

How's the Water?

M

ost people would agree that a vaccination to prevent illness is well worth the time, expense, and inconvenience. Similarly, local governments are trying source water protection to help avoid coping

with contaminated drinking water. This article presents the potential benefits of source water protection to communities, as well as to locally financed water districts, because in some cases these are the local entities responsible for dealing with polluted source waters.

Where possible, examples have been drawn from the actual experiences of specific communities. They offer concrete support for the common-sense 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 shields groundwater sources. Management of land around a reservoir used for drinking water is an example of source water protection for a surface water supply.



Photo courtesy of EPA/Steve Delaney, photographer

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Source

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Water

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Protection:

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What's in It

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For You?

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**Steve Ainsworth,
Hamilton Brown,
and
Paul Jehn**

Source water protection programs typically involve taking the following basic steps:

- Delineating source water protection areas.
- Identifying sources of contamination that may affect the delineated areas.
- Implementing measures to manage these sources.
- Planning for the future.

Benefits

Perhaps, the benefits of protecting source waters can be illustrated most easily if they are compared with the costs of failing to protect these source waters. 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 responsi-

ble 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 Safe Drinking Water Act (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, is losing 2.5 billion gallons of previously drinkable water for the foreseeable future because of contamination by industrial solvents. The state has decided not to clean his water up to drinking water standards.

Figure 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, although, given the drift of current legislative proposals to amend the Superfund program, localities may have to bear a greater proportion of the financial burden of dealing with polluted source waters.

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 also may enjoy substantial savings in the costs of complying with SDWA regulations. Implementation of source water protection programs, for instance, likely will save water purveyors significantly in avoided cost compliance with the proposed Disinfection Byproducts Rule. This is due to the fact that cleaner source waters require less disinfection, which means reduced requirements for removing disinfection byproducts. Water suppliers with source water protection programs in place also may be eligible for waivers from monitoring requirements that reduce their monitoring costs. Such waivers already have saved Massachusetts water systems approximately \$22 million over the three-year compliance cycle, while Texas water systems have saved \$49 million over two and one-half 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.

Another benefit of source water protection that can be expressed in economic terms (although few attempts have been made to do so) is

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The Costs of Saying "Never"

It is wise never to say "never." Twelve years ago, Montgomery County, Maryland, officials told the residents of Laytonsville that the nearby county-run landfill would never pollute the groundwater around it. Officials were so confident of this claim that they promised to give residents 50 years of free water if their wells became contaminated.

By about 1991, the county had detected low levels of trichloroethylene, or TCE, and freon in wells near the landfill. The county was quickly sued, and under the terms of a settlement it will spend \$3 million to extend county water lines to about 145 houses, plus \$45,000 a year to provide them with free water until 2045.

Controversy remains, however. Southwest of the landfill, two additional wells that supply residents not party to the settlement have been found to contain levels of TCE well above the drinking water standard. These residents now are asking the county for free water, but the county maintains that the landfill is not the source of the TCE in the two wells.

The county believes that the high levels of TCE and the absence of freon indicate that the contamination may be a result of citizens' using solvents to clean their septic tanks. In any event, source water protection may provide communities with an ultimately less painful alternative to doing nothing.

Figure 1: Costs of Various Responses

Community	Type of Problem	Response to Problem	Costs
Perryton, Texas	Carbon tetrachloride in groundwater	Remediation	\$250,000
Rockford, Illinois	Solvents in groundwater	Replace supply; hook private wells to public water supply	\$11.5 million (to date)
Camden-Rockland, Maine	Excess phosphorus in Lake Chickawaukie	Advanced treatment (not yet installed)	\$6 million (projected)
Moses Lake, Washington	Trichloroethylene in groundwater	Blend water; public education	\$1.8 million (to date)
Mililani, Hawaii	Pesticides, solvents in groundwater	Build and run treatment plant	\$2.5 million plus \$154,000/yr.
Tallahassee, Florida	Tetrachloroethylene in groundwater	Enhanced treatment	\$2.5 million plus \$110,000/yr
Pittsfield, Maine	Landfill leachate in groundwater	Replace supply; remediation	\$1.5 million
Rouseville, Pennsylvania	Petroleum, chlorides in groundwater	Replace supply (to date)	\$300,000 plus
Atlanta, Michigan	Volatile organic carbons (VOCs) in groundwater	Replace supply	
Montgomery County, Maryland	Solvent, freon in groundwater	Install county water lines; provide free water	\$3 million plus \$45,000/yr. for 50 years
Milwaukee, Wisconsin	Cryptosporidium in river water	Upgrade water system; meet immediate costs	\$89 million to upgrade system; millions in immediate costs
Hereford, Texas	Fuel oil in groundwater	Replace supply	\$180,000
Coeur d'Alene, Idaho	Trichloroethylene 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)

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 over \$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 clean up 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 the transcendent benefits—transcendent in that they may not be wholly translatable into economic terms. Although hard to measure in monetary terms, transcendent 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 waters. The risks are real enough; experts from the Center for Disease Control and Prevention estimate that waterborne

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, however, and 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.

Conclusion

The potential benefits of source water protection to communities are impressive. The benefits that can be captured in economic terms can be com-

pared 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 also 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 waters. 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. 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 cents 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 about 20 percent

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 groundwater's discharging contaminants, particularly nitrates, into surface waters are numerous.

Jerri Pogue, aide to the mayor of Everson, Washington, expresses her community's appreciation of this connection as it considers protecting its source waters: "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.

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 transcendent benefits, and such a program may prove to be a bargain. **PM**

Steve Ainsworth is a policy analyst with EPA's Office of Ground Water and Drinking Water in Washington, D.C. Hamilton Brown is the environmental consultant for the National Association of Towns and Townships in Washington, D.C., while Paul Jehn is the director of Ground Water Resource Management and Protection for the Ground Water Protection Council in Oklahoma City, Oklahoma.