

# River Voices



## Playing the Drinking Water Card

### *Strategies for river conservationists*

by Don Elder and Rita Haberman

Every year, poll after poll indicates that no issue resonates more broadly or deeply with the American public than the safety of public drinking water supplies. During the past several years, the river conservation movement has awakened to the enormous potential that we have for building public support for river conservation on this foundation of public interest. This potential is especially great where we can demonstrate that protecting a drinking water *source* is a far more effective and less expensive way to provide safe drinking water over the long haul than building elaborate facilities to treat increasingly polluted water.

There are a few special considerations that we should keep in mind as our organizations develop their commitment, capacity and public case for protecting rivers for public drinking water supply. We must remember that some of the greater *problems* plaguing many rivers stem directly from their poorly managed use or over-use as public drinking water supplies. We should also remember that drinking water use can *cause* major problems for a river, and that as a result not all rivers are now or should ever be tapped for public drinking water supply. Many river conservation programs, therefore, should include a drinking water source protection

program, but few if any should rely *exclusively* on one.

The purpose of this article is to increase awareness about the potential for using source water protection as a powerful river conservation tool, explain some of the pros and cons of

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*The public's strong interest in safe drinking water provides an excellent basis for building support for rivers.*

this approach, and most importantly, provide some specific recommendations on developing this approach as part of a comprehensive river conservation program.

### **Potential problems created by drinking water use**

River conservationists should develop long-range strategies to prevent or at least minimize the effects of four potential problems associated with drinking water use: dams, diversions, wastewater and leapfrog water development projects.

**Dams.** Hundreds of rivers across the nation have been dammed unnecessarily in the name of meeting future public drinking water needs.

The most common justification offered for damming a public water supply river is a claim that it is necessary to do so in order to secure a greater *quantity* of water to meet predicted long-term public demands. Another reason is that dams can result in higher chemical water *quality*, at least in terms of the relative concentrations of substances that settle to the bottom of a reservoir. Finally, it is often argued that damming a relatively remote and previously untapped river or stream can provide ample water quantity and quality less expensively than any other alternative course of action.

These arguments for damming a free-flowing river may be shallow, incomplete, based on faulty assumptions, and, in most cases, simply incorrect, but sadly they still often

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**River Network is a national nonprofit organization whose mission is to help people organize to protect and restore rivers and watersheds.**

We support river and watershed advocates at the local, state and regional levels, help them build effective organizations, and promote our working together to build a nationwide movement for rivers and watersheds. River Network also acquires and conserves riverlands that are critical to the services that rivers perform for human communities: drinking water supply, floodplain management, fish and wildlife habitat, recreation and open space.

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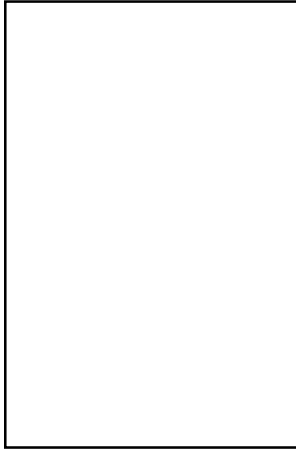
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# From the President

The good news is, every national poll shows that almost all Americans are very concerned about the quality of their drinking water—tops among all environmental issues. The bad news is, Americans don't understand that there's a connection between rivers and drinking water. About as many think drinking water comes from the rivers as think it comes from the oceans.

It's our job to change that. If we do our job, county commissioners will hear from constituents who don't want a new mine, in spite of the jobs, because it might poison the river and the groundwater. I believe that drinking water is the single most popular lever we have for cleaning up and protecting our rivers.



© photo by Linda Kliever

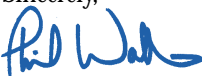
I believe that drinking water is the single most popular lever we have for cleaning up and protecting our rivers.

This 24th issue of *River Voices* is about drinking water: how it can be an organizing theme for river and watershed protection. It is also about the downside: how the river can be degraded by the development of drinking water and how you can prevent that. There's powerful information here about the new Safe Drinking Water Act, about working in tandem with water utilities, about reform of farming practices. There's information about the close connection between rivers and groundwater.

If you're a river activist, *River Voices* is a publication you can't afford to be without. The 24 issues to date cover most of the topics that concern you the most. The same goes for our *River Fundraising Alerts*, our 1-800 assistance hotline, access to volunteer experts, and all our other services. If you're not a Partner, now's the time to sign on (see page 26).

We're proud to announce the publication of *Starting Up: A Handbook for New River and Watershed Organizations*, with the best articles we could find on every subject from designing a logo to working with the media. It's available to Partners at a minimal price. There's another good reason to sign on.

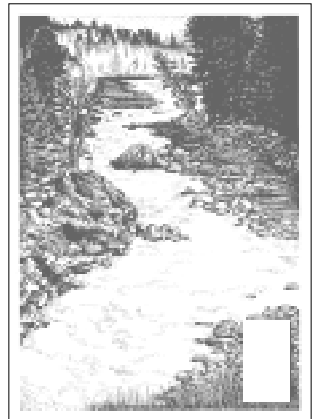
Let me tell you something I felt when I started the Rio Chama Preservation Trust in New Mexico. I didn't have to take on that challenge, but once I did I owed it to the river to do a professional job, with all the resources at my disposal. I knew the community—the media, the agencies, the environmentalists, the boaters and anglers—looked to me as the voice for the Chama. What I needed, back in 1986, was a River Network to back me up with information, advice and contacts. It didn't exist, so I invented it. We're here now to serve you. Give us a call.

Sincerely,  
  
Phillip Wallin  
President

## New from River Network: **Starting Up**

*A handbook for new river and watershed organizations*

*Starting Up* provides a treasure of information about how to run a successful organization. Based on the invaluable experience of dozens of leaders in the river and watershed conservation movement, this handbook lays out the critical moves every organization needs to thrive and grow. 350 pgs, \$25, \$10 for Partners (includes shipping).



Call (503) 241-3506 to order yours today, or e-mail: [rivernet@igc.apc.org](mailto:rivernet@igc.apc.org)

Source: AWWA

carry the day—particularly where public officials are focused on the value of rivers for drinking water to the exclusion of the other important public values rivers provide.

**Diversions.** Public water supply withdrawals can be as devastating as dams to a river ecosystem. The natural flow regimes of very large rivers can be disrupted by high-volume withdrawals, and many smaller rivers can be harmed by much more modest withdrawals. Typical impacts of diversions include damaged fish and wildlife habitat and degraded water quality (because there is less water left to dilute pollutants).

**Wastewater.** With public water supply use comes public wastewater generation. The vast majority of municipalities continue to discharge most of their treated wastewater into area streams. Most cities place their discharges downstream of drinking water intakes. The consequence is that treated sewage constitutes most, and in some cases *all*, of the flow of “drinking water rivers” for considerable distances downstream of dams or large intakes for weeks or months each year. Even when these discharges are treated to the highest possible levels, they do not support the natural life balance of the river. Interbasin wastewater discharges often make the situation even worse for “drinking water rivers” by creating a major net water loss.

## Steps in Developing a Source Water Protection Program

- Inventory and characterize the water sources
- Identify pollutant sources and relative impact
- Assess vulnerability of intake to contaminants
- Establish source water protection goals
- Develop source water protection strategies
- Implement the program
- Monitor and evaluate program effectiveness

**Leapfrog water development.** Many of our wildest and healthiest rivers are attractive for water supply development precisely because of their high water quality. This is true in the mostly arid West—where public water supply projects have long taken a tremendous toll on rivers—and now, far more than ever before, in many portions of the more humid East and South where population growth pressures are great, or where urban sprawl is spreading populations across wider and wider areas. In far too many places, existing supplies that could be cleaned up, protected adequately, and used efficiently are being abandoned in favor of

water development projects on more distant rivers.

## Recommendations for River Conservationists

Clearly, being tapped for public drinking water supply can prove to be a mixed blessing or worse for rivers. Nevertheless, there is much to be gained for rivers already tapped by building on the broad and deep public interest in clean drinking water to secure protection and improvement of the health of drinking water source waters. We recommend the following strategies for “playing the drinking water card.”

- **Promote protection of existing supplies.** This issue of *River Voices* is full of ideas and strategies on this topic: Source water protection programs; new provisions in the Safe Drinking Water Act; riverside buffers; agricultural, forestry and urban best management practices; land use planning; public education; point source discharge permits; and land acquisition. These are some of the tools we can use to protect existing water supplies and the health of our rivers. Protection of existing water supplies helps protect rivers already developed for water supply, reduces

Illustration: Sarah Lauterbach



treatment costs, and minimizes the pressure to tap into the few remaining remote, pristine, clean rivers.

- **Promote efficient use of existing supplies.** Water efficiency is a significantly under-used strategy that can provide a multitude of benefits for rivers. It is an alternative to additional water supply dams and diversions and related detrimental ecological and socioeconomic impacts. Water efficiency helps maintain healthy flows for fish and wildlife and recreational uses. It protects water quality by keeping flows higher and diluting pollutants, as well as by indirectly reducing the amount of wastewater discharged back to streams. Water efficiency also saves households, businesses, and public water and energy utilities tremendous amounts of money. An excellent source for more information on water efficiency is: the Rocky Mountain Institute, 1739 Snowmass Creek Road, Snowmass, CO 81654, (303) 927-3851, <http://www.rmi.org/>.

- **Promote wastewater reuse.** In addition to reducing the amount of wastewater generated and discharged, wastewater reuse can significantly reduce the peak demands on public water supplies. By reducing peak demands, it can reduce the pressures for costly and environmentally damaging new water development projects to meet expected future needs. For more information on this integral component of a comprehensive water management program, contact AWWA (see page 11).

- **Convince people whose water comes from the ground that a “watershed approach” also protects their**

**drinking water interests.** In areas where most people receive their drinking water from the ground, talk about the link between river conservation and drinking water source protection tends to draw blank stares from many people, including many river conservationists. It

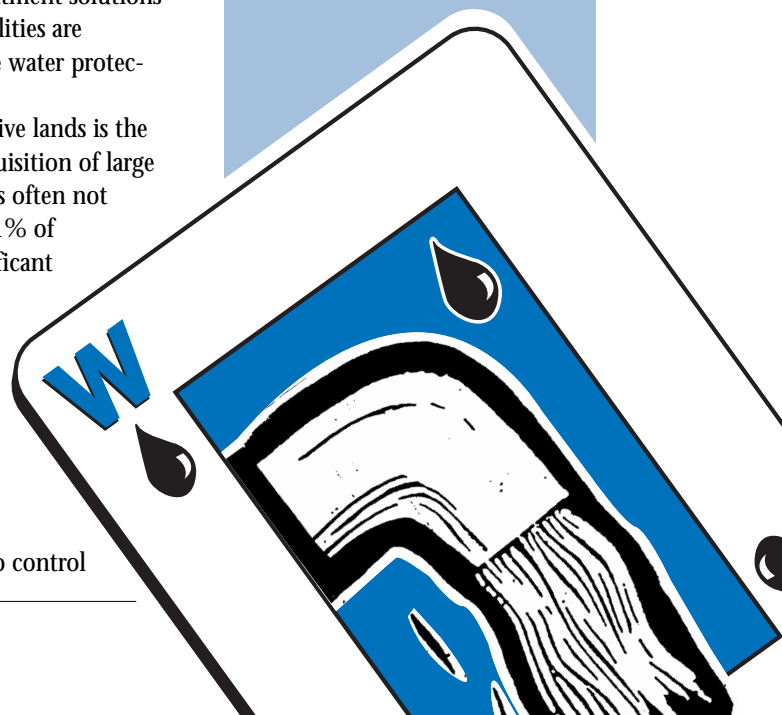
should not. Most of the things that need to be done to conserve rivers through a “watershed approach” will also directly benefit the quality of groundwater supplies.

- **Build alliances with water utilities.** Acquaint yourself with the water utility managers in your watershed. Learn about existing and proposed water supply systems, issues and problems. Source water protection is widely considered the “first barrier” in a “multiple barrier” approach to

providing safe drinking water. Treatment, disinfection, distribution system maintenance, and continuous monitoring are other critical steps. As the costs of technology-based treatment solutions continue to increase, utilities are focusing more on source water protection.

Acquisition of sensitive lands is the best alternative, but acquisition of large parcels at market value is often not affordable. Today, only 1% of water utilities own significant portions of their watershed. Furthermore, it is extremely difficult for water utilities to implement source water protection programs on their own because water utilities typically have little or no control

***In many cases, it is much less expensive to protect the source than to treat polluted water. Source water protection to avoid costly treatment is a strong motivator for communities.***



# A TALE OF TWO RIVERS:

*How the friends of the Cahaba and Locust Fork Rivers built the case for protection of one river for drinking water use and protection of another from it*

by Don Elder

The Cahaba and Locust Fork Warrior Rivers, Alabama's longest and second longest free-flowing rivers respectively, lie just southeast and northwest of Birmingham, Alabama's largest city. The Cahaba has supplied high quality drinking water to the Birmingham metropolitan area for more than 100 years. In recent years, however, sprawling development and poor wastewater management in the Cahaba Basin has threatened water quality. Increasing water demands have also led to increasing water withdrawals, which leave portions of the river devoid of flow for longer and longer periods of time each year.

Additionally, high population growth rate projections and very high projections of increasing per capita water use led the Birmingham Water Works to propose the construction of a large drinking water supply dam on the Locust Fork River to augment, and perhaps eventually replace, the Cahaba as a drinking water source. The Water Works supported its argument for the proposed project by providing river conservationists with a sort of "Sophie's Choice": support the damming of one of the South's finest remaining natural rivers or see the pressures on another increase to the point of potential ecological collapse. The Water Works also claimed that the project would help the Cahaba by reducing demands on it *and* help the Locust Fork by securing protection of the land immediately around the new reservoir and reducing the river's sediment load downstream.

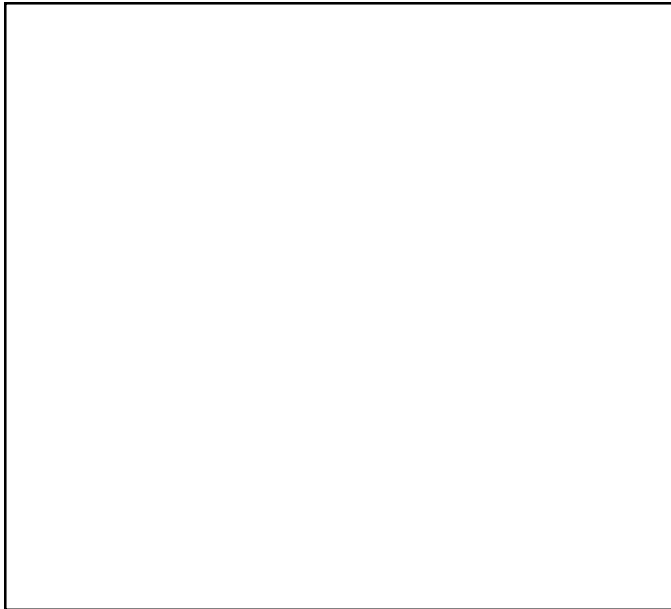
The Cahaba River Society and the Friends of the Locust Fork River responded by demonstrating technically and publicly that this was a *false* choice. Rather than allowing the Alabama river conservation movement to be

divided by it, the groups worked together to present a far better choice in the form of a comprehensive set of protection and management actions for all the rivers of the region. These included: the initiation of an extensive greenway system along the Upper Cahaba and its tributaries; the development of a new stormwater management and erosion control program in the entire Upper Cahaba Watershed; the acceleration of direct action to clean up existing point and

nonpoint source problems in both river basins; and the establishment of an aggressive water efficiency program supported by governments and local businesses that is beginning to save the public tremendous amounts of water *and* money.

While the Water Works has not completely abandoned its plans to dam the free-

Photos: Beth Maynor Young



*The Cahaba River.*



*The Locust Fork.*

flowing Locust Fork, public support for the plans has waned. In the meantime, important long-standing issues in both river basins have been addressed, one great river has been protected *for* its drinking water use, and another has been protected *from* it. ➤

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over planning, zoning and land use outside their often limited jurisdictions. Therefore, many utilities are reaching out to river conservation and other community-based groups to seek support and cooperation in developing source water protection programs. See article on such partnerships on page 11.

- ***Become involved in your region's long-range water supply planning.***

Inflated projections of population growth and water use tend to drive bigger, costlier, and more damaging water supply and wastewater projects. Support reasonable population growth and water use projections. Support active management of water demands. Promote expenditure of a portion of the large amounts of monies to be saved through reasonable planning on source protection and progressive demand-management programs.

- ***Understand the economics of drinking water.*** In many cases, it is much less expensive to protect the source than to treat polluted water. Source water protection in lieu of costly filtration is a strong motivator for communities. Ten percent of the nation's surface drinking water supplies are still clean enough today that filtration is unnecessary. Source water protection can prevent the need for costly treatment facilities for these high-quality supplies, and can prevent or minimize the need for more elaborate, expensive facilities on the rest.

- ***Include a growth management component in your overall river conservation strategy.*** As long as sprawl growth or spread development (sprawl without population increase) occurs on the edge of metropolitan centers, the quality of many existing and potential water supplies will be threatened. Make sure to incorporate a groundwater management strategy in your overall river conservation program—regardless of its name or structure. If other organizations in your area are already working on this issue,

form alliances with them. If not, consider convincing one or more to work on it with you, or to serve as a catalyst for the formation of a new group that will.

- ***Build a balanced program.*** Promote source water protection programs not only for their value to provide safe and affordable drinking water, but also because these programs can provide other significant benefits to your community—such as wildlife habitat, open space, recreation, and flood management. In other words, promote the full range of benefits of river health, including ***but not limited to*** safe drinking water. Build alliances with other river groups. Be a champion for wild rivers, including those outside your watershed—even when it may be outside your own river group's mission statement. Rivers stay within their watershed boundaries, but river issues do not. Work with your colleagues in river conservation to ensure good management of existing water supply rivers ***and*** the highest degree of protection possible for the rest.

## Conclusion

Far too many people still do not know what the term "watershed" means. Of those who do, many do not regard "their" watershed as the one *in* which they live, work and play, but rather as the one *from* which their city pipes its drinking water.

The future of river conservation depends on our ability to change this. The public's strong interest in safe drinking water provides an excellent basis for building support for rivers. Promote the "watershed to water tap" message. As our voices join in chorus, our collective ability to conserve drinking water supply rivers—and, ultimately, ***all*** rivers—will grow. ◀

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*Rita Haberman is a watershed program manager at River Network and coeditor of River Voices.*



*Promote the "watershed to water tap" message. As our voices join in chorus, our collective ability to conserve drinking water supply rivers—and, ultimately, all rivers—will grow.*

## A Well-Kept Secret: Potentially Powerful New Tools for River Conservation in the 1996 Safe Drinking Water Act

by Erik D. Olson

When the new amendments to the Safe Drinking Water Act (SDWA) were approved by the U.S. Congress and signed into law by President Clinton on August 6, 1996 (Public Law No. 104-182), many environmentalists were shocked that the anti-environmental 104th Congress was allowing this new law to be enacted. The law was passed in a belated attempt to salvage this Congress' well-deserved reputation for extremism, but little has been written about the key improvements in the new law. Clearly, the source water protection in this law is not comprehensive (perhaps that will come with the next Clean Water Act amendments). However, there are several new tools in the new law that activists could use to fortify protection for our rivers and other source waters across the country.

Tap water contamination is a serious health concern in the United States, and the prevention of polluted drinking water as a public health measure is one of the most powerful arguments available to the advocates of river protection.

Scientists from the Centers for Disease Control (CDC) unofficially have estimated that contaminated tap water in the U.S. causes sickness for more than 900,000 people each year and results in approximately 900 related deaths. Experts with the Environmental Protection Agency (EPA) and academic scientists say actual numbers may be substantially higher; they estimate that 7.1 million water borne disease cases each year are caused by contaminated tap water. Recent studies by academic and government scientists show that chemical contamination of tap water also contributes substantially to cancer and other illness rates in the U.S.<sup>1</sup>

### Learning the SDWA Lingo

Currently, the EPA first establishes a Maximum Contaminant Level Goal (MCLG) for each contaminant, which is strictly health-based and not enforceable. Under the new Act, the EPA must consider children and other vulnerable subpopulations while establishing the MCLG.

Next, EPA establishes an enforceable Maximum Contaminant Level (MCL), at a level as close to the MCLG as is "feasible," taking treatment costs and certain health benefits into consideration. If EPA finds that it is not feasible to monitor a water contaminant (such as viruses), the agency specifies a "Treatment Technique," which water systems must use to remove that contaminant, rather than setting an MCL for the contaminant. EPA has established enforceable standards for 84 contaminants, with the majority being controlled under MCLs rather than Treatment Techniques.

The one Treatment Technique that is of major consequence for those interested in protection of rivers and other source waters is the so-called

"Surface Water Treatment Rule" (SWTR). The SWTR states that all public water systems using surface water (or groundwater under the direct influence of surface water) must show they have adequately protected their source water and that their water is consistently of very high quality in terms of bacteria and parasites like *Giardia*, or they have to filter their water through sand or a similar substance to prevent contamination of tap water with dangerous microbes.

Congress didn't really tamper with this provision in the 1996 law, but did require EPA to update the SWTR to consider *Cryptosporidium* ("Crypto") and other microbe threats. They also added a provision clarifying that truly pristine watersheds in consolidated ownership that have very high quality water can qualify for the "avoidance of filtration" so long as health is protected, in some cases through addition of better disinfection (such as using ozone as a primary disinfectant instead of chlorine, since ozone kills Crypto and chlorine doesn't). ◀

The EPA is the lead federal agency overseeing implementation of the SDWA, but in all states (except Wyoming), the state has "primacy" or primary responsibility of administering the law. In many states the law is administered by the state health department, not the natural resources department. A few states have shared responsibility among agencies. As you might expect, most state health departments do not have a river and watershed conservation perspective while implementing the SDWA. At

the same time, the new law presents a rare opportunity for informed citizens to shape the new SDWA program in a way that could have tremendous benefits for the health of our rivers and watersheds AND provide a more cost effective alternative to building more and more multimillion dollar facilities to filter and treat our drinking water.

The new SDWA creates a drinking water **State Revolving Fund** (SRF), authorized at \$1 billion/year (Section 130); it was just capitalized

There are several new tools in the new law that activists could use to fortify protection for our rivers and other source waters across the country.



with \$1.275 billion to start with in FY97. This new SRF for the SDWA is modeled after the SRF for the Clean Water Act. There is also a provision in the new law to integrate these two SRFs. States will be allowed to move money back and forth between the Clean Water Act SRF and the SDWA SRF (up to 33% of the dollar amount in the SDWA SRF). How states plan for this significant influx of money will set the stage for how source water protection (and its associated potential benefits to the health of our rivers) will be implemented state by state. Some of the major new tools for river protection available under the SDWA as it was updated in 1996, include:

**State Source Water Quality Assessment Programs (Section 132)** - EPA is required to issue guidance for state source water assessment programs by August, 1997. These programs will delineate the boundaries of source water for water systems, and identify sources of regulated and state-designated high risk unregulated drinking water contaminants in those watersheds or source waters. States must receive EPA approval of a source water assessment program within 18 months after EPA issues the guidance (state programs are automatically approved if EPA doesn't disapprove them within 9 months), and states must assess the source water of water systems within the following two years. If the state fails to carry out the program, it will not be eligible for source water protection grants, and water systems in the state will not be allowed new provisions authorizing monitoring flexibility. While the law says primary states "shall" assess source waters, EPA has not yet taken a position on whether it can withdraw drinking water primacy from a state failing to adopt a source water assessment program.

River and watershed citizen groups should get involved now in efforts to:

- (1) encourage the EPA to adopt strong source water assessment guidance—call Roy Simon, at U.S. EPA-OGWDW (4606), 401 M Street, SW, Washington, D.C., 20460 (Email: [simon.roy@epamail.gov](mailto:simon.roy@epamail.gov)); and
- (2) find out what state agency administers the SDWA in your state (by calling EPA at (800) 426-4791), encourage them to take this program seriously, and make sure they create ample opportunity for public involvement.



**Grants for State Source Water Quality Assessments (in FY 1997 only)** - states are authorized, to use up to 10% of their SRF grant allotment to delineate and assess source water protection areas. Therefore, it is important to encourage state agencies to use 10% of the SRF allotment for 1997 to do source water assessments and delineations. The funds can be spent over the course of several years, but must be set aside by September, 1997.

**State Source Water Protection Program Implementation (Section 124)** - a state may use up to 10% of its SRF allotment to "administer or provide technical assistance through source

water protection programs" without fiscal year limitations. It is important to advocate that your state set aside this money for source water protection efforts.

**Loans for Water System Activities to Protect Source Water** - loans can be made to water systems to acquire land or conservation easements to protect source water and to implement "voluntary, incentive-based" measures to protect source waters (to a maximum of 15% of the state's SRF allotment). This provision provides a great opportunity to develop programs to work with private land owners (residential, agricultural, etc.) to protect riparian corridors along source water rivers. In addition, grants may be made for any activity that "will facilitate compliance with" EPA's MCLs or Treatment Techniques (see sidebar on page 8) or will "otherwise significantly further the health protection objectives" of the law—including source water protection. Loans may be low or zero interest, or essentially converted to grants, in "disadvantaged communities."

**Source Water Protection "Petition" Program (Section 133)** - states are authorized to establish a program to receive and approve petitions from water systems or local governments to assist in the development of "voluntary, incentive-based partnerships" for source water protection. These partnerships are to include local officials and other people (including active local watershed groups) in the delineated source water area likely to be affected by the source water program. These partnerships are to identify pollution sources, seek resources to help address the pollution problems, and find any information gaps that prevent solutions. Grants totalling \$5 million are authorized for such partnership programs, and up to

10% of the state's SRF allotment can be used to respond to petitions.

During the legislative debate, most environmentalists expressed the view that this petition program (largely drafted by the agribusiness lobby) was unlikely to be used. Many urged that it be dropped since it was likely to be useless. Some suspected it was intended as a ruse to avoid a regulatory program in some source waters. That fight, however, was lost, so we all now must hope that some good may come of this. Still, we believe that the broader, more discretionary state source water funding mechanisms are more flexible and more likely to be usable for meaningful source water protection activities.

**Surface Water Treatment & (Hopefully) Source Water Protection Rule (Section 102)** - as noted earlier, EPA has a long-standing rule referred to as the Surface Water Treatment Rule (SWTR) that requires water systems to show that their surface waters are protected and have very high quality water, or they must filter their water. These SWTR provisions already have been used by citizen groups in New York and elsewhere to drive water utilities to improve and maintain their watershed protection programs, under threat of having to spend large amounts of money to retrofit water treatment plants with filtration. Under the 1996 SDWA amendments, EPA must update and strengthen these rules in order to protect the public from *Cryptosporidium* and other parasites and microbial threats. This presents an important opportunity for river and watershed groups to urge EPA to adopt stronger pollution prevention and source water protection measures as part of this rule.

**Right-to-Know About Your Tap Water, Source Water (Section 114) and its Polluters** - one of the crown jewels in the new law is the new Right-to-Know provision, which requires EPA to issue rules within two years requiring water utilities to notify their customers at least

annually of facts "including but not limited to" the source of their water and contaminants found in their tap water. Explanations about health effects must be included for any contaminant for which there was a violation, and for up to three additional regulated sources of contaminants present, even if there was no violation. EPA's authority to go beyond these basic minimum requirements gives the agency the ability to require water systems to notify their customers of the sources of contaminants in their tap water—a potentially powerful tool to help spur pollution reduction in their watershed. Each year, this report must be mailed to every customer in water systems serving more than 10,000 people. For systems serving fewer than 10,000 people, the report may be published in local papers. This requirement could revolutionize most Americans' understanding of drinking water quality, and it could become a powerful tool to mobilize citizen support for river and watershed conservation.

River and watershed groups need to insist that the EPA require water systems to identify and inform their customers about the known or suspected sources of contaminants in their source waters.

**Water System "Capacity" Building Provisions (Section 119)** - provide potential new incentives for source water protection. These measures will require states to prevent the creation of new small water systems that cannot support themselves economically and comply with health standards. The law also requires states to review and remedy problems at existing water systems that have consistently suffered from water contamination violations, and small struggling water systems. States are required to take steps to build capacity through grants, training, technical assistance, and other means to make water safer at these ailing small systems. If aggressively implemented, these

measures could both reduce the tendency toward ill-planned sprawl, and force the consolidation and restructuring of troubled small systems—both actions that could be used to encourage more intelligent planning for water systems and their potential pollution sources in watersheds.

## Conclusion

While of course none of these provisions is a "magic bullet," all of them will lead to incremental improvements. The new Safe Drinking Water Act presents important opportunities and new machinery for river and watershed conservation organizations to strengthen the protection of our rivers in order to better protect our tap water and public health. Get informed and involved.

Contact EPA's Drinking Water Hotline for state agency officials in your state responsible for implementing the new SDWA at (800) 426-4791.

For other citizen organizations in your state working on SDWA, contact Anne Shimabukuro at NRDC at (202) 289-6868 and River Network at (503) 241-3506.

For more information about the Campaign for Safe and Affordable Drinking Water, contact NRDC at (202) 289-6868.

See page 25 for online SDWA information. ➔

## Endnote

<sup>1</sup>For a review, see, e.g. NRDC, USPIRG and CWA, *Trouble on Tap* (1995).

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*Erik Olson is a senior attorney with the Natural Resources Defense Council in Washington, D.C. He serves as coordinator of the Campaign for Safe and Affordable Drinking Water, an alliance of more than 300 groups.*

# Watershed Groups and Water Utilities Work Together

by Jack Hoffbuhr

**T**he American Water Works Association (AWWA) is a 55,000-member organization dedicated to safe and sufficient water for all people, with municipal drinking water as its primary focus. Members include water supply utilities, consultants, academicians, and manufacturers in the water supply community. AWWA serves as a forum for its members and a source of information and education.

## An Ounce of Prevention

Source water protection is important to all water supply utilities. The practical consideration is that the more polluted a source of water becomes, the more costly and difficult it is to treat the water. To the consumer, this means more costly water bills.

The dilemma is that very few (less than 1%) water utilities own significant portions of the land that water flows over (the watershed) to reach rivers or aquifers from which drinking water is drawn. Not only do they not own the land, water utilities are not the agency that makes or enforces the laws governing land use. For example, if the dry cleaner down the street is dumping dry cleaner fluid into the storm drain that connects to the river where drinking water comes from, the water utility has no control over policing the business. Making the polluter pay is not always possible or enforceable.

## Economic Incentives

Sometimes it takes economic incentives to help keep source waters safe. In the case of a farmer applying pesticides to his crops, to ask the farmer to stop applying pesticides, or to take half of his land out of production to make a filter buffer along a river may not be a realistic option for the farmer. A cooperative arrangement with an economic incentive has a better chance to persuade the farmer to change his actions, and to keep the source water free of pesticides.

New York City has had success with economic incentives in their watershed protection efforts. In recent federal legislation, up to \$15 million per year through the year 2003 is authorized for demonstration projects that protect and enhance New York City's watershed. This is in addition to millions already spent by the city for purchasing land and funding protection efforts in the watershed. In addition to incentives for existing landowners to "do the right thing," there are also incentives for cases where severe pollution is occurring from abandoned businesses, such as old mining sites.

## Common Goals

The common goal shared by water utilities and river organizations is protecting water quality in rivers. The common challenge is influencing the landowners and land use regulators to adopt practices that will make a difference. AWWA's recommendation is for voluntary partnerships to be formed on the national and local level involving river groups, utilities, and all organizations having a common vision to work collectively for change.

The beginning steps of River Network's "Basic Elements of Local Watershed Conservation Plans" (*River Voices* Fall/Winter 1995) are almost identical to AWWA's "Elements of a Source Water Protection Program." These activities include: delineate the watershed boundary, inventory and characterize water sources, identify pollution sources and relative impacts, establish source water protection goals, and develop strategies.

By working together, the time, energy, and cost of common activities can be shared.

## Win-win Relationships

River organizations and water utilities have a lot to offer each other by forming partnerships.

Water utilities:

- Have water quality testing laboratories and in most cases have data concerning the quality of the water supplies.
- Can supply information concerning: the source of a customer's tap

water, the risks and costs of not protecting water supplies, and identification of pollution problems a water system is currently facing.

River Organizations:

- Can play a public advocacy role.
- Organize volunteers for citizen support and action.
- Vote. This means election of city councils, county commissioners, state representatives, federal representatives, etc. that have source protection high on their agenda.

For more information about how river and watershed conservation groups can cooperate with water utilities, contact AWWA:

6666 West Quincy Avenue

Denver, CO 80235

(303) 794-7711, <http://www.awwa.org> ➔

*Jack Hoffbuhr is executive director of the American Water Works Association.*

## Mississippi River Basin Alliance: Organizing Techniques for Safe Drinking Water

by Suzi Wilkins

This fall, the Mississippi River was number one on the list of the nation's most polluted rivers. Approximately one-half of the 1.5 billion pounds of toxics reported discharged directly into U.S. waters between 1990-1994 were discharged into the Mississippi—702 million pounds.

About 18 million people in the Mississippi watershed drink this river water; of that number, 4.2 million receive their water supply directly from the mainstem of the Mississippi.

Sobering facts.

### Working on Two Fronts

Most people have no idea where their drinking water comes from and what kinds of “nasties” their water contains; nor do they know what kind of additives their local water company dumps back in for the next downriver community to “enjoy.”

For the Mississippi River Basin Alliance, these numbers serve as a powerful organizing tool. Indeed, we need to attack pollution on two fronts:

- we must prevent pollution—both point and nonpoint sources—from entering our river; and
- we must treat the water adequately when it arrives at the municipal water company's intake pipe.

### Using the Numbers

The Alliance employs a variety of tools to help identify the sources of pollution for drinking water in the basin. One tool is the EPA's Toxic Release Inventory (TRI). While the agency's data is not current (1994 is the most recent data available), it can help to identify some point source problems. The TRI also does not cover all toxic dischargers. More than 90% of dis-

chargers are exempt from TRI reporting, including sewage treatment plants, mines, utilities and municipal incinerators. Similarly, EPA requires reporting for only 5% of toxic chemicals used commercially in the U.S. (340 out of 73,000). Thus, citizens can use the TRI numbers to a limited extent to identify some point source pollution generators and confront specific culprits.

A second useful information tool is the reports generated during the past few years by the Environmental Working Group, an environmental research organization based in Washington, D.C. These reports include *Tap Water Blues: Herbicides in Drinking Water* (1994); *Weed Killers By The Glass: A Citizens' Tap Water Monitoring Project in 29 Cities* (1995); and *Dishonorable Discharge: Toxic Pollution of America's Waters* (1996). The first two reports cover nonpoint source pollutants—such as herbicides and pesticides—for which monitoring and reporting is inadequate. The latter contains a five-year (1990-1994) compilation of TRI information, nationwide and state-by-state.

Every spring, farmers across the Midwest Corn Belt apply 150 million pounds of five herbicides—atrazine, cyanazine, simazine, alachlor, and metolachlor—to their corn and soybean fields. And every spring, rains wash a substantial portion of those chemicals into the drinking water of 11.7 million people in the Midwest states and Louisiana.

As of yet, there are few “magic bullets” to reduce nonpoint source pollution. The EPA has no regulatory authority over this source of pollution. During the next decade, one of the big challenges will be to look at both regulatory and non-regulatory ways to reduce poison from entering our water bodies.

### Getting the Facts Out

Being armed with good information can set the foundation for a strong education campaign. Clearly, all media are not sympathetic to pollution stories. Although there are some reporters who do not want to put their largest employer(s) in a bad light or blow the whistle on inadequate municipal water supply treatment, there are many reporters who relish environmentally

focused stories. Reliable facts and figures will help sell the story.

Using both local and national media can be very successful. In the summer of 1995, the Mississippi River Basin Alliance secured 10 of our member groups throughout the watershed to undertake tap water testing for cancer-causing herbicides. The testing, which was conducted at Iowa State Hygienic Laboratory, revealed widespread contamination of public tap water. The Environmental Working Group

included the Mississippi results, along with those from 18 other locations nationwide, into their *Weed Killer by the Glass* report. A series of local press events were held throughout the basin



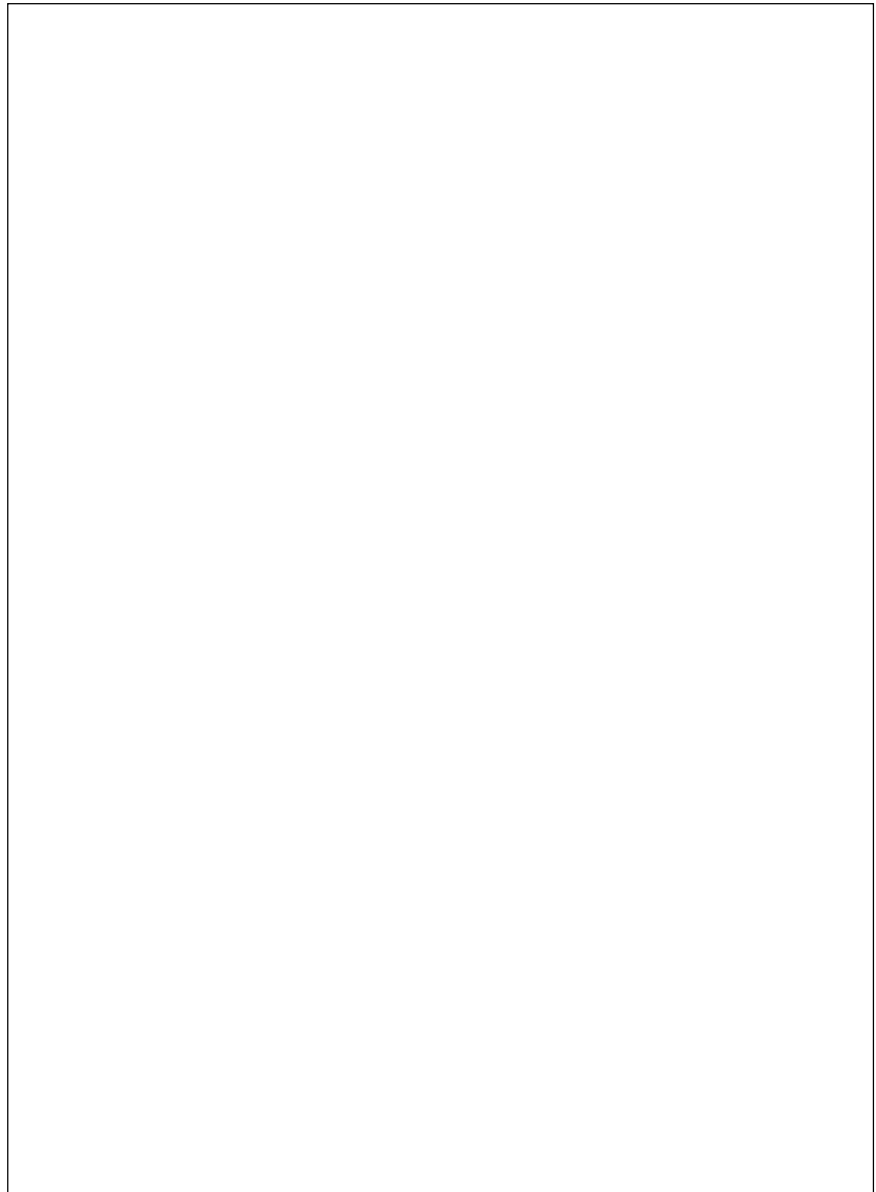
**Being armed with good information can set the foundation for a strong education campaign.**

on the same day that EWG held one in Washington, D.C. Because of the national coverage, local press were able to use the national figures and put a local spin on the story by demonstrating how local municipalities measured up (i. e. whether local herbicide contamination levels exceed federal quality standards).

## Making Changes

A strong public awareness effort can lead to both state and federal policy work. On the state level, one weed killer tester took her information to the state of Iowa when it considered weakening its state herbicide standards. Armed with her data on the pesticide levels in Omaha's drinking water and the health hazards for herbicides, her testimony helped maintain the existing standards. On the national level, the report and public education laid solid groundwork for the subsequent reauthorization of the federal Safe Drinking Water Act.

Working directly with the municipal treatment facility is also important. Their number one goal is to provide safe, adequate drinking water for their customers. These water providers will often take great lengths to "clean up" their raw water by weekly dumping thousands of pounds of chlorine or granulated charcoal to kill or bind pollutants. They do this with little regard to what is discharged and sent downriver. The new Safe Drinking Water Act contains a new provision that requires local water providers to report the quality of their product in simple terms to their customers. This new provision offers excellent opportunities for citizens to work with their water companies to insure that the appropriate information included represents an



*The reports published by the Environmental Working Group in Washington, D.C. are powerful organizing tools for effective public education campaigns.*

"average" water quality sample rather than the best one for the year!

Our nation's drinking water supply is vulnerable, and we must work to educate consumers about this commodity we all take for granted. 🐟

*Suzi Wilkins is executive director of the Mississippi River Basin Alliance. The Alliance is a network of more than 75 conservation and environmental justice organizations.*

# The Ground/Surface Water Connection:

## *Drinking water source protection involves both*

by Paul Jehn

Promoting the value of rivers as drinking water sources is becoming an increasingly important strategy among river and watershed conservation organizations. While building this case, though, it is important to understand the common types of source water supplies: surface water and groundwater. The purpose of this article is to help grassroots river and watershed conservationists better understand the often interconnected relationships between groundwater and surface water, and apply those concepts in a watershed approach to protect drinking water and the health of our rivers.

### Significance of Groundwater and Historical Neglect

First, some background information is needed. Groundwater comprises more than 97% of available fresh water supplies. On the average, groundwater supplies approximately 40% of the streamflow in this country (U.S. EPA 1990). In some parts of the country and during certain seasons of the year, groundwater can account for 90%-100% of streamflow. Approximately 50% of drinking water in this country is supplied by surface water. In reality, most drinking water systems are influenced by both ground and surface water.

Groundwater and surface water are integral and related components to the hydrologic cycle (figure 1), yet these resources are often managed by different programs in federal, state and local agencies, where protection of one resource may have been achieved at the expense of the other. As a result, in some cases the quality of surface water has been improving during the past 20

years, while the quality of groundwater has been declining.

Part of this is due to the difficulty in quantifying groundwater influences on surface water—many watershed management activities still do not incorporate groundwater protection.

A few examples illustrate this point. Some of the common urban runoff management practices recommend disposing of stormwater runoff into shallow drain wells. This practice often merely transfers the

pollutants to groundwater, and subsequently to surface waters. In another example, many point source dischargers, permitted under the Clean Water Act, are using holding lagoons and settling basins before discharging wastewater to surface waters. Again, many of these holding lagoons are merely percolation ponds that transfer the pollutants to groundwater. One more example is that many models used to determine “total maximum daily loads” of pollutants do not factor in the contribution of pollutants from groundwater. As a result, a disproportionate emphasis is placed on surface water source contaminants when groundwater source pollutants may also contribute significantly to the system, as has been the case with nitrates.

### Source Water Protection and the Watershed Approach

Source water (drinking water) protection can be made an integral part of the watershed approach to river

conservation, but first an understanding of the protection needs of three common types of source water supplies is needed (See Figure 2, page 17). Three common types include:

- 1) drinking water received from a groundwater supply that is not dependent on streams or lakes for recharge but is recharged by precipitation infiltrating through the soil column;
- 2) drinking water received from a surface water supply influenced by groundwater; and

- 3) drinking water derived from groundwater with surface water recharging the wellhead protection zone.

Watershed protection requires an integrated and holistic approach to program management. Source water protection contains many of the same elements as watershed protection, but focuses on a much smaller area (or subwatersheds) that contribute to drinking water supplies. Successful source water protection requires the integration of

traditional groundwater and surface water protection efforts with programs such as: emergency response, hazardous materials handling and storage, land use planning, and pollution prevention. Depending on the area, source water protection may involve wellhead protection, surface water reservoir protection, or river and stream protection. In reality, most source water protection areas will be a combination of at least two of these protection activities.

*Depending on the area, source water protection may involve wellhead protection, surface water reservoir protection, or river and stream protection. In reality, most source water protection areas will be a combination of at least two of these protection activities.*

Figure 1:

# The Hydrologic Cycle

Source: Council on Environmental Quality, 1981, Washington, D.C.

## Three Common Types of Source Water Supply Systems

### 1. Groundwater Source

This is the type of water supply we typically think of when we refer to wellhead protection. Research has shown that in many areas of the country, public and private groundwater drinking water sources continue to degrade in quality. This degradation is a result of accidental and intentional spills and dumping and sometimes the incidental disposal of hazardous chemicals resulting from lack of knowledge of the groundwater contaminant potential. Some communities, such as Dayton, Ohio, are restricting the amounts of hazardous materials that can be stored within a wellhead protection area. Some of these same municipalities also post signs in

wellhead protection zones and provide special training to emergency responders to spills. Zoning overlay districts are also being used to attract groundwater-friendly businesses to locate in wellhead protection zones.

### 2. Surface Water Influenced by Groundwater

This is perhaps the most dramatic example of groundwater and surface water interaction. In many alluvial valleys and floodplains, this is a constant interaction. States are in the process of developing criteria for the delineation of surface water source protection areas. These areas include the obvious areas upstream of the surface water intake and the not so obvious areas of groundwater contribution to the system. Table 1 provides a summary of some of the criteria developed by states to delineate

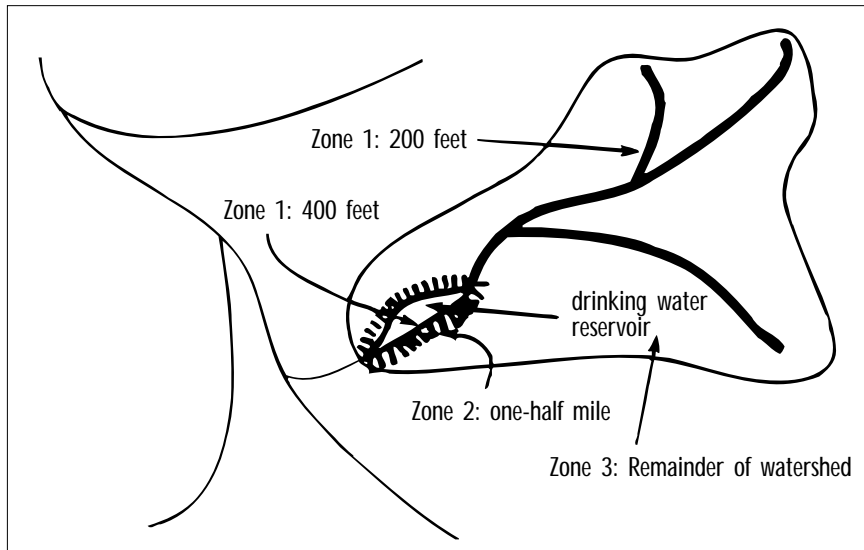
the areas needing special protection for these surface water supplies.

An example of a good statewide program is the Massachusetts Department of Environmental Protection (DEP) which developed criteria for the protection of surface water supplies. These criteria place restrictions on land use activity within the drinking water subwatershed. The intent is to prevent contamination from all types of surface activities that have the potential to contaminate either groundwater or surface water. The proposed regulations would prohibit activities such as underground storage tanks and hazardous waste treatment storage and disposal in Zone 1 (200 - 400 feet from the upper boundary of the bank of a surface water source). Zone 2 (one-half mile upgradient of Zone 1) would prohibit activities such as landfills and hazardous

Table 1: Surface water delineation criteria for source water protection

State	Zone 1	Zone 2	Zone 3
Delaware, New Castle County	All land surfaces in the 100-year floodplain located upstream of a public water supply intake	Erosion-prone slopes (greater than 15% grade)	Areas that drain on the surface or underground to public water supply reservoirs
Massachusetts	200-400 feet from the stream bank	one-half mile from the stream bank	the remainder of the watershed
Utah	Minimum protection area defined as 300 feet on either side of drinking water source streams for a distance of 15 miles upstream of a public water supply intake.		
Connecticut	Land within 250 feet of a reservoir or public water supply diversion or land within 100 feet of a tributary stream.		

Figure 3: Source water subwatershed criteria as proposed by MA DEP



waste treatment, storage and disposal facilities, and Zone 3 (the remainder of the subwatershed) would prohibit the siting of radioactive waste disposal facilities.

### 3. Groundwater Being Recharged by Surface Water

In many cases, drinking water wells which are completed in shallow alluvial aquifers are influenced by surface water. Some of these wells actually draw from

the hyporearic zone (that area of the river and sediments where there is constant interchange of water). Other examples include infiltration of precipitation or the direct discharge of storm water into shallow drainage wells in these same aquifers.

Pekin, Illinois, is one example of a community dependent on groundwater recharged by surface water that has developed a successful source water protection program.

The city determined that if one of the well recharge areas in their wellfield was contaminated, it would result in a loss of 5-7 million gallons of production supply. Treating groundwater would cost about \$4 million. It would cost approximately \$15 million to build a surface water treatment plant, and the alternative, contaminated surface water, would deter further economic development.

Pekin's drinking water wells draw from a homogeneous, unconfined sand and gravel aquifer recharged in part by Arlen Lake, which is the typical two to three year time and travel of the wellfields. Land use activities in the source water protection area include residential, commercial, industrial and recreational. The primary industrial activities in the area are automotive repair shops. Endothall, an algicide used in surface water, has been detected in the Pekin municipal wells.

Three key techniques Pekin has used to protect source water include:

- Developing an ordinance to restrict algicidal use in the surface waters which are in the wellfield recharge areas, and include surface water protection in its wellhead protection plan.
- Organizing two pollution prevention workshops: one for the businesses in Pekin and a second to provide technical assistance to automotive repair shops that are the largest business type located within the recharge areas.
- Amending the existing ordinance (which requires certain best management practices for existing potential contaminant sources) to create a new overlay zoning ordinance with special/conditional use permits in the commercial and industrial zoned parcels within the well recharge areas.

### Steps for Developing a Source Water Protection Program

Successful source water protection programs can be viewed as a progression of five main steps:



1) Delineation: Where is the drinking water source for the community coming from?

2) Contaminant Source Inventory: What activities in this identified recharge area have the potential to contaminate drinking water?

3) Source Management: What programs are needed to manage the sources of contamination?

4) Projected Future Activities: What are the projected future activities in the source water recharge area that have the potential to contaminate drinking water?

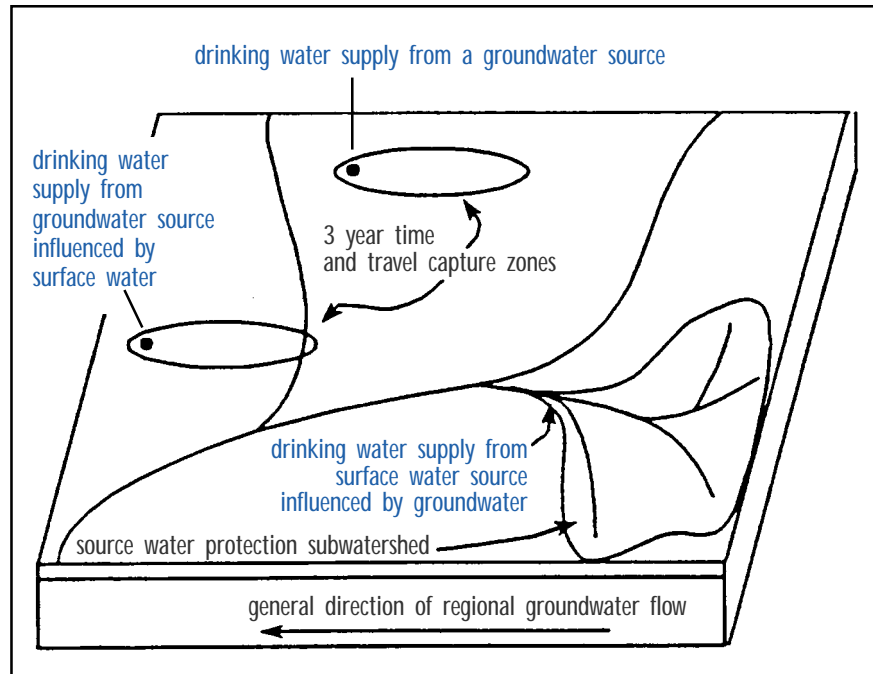
5) Public Ownership: Creating public ownership by involving all stakeholders in the process. Successful programs must go beyond the traditional state and federal requirements, and include special management practices specifically tailored for the identified source water recharge area. Often, comprehensive watershed and source water protection can be achieved by re-prioritizing existing programs. Other approaches will require more emphasis on local program development. Both regulatory and voluntary programs can be effective at source water protection. Whatever the approach taken, most successful programs involve all stakeholders (e.g., federal state, local governments, industry, and citizen interest groups) in the decision-making process.

## Conclusion

All three examples of source water protection (drinking water derived from groundwater, surface water or a combination) require activities that may be more stringent and focused than is typically used for watershed management.

River and watershed conservation groups should consider focusing on drinking water source protection as a way to protect and restore rivers. However, it is important to recognize

Figure 2: Schematic drawing illustrating three common types of source water supply systems.



and incorporate the often not so obvious connection between groundwater and surface water. Caution must be exercised to avoid pollution trading, which in the short term may benefit one resource at the expense of another, but will eventually come back around in the hydrologic cycle.

The Safe Drinking Water Amendments of 1996 provide water resource managers and grassroots organizations with an unprecedented opportunity to protect drinking water supplies. These amendments represent the first time the Congress has directed the EPA and the states to make groundwater **and** source water protection a priority.

Now, more than ever before, we have some tools to ensure that our tap water is safe and our sources of drinking water (including rivers!) are protected. 🐟

*Paul Jehn is the technical director for the Ground Water Protection Council, Oklahoma City, Oklahoma.*

## Source Water Protection Strategies

Land-use controls (applicable to all watersheds/recharge areas)

- Buffer zones
- Land acquisition
- Comprehensive planning
- Zoning
- Written agreements
- Legal action
- Public information, education, and participation
- Watershed/recharge area inspections



Source: AWWA

# Raccoon River Watershed Project: A Partnership Process for Source Water Protection

by Lisa Henry

Since October 1994, the Iowa Natural Heritage Foundation, the Des Moines Water Works, and six Iowa agricultural based organizations, have been involved in the Raccoon River Watershed Project (RRWP). The RRWP is an alliance striving to speed the voluntary adoption of techniques to protect water quality through demonstrations of environmentally and economically sound practices throughout the Raccoon River watershed in west central Iowa. The results will benefit agriculture, the people of Des Moines, and the river.

## The Raccoon Watershed

The Raccoon River Watershed stretches through 10 counties in northwestern and central Iowa (see map). It is an agricultural watershed that includes about 6,300 farms covering 2.3 million acres of some of the most productive land on earth. Approximately 1.7 million acres are planted to corn and soybeans annually. A strong pork industry is also an important part of the watershed economy with an estimated economic impact of \$675 million in the watershed. Nearly 150 agricultural service dealers provide

agricultural inputs and services throughout the region. The Raccoon River is also the source for the state's largest water supplier, the Des Moines Water Works, serving 270,000 Des Moines residents (one-tenth of all Iowans). Nitrates, chemicals and other pollutants affect the quality and cost of this drinking water.

The Raccoon River watershed used to have many wetlands, which filtered contaminants, including nitrates, from the water. When farmers drained wetlands to expand their farms, that natural filtration system was lost.

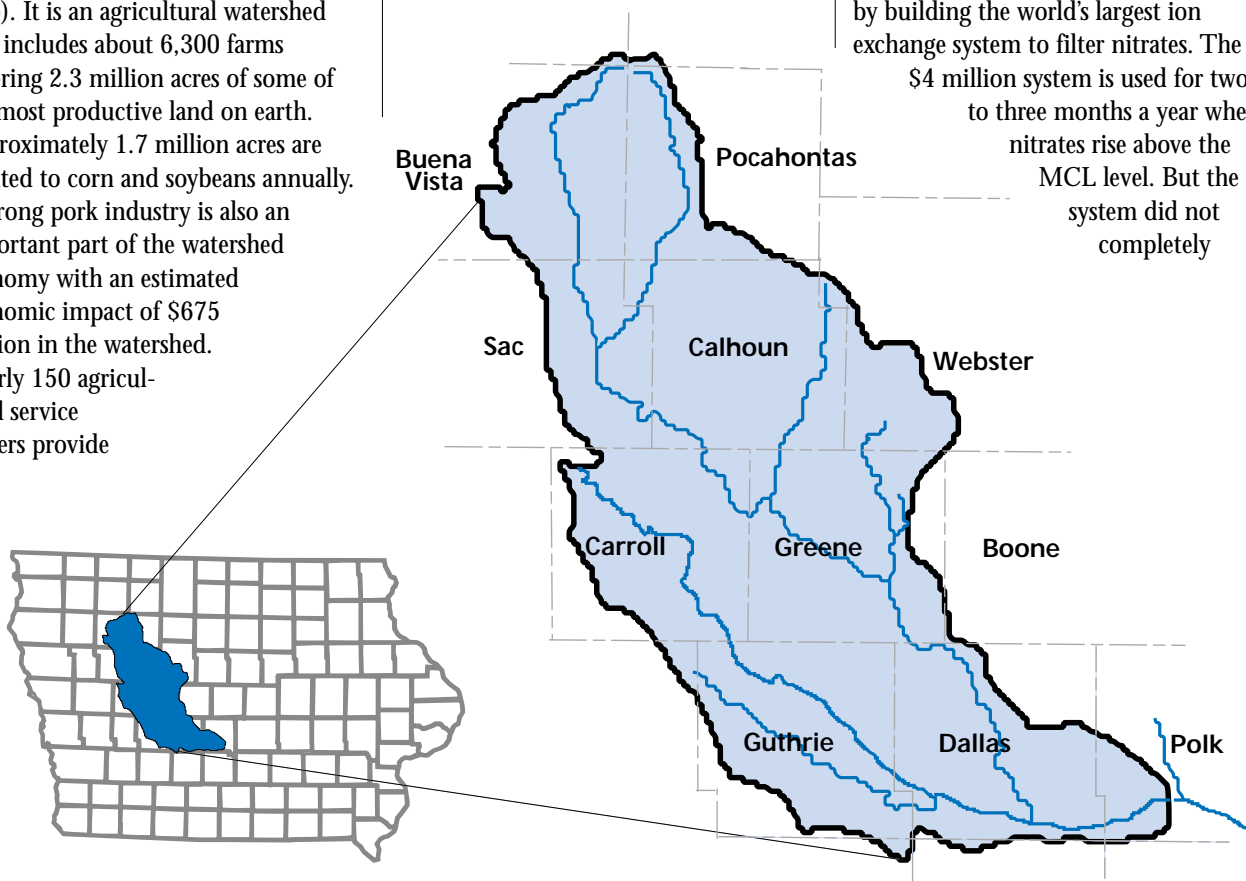
## Convergence of Factors

There was a convergence of factors that led to the formation of the RRWP. Such factors include:

- continued reports of high nitrate levels in the river;
- a preference for source water protection over treatment;
- a preference for voluntary action over regulation; and
- an agricultural community interested in taking a coordinated, proactive approach to address problems.

A 1993 report that appeared in the *Journal of Environmental Quality*, (Lucey and Goolsby) documented nitrate-nitrogen (N-NO<sub>3</sub>) concentrations in the Raccoon River. The report states that the river's water has exceeded the EPA's Maximum Contaminant Level (MCL) for N-NO<sub>3</sub> on a total of 587 days since 1970, 85 days since 1988.

The Des Moines Water Works addressed the nitrate problem in 1992 by building the world's largest ion exchange system to filter nitrates. The \$4 million system is used for two to three months a year when nitrates rise above the MCL level. But the system did not completely



alleviate the Raccoon's nitrate levels, agriculture practices continued to put the MCL levels over the limit.

It was because of continued reports of high nitrate levels in the Raccoon River that a consortium of groups representing agriculture convened the Iowa Nutrient Management Task Force during 1991 and 1992. The mission of the Task Force was to examine, review and develop a comprehensive summary of nutrient management programs and practices important to all Iowans. The goal was to develop a list of needs and best management practices to allow Iowa agriculture to increase its productivity and maintain environmental responsibility into the 21st century. In many ways, the mission of the task force was agriculture's effort to scrutinize themselves, concentrating on economic and environmental evaluation of nutrient use. Perhaps more importantly, Task Force members recognized change is not only inevitable but also holds opportunities for agriculture.

## Funding

Recognizing the significance of the watershed to Iowa's agricultural and environmental future, the Northwest Area Foundation is providing an initial \$554,000 grant. The Northwest Area Foundation is a private regional foundation of St. Paul, Minnesota, which offers grants to promote sustainable development and alleviate rural and urban poverty in an eight-state Upper Midwest and Northwest region. Their interest in funding this project is their belief that facilitating voluntary adoption of proven practices will decrease the likelihood of further governmental regulation and will help farmers in the region remain competi-

tive in the future. The RRWP partners are matching this with in-kind support equaling \$421,000.

## RRWP Objective, Principles and Strategies

The primary objective for the project is to speed the voluntary adoption of proven techniques to protect water quality. Principles supporting the objective include:

- There must be scientific basis for defining problems and solutions;
- The program recognizes that a voluntary approach will be more effective than a regulatory approach;
- Protection must be economically sustainable, recognizing that some measures may improve net farm income; and,
- Farmers must be free to communicate their successes and receive public recognition for their efforts.

The RRWP is using three strategies to achieve its objective, each focusing on the process of meeting the needs of watershed stakeholders. The first strategy is to initiate targeted demonstration projects within the 10-county area. The project helps individuals and local communities by providing technical and/or financial assistance and facilitating initial planning for demonstration projects.

The second strategy utilizes a coordinated partnership approach. The partnership approach uses networks of representatives from government agencies, university researchers, extension, municipal water suppliers,

commodity, farm, agribusiness, environmental and conservation groups. The success of this approach depends on forming new arrangements with groups to achieve mutually beneficial goals by capitalizing on the strengths provided by each partner.

The third strategy is to employ a comprehensive public awareness initiative in which multiple communication methods are used to protect water quality by raising the awareness, knowledge and skills required for farmers as well as other watershed stakeholders. These demonstration projects are key examples of how communities, groups as well as individuals, can be proactive

about protecting water quality. This also provides a mechanism for farmers and others to show their successes and receive public recognition for their efforts.

## Demonstration Projects

The RRWP has sponsored a variety of practices testing for economic and water quality benefits. Throughout 1996, the RRWP established 24 demonstration sites showcasing various practices including stream side buffers, living erosion control dams, natural areas, rotational grazing, the N-CHECK (nitrogen management) program, precision farming and narrow row high population corn (NRHP).

In relation to the RRWP, it is misguided to expect a project, especially of this size and duration, to be able to document any measurable changes in water quality. Realizing this, the RRWP partners have identified that project

*The primary objective for the project is to speed the voluntary adoption of proven techniques to protect water quality.*

*The Cooklin farm in May 1996*

## Landscape Buffer Systems

In Iowa, riparian corridor management and gully erosion remains largely unaddressed. Law-making bodies in the state have been pressed on several occasions to enact legislation requiring the implementation of grassed riparian buffer strips from 16 to 66 feet in width to protect river water quality.

Realizing the potential animosity by landowners that would result from such mandated implementation of buffer strips, the state legislature has chosen not to act upon the proposed mandate at this time. Instead, they have chosen to promote programs to assist landowners in the voluntary adoption of riparian buffer strip installations. In fact, the Iowa DNR is monitoring the progress of the RRWP efforts before recommending further legislative actions.

The RRWP has promoted site-specific design and installation of several landscape buffer systems since the origination of the project. In conjunction with other RRWP programs, the project is confident that, over time, landowners will adopt buffer systems specially suited to their site and production systems.

*The Cooklin farm in October 1996 after 26 acres of buffer strips were put in. The river corridor is to the right.*

*The RRWP has promoted site-specific design and installation of several landscape buffer systems*

The future outlook for landscape buffer systems is very promising. The project is offering an incentive payment to landowners who choose to install buffer strips. The incentive will, in most cases, help to offset the cost to the producer of diversifying Natural Resources Conservation Services

recommended warm season native grass plant mixes. More than 50 acres of buffers will be installed in 1996. Five sites, ranging from a one acre willow post planting up to a 26-acre site including five native grasses and numerous native forbs, are in the process of being established. Project staff document the design, planning, planting and success of these buffers. 'Before and after' presentations will be created to promote the

benefits of buffer systems with producer audiences in the watershed. Additionally, the RRWP is working with the Agro-Forestry Group from Iowa State University to apply the lessons learned from research conducted with the Leopold Center for Sustainable Agriculture. ➤

progress will be measured by evaluating the change in attitudes and behaviors. This type of evaluation supports the assessment of the primary objective of the RRWP, which is to speed the voluntary adoption of techniques that protect water quality. However, in at least one case, the RRWP is hopeful to be able to document the water quality benefits of a particular

practice. The project hopes to establish 5-10 constructed wetland installations that will be located on subsurface tile drainage systems. This site-specific practice will allow the project to measure "before and after" water quality attributes.

Narrow row high population corn has been a popular demonstration partly due to the fact that it may increase corn

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yields by as much as 30% and cut herbicide use by as much as 75%. The NRHP technique uses special corn hybrids developed to thrive in narrower rows and high density populations. Bill Horan, Calhoun County farmer, is actively involved in the RRWP. Horan is experimenting with four acres of NRHP in 7.5-inch rows. This plot was planted at a rate of 47,000 plants per acre.

"If we can show folks we're trying different things and making an effort to farm in a better, more positive way for the environment, it's going to cause fewer rules and regulations to come down that we may or may not want to do and may not be good for the bottom line," said Horan. "Anything we can do as producers to positively impact the watershed is going to be good for us." Horan is also experimenting with RoundUp Ready Soybeans and *Bacillus thuringiensis*, a naturally occurring bacterium which provides reliable protection against European Corn Borer infestation of field corn.

Doug Lindgren, a Buena Vista County farmer, said the demonstration projects the RRWP is involved with offer definite benefits to farmers.

"The demonstrations are positive for the economy and help educate farmers about new practices available to them," said Lindgren. "We're developing a new model for Iowa and the nation. We're at the tip of the iceberg, and I'm very excited to be a part of this project. It was an opportunity to build some bridges with various commodity groups involved and with farmers in the watershed," he continued, "I wanted to take a proactive role.

"Everyone is working together well and we all feel like key players at this point," said Lindgren. He added he feels it is important for all of the RRWP partners to continue to accept the opportunities offered to them in the project.

Roy Bardole of rural Rippey, Iowa, said he would like to see the project

help build more communication and understanding between farmers and urban residents. Bardole farms on land bordering the Raccoon River, and he knows that Des Moines area residents drink that same water. Bardole said he feels obligated to do whatever he can to enhance the river.

"It's unrealistic to say we will eliminate nitrates in the Raccoon River. However, that doesn't mean we can't do a better job of managing our nitrogen use in agriculture," said Bardole. "I want to do everything we can to keep pesticides, excess soil and coliform out of the river. Man introduced these river contaminants to the environment, nitrogen has always been here."

"Whatever we can do to help protect the environment—we better do it," said Bardole.

The RRWP has made substantial strides over the last year to inform residents of the watershed about the producers and residents involved with the RRWP. A primary goal of the project is to recognize farmers for their efforts through press releases, awards programs and magazine articles. This new style of rewarding farmers publicly for all they have done in the past and continue to do has been somewhat of a turnaround from past practices. The RRWP is not run by staff based out of Des Moines, but more accurately is run by residents of the watershed and all that they do to protect and preserve the land and water they make their living on. Cooperators of the RRWP make this project a reality and they deserve the recognition and a pat on the back for their hard work that so many times has gone unnoticed in the past.

## The Challenges

In developing the RRWP, eight project partners invested considerable time laying the foundation for how the project would work. The project partners had to develop the capacity to work together in a coordinated effort.

Early details that needed to be worked-out include: defining mutually acceptable goals and objectives; defining the ground rules for operation and cooperation; and establishing lines of communication. Project partners had to develop a sense of trust while recognizing the sensitivity that may exist when confronting complex intertwined environmental and economic issues.

Once the foundation was set the next step was to sell the RRWP concept to the watershed residents. The success of any grassroots voluntary conservation effort is dependent upon the ability of the local residents taking ownership in the process. Because the process evolved through the leadership of the eight original partners it was important to develop a new mechanism that allowed for grassroots involvement. The RRWP did this by forming a Governing Board which is comprised of citizens from the watershed. The project has to continuously strive to meet the needs of all watershed stakeholders. This requires the project leaders to really listen to the people who have a direct economic interest in the watershed, take advantage of teachable moments and attempt to build capacity for working on watershed management issues.

The partner organizations involved with the RRWP include Agribusiness Association of Iowa, Des Moines Water Works, Iowa Cattlemen's Association, Iowa Corn Growers Association, Iowa Farm Bureau Federation, Iowa Natural Heritage Foundation, Iowa Pork Producers Association and the Iowa Soybean Association.

For more information about the RRWP, contact the project office at (800) 797-4322. ➡

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*Lisa Henry is the communications director for the Raccoon River Watershed Project. Her primary objective is to interview farmers and producers, promoting their voluntary adoption of environmentally sound practices.*

# Protecting Public Health Can Also Help Rivers

by Daniel A. Okun

Wherever we live and work, we contribute to degradation of water in some watershed. Because it is not economically feasible to keep all water pure, the philosophy for managing water quality has been to protect water for its best uses, ranked by regulatory agencies in accordance with the impact of their quality on public health: Class A: Drinking Water; Class B: Bathing Waters; Class C: Maintenance of Aquatic Life.

The passage of the Clean Water Act in 1972 was designed to make the nation's streams, rivers, lakes and coastal waters "fishable and swimmable"; however, the Act said nothing about the water being "drinkable."

Drinking water was not addressed until 1974 with the passage of the Safe Drinking Water Act (SDWA). This landmark legislation was sparked by the finding of numerous synthetic organic chemicals (SOCs) in the Mississippi River. The law placed responsibility for drinking water quality on EPA. Chlorine, the chemical that was largely responsible for assuring that drinking water would no longer cause typhoid

fever or other enteric diseases, was found to react with organic matter in the water to form trihalomethanes (THMs), some of which were believed to be carcinogenic. To reduce the formation of these disinfection by-products (DBPs), it became necessary to reduce the organic precursors in the water sources. Furthermore, the number of contaminants regulated has increased from 23 in 1962 to 84 today, with more to be added in the future.

In the 1980s waterborne outbreaks of giardiasis began to appear in unfiltered water supplies. Giardiasis is a diarrheal disease caused by the cysts of a protozoa, *Giardia lamblia*, discharged by warm-blood animals. Even more serious was the emergence of waterborne outbreaks caused by the oocysts of *Cryptosporidium parvum*, ingestion of which can be fatal to immuno-compromised individuals.

The most serious waterborne outbreak in modern history occurred in Milwaukee, Wisconsin, in 1993, when more than 400,000 cases of cryptosporidiosis were reported—almost the entire population drawing water from one of two sources in Lake Michigan. More than 4,000 people were hospitalized and approximately 100 people died.

These chemical and microbiological risks led to the 1986 and 1996 amendments to the Safe Drinking Water Act aimed to reduce health risks from the ingestion of both surface and groundwaters. It is not happenstance that in today's political climate, the SDWA was reauthorized while the Clean Water Act (CWA) was passed over. Public health now enjoys a higher priority with the public than the environment. Surface waters, which provide water for 63% of the total population served by public water supplies in the U.S., pose the most difficult problems. Surface waters are generally more vulnerable to pollution and contamination from urban, industrial, and agricultural development, than groundwater.

## Source Water Protection Gains Attention

More attention is being focused on preventing water source contamination rather than relying solely on treatment. One of the most important ways to protect water sources is to control development within the watershed. Land use planning and control involve regulating the density, location and types of development, and mitigating the effects of development. This involves the application of zoning to watersheds that provide community water supplies. Land use controls are critical but controlling the impacts of development is also important. Two frequently used tools are:

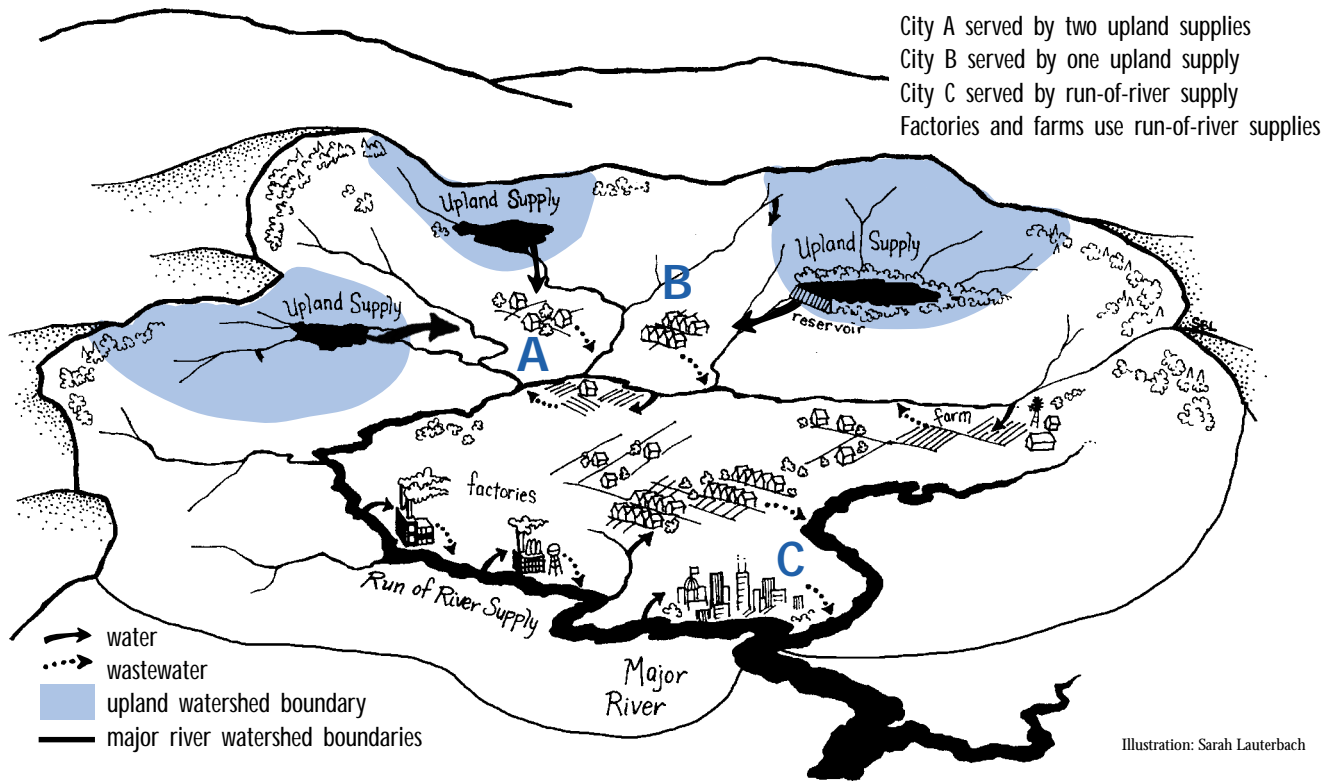
- Regulating the use of chemicals within watersheds; and,
- Constructing buffers and local detention ponds to reduce pollution from stormwater runoff.

## No Guarantee on the Technological Fix

The U.S. Environmental Protection Agency's Primary Drinking Water Regulations state: "Production of water that poses no threat to the consumer's health depends on continuous protection. Because of human frailties associated with protection, priority should be given to selection of the purest source."

This principle was often ignored because water treatment technology, specifically filtration and chlorination, was thought to provide safety. Such treatment had ended the epidemics of typhoid and other diarrheal diseases that, until the early 1900s, plagued the cities that drew their water supplies from sources such as the Mississippi, Ohio, and Delaware Rivers. However, this technology is no longer a guarantee of safety where sources are polluted.

Conventional treatment does not address trace chemical contaminants that may be present in water. The oocysts of *Cryptosporidium* are not inactivated by chlorine, which is of considerable concern because they are ubiquitous where animal and human wastes are present. Waters that meet current drinking water regulations do not yet address *Cryptosporidium* because of difficulties with monitoring for the oocysts, which have been responsible for waterborne outbreaks of cryptosporidiosis and also may be responsible for many of the cases of other diarrheal diseases of unrecognized etiology. ➤



Drinking water protection relies on the adequate implementation of the CWA and the SDWA, but this has been difficult to accomplish. The CWA addresses the control of urban and industrial wastewater discharges, although its regulations are seldom integrated into regulations promulgated under the Safe Drinking Water Act. The two acts are administered separately by EPA and by most state regulatory agencies. Older communities and antiquated industrial enterprises pose problems, as do small communities springing up in periurban areas of cities that provide their own unsatisfactory wastewater collection and treatment in package plants. Also important are the nonpoint sources of pollution from agricultural lands and from urban areas which are now beginning to receive regulatory attention. Even where such watershed land development regulations exist, the major problem is the limited monitoring that can be afforded by the state regulatory agencies. In North Carolina, for example, the Division of Environmental Management advised that it could inspect a package wastewater treatment plant only about once every five years. Three of the more heavily developed counties instituted their own monitoring of these facilities. Volunteer citizen and school groups can undertake their own policing of watersheds, working with local and state agencies.

### Examples of Source Water Protection

The concern for watershed regulation originated about 20 years ago, when EPA reduced the permissible level of turbidity in drinking water. Private water companies in Connecticut, near New York City, had purchased their watershed lands many years previously to protect drinking water quality. The

### The Two Types of Watersheds

The above drawing illustrates a distinct difference between two types of source water watersheds; the run-of-river watershed and the upland watershed. Historically, cities focusing on commercial development located on large rivers, often where the river flows into a larger river, a lake or to the ocean. These run-of-river sources offered ample quantities of water, which were easily withdrawn and, before upland development had begun, provided water of reasonably good quality. However, in the mid- and late-19th century, these rivers had become the vehicle for the transmission of a wide range of diarrheal diseases because of urban and agricultural development upstream. Disease outbreaks ceased when filtration and chlorination were introduced in the early-20th century. Many of the cities using run-of-river supplies had the option of developing upland or groundwater sources, but had selected the lower cost option. Table 1 (page 24) lists some of the larger cities that draw upon run-of-river sources. Water quality control for run-of-river sources is difficult because of the high density of populations and the diverse activities characteristic of the large watersheds necessary for such supplies. Upland watersheds are more readily protected. ➤

lands had become quite valuable over time and the water companies had begun selling off these lands for development, ostensibly to provide the funds to help pay for filtration plants necessary to meet the lower turbidity limits.

The Connecticut Department of Health intervened and the state legislature created a Commission on Water Company

Lands. The legislature adopted the Commission's recommendation to prohibit the sale of lands for development on the basis that filtration would not mitigate the degradation caused by the projected development. The water companies sued the state, but the decision was upheld. The court held that legislation prohibiting the sale of the watershed lands for development had as its obvious purpose: "the protection of the health and welfare of the States' inhabitants... watershed properties are critical to water purity."

Since that time, local or state regulations regarding the control of development on watersheds and the protection of both surface and groundwaters, have been upheld by the courts, on the basis that states and their local jurisdictions possess the power to protect the public health. The law clearly recognizes that prevention, by protection of watersheds, is better than the cure, treatment. This is not to say that treatment is not required. Even wholly protected watersheds are vulnerable; wild animals are a potential source of *Giardia* and *Cryptosporidium*. Both watershed protection and treatment are required. The better the protection, the more reliable and economical is the treatment or cure and the ultimate safety of the water.

North Carolina requires submission and approval of land use plans from all local authorities holding domain over watersheds used to provide public water supplies. This law was directed at addressing problems occurring when a watershed in one community or county provides water to a different downstream community. The state established regulations appropriate for various types of watersheds, distinguishing between types of upland sources and run-of-river sources. For example, a community with an upland source that now has no point sources of pollution may be required to forbid the establishment of any development which would produce a point source discharge. Regulations are also directed at controlling nonpoint pollution from farm, residential and industrial activities. Implementing the proposed land use controls is not easy, because upstream landowners are reluctant to restrict development on behalf of downstream communities.

Another example is Greenville, South Carolina, where in 1994, the ultimate in watershed protection for upland supplies was accomplished. People were concerned that the city, which owned two watersheds, faced with financial exigencies, might seek to sell some of these valuable properties for development in the future. The city officials and officers of the water authority placed the watershed properties in trust of a private nonprofit land conservancy dedicated to protecting the watersheds in perpetuity.

### Reclamation: Another Option

As costs and conflicts over water grow, the reclamation of urban wastewaters for nonpotable reuse in urban areas can preserve high-quality waters for their highest use: drinking.

Table 1:


### Larger Cities Drawing Upon Surface Sources

Upland Sources	Run-of-River Sources
Birmingham, AL	Sacramento, CA — Sacramento R.
Oakland, CA	Washington, DC — Potomac R.
Denver, CO	Atlanta, GA — Chattahoochee R.
Bridgeport, CT	Evansville, IN — Ohio R.
Hartford, CT	Kansas City, MO — Missouri R.
New Haven, CT	Topeka, KS — Missouri R.
Indianapolis, IN	Louisville, KY — Ohio R.
Wichita, KS	New Orleans, LA — Mississippi R.
Boston, MA	Minneapolis, MN — Mississippi R.
Springfield, MA	Jackson, MS — Pearl R.
Newark, NJ	St. Louis, MO — Missouri R.
Albany, NY	Omaha, NE — Missouri R.
New York, NY	Wilmington, NC — Cape Fear R.
Greensboro, NC	Cincinnati, OH — Ohio R.
Youngstown, OH	Philadelphia, PA — Delaware R.
Portland, OR	Pittsburgh, PA — Allegheny & Monongahela R.
Providence, RI	Clarksburg, WV — W Fork, Monongahela R.
Dallas, TX	Chattanooga, TN — Tennessee R.
Tacoma, WA	Nashville, TN — Cumberland R.
Portland, ME	Richmond, VA — James R.

Not Included: Cities drawing from lakes, impoundments on large rivers, and multiple sources.

Reclaimed water can be used for landscape irrigation, industrial processes and cooling, toilet-flushing, vehicle-washing, construction, fire-protection, and environmental enhancement. The reclaimed waters are appropriately treated and made microbiologically safe, so that inadvertent ingestion would provide no risk. However, because such waters are not intended for long-term ingestion, no effort is made to address the trace chemical contaminants which only have health significance after long-term ingestion. Two of the larger cities with dual distribution systems, one for potable and the other for nonpotable use, are Irvine, CA, and St. Petersburg, FL.

### Conclusion

Protection of public health has again established its primacy as the basis for protection of our nation's waters (including rivers). Those who are concerned with maintaining the quality of our waters would do well to ally themselves with those who are concerned with promotion of the public health. Public health enjoys bipartisan support and is not nearly as vulnerable to economic and development pressures as protection of waters for predominantly environmental purposes. 

*Daniel A. Okun is a Kenan Professor of Environmental Engineering, Emeritus at the University of North Carolina at Chapel Hill.*



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# References and Resources

## Organizations/Agencies

**American Water Works Association (AWWA)**, the national trade association of water utilities. Produces numerous helpful publications. Web site is loaded with helpful information on all aspects of water supply including the SDWA and source water protection, <http://www.awwa.org>. AWWA, 6666 West Quincy Ave., Denver, CO 80235, (303) 794-7711.

**U.S. Environmental Protection Agency**, See Web site <http://www.epa.gov/watrhome/regs/sdwa.html> for information about SDWA (full text, summary and themes), source water protection, drinking water State Revolving Fund, and more. Call EPA's Drinking Water Hotline, (800) 426-4791, for state agency officials in your state responsible for implementing the SDWA.

**National Drinking Water Clearinghouse**, a good source for basic and technical information. Numerous publications and fact sheets, many are free. NDWC, West Virginia University, PO Box 6064, Morgantown, WV 26506-4191, (800) 624-8301.

**Environmental Working Group**, an research organization that has produced several reports on drinking water. See web site for all of EWG's reports and more, <http://www.ewg.org>. EWG, 1718 Connecticut Ave., NW Suite 600, Washington, D.C. 20009, (202) 667-6982.

**Campaign for Safe and Affordable Drinking Water**, an alliance of more than 300 public health, labor, religious, consumer, AIDS, and grassroots and national environmental groups, which fights for better protection of drinking water, and lead the battle to strengthen the SDWA. Contact NRDC at (202) 289-6868.

**The Groundwater Foundation**, founded on the principle that education is a powerful motivator for change. Provides The Groundwater Guardian Program, which encourages communities to begin groundwater protection programs. Produces a water education newsletter; *A Community Guide to Groundwater Guardian*, a community's "road map" through the guardian process; and more. P.O. Box 22558, Lincoln, NE 68542, (800) 434-2742.

**Ground Water Protection Council (GWPC)**, is a national nonprofit organization whose members consist of state and federal groundwater and underground injection control regulatory agencies, industry representatives,

environmentalists and concerned citizens, all of whom come together to mutually work toward the protection of the nation's groundwater supplies. GWPC's purpose is to promote and ensure the use of best management practices and sound laws regarding comprehensive ground water protection. For more information contact Paul Jehn: (509) 775-3247; e-mail [pauljehn@televar.com](mailto:pauljehn@televar.com).

## Publications

*Effective Watershed Management of Surface Water Supplies* by AWWA (contact information above). An excellent reference on techniques, includes 20 case studies and results of a national survey of water utilities.

*Source Protection: A Guidance Manual for Small Surface Water Supplies in New England (need correct author/contact info.)*

*In the Drink, Tap Water Blues, Weed Killers by the Glass, Pouring it On: Nitrate Contamination of Drinking Water, and Just Add Water*. All are reports documenting violations of federal drinking water standards by Environmental Working Group (contact information above).

*Groundwater & Surface Water: Understanding the Interaction, A Guide for Watershed Partnerships* by Know Your Watershed, 1220 Potter Drive, Room 170, West Lafayette, IN 47906, (317) 494-9555, <http://ctic.purdue.edu/kyw/kyw.html>.

*National Groundwater Status Report* by Paul Jehn, Ground Water Protection Council, 1994. 84p. See contact information above.

## Conferences

The League of Women Voters Education Fund is organizing an effort to mobilize community dialogue, and empower local decision makers to be leaders in pollution prevention of community drinking water supplies. *Tools for Drinking Water Protection: A Community Call to Action*, a live, 90-minute, interactive broadcast will be the catalyst for local events on groundwater and surface water protection nationwide. The event will take place on Wednesday, March 19, 1997 at 2:30 pm ET. To Register: PBS Adult Learning Satellite Service: 800-257-2578, Videoworkshop homepage: <http://www.drinkingwater.org>

For more information contact Bonnie Burgess or Elana Cohen, (202) 429-1965, Email: [75457.246@compuserve.com](mailto:75457.246@compuserve.com)



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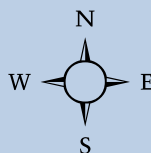
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