

Protecting the Source of Your Community's Drinking Water

Let's Start at the Very Beginning

by Lynn Thorp, Clean Water Action/Clean Water Fund & Gayle Killam, River Network

As watershed advocates, we need to motivate people to act for the health of the watershed. One powerful motivator is drinking water quality.

Watershed advocates are increasingly finding that the world of drinking water offers new tools and new arguments for restoring and protecting our waterways. And in the case of *Source Water Protection*, the opportunities have never been better.

New policy tools, increased awareness of the importance of clean water to public health and a growing understanding of the value of protecting drinking water sources, have led to a new focus on source water protection. This means that all over the country watershed activists, public health advocates, water system operators and public officials are working together to protect drinking water sources by tackling long-standing pollution and land use challenges.

The 1996 amendments to the federal Safe Drinking Water Act required water systems to prepare "Assessments" of their drinking water sources and their vulnerability to contamination. These "Source Water Assessments" and their recommendations are now available through state agencies and can be a powerful tool for protecting water bodies from

pollution threats. There are many examples in this issue that demonstrate how watershed groups can use and have used the information available in Source Water Assessments to further their protection efforts.

Polls consistently show that people are concerned about the quality of their drinking water. Meanwhile, government agencies and water systems agree that we need a massive financial investment to update our drinking water infrastructure and make sure public water systems can provide safe and affordable drinking water for their consumers. The opportunities are ripe to identify problems and to focus broader attention and financial resources on cleaning them up and preventing future problems.

Where Does My Drinking Water Come From?

Many consumers served by public water systems don't know what waterbody is the source of their drinking water, but for 66% of those people their water comes from a river, lake, stream or other **surface water** source.

The remaining public water system consumers are drinking water from a **groundwater** source. As watershed advocates know so well, surface and groundwater interact and affect each other. All the bodies of water we work to cleanup and protect are somehow connected to somebody's drinking water. This can be a powerful mobilizing factor.



Photo credit: U.S. Environmental Protection Agency



River Network

Connecting People, Saving Rivers

CONTENTS

- 1** Let's Start at the Very Beginning
by Lynn Thorp & Gayle Killam
- 3** From the President
- 5** EPA's Water Source Program
by Marjorie W. Copeland
- 8** Identifying the Funding to Make Things Happen
by Merritt Frey
- 10** Source Water Protection: What's in it for You?
by Steven Y. Ainsworth & Paul Jehn
- 14** A Tall Glass of Reason
- 16** The Upper Neuse Clean Water Initiative
by David Swann & Kelley Hart
- 18** Plans to Protect the Source
- 24** Case Study: Superior Outcomes through Collaboration in the Schuylkill
by Jennifer A. Adkins
- 26** Resources & References
- 27** River Network Partnership

NATIONAL OFFICE

520 SW Sixth Avenue, Suite 1130 • Portland, OR 97204-1511
503/241-3506 • fax: 503/241-9256
info@rivernetwork.org • www.rivernetwork.org

D.C. OFFICE

3814 Albemarle Street NW • Washington, D.C. 20016
202/364-2550 • fax: 202/364-2520
DC@rivernetwork.org

River Network is a national, nonprofit organization whose mission is to help people understand, protect and restore rivers and their watersheds.

RIVER NETWORK BOARD OF TRUSTEES

| | |
|----------------------|-------------------------------------|
| Clarence Alexander | Dianne Dillon-Ridgley, <i>Chair</i> |
| Todd Ambs | Don Elder |
| Catherine Armington | Robert Gomez |
| Adrienne T. Atwell | Dave Katz |
| Suzi Wilkins Berl | Paul Paryski |
| Sally Bethea | Charles F. Sams III |
| David Borden | Judith Spang |
| William G. F. Botzow | Marc Taylor |
| Rob R. Buirgy | Jim Waring |
| Kimberly N. Charles | James R. Wheaton |

RIVER NETWORK STAFF

| | |
|-------------------|-----------------|
| Matthew Burke | Deb Merchant |
| Geoff Dates | Pat Munoz |
| Steve Dickens | Eric Relation |
| Don Elder | Susan Schwartz |
| Thomas Fitzgerald | Diana Toledo |
| Jean A. Hamilla | Stephen Twelker |
| Gayle Killam | Wendy Wilson |
| Katherine Luscher | Alanna Woodward |

River Voices is a forum for information exchange among river and watershed groups across the country. River Network welcomes your comments and suggestions. River Network grants permission and encourages sharing and reprinting of information from *River Voices*, unless the material is marked as copyrighted. Please credit River Network when you reprint articles and send the editor a copy. Additional copies and back issues are available from our national office.

Editors: Gayle Killam and Katherine Luscher

Editorial Assistance: Jean A. Hamilla

Design & Layout: Greer Graphics

From The President

There are many good reasons for watershed protection. Few are more compelling than protection of drinking water sources.

Source water protection is the foundation of every sound drinking water supply strategy. Making this clear can build stronger public support for comprehensive watershed protection and restoration approaches, because year after year, drinking water quality tops Americans' list of environmental concerns.

Of course, drinking water issues play out very differently from one watershed to another. Many people rely on surface water, while many others rely on groundwater. A growing number of cities use both. A few cities rely on very well protected, completely forested watersheds that they directly manage primarily for drinking water supply. However, far more rely on sources that are affected by myriad land and water uses, some of which are within their direct power to control, and many others of which are not.

While every situation is different, all good source water protection strategies are watershed-based, long-range, comprehensive, and proactive. Most necessarily involve a mix of mandatory, voluntary, unilateral and cooperative measures. And they all require consistent public support over time. This issue of *River Voices* provides information and ideas that can help you develop the best possible source water protection strategies with the citizens and leaders of your area.

The next issue of *River Voices* will include some new ideas about how to make the case for using drinking water supplies efficiently, so as to minimize public demand on finite water resources over time. We hope both will be useful to you, and that you will share stories about your approaches and accomplishments in protecting and conserving source waters in the months and years ahead.

Don Elden



Photo credit: River Network Collection

cont. from page 1

What Does This Have to Do With Health?

We know that people associate drinking water with their own health, thus the dramatic (and not generally wise) rush to purchase bottled water. We don't have to convince people that drinking water is important, but we do have to give them correct information and positive actions to take to protect their drinking water.

People can be exposed to contaminants in drinking water from numerous sources, including byproducts of disinfection, pesticides, household cleaning and improvement materials, solvents, industrial activities, animal feeding operations, agricultural activities and septic systems and cesspools. The idea behind Source Water Protection is to stop the contaminants from getting into the drinking water source in the first place rather than relying on treatment to remove them.

“Drinking water has always been an issue that most people care about. Since source water protection is all about protecting drinking water at its source, we are able to engage a whole new audience who may have been resistant to getting involved in environmental issues. And we are able to do this without putting forth a whole lot of extra effort because the things that are done in the name of source water protection generally work to improve water quality for aquatic life and recreation. Furthermore, many of the impaired surface waters in Louisiana and Mississippi are also source waters. So we get to motivate people to protect waters that we were already working on”.

— Gulf Restoration Network (LA)



Photo credit: U.S. Environmental Protection Agency

Source Water Protection is Money Smart

Many communities have found that the less polluted water is before it reaches the treatment plant, the less extensive and expensive the efforts to safeguard the public's health need to be. This saves everyone money and improves the community's quality of life.

The time is now to motivate more people in your watershed to address existing problems and help to prevent future risks. You can do this by appealing to their concerns about public health and public costs of treatment. The resources to help you do this in your watershed are more plentiful than ever due to the work completed as part of the Source Water Assessments. Including drinking water protection in your priorities will enhance your reach in the community and effectiveness on the ground.



EPA's Source Water Program

The best barrier against drinking water contamination is prevention. U.S. Environmental Protection Agency (EPA) has been working for many years to protect the Nation's water supplies. If you live in a large city, your source of drinking water, called source water, is probably a lake, river or reservoir. These types of surface waters supply drinking water to over 60% of the people served by Public Water Systems in the United States. If you live in a rural area, your source water may be groundwater. In any case, your drinking water starts its journey to your tap from a watershed.

A watershed is the land area that drains to a single body of surface water or to groundwater. What happens in the watershed can affect the quality of your drinking water supply. Hence, source water protection is watershed protection. Keeping pollutants out of our drinking water supplies, also known as source water protection, preserves water quality in the watershed, provides cleaner drinking water and reduces the need for costly drinking water treatment.

The Safe Drinking Water Act (SDWA) protects 250 million people who drink from public water supplies. EPA's source water protection program under the SDWA began as the Wellhead Program in 1986. The Wellhead Program addressed pollution prevention and management by focusing on protecting underground sources of drinking water. The law specified certain activities, such as delineation, contaminant source inventory and source management, be

incorporated into Wellhead Programs, which are approved by the EPA. All states have EPA-approved Wellhead Programs, and a number of Indian tribes are also implementing them.

In 1996, Congress amended the SDWA by going beyond the Wellhead Program and adding surface water through the Source Water Assessment Program (SWAP). The Act required states to develop and implement SWAPs to analyze existing and potential threats to public drinking water supplies by building on the work completed

under the Wellhead Program. While tribes were not required to implement SWAPs, EPA recommends tribes implement SWAPs where feasible.

In 1999, states were asked to

submit SWAPs to EPA for approval. States developed their assessments with the help of the Drinking Water State Revolving Fund. EPA approved 52 SWAP programs. While States had flexibility in designing their program, the following are the four steps required for completing a source water assessment:

1. Identify or delineate the source water protection area.
2. Conduct a contaminant source inventory.
3. Determine the susceptibility of the public water supply to contamination from the inventoried sources.
4. Release the results of the assessments to the public.

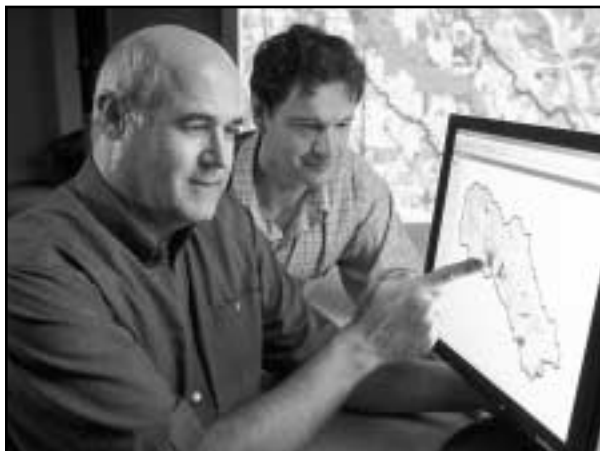


Photo credit: U.S. Environmental Protection Agency

by *Marjorie W. Copeland*
EPA - Office of Ground
Water and Drinking
Water

www.epa.gov/safewater

EPA's Source Water Program, cont.

cont. from page 5

To date, states have completed about 98 percent of the assessments. Since tribes are not required to do assessments, they have completed fewer, about 56%. Many Regions are now implementing the assessments in Indian Country with the tribes. Nationally, states and tribes have identified the top threats of contamination to be: septic systems (both individual and large capacity), agriculture (crop production), underground storage tanks and abandoned wells. Since these top threats represent assessments conducted nationwide, actual priority threats for individual public water supplies may vary. You should contact your local water system operator for the results of the assessment for your water supply. You should also obtain a copy of the *Consumer Confidence Report* (often referred to as "Water Quality Reports") for your community water system. These reports are required to provide a summary of the results of the Source Water Assessment conducted for your drinking water system [see page 19].

While the assessment of source water is required by the Safe Drinking Water Act, follow-up protection activities were not included in the statute as a requirement. Congress had intended for protection to grow from the public involvement requirement of the Source Water Assessment Program and from releasing the results of the assessments to the public. Due to security concerns, some states have elected to limit the availability of detailed information from the assessments.

The EPA has partnered with other federal agencies, states and private organizations to promote source water protection activities. The EPA has given grants to the National Rural Water Association, Environmental Finance Center Network, the Groundwater Foundation, the Trust for Public Land, Clean Water Action and others. The EPA also has a

new cooperative agreement with River Network to develop and adapt source water training materials for watershed audiences. This year, the EPA is funding a pilot project to facilitate state initiatives to promote land use planning and stewardship for the purpose of protecting drinking water. One of the more exciting initiatives for EPA's source water program is the Source Water Collaborative (SWC) [see page 7].

The EPA is working to advance source water protection through Smart Growth. Smart Growth is development that serves the economy, the community and the environment by moving the development debate away from the traditional growth/no growth question to "how and where should new development be accommodated." Growth and development affects water quality. EPA is working with the SWC and others to promote Smart Growth because it fosters the preservation of natural lands to absorb and filter rainwater and buffer waterbodies. This in turn reduces the threat of contamination for sources of drinking water.

Until recently, EPA addressed provisions for the Clean Water Act and Safe Drinking Water Act separately. However, this is changing as the two EPA offices handling these statutes have begun collaborating to better integrate the programs. The tools of the Clean Water Act (CWA) can and should provide a key vehicle for protecting drinking water sources.

States have wide discretion in how they implement important elements of the CWA so understanding how to use the CWA for source water protection means understanding how state Clean Water Act managers make implementation decisions. Some of that may be gleaned from state documents, but much of it will come from conversations with the Clean Water Act managers.

Key questions on source water management for state Clean Water Act managers include:

- How do they apply ambient water quality criteria in their Water Quality Standards to protect drinking water use?
- How do they determine that water is impaired for drinking water use? How much data, and of what quality, do they require to support that determination?
- How do they prioritize impaired waters for the development and implementation of Total Maximum Daily Loads (TMDLs) to restore the impaired uses and where does the drinking water use fit in?
- How do they implement TMDLs through the nonpoint source (CWA §319) program?
- How do they use the National Pollutant Discharge Elimination System (NPDES) permit effluent limits and notification requirements to protect downstream drinking water intakes?

Three action items came out of the Clean and Safe Water Roundtable at the 2006 River Rally that sum up EPA's directions for integration today. They include:

1. establishing structural linkages between Clean Water and Safe Drinking Water programs;
2. developing models showcasing integration; and
3. facilitating communication across boundaries between watershed interests and water suppliers.

The next step for EPA's source water program is focusing our attention on the top contaminant threats identified by state and tribal Source Water Assessments, (e.g., septic systems, agriculture and underground

Source Water Collaborative Unites to Protect Sources of Drinking Water

Fourteen national organizations united in 2006 to protect America's drinking water at the source—in the lakes, rivers and aquifers we tap for drinking purposes. The Source Water Collaborative (SWC) combines the strengths and tools of a diverse set of member organizations to work together to protect drinking water for generations to come. The SWC members have agreed that drinking water protection should be integrated into land-use planning and stewardship; road, sewer and water projects; farming, industry and development practices; waste disposal methods; watershed planning, protection and cleanup; and the routine decisions Americans make every day. This approach recognizes that we cannot rely on treatment alone to protect our drinking water. The quality, quantity and cost of drinking water depend not only on treatment and distribution, but also on land stewardship and planning decisions.

SWC members are working together to share information, develop recommendations and disseminate key information and recommendations in ways that are useful to land use and stewardship decisions, to promote source water protection.

For more information on the Source Water Collaborative, please see the SWC's website at www.protectdrinkingwater.org, or contact Sylvia Malm at malm.sylvia@epa.gov.

storage tanks), which are threats to surface water, as well as, groundwater. Our goal is to get new allies in source water protection and integrate source water protection into watershed activities. Remember: source water protection is watershed protection, too!

For information on the EPA Source Water Program, please visit our website at: www.epa.gov/safewater/protect.html.



Identifying the Funding to Make Things Happen

by Merritt Frey

Excerpted with permission from Source Water Stewardship: A Guide to Protecting and Restoring your Drinking Water

The perfect source water protection plan will get you nowhere without the funding to back it up. This is a classic chicken-and-egg situation: You need a good plan in order to identify funding, but you need to know about funding in order to develop a realistic plan. In reality, source water protection plan development and funding investigations will need to occur concurrently.

If you've developed a great relationship with local officials or the local water utility, they may be well-versed in the world of federal grants, loans, bonds and levies. Local governments and utilities have access to a different range of funding opportunities than citizens or watershed groups, so having government or a utility in a leadership role can be a real asset. However, you can still help. For example, you can offer to write letters of support for their grant or loan requests, or to help organize volunteer help or donations for any required matching funds (many grants require this).

If your local government or water utility will not step up to the plate, you are not totally lost. Individual citizens and citizen organizations such as watershed groups or community groups can bring home the bacon. Realistically, this approach may mean that you need to carefully prioritize source water protection activities and choose only the most crucial ones. However, your work can still make a huge difference.

Wondering where you'd even start your funding search? Here are a few suggestions:

1. Use the Source

Water Protection Toolkit to find funding solutions. The Toolkit, available online at www.cleanwaterfund.org (click on Protecting Drinking Water Sources on

the right), identifies many programs and tools that provide funding opportunities.

2. Use U.S. EPA's Catalog of Funding Sources. This online tool includes a search function that allows you to search specifically for federal funding programs that support source water protection and restoration. The Catalog also allows you to sort by eligibility—narrowing the returns to only those programs that can help you. Find it at:

www.epa.gov/watershedfunding.

3. Remember that most states also have their own funding programs for a variety of water quality related issues. These programs may be even more useful to you than the federal programs. To learn more about your state's programs, visit your state's website and explore (research at least the environmental, agricultural and public health agencies).

4. Investigate foundation grants.

Citizen groups have a great resource that most local governments and utilities can't access—foundations. Foundation grant funds to support work that matches their mission. Drinking water protection is a wonderful opportunity for grant writing, since it touches on everything

from public health to environmental protection and community development. To learn more about foundations that

might want to support your source water protection project, visit the Foundation Center website at: www.foundationcenter.org.

River Network Partners can search the online Directory of Funding Sources for river and watershed conservation organizations at: www.rivernetwork.org/partners.

5. Read the **Action Guide for Source Water Funding: small town and rural county strategies for protecting critical water supplies**. Although a little dated, this guide provides an overview of strategies for funding small-town source water protection activities. Contact that National Center for Small Communities at 202/624-3550.



A Brief Selection of Source Water Funding Opportunities

Safe Drinking Water State Revolving Loan Fund

The Safe Drinking Water Act created a Loan Fund that is used by the states to finance drinking water projects. U.S. EPA encourages states to set aside portions of their funding for source water protection activities. To learn more about using the Loan Fund for source water protection, read U.S. EPA's fact sheet at: www.epa.gov/safewater/dwsrf/source.pdf.

Clean Water Act Revolving Loan Fund

Clean Water State Revolving Funding (CWSRF) programs provided an average of \$3.8 billion over the past five years to fund water quality protection projects for wastewater treatment, nonpoint source pollution control and watershed and estuary management. CWSRF funds are available for a variety of Source Water Assessment and protection activities. For U.S. EPA's fact sheet on the CWSRF and source water protection, see www.epa.gov/owm/cwfinance/cwsrf/factsheets.htm#Drinking.

Clean Water Act Nonpoint Source Control Grant Program

Section 319 of the Clean Water Act requires each state to create a nonpoint source management program to control polluted runoff. Each year, U.S. EPA grants funds to the states to run their programs. Most states pass a large portion of the funds on to local governments, citizens organizations or other entities for nonpoint source restoration projects. To find out more, visit www.cwn.org and click on "polluted runoff."

Farm Bill Funding Programs

The Farm Bill contains many programs that provide grants, cost-share and technical support for restoration projects to address agricultural water quality problems. Many Farm Bill programs are very well funded. For more information, visit the Source Water Protection Toolkit at www.cleanwaterfund.org (click on Protecting Drinking Water Sources on the right).

Community Development Block Grants from the Department of Housing and Urban Development

These grants go to drinking water improvements, among many other eligible priorities, in low-income neighborhoods. To learn more, visit: http://cfpub.epa.gov/fedfund/search2.cfm?prog_num=16.

Rural Utility Service

The Rural Utility Service provides loans, grants and loan guarantees for drinking water projects (as well as wastewater and stormwater projects) in rural and low-income areas. For more information, visit: www.usda.gov/rus/water.

Text excerpted from Chapter 7 of Source Water Stewardship: A Guide to Protecting and Restoring Your Drinking Water, published by the Source Water Protection Initiative, a project of Clean Water Fund, Clean Water Network and Campaign for Safe and Affordable Drinking Water, 2003.

Source Water Protection: What's in it for You?

Compiled by
Steven Y. Ainsworth
*EPA - Drinking Water
Protection Council*
and
Paul Jehn
*Ground Water
Protection Council*

Most people would agree that a vaccination to prevent illness is well worth the time, expense and inconvenience. Similarly, local governments are using source water protection to help avoid coping with contaminated drinking water. The potential benefits of source water protection to communities, as well as to locally financed water districts, are worth the cost because in some cases, these are the local entities responsible for dealing with polluted source water. Where possible, examples have been drawn from the actual experiences of specific communities. They offer concrete support for the commonsense principle that the less polluted the water is when it reaches the treatment plant, the less extensive—and expensive—will be the efforts needed to safeguard public health.

What is Source Water Protection?

Simply put, source water protection means preventing the pollution of the lakes, rivers, streams, and groundwater that serve as sources of our drinking water. Wellhead protection is an example of an approach to source water protection that is designed to prevent contamination of groundwater sources. Management of land around a reservoir used for drinking water is an example of source water protection for a surface water supply.

In 1996, Congress amended the Safe Drinking Water Act (SDWA) to require states to complete source water assessments for their public water systems. Congress intended that localities would use the assessment results as the basis for source water protection programs through the implementation of prevention measures to manage the potential contamination sources identified in the assessments and through planning for emergencies and other contingencies.

Benefits of Source Water Protection

Perhaps, the benefits of protecting source water can be illustrated most easily if they are compared with the costs of failing to protect this source water. Costs can be divided into those that are relatively easy to capture in economic terms and those that are not. Easily quantifiable costs of source water contamination include the costs of treatment, remediation, finding and establishing new supplies or providing bottled water, paying for consulting services and staff time, litigating against responsible parties, and conducting public information campaigns when incidents arouse public and media interest in source water pollution.

Costs also include those necessary to meet the regulations of the SDWA, such as the Disinfection Byproduct and Enhanced Surface Water Treatment Rules and monitoring requirements. Additionally, although it is seldom done, communities often find it relatively easy to estimate the value of a drinking water supply that has been abandoned due to contamination. Such costs can be high when the quantity of water rendered undrinkable is large or when the supply of potential drinking water is small. For instance, Wichita, Kansas, lost 2 billion gallons of previously drinkable water for the foreseeable future because of contamination by industrial solvents. The state decided not to cleanup this water to the drinking water standards.

Table 1 shows a sampling of localities of various sizes that have borne high and readily quantifiable costs due to source water pollution. The table attempts to isolate community costs by excluding state, federal and private industry funding. Also, not included are such costs to individuals as lost wages, hospital and doctor bills, reduced property values, higher water bills and in extreme cases, death.

Communities with effective source water protection programs may enjoy substantial savings in the costs of complying with SDWA regulations. Implementation of source water protection programs will likely save water purveyors significantly in avoided cost compliance with the Disinfection Byproducts Rule. This is due to the fact that cleaner source water requires less disinfection, which means reduced requirements for removing disinfection byproducts. Water suppliers with source water protection programs in place may also be eligible for waivers from monitoring requirements that reduce their

monitoring costs. Such waivers already have saved Massachusetts water systems—\$22 million over a 3-year compliance cycle, while Texas water systems have saved \$49 million over 2.5 years.

Under the Surface Water Treatment Rule's filtration waiver program, huge savings are potentially available to surface water systems with good source water quality and a working program for source water protection. For example, 15 systems in Maine have saved \$108 million in capital costs by avoiding filtration.

TABLE ONE

| Selected Community Water Systems Incurring Costs of Source Water Contamination (Costs measured as U.S. 1995 dollars) | | | |
|--|--|--|--|
| <i>Community</i> | <i>Type of Problem</i> | <i>Response to Problem</i> | <i>Costs</i> |
| Perryton, Texas | Carbon tetrachloride in groundwater | Remediation | \$250,000 (estimated) |
| Rockford, Illinois | Solvents in ground water | Replace supply, hook private wells to public water supply | \$11.5 million (estimated) |
| Camden-Rockland, Maine | Excess phosphorus in Lake Chickawaukie | Advanced treatment (not yet installed) | \$6 million (estimated) |
| Moses Lake, Washington | Trichloroethylene in groundwater | Blend water Public Education | \$1.8 million (estimated) |
| Mililani, Hawaii | Pesticides, solvents in groundwater | Build and run treatment plant | \$2.5 million + \$154,000/year |
| Tallahassee, Florida | Tetrachloroethylene in groundwater | Enhanced treatment | \$2.5 million + \$110,000/year |
| Pittsfield, Maine | Landfill leachate in groundwater | Replace supply, remediation | \$1.5 million |
| Rouseville, Pennsylvania | Petroleum, chlorides in groundwater | Replace supply | \$300,00 (estimated) |
| Atlanta, Maine | VOCs in groundwater | Replace supply | \$500,000 to \$600,000 |
| Montgomery County, Maryland | Solvent, Freon in groundwater | Install county water lines, provide free water | \$3 million + \$45,000/year for 50 years |
| Milwaukee, Wisconsin | Cryptosporidium in river water | Upgrade water system, immediate water utility, city health dept. costs | \$89 million to upgrade system, millions in immediate costs |
| Hereford, Texas | Fuel oil in groundwater | Replace supply | \$180,000 |
| Coeur d'Alene, Idaho | Tetrachloroethylene in groundwater | Replace supply | \$500,000 |
| Orange County Water District, California | Nitrates, salts, selenium, VOCs in groundwater | Remediation, enhanced treatment, replace supply | \$54 million capital costs only |

continued on page 12

Source Water Protection, cont.

cont. from page 11

Another benefit of source water protection that can be expressed in economic terms (although few attempts have been made to do so) is that it helps to maintain real estate values in areas served by protected water supplies. Also, source water protection avoids the loss of potential tax revenues and jobs because businesses refuse to locate or remain near places with known or suspected problems.

A survey of 21 Minnesota cities by the Freshwater Foundation found that five cities collectively lost more than \$8 million in tax revenues because of real estate devaluation as a result of groundwater pollution. In commenting that businesses prefer communities with protected water supplies, Charles Renner, executive director of the Pekin (Illinois) Area Chamber of Commerce, asks, “Who wants to move a business or industry to a town where they can look to pay tax toward a multimillion dollar bond issue to cleanup the groundwater?” Sam Rowse, president of Veryfine Products, a major fruit juice manufacturer in Westford, Massachusetts, adds, “The integrity of a town’s water reflects upon the integrity of the companies within that town.”

Benefits That are Harder to Quantify

In addition to the readily quantifiable benefits of source water protection, there are numerous benefits to which it is more difficult to assign a dollar value. These include benefits that may not be wholly translatable into economic terms. Although hard to measure in monetary terms, such benefits may be among the driving forces behind source water protection.

These benefits include the reductions in risks to human health because of cleaner source water. The risks are real enough; experts from the Center for Disease Control and

Prevention estimate that water borne diseases transmitted through drinking water infect 940,000 people and are responsible for 900 deaths in the United States each year. Such pollutants as metals, volatile organic carbons (VOCs), synthetic organic chemicals (SOCs) and pesticides also can cause serious health problems, including cancer; birth defects; and organ, nervous system and blood damage. To quantify reductions in health risks due to source water protection efforts is difficult; any attempt to place a dollar value on serious illnesses and deaths is highly controversial.

Other benefits of source water protection that are not wholly captured by economic measurements include safeguarding a resource for the benefit of future generations (i.e., stewardship), building and keeping consumer confidence in water purveyors or local officials, and helping to support healthy ecosystems, recreation and other beneficial uses.

Ripple Effects of Source Water Protection

Source water protection can have important secondary benefits. Protection of reservoirs and other surface water sources of drinking water is obviously beneficial to fish, wildlife and recreation. Where aquifers discharge to surface waters, protecting groundwater supplies can help maintain the beneficial uses of the surface water. Areas of groundwater/surface water interaction are widespread, and recorded incidences of groundwaters discharging contaminants, particularly nitrates, into surface waters are numerous.

Jerri Pogue, former city clerk/treasurer of Everson, Washington, expresses her community’s appreciation of this connection as it considers protecting its source water: “Since the aquifer that supplies our drinking water is connected to

the Nooksack River, source water protection would provide the extra benefit of helping support our community's rights to current and future uses of the river.”

Such benefits make source water protection programs potentially key components of three-dimensional approaches to watershed management.



Photo credit: U.S. Environmental Protection Agency

Conclusion

The potential benefits of source water protection to communities are impressive. The benefits that can be captured in economic terms can be compared with estimates of the costs of source water protection in a cost/ benefit analysis. Typical costs include those of program administration, staffing, opportunity losses and tax revenue losses from restrictions on development, revenue losses from excluding businesses from protected areas and the expenses of structural management measures. Costs may vary greatly from community to community and place to place, and will depend on such factors as the value of real estate in a particular neighborhood or district and the measures that the community selects to protect its source water. For example, estimates of the costs of a local wellhead protection program in Maine range from \$8,500 to \$336,500. The wide range in costs is due primarily to different estimates in the amount and value of land to be purchased and placed under conservation easements. By omitting the costs of easements, which communities may opt to forgo as a protection measure, estimated costs would range from \$6,000 to \$86,500.

The popular assumption that less development means less revenues for local governments should be examined in light of studies showing that the revenues from increased development in some communities are exceeded by the costs of providing public services. For example, a 1992 study by the American Farmland Trust found that three towns in Massachusetts spent \$1.12 in services for every tax dollar raised by development. In contrast, the towns spent only \$.33 in services for every tax dollar raised on farm and open land.

In many communities, the costs of limiting development to protect natural resources are further offset by the higher tax revenues that can result from increases in the value of property located in or near the protected areas. Houses adjacent to Pea Island National Wildlife Refuge in North Carolina, for instance, are estimated to be worth ~20% more than similar nearby houses not located next to the refuge.

It is clear that source water protection can be a cost-effective approach to safeguarding a community's drinking water supplies. Factor in benefits that are, in whole or part, not translatable to monetary terms, and such a program may prove to be a bargain.

This article is not a statement of policy of the EPA. This article is reprinted with permission. It was originally published in the print edition of *Ground Water Monitoring & Remediation*, is available on the Blackwell Synergy online delivery service, accessible via the journal's website at www.blackwellpublishing.com/gwmr or www.blackwell-synergy.com. Hamilton Brown, formerly on the staff of the National Association of Towns and Townships in Washington, D.C., provided information for Table 1.



Integrating Smart Growth Strategies

A Tall Glass of Reason

Few environmental causes reach as directly into the homes and offices of Americans as drinking water. It's a bit of under-appreciated magic: Turn the faucet and out comes water you can drink. But, protecting this convenience is not so simple. Filtering and processing alone are only part of the challenge. The key to delivering safe drinking water is not only in treatment, but also in protecting the lakes, streams, rivers and aquifers Americans tap for drinking water. To do so, we must plan and design our communities and manage our forests and open space to ensure safe and sustainable water supplies. As the U.S. Forest Service reported, "some 180 million people depend on forests for their drinking water" (*Forests on the Edge*, report by U.S. Department of Agriculture, May 2005). Smart growth strategies can be one way to help protect this critical resource.

Safe drinking water is a benefit Americans treasure like few others. The number one reason Americans vote to increase their taxes for conservation is to protect their sources of drinking water (Poll of 1,500 registered voters surveyed in April 2004 by Fairbank, Maslin, Maullin & Associates and Public Opinion Strategies for the Trust for Public Land and the Nature Conservancy). Smart growth strategies can help keep America's drinking water safe. Here's how:

- **Smart growth strategies keep contaminants from entering drinking water sources.** Smart growth encourages compact building designs and managed wastewater systems, and preserves natural lands to absorb and filter rainwater and buffer waterbodies from contaminants. Contaminants pose a significant threat to drinking water. Sediments, nutrients and other contaminants from runoff and flooding cause the majority of all water pollution in the United States (The

National Water Quality Inventory: 1996 Report to Congress, U.S. Environmental Protection Agency). Septic systems are the third most common source of groundwater pollution (US EPA, 2003: Onsite and Clustered (Decentralized) Wastewater Treatment Systems).

- **Smart growth encourages lifestyle choices that reduce pollution.** Smaller lawns, more open space, more transportation choices, walkable neighborhoods and mixed-use development are all features of smart growth approaches that can protect sources of drinking water and offer lifestyle choices. Smaller lawns lead to reduced fertilizer and pesticide use. Open space protects groundwater recharge and filtration. More transportation choices lead to fewer and shorter trips in the car (and less polluted road runoff to sources of drinking water). Overall, this means people are producing less pollution that ends up in the water supply.
- **Smart growth priorities preserve drinking water recharge areas.** A cornerstone of smart growth is the preservation of open space and critical environmental areas—thus protecting the land needed to recharge sources of drinking water. In the 15 years between 1982 and 1997, the amount of developed land in the contiguous United States increased by a third. Smart growth practices can protect this rapid development from obliterating critical water recharge areas so clean water will continue flowing into the lakes, rivers, streams and aquifers used for drinking water.
- **Smart growth practices prevent soil erosion, which causes sediments to enter drinking water sources.** Low

impact development practices lead to better erosion and sediment control on construction sites. Increased sediment loads pollute sources of drinking water and can make drinking water treatment more expensive.

- **Smart growth makes it cheaper to treat drinking water.** Protecting water quality at the source, as smart growth approaches can, is more cost-effective in the long-term than relying exclusively on filtration and treatment to remove all pollutants. How we use our land can significantly affect the cost of water distribution, sewer services and treatment costs. These costs can be significantly lower for individual households in compact developments. Preserving forests means that water is naturally filtered, reducing treatment costs.

Clustered development strategies create densities that dramatically reduce water system infrastructure costs. For a household on a one acre homesite, yearly water and sewer services on average could be \$380. On a more compact acre site near the water/sewer service center, costs would be reduced to as little as \$143, even for a household using the same amount of water. (*Journal of the American Planning Association*, Winter 2002, v68).

Smart growth practices also preserve forested lands, which reduces treatment costs. Forest cover may serve as a natural filter, decreasing the amount of contaminants that must be treated. Based on a study of twenty-three surface water treatment plants—a 10% loss of forest cover in a watershed—there is a 12% average increase in water treatment costs. (Trust for Public Land, unpublished study, 2005).

What To Do

Better land stewardship and planning is one way to protect the drinking water we use every day. This can include a watershed planning approach to smart growth and low-impact development techniques, clustered development, and preservation of natural areas. Source water concerns can be consciously incorporated into the development and planning process. You can help make a stronger connection between smart growth practices and providing safe drinking water through the following activities:

- Join with many local governments who are using policies and tools that enhance existing neighborhoods, minimize the impacts of new construction on the environment, protect drinking water and provide a range of housing and transportation options.
- Integrate drinking water protection and smart growth messages in your work with state and local officials and community leaders.
- Share success stories and issues—let us know what you've learned about planning and implementing smart growth and low-impact development strategies to protect drinking water sources. Also, please tell us what information would be helpful in using smart growth strategies to protect your sources of drinking water.



In 2004, The Trust for Public Land, the U.S. EPA, River Network, The National Association of Counties and American Rivers convened a network of organizations to explore and promote the use of smart growth strategies for the protection and improvement of water resources. Activities of the network included planning and hosting sessions on smart growth and clean water at the annual New Partners for Smart Growth Conference and identifying and filling information gaps for practitioners with materials such as this fact article. Please submit your comments or questions to Gayle Killam at River Network: gkillam@rivernetwork.org

CASE STUDY

A Community in Action

The Upper Neuse Clean Water Initiative

by David Swann
and
Kelley Hart

Trust for Public Land

The National Research Councils concluded in their *New Strategies for America's Watersheds* that when local communities take responsibility for protecting their natural resources or environment, "they do it more effectively and more economically than a top-down regulatory approach." This has proven to be true in several community-led watershed projects where voluntary land conservation is serving to be an extremely important tool for protecting water supplies. The Trust for Public Land (TPL) has found that while protection of clean drinking water is often a critical community goal, it is not the only benefit of watershed protection. Others include improved stormwater retention, more active and passive recreational opportunities, habitat protection and preservation of community character and quality of life.

Case in point:
The Upper Neuse
Clean Water
Initiative. The
Upper Neuse

Clean Water Initiative is a collaborative, voluntary effort to prioritize and protect those lands most critical for the long-term safety and health of all drinking water supplies in the Upper Neuse River Basin. There are nine water supply reservoirs supplying eight municipalities in this 770 square-mile Piedmont Basin in North Carolina. Two of those municipalities—Raleigh and Durham—are among the top five fastest growing cities in the state. Continued growth is a given—as much as 50% by 2025—and with it, the genuine possibility of water quality degradation. Faced with the apparent dilemma of having to choose between economic growth and watershed protection, the community came together and created a regional strategic plan to accommodate both.

Although many communities in the Upper Neuse River Basin have their own water supply intake (and in many cases their own reservoir), water throughout the basin is a shared and interconnected resource requiring a unified approach for its protection. It had become increasingly clear that regulations alone, although critical to the effort, would not be sufficient to protect water supplies in the future. "We have learned from our experience in protecting the Tar River Basin that strong private-public partnerships such as this can bring resources to a project that would otherwise be unavailable," said J. Dudley Watts, Granville County Manager. "We have to change people's mindset from looking for ways to get around watershed regulations to focusing on protecting the resource.

Strategic land protection through incentives can balance growth and protection while creating a better place to live for future generations."

The number one reason Americans vote to increase their taxes for conservation is to protect their sources of drinking water.

(Poll of 1,500 registered voters surveyed in April 2004 by Fairbank, Maslin, Maullin & Associates and Public Opinion Strategies for the Trust for Public Land and The Nature Conservancy.)

The Upper Neuse Clean Water Initiative brought together local landowners, elected officials, government agency representatives and local, state and national conservation organizations to create a proactive and thoughtful land conservation strategy based on targeted place-based technologies. The Trust for Public Land facilitated a public forum in which community leaders and stakeholders identified protecting water quality as their primary conservation priority. Protecting working lands, aquatic habitat connectivity and terrestrial habitat connectivity were secondary priorities. TPL and the Triangle J Council of Governments (TJCOG) then assembled a team of local experts in water quality, water resources management and Advanced Geographic Information Systems (GIS) to create a

Please direct questions or comments about the Upper Neuse Clean Water Initiative to Kelley at 202/543-7552 or Kelley.hart@tpl.org

www.ctnc.org/upperneuse.htm

Conservation Plan that used water quality priorities as criteria for identifying parcels to be conserved.

TPL's GIS model, Greenprinting, was used to create a systematic approach for analyzing lands that offer highest conservation benefits across the basin, recognizing that not all water resources are equally vulnerable to contamination. Areas having similar dynamics and sources of contamination can also have different degrees of vulnerability and respond differently to source water protection and water quality management strategies. GIS allowed local governments, watershed associations, land trusts and water suppliers to better understand those dynamics and the specific needs of the watershed.

Greenprinting not only functioned as a sophisticated prioritization tool, but also worked to leverage community input and allow for maximum local ownership of the results. Once the modeling was complete, TPL and TJCOG explored various ways to incorporate the other conservation priorities identified by the stakeholders. These results and products were shared with community leaders and stakeholders in a second public forum. Based on feedback from that meeting and subsequent discussion with land trusts and others, TPL and TJCOG developed parcel selection criteria that, when paired with the model results, identified lands that can meet the stakeholders' priorities and additional criteria specific to individual land trusts. The partners are now working with landowners, local governments on

landowner outreach and voluntary acquisition through the purchase or donation of land or conservation agreements.

Aside from drinking water protection, collaborative efforts like the Upper Neuse Clean Water Initiative often lead to more public involvement in other significant local decisions concerning future livability

issues—especially future land-use planning. In communities already developing and implementing source water protection plans, the process has served to bring many diverse interests together around a common goal and strengthen the local, rural and urban relationships through communication and increased understanding of

otherwise potentially adversarial priorities.

The Upper Neuse Clean Water Initiative is funded through water/sewer utility revenue from the City of Raleigh and managed by the Conservation Trust for North Carolina. Along with The Trust for Public Land, other partners in the Upper Neuse Clean Water Initiative include the Ellerbe Creek Watershed Association, the Eno River Association, the Tar River Land Conservancy, Triangle Greenways Council, the Triangle J Council of Governments, the Triangle Land Conservancy and the Upper Neuse River Basin Association.

For more information on the Upper Neuse Clean Water Initiative and The Trust for Public Land, go to www.tpl.org and www.ctnc.org.



Photo credit: U.S. Environmental Protection Agency



Examples from the Watershed Conservation Community

Plans to Protect the Source

Ohio

Source Water Education – How SWEET it is!

Jeanne Russell, Nonpoint Source Education Coordinator, ODNR/Division of Soil and Water Conservation

Over half of Ohio's 88 county Soil and Water Conservation Districts (SWCDs) have been savoring the sweet taste of success as they conduct source water education programs for a variety of audiences in their counties. From septic system seminars and municipal meetings to garden club events and county fairs, participants are learning about the importance of source water protection.

In Spring of 2005, staff from Ohio EPA's Division of Drinking and Ground Waters (DDAGW) and the Ohio Department of Natural Resource's Division of Soil and Water Conservation (DSWC) partnered to establish a statewide network of Source Water Environmental Education Teams (SWEETs) with the tools and training necessary to strengthen their source water protection education efforts. The network currently includes 39 teams serving 46 Ohio counties.



Photo credit: ODNR/Division of Soil & Water Conservation

Each SWEET was organized by a county SWCD and consists of three or more local water resource partners such as local health departments, watershed coordinators, public water system operators, planning commissions, extension agents, parks departments and solid waste districts. Funding received through an Ohio EPA Office of Environmental

Education Fund grant covered the cost of providing the teams with new user-friendly groundwater simulators, drinking water source assessment reports and protection area maps. Five regional workshops were conducted to teach team members how to design groundwater simulator demonstrations targeting local water resource issues.

In exchange for these resources and training, SWEETs agree to conduct a minimum of three source water education outreach events per year for three years. Since November 2005, 93 events have been reported reaching over 8,500 citizens across the state. In Van Wert County, a local television station produced a 20-minute program featuring a SWEET presentation that will be aired multiple times for the general public.

Reactions to the source water protection education programs have been extremely positive. Christina Hitchcock, a watershed coordinator in Union County, reported that homeowners participating in a septic system and well workshop, "paid close attention to the demonstration and asked good questions relating to septic system maintenance and protection of groundwater resources."

In Van Wert County, 83% of the 33 licensed farmers who attended a pesticide recertification course indicated on a post-program survey that they will adopt practices to protect groundwater after participating in a SWEET demonstration.

SWEET presentations can be used to fulfill public education and outreach requirements outlined in Ohio EPA's Drinking Water Source Protection Planning Guidance. A listserv and SWEET website are being developed to provide additional support to SWEETs, and to give them the opportunity to share their SWEET successes.

For additional information about Project SWEET, contact Jeanne Russell, ODNR/DSWC at Jeanne.Russell@dnr.state.oh.us or Kristy Hunt, Ohio EPA/DDAGW at kristy.hunt@epa.state.oh.us.

Massachusetts

Two Sources of Water; Two Different Strategies

John McNabb, Clean Water Act

The Cohasset Water Department, which serves about 7,200 residents of this small town located about 20 miles south of Boston, Massachusetts, has an active source water protection program in place. The Department has two surface water sources, Lily Pond and the Aaron River Reservoir, and two wellfields which are currently out of service. The Department is managed by an elected, 3-person Board of Water Commissioners.

Recent source protection efforts began in 1986 with the initial delineation of the watershed for the Pond and Reservoir, and continued in 2002 with the completion of a Surface Water Supply Protection Plan (SWSP). Both of these studies identified eutrophication from excessive nutrient loading as the major challenge to be met. A limnology study conducted in 2003 provided further information.

Mapping of the sub-basins, which drain into Lily Pond, shows that the Peppermint Brook sub-basin is heavily developed with residential structures, and that the Brass Kettle Brook sub-basin is almost completely undeveloped. Both contribute nutrients and pollutants into the Pond, but need different solutions because of their different impacts from development.

The strategy for the relatively undeveloped Brass Kettle Brook sub-basin is to acquire land to prevent further development. Since 2001, when the land acquisition program started, the Water Commission has acquired over 77 acres of watershed land. Substantial

CONSUMER CONFIDENCE REPORTS

Since 1999, community water systems have been required to provide their customers with annual water quality (or consumer confidence) reports. Information is provided about where the water comes from and any regulated contaminants the water system has detected in treated water and the level at which they were found for the preceding calendar year. Health effects language is also included. These reports must also contain information about the required source water assessment completed for that system. Two pieces of information are specifically required: 1) how customers can obtain a copy of the results of the assessment and 2) a brief summary of the water system's susceptibility to contamination based on the findings of the assessment. This information should appear yearly, even if the source water assessment has not been updated. EPA also encourages water suppliers to use these annual reports as a way to discuss source water protection actions that are in the planning stages or are already in place. The reports can also serve as an education vehicle to let customers know how they can control residential uses that could negatively impact their drinking water.

These annual reports were originally intended to be key tools in making the assessment information available to the public. However, security concerns have prompted some states and utilities to limit access to assessment information. The amount of information provided about the source water assessment varies widely from state to state and system to system. The susceptibility information is often lacking. A typical example comes from the State of Nebraska:

"A source water assessment of our water supply has been completed by the Nebraska Department of Environmental Quality (DEQ). The assessment includes maps, an inventory of potential contaminant sources and a determination of the vulnerability of the system to contamination."

In contrast, the Cohasset Water Company, an award winning utility in Massachusetts, provides its customers with a detailed map showing the water supply protection areas and identifying potential sources of contamination in the watershed. In addition to the minimum information required about the Source Water Assessment Report, it provides information about steps that the water system has already taken to protect the source water and states that the Water Commission intends to implement the recommendations in its State approved protection plan.

A copy of Cohasset's water quality report and map can be viewed at:
www.cohassetwater.org/2005CohassetCCR.pdf
www.cohassetwater.org/2005CohassetCCRMap.pdf

continued on page 20

Plans to Protect the Source, cont.

cont. from page 19

financial assistance for this has been provided by the Massachusetts Executive Office of Environmental Affairs' land acquisition grant program.

For the developed Peppermint Brook sub-basin, the Commission is in the midst of a 3-5 year program to retrofit the landscape by installing 55 raingardens to passively clean stormwater before it can enter the Pond. These raingardens, placed to collect water before it enters catchbasins, is projected to reduce nutrient loading from this sub-basin into the Pond by 50% or more. The program is being funded by both a \$255,000 319 grant from the EPA and Massachusetts Department of Environmental Protection and by a \$450,000 Clean Water State Revolving Fund low-interest loan.

North Carolina

Interactive Drinking Water Maps

by Hope Taylor-Guevara,
Clean Water for North Carolina

Many of us know that drawing attention to our streams, rivers, lakes, wetlands and groundwater as sources of drinking water helps to “bring home” the need for protection to our fellow grassroots citizens, as well as, to local and state decision-makers. It raises the “moral ante” when a new permit or expanded discharge is being considered, and if the receiving water is already designated as a “water supply” resource, it may stop the permitting or tighten the standards.

As a part of the EPA-mandated Source Water Assessment Program (SWAP), each state environmental agency was required to prepare a report on the “susceptibility” of every public drinking water source by 2004.

In other words, they were not just to look at the current water quality, which suppliers were already required to report to consumers annually, but look at both the Potential Contaminant Sources and the “vulnerability” (soil characteristics, slope, rainfall, etc.) of the source. In North Carolina, this was a massive task, with over 10,000 public water supplies, many of them depending on public wells and serving only a dozen to hundreds of customers.

Because of good leadership in our Environmental Health Division and strong public involvement, our agency took a relatively “precautionary” approach to designating contaminant sources. The Public Water Supply Section listed every pollution incident and facility for which they had GIS coordinates from several environmental divisions, and assigned the risk of contamination from each source a “high” rating. Then, they went a step further to create an interactive map showing all those potential contaminant sources (in red, no less) along with major streams and rivers, highways, county and municipal boundaries and gave it a simple “query” function, so that the user can find the name and facility identifiers for every symbol on the map.



Even if North Carolina isn't your home, we encourage you to utilize your own state's public water supply section and make a similar map for your state. You'll be amazed how many ways you'll find to use it to protect your waters and public health. Agencies will already have completed their individual Source Water Assessments, which are generally available on line for each source.

When our organizers go to visit a community, we create a unique map showing contaminant sources in the area, with the ability to track down all the relevant permits and files. When we go to lobby our state legislators—as we've been doing this year to draw attention to the need for protections for vulnerable private well users—we take a dramatic map of the legislator's district; it never fails to rivet their attention. We've even helped agency staff from agency divisions involved in landfills, underground storage tanks and other sources of pollution to use the interactive map—it really helps them to do their jobs by finding locations and seeing the relationships between the facilities and vulnerable populations or resources.

Along with Right-to-Know (www.rtknet.org) and compliance databases (www.epa.gov/echo), the Source Water reports and interactive websites bring local and watershed activists and policy wonks a lot of powerful tools to increase oversight and bring about a better water future for all of us!

Visit North Carolina's "SWAPinfo" map at http://204.211.89.20/Swap_app/viewer.htm.

For a dramatic view of Potential Contaminant Sources across the state, click "hide group" under the Public Water Supply Sources on the left hand side, then use the slider bar to move down to the Potential Contaminant Sources. Click on "show group" below them and then click on "refresh" at the left end of the toolbar at the top.

Oregon

Drinking Water Protection Priorities

By Sheree Stewart, Oregon Department of Environmental Quality

The Safe Drinking Water Act (SDWA) funding to Oregon Department of Human Services (DHS) and the Department of Environmental Quality (DEQ) was used to conduct Source Water Assessments and now to provide drinking water protection technical assistance to public water systems and communities based on the information from the assessments. The assessments were completed for all Oregon public water systems in June 2005, providing 2,400 public water systems with individual Source Water Assessment Reports.

Since there are no new authorities associated with drinking water protection in Oregon, we must rely upon integration and coordination with other programs. Over 15,150 "potential contaminant sources" were identified as part of Oregon's source water assessments. With the data now entered into an Access database, we are able to prioritize our work with other programs and agencies. Our primary focus is to encourage other programs to use the sensitive areas as priorities within their programs. We also emphasize the importance of considering all components of the water cycle, such as addressing groundwater issues within municipal watersheds where groundwater may be contributing to the water quality problems in nearby surface waters.

The top priorities for Oregon's drinking water protection staff include:

- Using the susceptibility results to prioritize assistance—by system and by risks.

continued on page 22

Plans to Protect the Source, cont.

cont. from page 21

- Developing strategies to address the 5-10 highest risks for groundwater and surface water (such as spill response and pesticide reduction).
- Integrating with Clean Water Act work and the “watershed approach.”
- Integrating the new assessment data into policy priorities where possible, both at DEQ and other sister agencies —Oregon Department of Transportation, Oregon Department of Agriculture and Oregon Department of Forestry.
- Finding ways to address the issue of potential pharmaceuticals in Oregon drinking waters by:
 - ✓ Utilizing USGS data to identify high priority areas;
 - ✓ Utilizing the assessment database to cross-reference high priorities; and
 - ✓ Promoting focused collection events and education/outreach.
- Supporting and collaborating with the DEQ Laboratory in their Toxics Monitoring and pesticide risk reduction efforts.
- Focusing technical assistance on the microbial sources within 2-year time-of-travel of public supply wells.
- Finalizing the application process to provide grant funding (through SDWA) to implement new protection projects, outreach/education and other activities.
- Oregon’s Department of Environmental Quality has developed a resource-rich webpage with many links related to drinking water protection. Included, under “technical assistance” is a Wellhead Protection

Guidance Manual. www.deq.state.or.us/wq/dwp/dwphome.htm

- Using queries of the drinking water protection database to provide information for other DEQ programs to determine high priorities. For example:
 - ✓ 285 sites on the active hazardous waste cleanup list in Oregon within the 2-year time-of-travel for groundwater public water supply wells.
 - ✓ 27 leaking underground storage tanks in sensitive areas; 7 surface water, 20 groundwater systems within a 2-year time-of-travel to the well.
 - ✓ 67 discharge points for permitted wastewater treatment plants upstream of public drinking water intakes.
 - ✓ 6 reservoirs and lakes that serve as community drinking water sources are used for recreation that includes human contact.

GIS Maps and Database

One of the primary goals for the Source Water Assessment project was to provide public access to the results. Oregon’s Access®-based Source Water Assessment database includes a significant amount of data related to the location, delineation, inventory, sensitivity analysis and susceptibility analysis for each water system assessed. The DEQ website posts Oregon’s GIS-based maps and shapefiles of public water supply watersheds for intakes and the recharge areas for wells and springs, as well as, a data layer with over 15,000 identified potential sources of contamination within the drinking water source areas. Shapefiles of the drinking water source areas are also

posted in Oregon Geospatial Enterprise Office's data clearinghouse. Individual maps, assessment results and data layers are available by request at a local or regional scale. The database includes fields to track water system's progress in implementing local source water protection strategies including fields to track the information regarding the type of protection strategies being applied (e.g. public outreach/education, enforceable or voluntary BMPs, zoning/overlays or other land use measures, health regulations, land acquisition/conservation easements) and the specific land use(s) addressed within the protection area (e.g. agricultural, harvested forests, commercial/industrial, residential, municipal, transportation corridors, etc.).

The drinking water assessment GIS data for each water system within each County was sent to the County boards of commissioners, land use planners, health departments and GIS departments for incorporation into land use planning and designation of special areas at the local or county level. Counties and cities are now able to directly overlay the identified drinking water protection areas on other planning information available to them.

Monitoring Data for Source Areas

The identification of the high risk systems will serve as an important tool for determining priorities for the next phase of drinking water protection work. One of the most challenging issues concerning drinking water and public health is the lack of monitoring data for chemical compounds that are not addressed in the Safe Drinking Water Act requirements. When the SDWA drinking water parameters are compared to the list of parameters included in the CWA/Oregon Water Quality Standards, *we find that there are currently only 37 parameters in common.* Most ambient water

quality monitoring in Oregon is related to protection of fish and serves to generate the Clean Water Act Section 303(d) listing process. This means that the majority of ambient monitoring is focused on temperature, turbidity and pH.

Since there is very little data on drinking water-specific parameters in raw source waters, Oregon's drinking water protection program is seeking to integrate information from the assessments into the existing toxics monitoring work of the Oregon DEQ Laboratory Division. The susceptibility analysis results from the Source Water Assessments will be used to prioritize high risk areas for sampling. We will focus on sampling selected high priority sites in the source streams above intakes and at wells. The primary purpose for gathering the additional monitoring data is to *provide DEQ, Department of Human Services (DHS) and other natural resource agencies with information enabling more focused technical assistance to reduce any water quality impacts identified through the monitoring.*

The new monitoring data will help Oregon agencies identify specific needs for technical assistance in drinking water source areas and prioritize some of the existing work by type of land use/activity or potential contaminant. Reducing the risk of contamination for the public water systems will ultimately reduce the need for additional (more expensive) drinking water treatment in the future.



CASE STUDY

Superior Outcomes through Collaboration in the Schuylkill

by *Jennifer A. Adkins*
Schuylkill Watershed Initiative Grant Coordinator, Partnership for the Delaware Estuary
www.DelawareEstuary.org

The Schuylkill River Watershed in Pennsylvania is the largest, most diverse and most heavily developed region in the Delaware Estuary. It provides drinking water to more than 1.5 million people. In 2003 the Philadelphia Water Department completed Source Water Assessments of the Schuylkill River that identified four major threats to surface water supplies: abandoned mine drainage, agriculture, sewage discharges and stormwater runoff in the watershed.

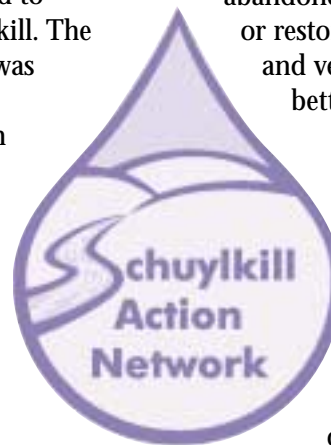
With such diverse threats and a watershed nearly 2,000 square miles in size, it was clear that a group effort was needed to protect water quality in the Schuylkill. The Schuylkill Action Network (SAN) was born from this need, and today is putting the knowledge gained from the assessment to work on the ground.

Since 2003, the SAN has grown from four original founding agencies to a diverse group of over 100 different agencies, water suppliers, nonprofit organizations, corporations, citizens, schools and universities, including the Partnership for the Delaware Estuary (A National Estuary Program). Within SAN there are workgroups for each of the four major threats to the watershed, each charged with prioritizing specific sources of pollution and identifying and implementing projects to address those pollution sources.

The SAN's ability to implement projects received a huge boost when, in 2004, a \$1.15 million Targeted Watershed grant was awarded by the U.S. Environmental Protection Agency for a selection of water quality improvement projects in the Schuylkill. Included are studies, demonstrations and educational/outreach activities together which provide an excellent example of a cooperative approach

to coordinated water quality protection for a large watershed.

Most of the over 40 projects of the Schuylkill Watershed Initiative Grant (SWIG) address water quality impairments by either reducing agricultural runoff, reducing abandoned mine drainage and/or improving stormwater management at local sites. The SWIG provides resources to local project managers for conservation planning and installing streambank fencing, livestock crossings and plantings along streams on farmland, installing passive treatment systems for removing heavy metals from abandoned mine drainage and creating or restoring swales, wetland pockets and vegetated areas near streams for better stormwater management.



The SWIG also provides a superb model of the Schuylkill Action Network at its best—utilizing the strengths of the network and its various partners to achieve measurable results. Each agency and organization involved in the SWIG projects plays a critical role to which it is uniquely adapted. Together the Philadelphia Water Department, the Partnership for the Delaware Estuary and the EPA in Region 3 developed a comprehensive workplan and budget for the SWIG. As the official recipient of the grant, the Partnership for the Delaware Estuary oversees implementation, establishing and managing a series of sub-grants to local project managers, providing administrative support and guidance, and tracking and reporting project activities, results and expenditures to EPA. The Philadelphia Water Department provides technical and financial support to the Partnership for the Delaware Estuary and local project managers. Schuylkill Action Network workgroups track

project progress and provide guidance and technical assistance as needed to local project managers. And the local project managers—primarily nonprofit watershed organizations and conservation districts—use their local expertise to turn these resources into results on the ground, and are responsible for tracking and providing information on project activities and expenditures.

The Philadelphia Water Department also oversees the monitoring program for the SWIG projects, and works with several different SAN partners in order to do this. In many cases, biological monitoring in the form of macroinvertebrate surveying is completed by local project managers before work commences, and a year after the project is complete. For most projects, chemical samples are also collected—upstream and downstream samples before and after project implementation. A regional water supplier contributes chemical sampling services for some of these projects. USGS performs much of the monitoring for abandoned mine drainage remediation, which includes monitoring flow and other factors. The Philadelphia Water Department fills in any gaps by performing chemical and/or biological monitoring where the capacity does not otherwise exist, and it oversees the monitoring program as a whole, compiling all of the monitoring information and helping analyze the results. The Department also works closely with the Partnership for the Delaware Estuary to insure that local project managers are fulfilling monitoring responsibilities and to report on monitoring activities and results to EPA.

Although it relies on a variety of partners, the monitoring program for the SWIG is well organized and directed because it is specifically targeted to the needs of the grant and EPA's requirements. Monitoring in the watershed as whole is not as simple to organize. A great deal of water quality

information is collected and analyzed, but by various organizations, using various methodologies, and for various purposes. This may meet the needs of individual organizations, projects and responsibilities, but does not provide the information or format needed to assess and track overall watershed health over time.

One longer-term goal of the SAN is to establish a more organized and effective watershed-wide monitoring network. An important first step in this process will take place this fall when the topic of monitoring will be the focus of the annual SAN workshop. The workshop offers all of SAN's members and partners the opportunity to learn new monitoring skills and/or to contribute to an inventory and assessment of current monitoring practices and gaps in the watershed. The SAN will utilize workshop results to begin fostering a more cohesive monitoring network in the watershed.

The SAN has come a long way in three years, but the future looks as promising as ever. In 2006 SAN collected feedback from its members, partners and other stakeholders through a series of focus groups, interviews and surveys and has more ideas than ever for how it can work to protect this critical watershed. So stay tuned!



For more information on the Schuylkill Action Network or the Schuylkill Watershed Initiative Grant contact Jennifer Adkins at 302/655-4990 Ext.112 or jadkins@delawareestuary.org. Or visit www.delawareestuary.org or www.schuylkillactionnetwork.org.

Resources & References

PUBLICATIONS

A Guide to Developing a Source Water Protection Plan by Pennsylvania's Department of Environmental Protection provides a general overview, a review of groundwater and contamination principles, a five step process to develop a source water protection plan, case studies and additional resources. www.dep.state.pa.us

Path to Protection: Ten Strategies for Successful Source Water Protection, by Caryn Ernst and Kelley Hart; published by the Trust for Public Land (2005). This booklet summarizes findings based on experiences of the five pilot projects and proposes ten strategies to help state and local governments create a plan for source water protection. www.tpl.org

Protecting the Source: Land Conservation and the Future of America's Drinking Water by Caryn Ernst; published by the Trust for Public Land (2004). This report explores scientific, economic and public health rationales for using land conservation for drinking water protection and presents best practices for successful implementation locally. www.tpl.org

Source Protection Handbook: Using Land Conservation to Protect Drinking Water Supplies by Caryn Ernst and Kim Hopper; published by the Trust for Public Land (2005). This book provides local governments, water suppliers and agencies and community drinking water advocates with the tools to identify source water conservation opportunities, implement funded source water conservation programs and acquire and protect the lands that will help keep our drinking water clean. www.tpl.org

The Groundwater Foundation's Source Water Assessment and Protection Workshop Guide provides local leaders and community members with tools to educate and motivate other community members to get involved in the source water assessment and protection process. www.groundwater.org/gi/swap/swap.html

Source Water Stewardship: A Guide to Protecting and Restoring your Drinking Water by Merritt Frey, walks you through a process for understanding your assessment, reaching out to others who are or should be involved in protecting and restoring drinking water quality and designing an action plan for drinking water protection and restoration. www.cleanwaterfund.org/sourcewater/guide.html

EPA RESOURCES

The publications and resources page of **EPA's Source Water Webpage** has extensive collections of EPA documents, publications by other organizations and a bibliography which includes a list of available materials. It covers a variety of topics including source water assessment and protection, Best Management Practices, wellhead protection, Underground Injection Control, CWA/SDWA integration, security and funding. www.epa.gov/safewater/protect.html

The Office of Ground Water and Drinking Water is compiling **Case Studies of Local Source Water Protection Programs** representing a variety of approaches to protecting sources of drinking water supplies for a diverse group of communities. www.epa.gov/safewater/protect/casesty/index.html

Consider the Source: A Pocket Guide to Protecting Your Drinking Water is the popular pocket guide on source water protection, which can be obtained through the website. www.epa.gov/safewater/protect/pdfs/swppocket.pdf.

Drinking Water Quality in Indian Country: Protecting Your Sources is a tribal source water protection fact sheet available from the EPA source water website. www.epa.gov/safewater/protect/tribe/fact.pdf

The Groundwater and Drinking Water Webpage has links to information on local drinking water quality, drinking water standards, public drinking water systems, underground injection control and more. www.epa.gov/safewater

The Source Water Protection Webpage has basic information about the water used for drinking water and the federal, state and local programs that assess and manage potential public health risks, including a Web Guide - an annotated guide to EPA source water resources. www.epa.gov/safewater/sourcewater

The Training Materials on Source Water Protection Best Management Practices are intended for individuals, agencies and organizations working directly with public water suppliers, communities or Tribal governments to develop and implement local source water protection programs. The materials are divided into two parts: a training module in Microsoft PowerPoint format and a series of more detailed source water protection "practices bulletins" by specific potential contaminant sources. www.epa.gov/safewater/dwa/electronic/ematerials.html#SWP

OTHER RESOURCES & ORGANIZATIONS

The National Drinking Water Clearinghouse is a public service organization that collects, develops, and distributes timely drinking water-related information. Intended for communities with fewer than 10,000 residents and the organizations who work with them, the NDWC helps small communities by providing needed technical assistance and information. www.nesc.wvu.edu/ndwc/ndwc_index.htm

The National Tap Water Quality Database contains data collected from 42 states by the Environmental Working Group. The overwhelming majority of the data obtained were from utilities. www.ewg.org/tapwater/

Let River Network Help You Keep Your Head Above Water!

Join the River Network Partnership and connect to the information and resources you need to stay afloat!

Access our River Source Information Center with the 1-800 hotline:

Let us help you research a particular issue and put you in touch with the necessary contact and resources through one-on-one consultations.

Log onto our Partner-only website: Browse updated postings of funding sources, upcoming events and trainings, and templates and river clipart.

Receive numerous other Partner benefits: Benefits include subscriptions to *River Voices* and the *River Fundraising Alert*, access to the online *Directory of Funding Sources for River and Watershed Conservation Groups*, one free publication, discounts on all other River Network publications, and much more!

- New Partner
- Partner Renewal

Sign Me Up!
www.rivernetwork.org



Annual Partner Dues are only \$100.

- Organizational Partner Agency/Tribal Partner Individual Partner

Name _____ Phone (____) _____

Org/Agency _____

Address _____

City _____ State _____ Zip _____

Email _____ Website _____

- My check is enclosed

Please charge my credit card: Visa MasterCard

Card # _____ Exp. Date _____

Signature/Name on Card _____

First time Partners will receive an initial set of Partner materials, including your choice of (check one):

- How to Save a River Starting Up: A Handbook for New River and Watershed Organizations
- River Talk! Communicating a Watershed Message Listening to Watersheds - A Community-Based Approach to Watershed Protection
- Testing the Waters - Chemical & Physical Vital Signs of a River

Please make your check out to River Network and return this form to:
 River Network, 520 SW 6th Avenue, Suite 1130, Portland, OR 97204.

River Network works to support you and your needs. We provide training and technical assistance to our Partner groups. River Network does not promote legislation or represent your organization in legal matters.



River Network

Connecting People, Saving Rivers

520 SW Sixth Avenue, Suite 1130
Portland, Oregon 97204-1511

ADDRESS SERVICE REQUESTED

Nominate Your River Hero!

May 18-22, 2007
Dolce Skamania Lodge
Stevenson, Washington



River Heroes

*Celebrating Rivers and
Those Who Protect Them*

*Honoring those who provide
the river conservation movement
with leadership and inspiration.*

2007 River Heroes Awards Banquet

River Network is seeking nominations for individuals to be honored at the 2007 River Heroes Awards Banquet. Awards will be presented on May 21 at the 8th Annual River Rally.

Nomination material and criteria can be found online at: www.rivernetwork.org or by contacting Katherine Luscher at 503/ 542-8384; kluscher@rivernetwork.org.

**Nomination
packets must
be postmarked
by February 9,
2007.**