clean Water Act activities to ensure that protecting drinking water sources is a high priority and based on the best available information.

State Role

Join source protection programs with state Clean Water Act programs in order to integrate source protection into Clean Water Act plans and criteria.

Local practitioners and national leaders repeatedly spotlight the need for states to integrate clean water and drinking water programs to support resource-based watershed and groundwater protection. For example, the EPA's SWAP regulations promote integration by requesting source water delineations that transcend geographic and political boundaries. The regulations require identification of contaminants of concern that touch multiple regulatory programs. Integrated planning leads to creative funding mechanisms and innovative local approaches to addressing states' primary water resource threats. In the last five years, many states have moved to integrate their Clean Water Act programs such as the State Revolving Funds and Nonpoint Source and Estuary Programs. Further integrating source protection programs will only enhance the implementation efforts of both programs.

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CASE STUDY

New Jersey

New Jersey has made great strides integrating clean water and drinking water programs, incorporating smart growth goals, and linking water protection goals to land conservation goals.

One of the state's most effective tools for integrating programs has been developing resource-based regulations. For example, New Jersey has given special clean water regulatory protection to crucial headwaters and reservoirs under the statewide three-level antidegradation classification system. Water bodies that have exceptional water supply significance — such as those that serve as sources of drinking water, support habitat for species that are endangered or threatened, or provide recreational or commercial uses — may receive Category 1 status (C1). With strong gubernatorial and public support, many drinking water reservoirs and entire natural drainage areas have already received this designation. In C1 areas, there are restrictions governing new or proposed changes to activities that will potentially lower water quality. New or expanded wastewater discharges from municipal or industrial facilities regulated under the New Jersey Pollution Discharge Elimination System permitting program are required to maintain existing water quality. Water intakes located on water bodies that have not been designated as a C1 water body are also protected by a policy that requires point sources to meet the C1 standard 1,500 feet above the intake.

In terms of integrating programs, New Jersey's Stormwater Management Rules forbid new development that will disturb more than one acre or result in at least .25 of an acre of new impervious surface within a 300-foot buffer of C1 shorelines/streambanks and upstream tributaries in the same sub-watershed with some exceptions. New Jersey's new stormwater rules required under the Clean Water Act also address subsurface source water. They call for Municipal Stormwater Management plans to identify groundwater recharge areas and wellhead protection areas. Municipalities must evaluate their existing master plans and regulations and update them to implement low-impact development (LID) techniques that will help retain and treat stormwater on-site.

New Jersey has also linked federal Clean Water State Revolving Funds (CWSRFs) with Drinking Water State Revolving Funds and state dollars to provide low-interest loans for

various types of water projects. The New Jersey Department of Environmental Protection (NJDEP) and the N.J. Environmental Infrastructure Trust jointly manage these funds. As of late 2004, they have loaned over \$2.3 billion under the program. While projects have historically benefited from low-interest loans through the combination of a 50 percent NJDEP zero interest loan and a market rate Trust loan, a Smart Growth financing enhancement called Environmental Infrastructure Financing Program (EIFP) Smart Growth loans has a more favorable rate (75 percent NJDEP loan at zero interest combined with a 25 percent Trust loan) to cover projects that serve urban centers and complexes as designated by the State Planning Commission.

In 2002, the state's CWSRF expanded eligible funding categories to include land acquisition as well as other nonpoint source management projects. These projects are frequently funded through a combination of Green Acres grants and EIFP Smart Growth loans. Green Acres is a state land conservation program that uses state and federal funding sources to purchase open space, including sensitive land and water resources. Green Acres also provides loans and grants to municipalities, counties, and nonprofit land trusts to buy open space. Locals are able to leverage funds because voters in all New Jersey counties and almost half of the state's municipalities have approved dedicating a certain amount of property taxes to open space acquisition and recreation development. As a result, counties are collecting nearly \$160 million annually and municipalities are collecting \$58 million each year for these purposes. The Green Acres Program has preserved more than 550,000 acres of open space, or over 10 percent of the state's land area.

In 2002, the New Jersey legislature revised criteria for selecting land for acquisition, directing program administrators to give water resource protection criteria three times the weight of other criteria used in the priority system. The parcels do not have to be drinking water sources to qualify so long as they benefit water resources, such as aquifers, wetlands, and floodplains.

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10.

Use water quality monitoring and other measures of success to sustain implementation and manage state and local programs.

Challenge

States and localities may have limited understanding of the complex nature of their watershed and aquifer recharge areas, making it difficult for them to craft effective source protection plans or measure the success of those plans.

Local Role

Use monitoring results to drive protection goals. Realign monitoring regiments to collect more pertinent data.

Communities should undertake watershed or aquifer monitoring to understand the health of their water resources, identify potential sources and levels of contamination, and determine where conservation, restoration, or best practices are effectively mitigating water quality problems. Scientific data from monitoring programs also helps build public and political support for comprehensive

source protection strategies that may include land conservation, public funding, and regulatory and zoning changes.

State Role

Support locals with new and efficient monitoring practices that cover regulatory and source water protection goals. Create and maintain state databases to support resource-based planning.

States should be a resource for water suppliers and other stakeholders to help them identify new or more efficient monitoring practices, plan comprehensive monitoring programs, and develop partnerships to implement their programs. By providing information regarding the most up-to-date monitoring techniques and by encouraging consistent statewide approaches to monitoring, a body of knowledge can be created about the quality of resources that can be used for multijurisdiction and resource-based source water protection efforts. States should also look for ways to provide matching funds for local monitoring efforts to create incentives for local investment in water quality monitoring.

CASE STUDY

Charlotte-Mecklenburg Utilities

Collaboration and monitoring are the keys to protecting the watershed serving Mecklenburg County and the City of Charlotte, North Carolina.

Partnering with other local governments in the region, these two local entities safeguard the Mountain Island Lake watershed, the primary source of drinking water for about 600,000 people in Charlotte-Mecklenburg, Gastonia, and Mount Holly, with an innovative strategy called the Surface Water Improvement and Management (SWIM) plan. This plan calls for interjurisdictional collaboration on water quality monitoring, stream buffers, GIS mapping, enhanced enforcement, low-impact development techniques, and public education.

Under SWIM, the Charlotte/Mecklenburg Office of Water & Land Resources established a Creek Coordination Committee with representatives from its offices as well as the city/county water, parks, stormwater, and planning departments in addition to other local, state, and federal stakeholders. This collaborative body was instrumental in adopting a county-wide stream buffer system and implementing a number of streamside forestry and ecosystem restoration projects. The group recently helped the town of Huntersville develop an ordinance requiring LID techniques that will reduce stormwater pollutant loading to McDowell Creek and Gar Creek, which are upstream of drinking water intakes.

Under the Mecklenburg County Water Quality Program, water samples on lakes and streams throughout the county are regularly collected. Extensive in-stream stormwater and baseflow monitoring is performed, and samples of water chemistry, macroinvertebrate, and fish are extracted from Mountain Island Lake. Monitoring results are published on the county's Web site and go into a stream inventory and assessment system that is used to identify water quality trends, uncover and eliminate pollution sources, and inform development of the water quality model.

The Charlotte/Mecklenburg Office of Water & Land Resources uses GIS maps and modeling to identify stream segments and drinking water resources most in danger of degradation. To target its land acquisition and creek restoration projects, it uses monitoring results, hydrologic data, projected development, and impervious surface patterns.

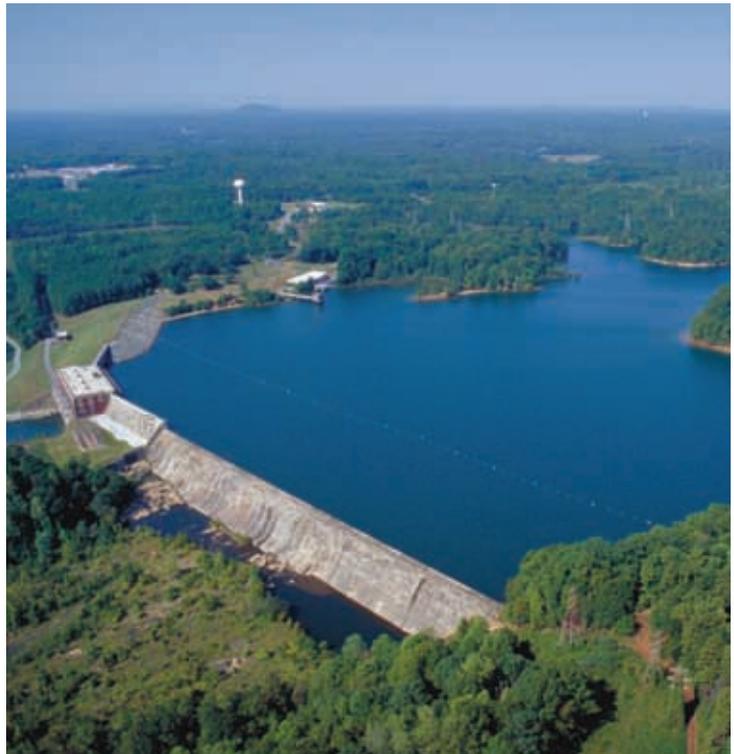
According to Owen Furusetth, chair of the Department of Geography and Earth Sciences at the University of North Carolina, Charlotte, and the director of the land/water modeling project, "With this information, local governments can steer development away from areas with the greatest water quality risk, and conservation groups can focus on the most environmentally sensitive lands for conservation."

In 1999, voters in Mecklenburg County approved a ballot measure providing more than \$100,000 for land conservation in the region. With help from the Initiative for Mountain Island Lake — a partnership of the Trust for Public Land, Catawba Lands Conservancy, the Community Foundation of Gaston County, and the Foundation for the Carolinas — approximately 74 percent of the Mountain Island Lake shoreline is now permanently protected from the impacts of development.

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