

SMALL FLOWS MAGAZINE

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Helping America's Small Communities Meet Their Wastewater Needs
Spring/Summer 2008 Volume 9, Number 1



Sewage, Environment, and Drinking Water
Save the Source,
Save Some Money

Published by the National Environmental Services Center

From the Editor...



Kathy Jespersen, Editor

"Two concepts that cannot be separated are public drinking water and public health protection. In fact, an entire industry was built on the bond between these two notions. Drinking water systems, drinking water organizations, and, yes, even the dreaded drinking water regulations exist because safe drinking water and public health have an alliance that cannot be divided." I wrote that in 2004, and it remains true today. But let's take that one step farther and make the link between wastewater and drinking water.

What gets flushed down the toilet can end up in the glass of water that you draw from your tap. And doesn't that sound appetizing? If what you flush down the toilet ends up in a failing septic system, trouble will likely come knocking. Failing septic systems can be a major contributor of source water pollution—including microbial contaminants and other waste. So how do you get people to recognize that what they are doing may be harming more than the environment—it may be harming the public's health as well? Turns out that's a pretty good question.

To assist in national source water protection efforts, the National Environmental Services Center (NESC) in partnership with the Rural Community Assistance Partnership (RCAP) recently received a grant from the U.S. Environmental Protection Agency (EPA) to administer the SMART About Water program.

The project will provide training and technical assistance about source water and wellhead protection to small and rural communities and will focus on how untreated wastewater from failing septic and sewer systems affects source water and what can be done to remedy this problem. This issue of *Small Flows Magazine* and the next two issues are funded under this grant. So you will likely notice that *Small Flows* is little different than it has been in the past.

First of all, we are not publishing juried articles in these magazines. They are, however, alive and well on the Web. You may view these articles at www.nesc.wvu.edu. Second, we will be discussing onsite systems in the context of source water protection. In other words, how can we better manage these systems to protect our source water?

In addition to the magazine, we've also developed a new Web site. The SMART About Water Web site can be found at nesc.wvu.edu/SMART. The site includes information about source water protection, magazine articles, and numerous other resources. We also have links to RCAP and EPA. We hope you find it useful.

Finally, I want to introduce our new director. Gerald Iwan took over the helm on April 28, 2008. Iwan comes to NESC from Connecticut, where he was chief of the Water Supplies Section of the Department of Health. He has also worked in environmental protection in New York and has served in a leadership capacity in several national organizations dealing with water and the environment. Iwan holds a Ph.D. in biology from Fordham University.

I am excited about the next two issues of *Small Flows*. I hope that they will include information that you can use in your own source water protection program. If you have article ideas, please forward them to me at Kathy.Jespersen@mail.wvu.edu. I look forward to hearing from you.

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U.S. Environmental Protection Agency,
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Steve Ainsworth | Project Officer
Municipal Support Division, Office of Wastewater Management, Washington, D.C.

Small Flows Magazine Staff, NESC

Gerald Iwan, Ph.D. | Director
Mark Kemp-Rye | Interim Communications Manager
Kathy Jespersen | Editor
John Fekete | Senior Project Coordinator
Caigan M. McKenzie | Staff Writer
Jennifer Hause | Engineering Scientist
Zane Satterfield | Engineering Scientist



Article Submissions

Small Flows Magazine welcomes letters to the editor, articles, news items, photographs, or other materials for publication. Please address correspondence to:

Editor, *Small Flows Magazine*
National Environmental Services Center
West Virginia University
P.O. Box 6064
Morgantown, WV 26506-6064
(800) 624-8301 or (304) 293-4191
www.nesc.wvu.edu

SMART Design Committee

Tom Arnbrister, Wyoming Rural Water Association
Bonnie Bailey, Water Environment Federation
Joy Barrett, Rural Community Assistance Partnership
Stacey (Issac) Berahzer, UNC Environmental Finance Center
Kimberly Borgzinner, Nevada Division of Environmental Protection
Jeff Butensky, U.S. Environmental Protection Agency Region 1
H.B. Calvert, Midwest Assistance Program, Inc.
Alanna Conley, U.S. Environmental Protection Agency Region 4
Jeff Cooley, Rural Community Assistance Partnership
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Ron Davis, Ramey Water
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Division of Public Water Supplies
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Erin Fishbaugh, Rural Community Assistance Partnership
Jay Frick, North Carolina Department of Environmental and Natural Resources
Rob Glazier, AmeriCorps/Corporation for National and Community Service
Mark Gross, Orenco
Debra Gutenson, U.S. Environmental Protection Agency Office of Water
Beth Hall, U.S. Environmental Protection Agency Office of Water
William Hasselkus, U.S. Environmental Protection Agency
Jeffrey Hoffman, The Hoffman Agency/Blue Water Outreach
Jean Holloway, Delaware Rural Water Association
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Kira Jacobs, U.S. Environmental Protection Agency Region 1
Tim Jones, U.S. Environmental Protection Agency Office of Wetlands,
Oceans, and Watersheds
Joel Jordan, Pennsylvania Rural Water Association
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Charles Kanetsky, U.S. Environmental Protection Agency Region 3
Rakhi Kasat, U.S. Environmental Protection Agency Office of Wetlands,
Oceans, and Watersheds
Christopher King, St. Louis University Center for Environmental Education
and Training
Dave Lenning, State of Washington Department of Health
Stephanie Lindberg, U.S. Environmental Protection Agency Region 7
Lorene Lindsay, Kansas City Water Service Department
Barb Lubberger, Ohio Environmental Protection Agency
Sylvia Malm, U.S. Environmental Protection Agency Office of Ground Water
and Drinking Water
Deb Martin, Great Lakes Rural Community Assistance Partnership
Jay Mashburn, Rural Community Assistance Partnership
Deidre Mason, Association of State Drinking Water Administrators
Cary McElhinney, U.S. Environmental Protection Agency Region 5
Stephanie McKee, Village of Spring Valley, Ohio
Joe Meek, Montana Department of Environmental Quality
Jeff Moeller, Water Environment Research Foundation
Robert Morency, Rural Community Assistance Partnership Solutions, Inc.
Dane Nagel, Village of Versailles, Ohio
Bill O'Connell, National Rural Water Iam Urbigkit, City of Riverton
Julie Ward, Great Lakes Rural Community Assistance Partnership
Keith Weber, West Virginia University
Lloyd Wilson, Association of State Drinking Water Administrators
Tina Van Zile, Sokaogon Chippewa Community
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Chesapeake Bay Area Wastewater Plants Reach Discharge Objectives

EPA has recently released figures that indicate the wastewater treatment plants affecting the waters of the Chesapeake Bay will achieve 93 percent of their nitrogen reduction goals and even surpass their phosphorus goals by 2010. But this progress comes at a price.

The EPA estimates that the total costs of these upgrades will be \$4 billion, and Pennsylvania and D.C. residents are griping. While Maryland and Virginia have made hundreds of millions of dollars available to help with this project, Pennsylvania has only \$28 million in grants available. Some officials fear that the costs for these nutrient upgrades may be passed on to some municipalities who will then pass huge rate hikes on to residents. The EPA's report stated that, "obtaining sufficient and timely funding to install nutrient removal technology poses the greatest challenge faced by municipalities in achieving nutrient reduction goals."

Donald Welsh, administrator of EPA Region III, which includes most of the Bay watershed, stated that EPA is proud of the enormous progress that has been made and is underway in the upgrade of wastewater treatment plants.

Treatment plants provide only about one-fifth of the nitrogen and phosphorus reaching the Bay, so action by other sectors is essential to reaching Bay goals. Nutrient reduction efforts from agriculture remain largely unaddressed due to the lack of funding and technical support for farmers, and nutrients from developed lands have increased as new construction continues to flourish.

The EPA Office of Inspector General has completed six reports, requested by Senator Barbara Mikulski, D-MD, examining various aspects of the Bay program. All of these reports are available online at www.epa.gov/oig.

Nutrient Trading Can Be A Confusing Issue

States adjoining the Chesapeake Bay are developing nutrient credit trading programs in an effort to achieve the cleanup goals for that grand body of water. However, a paper presented by the National Sea Grant Law Center warns of possible dissension in the courts about the practice.

Advocates argue that buying and selling pollution credits is a great way to achieve pollution reduction goals at less cost. Theoretically, a source that can cost-effectively achieve pollution reductions may sell credits to another facility. This has been a common practice to reduce acid rain emissions in air pollution efforts. But the paper warns that, while this type of trading was always a consideration in the Clean Air Act Amendments of 1990, the Clean Water Act doesn't address trading.

Two recent court decisions demonstrate how differently the laws may be interpreted.

In a Minnesota case, two towns hope to construct a new wastewater treatment plant that would increase phosphorus discharges into the river. The state's Pollution Control Agency approved the plan because the new discharges would be offset by a planned upgrade to a nearby plant that would decrease phosphorus by 53,500 pounds a year. The Minnesota Supreme Court agreed that this plan was reasonable.

But in a similar situation in Arizona, the US Ninth Circuit Court ruled that the EPA could not issue a permit to a mine to discharge copper into an impaired creek even though the company had agreed to remediate an inactive mine upstream to reduce copper loadings.

The court did say that an offset might take place under certain conditions if a Total Maximum Daily Load (TMDL) is in place. A TMDL is a budget that sets the maximum amount of pollution that can be discharged by each facility into a water body and still meet water quality standards.

For now, that ruling has prohibited the EPA from approving any new permits for impaired water bodies in Western states covered by the Ninth Court unless there is a TMDL and a compliance schedule.

To read more about nutrient trading in the Chesapeake Bay Watershed, visit www.chesapeake-bay.net/content/publications/cbp_12272.pdf.



"For many of us, water simply flows from a faucet, and we think little about it beyond this point of contact. We have lost a sense of respect for the wild river, for the complex workings of a wetland, for the intricate web of life that water supports."

—Sandra Postel, *Last Oasis: Facing Water Scarcity*, 2000



The National Source Water Collaborative's Call to Action

Your Water. Your Decision. is the title of a four-page guide for local officials published by the National Source Water Collaborative.

The Source Water Collaborative (SWC) is composed of federal, state and local organizations to further the goals of protecting sources of drinking water. The SWC hopes that by joining forces, they are able to more adequately protect America's drinking water at the source—in the lakes, streams, rivers and aquifers that we tap for drinking water.

The Your Water. Your Decision. initiative helps local decision makers understand their role in source water protection and how to include drinking water protection into a community's normal planning activities. The guide provides tools for specific situations, information about smart growth policies, and general resources for protecting our drinking water sources. Recommendations for appropriate development patterns, wise budget and pricing practices, and some general good stewardship techniques are included.

The SWC Local Officials guide is available for download at www.protectdrinkingwater.org.

Turning Sewage Into Biofuel?

Virginia scientists are hoping that using sewage to grow algae that will become biofuel and help reduce the excess nitrogen and phosphorus going into Chesapeake Bay while providing an alternative energy source.

Researchers at Old Dominion University have begun a pilot project for turning algae into biodiesel fuel. Using nutrient-rich wastewater to feed the algae, they are hoping to generate up to 200 gallons of biodiesel a day. Although this is not a lot of fuel, the reasoning is if it is successful here, then it could be done at sewage plants across the country, which could produce many more gallons of fuel.

Read more about Old Dominion's biofuel project at: www.odu.edu/ao/research/vcerc/research/biodiesel.shtml



Montana Town Awarded Grants For Source Water Protection

Residents of Hamilton, Montana have been awarded almost \$40K in grant money from state agencies to protect their more than 16,000 wells.

Close to 75 percent of the area's residents get their drinking water from private wells and with over 15,000 septic tanks in use, the state Department of Environmental Quality felt the money would be well spent.

Proposed projects include implementing an existing source water protection plan for the city of Hamilton, well testing within the city's watershed on a voluntary basis, an educational campaign focusing on the protection of the watershed, and disseminating information about the proper care of septic systems, including some financial incentives. The county is planning its first household hazardous materials collection, hoping to keep old motor oil, paints, pesticides, and batteries from going into the landfill.

One grant from the Department of Natural Resources will help the county evaluate potential risks to groundwater from future development by creating a groundwater vulnerability map. This project will gather existing information about the geography, soils, topography, population distribution, and other data to generate maps indicating where the groundwater is most vulnerable to contamination.

To learn more about Hamilton's environmental challenges, visit their Web site at www.cityofhamilton.net.



"...man will occasionally stumble over the truth, but usually manages to pick himself up, walk over or around it, and carry on."

—Winston Churchill (1874-1965)



Canadian officials assure safety of biosolids



As the practice of applying sewage sludge (biosolids) onto agricultural fields becomes more commonplace, groups of concerned citizens are protesting the practice. Fearing that the possibility

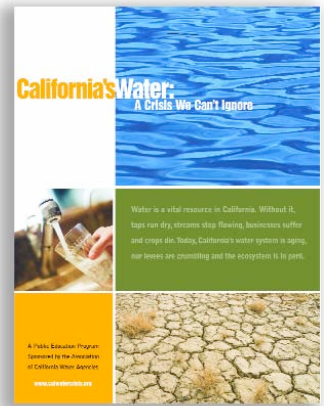
of diseases such as AIDS or SARs as well as pharmaceuticals and industrial and hospital chemicals may be part of the applied waste and could make them ill, citizens are worried. Government officials are conducting field plot studies to determine the fate of some of these agents and have determined that the concentrations of pharmaceuticals existed only in minute quantities (in parts per trillion).

Currently haulers and applicators need a certificate of approval for handling sewage biosolids. The application process is very controlled with a minimum of a 20 meter setback from surface water and a ban on the spread of biosolids between December 1 and March 31, or any time the ground is frozen or snow-covered. A close inspection program makes sure that the rules are followed, says Eileen Smith, manager of policy and special projects with the Waste Management Policy Branch of the Ontario Ministry of Environment.

Sewage biosolids must be analyzed for 11 metals and cannot be applied on farm fields unless they meet ministry standards. Pre-approval inspections are done on fields before they are approved to receive the sludge, and there are requirements on how long after application of the biosolids that crops can be harvested or animals can be grazed on the field. Safety for the residents is the reason behind the high standards of compliance and enforcement.

For more information about biosolids, visit the city of Hamilton, Ontario's Web site on the subject at www.cityofkingston.ca/residents/environment/biosolids/faq.asp.

California Valley Sinks as More Water Is Taken Out Than Returned



After years of supporting a soaring population, fertile farms, scores of golf courses, and status as a resort destination, the aquifer beneath the Coachella Valley is becoming depleted, causing the valley to actually sink. Subsidence is threatening to ruin roads, pipelines, and other infrastructure in this area, considered one of the fastest-growing areas in the country.

A recent study by the US Geological Survey indicated that the valley has sunk over a foot during the past decade. Steve Robbins, general manager of the Coachella Valley Water District, says, "Before long, you have cracking to your infrastructure, your roads crack, they don't drain anymore, your sewer lines break. That is when it's going to cost many, many millions of dollars."

While the area does have two outside water sources, they are also in jeopardy due to drought conditions and overdevelopment. Meanwhile, the Coachella Valley is among the fastest-growing areas in the country.

Continuing to overuse the aquifer would increase pumping costs as the water levels drop, and as the water quality deteriorates, more expensive treatment is required. Local officials admit that the best way to approach this crisis is to use what water they have in the most efficient way possible.

A Fact Sheet on California's water crisis can be found at www.calwatercrisis.org/pdf/ACWA_FactSheet_Sept2007.pdf.



"We have forgotten how to be good guests, how to walk lightly on the earth as its other creatures do."

—Barbara Ward, (1914-1981)
Only One Earth, 1972.



Annual Conference Engages Onsite Industry

The National Environmental Services Center (NESC) held its 10th Annual State Onsite Regulators and the 8th Annual Captains of Industry Conference March 3 through 8, 2008, in Point Clear, Alabama. The conference included sessions about soil, risk assessment, and aquifer protection. Attendees also had the opportunity to participate in a site field trip of onsite wastewater treatment technologies such as constructed wetlands, drip irrigation, textile filters, and gravelless and chamber drainage systems.



This annual conference allows participants to:

- Meet with state regulatory officials and Environmental Protection Agency decentralized wastewater coordinators from all across the country.
- Engage in meaningful networking opportunities with state-and federal-level decision-makers.
- Learn about the current status of decentralized research, state programs, and federal initiatives.

For more information about the conference, visit NESC's Web site at: www.nesc.wvu.edu/sora/index.html.

Complicated Battle over Lake Lanier

It's hard to believe such a beautiful body of water can create so much turmoil and adversity, but the multi-state, multi-court argument over water rights is certainly stirring up these precious waters.

Lake Lanier, the largest federal reservoir on the Chattahoochee River, is the main water source for more than three million metro Atlantans, and also supports multiple downstream users, from a nuclear power plant near Dothan, Alabama to prized oyster beds in Florida's Apalachicola Bay.

A recent federal appellate court ruling denied Atlanta its bid for about 65 percent more water for up to 20 years and the court went on to state that it would take an act of Congress to get more water out of Lake Lanier for the burgeoning city.

Officials from Georgia, Alabama, and Florida are negotiating a new water sharing agreement and hope to meet a February 15 deadline.

Turning Sewage into Drinking Water

A state-of-the-art water reclamation facility just opened in California that is designed to treat sewage to a point of purity that it will meet drinking water standards.


The Advanced Water Purification Facility (AWPF) will yield 70 million gallons of drinkable water per day or about 10 percent of the daily need for the area's 2.3 million residents. The water goes through multiple purification steps designed to reduce levels of organic chemicals, pathogens and other chemicals such as endocrine disruptors and pharmaceuticals.

When the water leaves the plant, half of it will go to the coast, where it will be injected underground through wells to prevent seawater from intruding into the groundwater. The other half will be piped to a giant pond set in permeable soil where the water will be allowed to percolate naturally down to the water table.

The principal process engineer on the project claims that this recycling system will provide Orange County a continuous supply of water, totally unaffected by drought conditions.

To see animations of this treatment system's processes and to learn more about the facility, visit their Web site at www.gwrsystem.com/process/index.html.





Sewage, Environment, and Drinking Water Save the Source, Save Some Money

By Kathy Jesperson

NESC EDITOR

Sources of clean, safe, reliable drinking water are what make a community healthy and viable. But compromise those sources, and a community can be sentenced to doom. Contamination not only threatens human health, it can jeopardize a community's ecology and economy. Given

these realities, it only makes sense to protect the source.

Source water protection is nothing new to drinking water and wastewater professionals. More than a decade after the Safe Drinking Water Act (SDWA) Amendments of 1996 were passed, all states should have completed a source water assessment. These assessments are an analysis of existing and potential threats to the quality of public drinking water. One of the possible threats to a community's source water comes from onsite wastewater treatment systems.

Nationwide, decentralized wastewater treatment systems (septic systems, private sewage systems, onsite sewage disposal systems) collect, treat, and release about four billion gallons of effluent per day from an estimated 26 million homes and businesses, according to the U.S. Environmental Protection Agency (EPA).

Half of these systems were installed more than 30 years ago when rules were nonexistent, substandard, or poorly enforced. EPA

estimates that anywhere from 10 to 30 percent of onsite systems are failing annually. The failing systems can pollute drinking water sources with nitrates and other nutrients, chemicals, pathogens, and pharmaceuticals. Once they are in the water, these pollutants can cause numerous diseases, including gastrointestinal illness, cholera, hepatitis A, and typhoid. Nitrates can cause methemoglobinemia (blue baby syndrome) in infants, which reduces the ability of the blood to transport oxygen. If left untreated, this condition can cause death. Fortunately there are a number of measures that communities can take to safeguard their source water.

One of the first things to recognize is that onsite wastewater treatment systems must be maintained. "Preventative maintenance is key," says Jennifer Hause, National Environmental Services Center (NESC) technical assistance (TA) manager. "It's the same as changing the oil in your car. Regular maintenance prevents serious—and expensive—problems with your engine.

"The same goes for onsite systems, regular maintenance thwarts major problems that can be even more expensive to remedy," Hause continues. "It is cheaper in the long run to maintain and manage onsite systems properly before they fail."

Having a plan to deal with onsite systems is in a community's best interest—for its population's health, and environmentally and economically. An adequate supply of drinking water ensures a community's sustainability.

"Availability drives development," says Hause. Overflowing drainfields can quickly pollute what was once a reliable drinking water

"A drop of sewage does more to a bucket of clean water than a drop of clean water does to a bucket of sewage," says Matthew Hudson in his article "Magical Thinking," Psychology Today, March 2008. While Hudson was talking about the implications of assigning magical powers to inanimate objects, he just as easily could have been talking about source water protection.

source. If a community has an area with many failing systems, the odds are stacked against its drinking water source. And a situation like this not only lowers the existing property values, it halts any new development, leaving the community's economic prospects in doubt.

An area's ecology also affects its economic future, and polluted water has a widespread effect on wildlife. Failing systems significantly contribute to the eutrophication of ponds, lakes, and coastal estuaries. Eutrophication often leads to changes in animal and plant populations and degradation of water and habitat quality. Once changes like these occur, a water source loses its capacity as a drinking water supply and recreational activities gradually disappear. The consequence is the collapse of economic growth and development.

Because a community's vitality depends on a reliable drinking water source, it should have effective strategies in place to make onsite systems safe, efficient, and economical.

Available Prevention Strategies

Septic systems can be a major contributor to source water contamination for a variety of reasons, including improper siting, poor design, faulty construction, and incorrect operation and maintenance.

Siting is typically addressed using minimal horizontal and vertical setback distances. What these setback distances do is keep septic systems a safe distance from drinking water sources to avoid potential contamination. To meet these requirements, system designers should take into account soil permeability, drinking water well locations, residential housing, and other considerations such as septic tank and drain field size.

To avoid design and construction tribulations, have no doubt about the credentials of engineers, septic system installers, or other construction workers. "Remember, you can verify qualifications now,

or you can fix the system later," says Craig Mains, a member of the NESCA technical assistance team.

Proper operation and maintenance is perhaps the most crucial pollution prevention measure. Even if systems are designed and constructed to regulation, inadequate operation and maintenance can lead to system failure.

Hydraulic overloading, infrequent septic system pumping, and improper disposal of household chemicals stress system performance. Annual system inspections, water conservation, and frequent system pumping prevent system failures and source water contamination.

"If a community promotes these strategies, it's halfway to protecting its source water," says Mains.

To get the rest of the way, a community should develop a good management program. "A good management program requires discipline and ability," says Mains. "It won't be easy, but it will have its rewards."

Historically, the responsibility of taking care of an onsite system is typically left to untrained and often uninformed system owners. "Out of sight, out of mind is the usual reaction to an onsite system," says Hause. "Most homeowners will only do something if their system fails. And then it may be too late."

But community management of these systems can improve their performance and ease source water protection burdens. Fortunately, local governments have a number of options for creating good management programs. The New England Interstate Water Pollution Control Commission (NEWPCC) offers the following alternatives.

Enforce an Ordinance

Initiating a septic system maintenance ordinance helps ensure that septic systems are inspected and pumped periodically. According to the NEWPCC, a maintenance ordinance could require system owners to be responsible for a number of issues, but more specifically to:

- Hire a certified inspector to inspect their systems,
- Send inspection results to the town or local health department,
- Use trained, certified system installers,
- Have systems inspected during installation, and
- Close out cesspools.

Set Up a Septic System Tracking Program

Use available geographic information system (GIS) software to accurately depict the septic systems in the source water area. Once systems are located, other software is available to keep track of inspection reports, monitoring, and other data. Some systems can even send automated reminders about preventive maintenance schedules to system owners.

Municipal Maintenance Program

Rather than assigning maintenance responsibility to system owners, the community can take over this obligation. The community charges system owners a fee and sets a pumping and maintenance schedule. This kind of management program frees system owners from maintenance responsibility and provides them with the security that they won't be fined.

If a community cannot take on this kind of responsibility, however, another option is to set up a voluntary community-sponsored pump-out program. In this kind of program, the community can negotiate a reduced rate that system owners can take advantage of, ensuring that a large number of owners will participate in the program.

Set Standards for New System Installation and Siting

These standards should minimize any potential threats, including siting systems away from floodplains, surface waters, shallow water tables, public water supply wells, poorly drained soil, and areas where effluent can't be sufficiently treated before it reaches

a water body. These standards should be routinely reevaluated and improved to protect the public health and environment.

And to truly be effective, the standards should include criteria for alternative onsite technologies, such as mound systems, aeration systems, and constructed wetlands. The standards also should include information about how to reduce site disturbance, minimize runoff, and preserve open space.

Educate the Public

No good management program will get off the ground without a concerted public education effort. Public involvement is critical to the success of a management program. But to get them involved, they will need to know what they are getting into. Every system owner should have the facts about onsite system management, including the knowledge that they are protecting their investment—a failing system can quickly lower property values. EPA and NESC have resources for public education tools.

The Last Word

Nothing speaks louder than money to a struggling community. Managing onsite systems protects source water and reduces the cost of producing drinking water later. “It all comes down to cost,” says Mains. “The better the quality, the less expensive the treatment is going to be.”

And treatment is only one issue related to cost. “If the source becomes too contaminated the community may have to abandon that source and develop a new one,” says Mains. And that can be an expensive endeavor. Drilling, installing new lines, and testing all come with a hefty price tag—one that a community may not be able to afford. So it just makes sense to prevent problems before they arise. After all, it’s the community’s future that’s on the line.

For more information about source water protection and onsite system management and maintenance, contact NESC at (800) 624-8301.

What is eutrophication?

Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams receive excess nutrients that stimulate excessive plant growth, such as algae, periphyton attached algae, and weeds. This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water when the dead plant material decomposes causing other organisms to die. Water without enough dissolved oxygen is hypoxic.

Source: U.S. Geological Survey at toxics.usgs.gov/definitions/eutrophication.html.

	Oxygen	Fluoride
n	8	9
	O	F
	16.00	19.00
.0	3.5	

What is hypoxia?

Hypoxia means “low oxygen.” In estuaries, lakes, and coastal waters low oxygen usually means a concentration of

less than 2 parts per million. In many cases hypoxic waters do not have enough oxygen to support fish and other aquatic animals. Hypoxia can be caused by the presence of excess nutrients in water. Excess nutrients can cause intensive growth of algae. The



consequences of this enhanced growth are reduced sunlight penetrating the water, a decreased amount of oxygen dissolved in the water, and a loss of habitat for aquatic animals and plants. The decrease in dissolved oxygen is caused by the degradation of dead plant material (algae), which consumes available oxygen.

Hypoxia can cause fish to leave the area and can cause stress or death to bottom dwelling organisms that can’t move out of the hypoxic zone. Nitrogen promotes algal and attendant zooplankton growth. The associated organic matter, such as dead algal cells and other debris from the algae, sinks to the bottom where it decomposes, consuming available oxygen.

Source: U.S. Geological Survey at toxics.usgs.gov/definitions/eutrophication.html.



Helping America's Small Communities Protect Their Source Water

"An ounce of prevention is worth a pound of cure," Benjamin Franklin famously stated more than 250 years ago. This simple philosophy drives a new environmental project—SMART About Water—designed to protect drinking water quality.

Funded by a \$3 million grant from the U.S. Environmental Protection Agency, SMART About Water is being orchestrated by West Virginia University's National Environmental Services Center (NESC) in partnership with the Rural Community Assistance Partnership (RCAP). The project will provide training and technical assistance about source water and wellhead protection to small and rural communities over the next 18 months and will focus on untreated wastewater from failing septic and sewer systems, the largest contributor to water quality degradation.

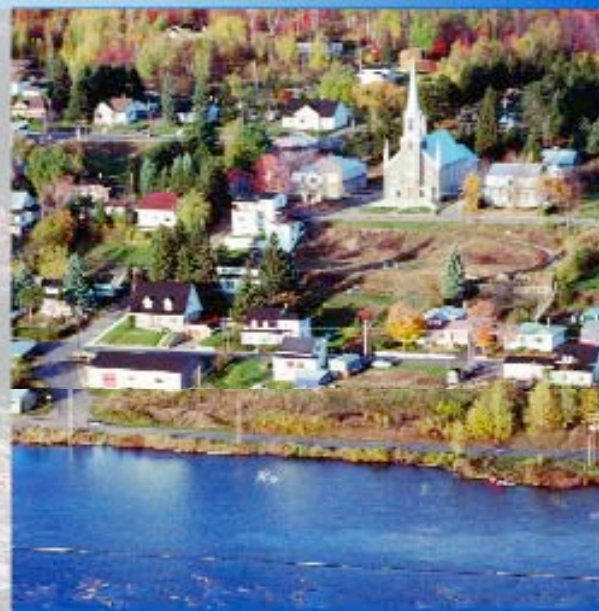
According to EPA, communities derive several important benefits when they protect their source water:

- If source water is contaminated it threatens public health.
- The cleaner the water is when it reaches the treatment plant, the easier and cheaper it is to treat.
- The cost of dealing with contaminated groundwater ranges from 30 to more than 200 times the cost of wellhead protection.
- Clean water and healthy ecosystems are vital in terms of quality of life for both humans and animals.

Although water quality has improved in the three decades since passage of the Clean Water and Safe Drinking Water Acts, pollution problems linger. Previous efforts concentrated on reducing point-source pollution, such as from industrial sites. Water quality issues now are related to the cumulative effect of nonpoint source pollution—untreated wastewater, agricultural fertilizers and pesticides, stormwater runoff, and roadway pollutants—that impact the physical, chemical, and biological health of nearby waters.

After assessing training needs, a team of advisors will develop specific recommendations, including both technical and non-technical issues. During 2008 and 2009, RCAP staff will deliver training to 245 "trailblazer" communities with systems serving fewer than 3,300 people.

To learn more about this project, call NESC at (800) 624-8301 or visit the Smart About Water Web site at www.nesc.wvu.edu/smart.



**A Project of the
National Environmental
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at West Virginia University,
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under a Cooperative Agreement
of the U.S. Environmental Protection
Agency, Office of Ground Water
and Drinking Water**

Working Together to Fix Waste and Water Problem

by Caigan M. McKenzie

NESC STAFF WRITER

Houses in Seaford, Delaware, were in the way of a plan to build a new road, so house mover John Evans bought them and sold them. Evelyn Wilson, president of the Coverdale Crossroads Community Council, saw these transactions as a win-win opportunity. "John made some money, and people who normally wouldn't be able to purchase a house were able to buy one through a lease-purchase agreement that Evans had set up," Wilson says. "Some of the houses were moved onto land that Evans owned in Coverdale Crossroads, and others were moved onto land that the prospective home buyers had purchased."

The Coverdale Crossroads Community is located in Sussex County, a largely rural, predominantly African-American, and low-income area. Bernice Edwards, executive director, First State Community Action Agency, points out that these houses were substandard and came without plumbing or electricity. Most of the residents used a cesspool, a failed septic system, or no system at all.

"When these houses were moved to Coverdale Crossroads, there wasn't a housing code in Sussex County," Edwards explains. Failed septic systems were contaminating surface water and groundwater.

Developing Partnerships

In October 1997, the Delaware Department of Natural Resources and Environmental Control (DNREC) entered into a partnership with the Coverdale Crossroads Community and

First State Community Action to upgrade septic systems and wells over a three-year period, beginning in October 1997.

Delaware's Nonpoint Source Program funded the project at \$150,000 a year, and Greenwood Trust Bank and the Sussex Conservation District matched funds in excess of \$100,000, according to Delaware's *1999 Nonpoint Source Annual Report*.

For the first year of the project, DNREC partnered with the Delaware Housing Authority, which donated homes to those in need. The local Prison Boot Camp and Work Release Program sent workers to demolish substandard homes and clear the debris and vegetation so that new septic systems and wells could be installed; no easy task considering one location had more than two tons of trash. Residents also pitched in, helping to remove debris, housing displaced home owners, and making



These pictures illustrate the various stages of development from inception to completion.



financial contributions. The Sussex County Council provided \$12,000 to cover the costs of trash disposal.

During the second year of the project, wells and septic systems were replaced or upgraded for 35 of the targeted 100 houses. Each homeowner was educated about how to maintain their system after installation.

The Resource Conservation and Development Council became a partner during the final year of the project, helping to coordinate the final implementation and for installing new housing.



Most of the 100 replacement systems are gravity systems, with a few low-pressure pipe systems. According to the Inland Bays Watershed, a gravity system has an efficiency rating for nutrient removal as follows: ammonium, 25 percent; nitrate, 35 percent; and total phosphorus, 90 percent. For low-pressure pipes, the efficiency rating is: ammonium, 94 percent; nitrate, 66 percent, and total phosphorus, 90 percent.

In addition to the replaced septic systems, more than 50 wells were upgraded.



The successful federal, state, and local partnerships for this project not only provided direct environmental benefits to area groundwater and surface waters, but it also enhanced community involvement and improved the quality of life for the residents of Coverdale Crossroads.



For more information, contact First State Community Action at www.firststatecaa.org, Coverdale Crossroads Community Council at www.sussexcounty.de.gov, the Delaware Department of Natural Resources and Environmental Control at www.dnrec.delaware.gov, the Delaware Housing Authority at www.destatehousing.com, and the Resource Conservation and Development Council at http://www.de.nrcc.usda.gov/partnerships/rcd/rc_d.html.

Funding Source Water and Wellhead Protection Programs

by Caigan M. McKenzie
NESC STAFF WRITER

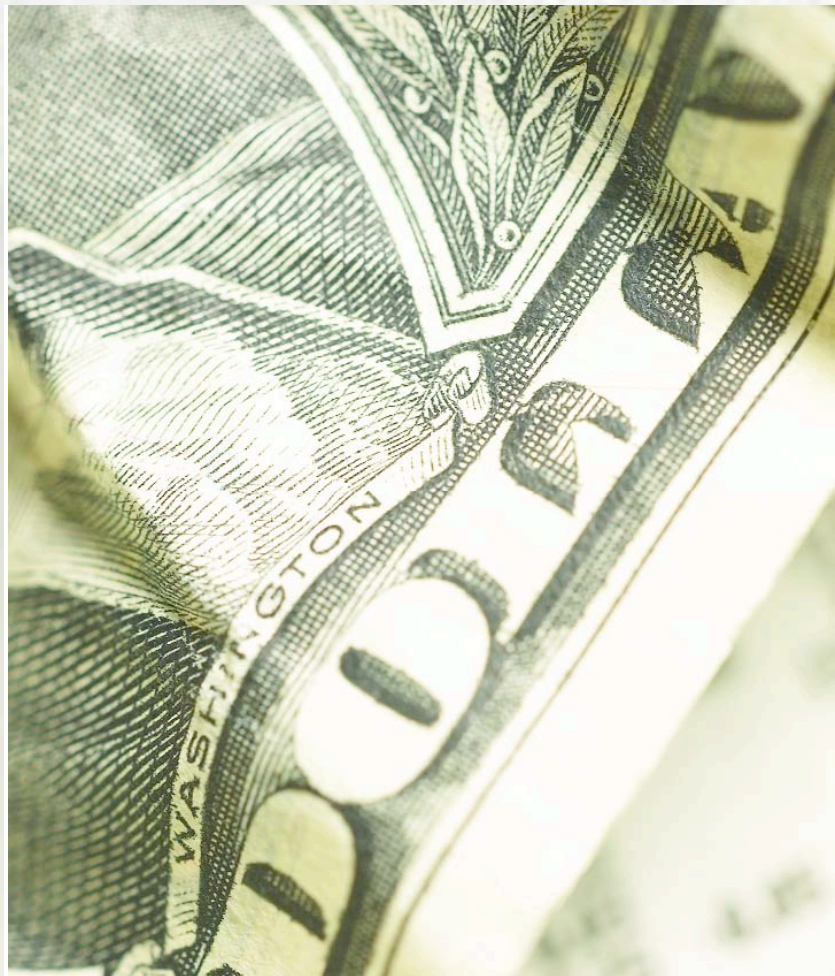
“When drinking water, think of its source,” an old Chinese proverb reads. Up until 1986, the Safe Drinking Water Act (SDWA) focused on treating water, but it was amended in 1986 and 1996 to protect the *sources* of drinking water through its Wellhead Protection and Source Water Assessment and Protection programs, respectively. These programs serve to protect drinking water from source to tap by creating barriers between drinking water sources and potential contaminants.

Implementing these amendments, however, placed additional financial and human resource demands on the states.

Show Me the Money

Knowing the steps to take to protect wellheads and source water is the easy part for water professionals. What is not so easy is finding the funding to finance the project. But money is out there; it's just a matter of knowing where to look. For example, states can solicit money from local source water protection organizations and other environmental groups, use state general revenue funds, state fee programs, capital programs, planning programs, community development block grants, state revolving funds, Section 319(h) monies, and partner with local businesses, urban programs, wetland programs, land acquisition programs, and education programs.

When putting together a funding package, the U.S. Environmental Protection Agency (EPA)



suggests asking the question, “What else is going on in my watershed or wellhead protection areas?” A broad-based approach that includes various land uses and stakeholders within a watershed can open more funding sources than can a more narrowly-based approach. Including wetlands as a part of the plan, for instance, could open up financing opportunities through the U.S. Department of Agriculture’s Wetland Reserve Program, the U.S. Fish and Wildlife Service, and the Natural Resources Conservation Service.

Safe Drinking Water Act Funding

Typically, the drinking water program is the first program water professionals contact. EPA awards grants to states through the drinking water state revolving fund (DWSRF), which was created through the 1996 Amendments to the SDWA. In turn, the states

offer low-interest loans to drinking water systems to improve infrastructure. If the state chooses, it can set aside a portion of the grant award to fund other drinking water activities, such as providing technical assistance to small drinking water systems, managing state drinking water programs, wellhead protection, and purchasing land needed for protection of source water. New Hampshire, for instance, provided loans to systems to purchase land or conservation easements to protect drinking water sources from contamination.

When a state establishes a loan program for land acquisition, conservation easements, and source water protection, it must develop a process for ranking projects according to importance. In many cases, the priority setting system requires that land be located within a delineated source water or wellhead protection area. Each state determines how loans are repaid.

Walt Ivey, director of environmental engineering division, West Virginia Office of Environmental Health Services, explains that “even though we have a loan program, we haven’t had any takers on it.” Loans through the DWSRF are offered at one percent, payable over 30 years for disadvantaged communities; otherwise, the loans are three percent, payable over 20 years. Ivey speculates that water systems don’t apply for DWSRF loans because they are not easy to repay. “While source water and wellhead protection are important, they are not an absolute requirement,” Ivey says. “It is not the same as replacing a leaking water line or a storage tank that is not holding water. These are the types of problems that have to be taken care of. And one option for repaying a loan is to increase rates. In West Virginia, water systems must go through the Public Utility Commission to increase rates, and this is where some of the difficulty comes in.”

In addition to DWSRF loans, West Virginia is offering grants for source water protection or for security of the land surrounding source water. “We have awarded approximately 14 grants, and we still have almost \$200,000 left,” Ivey says. This money is leftover from the state’s revolving funds set-asides. “We won’t continue to get this money, but we wanted to help water systems fund projects over the next year or so related to source water. Because the funds are limited, the amount of the grants will be around \$50,000 so that we can help more water systems. The grants will be awarded later this spring, and we have already sent out notices to all of the water systems.”

More information on these grants may be found at www.wvd-hhr.org/oehs/eed/swap or telephone 304-558-6759.

There are also federal set-asides that target funds from the overall DWSRF appropriation to fund drinking water projects for American Indian Tribes and Alaska Native Villages. This money is mostly used to monitor unregulated

contaminants and to reimburse drinking water operator certification-training expenses.

More information may be found at www.epa.gov/safewater/dwsrf.html, or telephone (202) 401-2345.

Clean Water Act (CWA) Funding

Annually, the Clean Water State Revolving Fund (CWSRF) funds more than \$5 billion water quality projects through low-interest or no-interest loans. It can provide 100 percent of the project cost with a repayment schedule of up to 20 years. Since 1988, CWSRF has issued more than \$65 billion in loans. The program provides assistance to communities, water systems, and other organizations, such as land conservation associations, for projects that protect source water and enhance water quality. In 2007, 77 percent of all loans (21 percent of funding) were made to communities with populations less than 10,000.

Each state decides how loans are repaid; some examples are recreational fees for fishing licenses or park entrance fees, drinking water fees, wastewater user charges, fees paid by developers, and donations or dues made to nonprofit groups. In 1995, for example, the Maine Municipal Bond Bank (MMBB) and the Maine State Housing Authority (MSHA) entered into a Memorandum of Understanding to make low-interest loans available to finance septic systems for owner-occupied, single family residences through the MSHA loan programs. The funds are used for the rehabilitation or replacement of septic systems. The interest rate is set at one percent with a maximum term of 20 years. The MSHA remits to the MMBB on a monthly basis any repayments for loans received during the prior month. This money is then put back into the CWSRF.

Some states have used cross-investment and cross-collateralization structures to fund their programs. Under these structures, a state can invest funds from one

SRF program, the DWSRF for example, to cure a default in the other, CWSRF for example.

These structures provide added security to bond holders, improving the bond ratings assigned to leveraging bonds and reducing the cost of borrowing to the SRF program. (See descriptions how New York, New Jersey, and Michigan used these structures to fund their programs at: www.epa.gov/owm/cwfinance/cwfinance/cwsrf/finalmi.pdf.)

Some success stories of using CWSRF funds to protect groundwater and surface water include Massachusetts which has used CWSRF to replace failed individual systems; and Minnesota, which has used the funds for agricultural best management practices, such as no-till equipment to reduce runoff to surface drinking water supplies.

Contact a state CWSRF representative to get help in funding a project. See www.epa.gov/owm/finan.htm or telephone (202) 260-7360 to find a representative.

Non-Point (319) Source Implementation Grants

This program provides grants to states and tribes to implement nonpoint source projects and programs, including Best Management Practices installations for animal wastes, pesticide and fertilizer control, stream bank restoration, and lake protection/restoration. Grantees, except for tribes, are required to provide 40 percent of the total cost of the project.

For more information, see www.epa.gov/owow/nps/cwact.html.

Watershed Funding Website

EPA has established a new Web site with information and links to databases on watershed finance tools and funding resources. This information should be useful to states, localities, nongovernmental organizations, and watershed groups interested in watershed protection and source water protection. The Web site can be found at: epa.gov/owow/funding.html.

U.S. Department of Housing and Urban Development (HUD)

HUD offers grants directly to the states through its Community Development Block Grant (CDBG) program. In turn, the states award grants to general local government units that carry out development activities.

HUD's role under the State CDBG program is to ensure state compliance with Federal laws, regulations and policies. At least 70 percent of CDBG funds must be used to help low- and moderate-income people.

For more information, see www.hud.gov/offices/cpd/communitydevelopment/programs/ or telephone HUD headquarters at (202) 708-1112, or telephone your state office. Contact information is listed at www.hud.gov/localoffices.cfm.

EPA's Environmental Finance Program (EFP)

While it doesn't offer loans or grants, EFP helps the public and private sectors develop creative approaches to funding environmental programs, projects, and activities. It has three components: the Environmental Financial Advisory Board (EFAB), the Environmental Finance Center Network (EFCN), and Environmental Financing Information Network (EFIN).

EFAB operates under the Federal Advisory Committee Act. Its board includes members of government, the finance and banking communities, business and industry, and national organizations. EFAB advises the EPA Administrator on environmental financing structures that can be used to pay for federal and state mandates.

EFCN is a network of nine university-based finance centers in eight EPA regions that shares financial information and partnership opportunities for environmental projects, including source water protection see side bar for a complete listing of the university finance centers involved. The University of Maryland uses the "community quilt" concept as one of its

Environmental Finance Center (EFC) Network

Environmental Finance Center at the University of Southern Maine
efc.muskie.usm.maine.edu

Region 1

Environmental Finance Center at Syracuse University
www.maxwell.syr.edu/efc

Region 2

EFC at the University of Maryland
www.efc.umd.edu/who.html

Region 3

Environmental Finance Center at the University of Louisville
cepm.louisville.edu/org/SEEFC/seefc.htm

Region 4

Environmental Finance Center at the University of North Carolina at Chapel Hill
www.efc.unc.edu/index.html

Great Lakes Environmental Finance Center at Cleveland State University
www.glefc.org/

Region 5

Environmental Finance Center at New Mexico Institute of Mining and Technology
efc.unm.edu/

Region 6

Environmental Finance Center at Dominican University of California
www.efc9.org/

Region 9

Environmental Finance Center at Boise State University
sspa.boisestate.edu/efc/

Region 10

financing techniques. This technique includes federal, state and local programs plus financing techniques such as innovative rate structures, public-private partnerships, and storm water utilities to "create a patchwork of funding opportunities."

EFIN developed *A Guidebook of Financial Tools* that gives an overview of various financial tools such as bonds, grants, loans, and fees for water and sewer utilities. The Guidebook is available for downloading at EFIN's Web site at www.epa.gov/efinpage/guidebook.htm. You can also contact EFIN at (202) 564-4994.

More information about EFP can be found at: www.epa.gov/efinpage.

E-Grants Initiative

This program was established in 2002 to help improve govern-

ment services by storing and providing information on more than 1,000 grant programs worth nearly \$400 billion in annual awards. This Web site can be found at www.grants.gov.

This program, managed by the U.S. Department of Health and Human Resources, is a collaborative effort led by 26 Federal grant-making agencies and 11 commissions, including EPA. It is designed for both grantors and grantees and includes instructions for downloading, completing, submitting, and tracking a grant application package.

An example of a funding opportunity is the environmental cleanup project in the Lake Fork Watershed area. This grant is funded by the Bureau of Land Management, which is offering up to \$70,000 to research, inventory, and monitor

the environmental cleanup of the Lake Fork Watershed area in Colorado.

Another example is a \$50,000 grant sponsored by the Department of the Interior, Bureau of Reclamation. The grant is for the development, management, and protection of the Snake River Area of Indian tribal water resources.

A final example is a \$650,000 grant for public and state institutions of higher learning to improve the quality of the nation's water through education.

National Association of Counties (NACo)

Although access to its grants through a clearinghouse is limited to NACo members, its Five Star Restoration Matching Grants Program is open to any public or private entity. It is called Five Star because the program requires participation from a diverse set of at least five community partners to accomplish the project. For example, youth groups, universities, foundations, ecologists, and corporations can work together. Partnership contributions include funding, land, workforce support, technical support, and/or other in-kind services.

For more information, see www.nfwf.org/fivestar, contact Carrie Clingan, community services associate, at cclingan@naco.org Community Services Associate, or telephone (202) 942-4246.

Other State Funding and No-Cost Assistance

Some states have grant and loan programs for source water protection. In addition, some states may provide technical assistance in source water protection and wastewater management at no cost to water systems or communities. To find out more about funding and technical assistance opportunities available in your state, telephone your source water protection contact listed at cfpub.epa.gov/safewater/sourcewater/sourcewater.cfm?action=Contacts, or review information on your state source water protection home page at cfpub.epa.gov/safewater/sourcewater/sourcewater.cfm?action=&Link_child=225.

Appalachian Regional Commission (ARC)

Part of ARC's mission is "to improve infrastructure in Appalachia to make the region

economically competitive." Appalachian states are: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia.

The commission provides funding to support these goals. Typically, ARC grants are awarded to state and local agencies, local governing boards, and nonprofit organizations. Because of the wide variety of financing options provided by the Appalachian Resource Center, you should contact a program manager at www.arc.gov/index.do?nodeId=13, or your local development district at www.arc.gov/index.do?nodeId=14 for help.

To learn more about source water protection and financing possibilities, contact your EPA Regional Office, call the Safe Drinking Water Hotline at (800) 426-4791, or visit their Web site at www.epa.gov/safewater. See also "Consider the Source: A Pocket Guide to Protecting Your Drinking Water."

For information about obtaining federal grant dollars, see the *Catalog of Federal Domestic Assistance* at 12.46.245.173/cfda/cfda.html, which lists all 1,424 Federal programs, projects, services, and activities that assist or benefits the public; the *Catalog of Federal Funding Sources for Watershed Protection* at cfpub.epa.gov/fedfund/, which has a searchable database of financial assistance sources, such as grants, loans, and cost-sharing, to fund watershed protection projects, EPA Watershed Program at www.epa.gov/OWOW/watershed, and Funding for Source water Protection Activities at www.epa.gov/safewater/dwsrf/pdsrf/pdfs/fs/_dwsrf_swp-funding-matrix.pdf.

Grants under Section 106 of the CWA help Indian tribes in carrying out effective water pollution control programs. Regional contacts can be found at www.epa.gov/owm/mab/indian/106coord.htm. Information about tribal grant resources can be found at: www.epa.gov/tribal/index.htm. Additional information about source water assessment and protection opportunities can be found at www.epa.gov/safewater/protect/tribe.html.

Governor Gage of Jamestown, Virginia, understood the need to protect this area of land when he enforced one of the nation's first wellhead protection ordinances in 1610. It read:

"There shall be no man or woman dare to wash any unclean linen, wash clothes, nor rinse or make clean any kettle, pot, or pan or any suchlike vessel within twenty feet of the old well or new pump. Nor shall anyone aforesaid, within less than a quarter mile of the fort, dare to do the necessities of nature, since by these unmanly, slothful, and loathsome immodesties, the whole fort may be choked and poisoned."



Bringing “Out of Sight, Out of Mind” To the Top of One’s Mind Using Social Marketing for Water Source Protection

By Jeffrey R. Hoffman

The late humorist Erma Bombeck wrote a book titled *The Grass is Always Greener over the Septic Tank*.

Even though her book title was slightly askew (grass is greener over the drainfield, right?), it almost encapsulates what many people think about septic tank systems: *there’s something nasty down there, but plants sure like it*. And just like graves, many people choose to not walk over them.

If they know they’re there.

It’s estimated that the wastewater treatment needs of almost 25 percent of U.S. households are met by some style of on-site septic tank system—that’s about 26 million households. And that’s a lot.

What historians believe was first invented by the French to handle post-Napoleonic poo, in-ground septic tanks have changed little in design or function for more than 100 years. Properly sited and maintained, septic tanks and their drainfields provide safe and efficient effluent management for rural residents—and for fast

growing suburban areas where they are cheaper to build than extending municipal wastewater systems.

Homeowners are happy; they have no sewage bills, and if they have a well, no water bills either. The septic tank is out of sight, out of mind. Until that fateful day when something just doesn’t look right, just doesn’t smell right.

And then, all the homeowner is concerned about is the expense and mess of repairs. There’s little or no concern as to environmental damages—especially if surface water is not perceived as nearby. So, as a water resource manager, how do you get people to think about what they don’t see?

That’s where social marketing comes in.

Simply put, social marketing puts traditional advertising and marketing approaches to work to create changes in behavior. Getting people to quit smoking is a change for personal good. Getting people to maintain their septic tanks is a change for social good, that is, public and environmental health.

Changing Human Behavior is Hard, But Not Impossible.

Social marketing delves into barriers to change and addresses those issues while delivering messages that encourage appropriate behaviors. Most

research in behavior change suggests that we humans are resistant to change—and we don’t like being told what to do.

Utilities and municipal governments have for years taken a rather ham-handed approach to messaging with top-down directives. The public’s been told what not to do, rather than what they should be doing. Tips on water conservation, stormwater management or septic tank maintenance fall on deaf ears when couched in a bossy, negative tone.

How do you overcome this challenge? Keep a few simple concepts in mind.

- **Know your audience**—more than just septic tank owners, it helps to know if they are young or old? New to the area or long-time residents? Lower, middle or upper income? Regularly maintain their septic systems or not?
- **Determine barriers for change**—that means you have to talk to your audience. Market research or social marketing firms can help design and conduct surveys, community discussions, and focus groups. You need to know what prevents septic tank owners from performing maintenance. Is it cost? Confusion? Needing reminders? Or just plain ignorance?
- **What messages will stick**—your surveys can help determine if they want details on what to do, how to do it, or why it is important.
- **How to communicate with them**—that is, what media to use. Radio? Television? Newspaper ads? Direct mail? Obviously you have budget limitations, but you need to speak where they’ll listen. Sending kids home from school with coloring books on septic tank maintenance probably won’t work.





being clouded from increased nitrogen loads and other stressors of urbanization. With research, the District determined that nonpoint source pollution needed to be addressed—not only use of lawn fertilizers and pesticides, but septic tank problems as well.

That prompted the launch of the “Know Where it Flows” campaign. This social marketing effort combined multiple messaging channels with information about simple lifestyle changes that can make big differences.

And the last, but probably most important concept, know what motivates the people you are trying to reach.

In Social Marketing Terms, It's Called the Exchange

Ask your community if water quality is important to them. They'll likely say yes. (Worry about the few that say no. They have issues.) After all, most people in the U.S. take abundant, clean, fresh water for granted.

Ask if they know that poor water quality, caused in part by septic tank failures and leachate, and fertilizer and pesticide run-off endangers aquatic and avian ecosystems and wetlands wildlife, and their response is that somebody should do something about that.

Ask if they know that poor water quality endangers their Friday night crab dinner, and they're likely to take action. That's what the Chesapeake Bay Program found out with their “Save the crabs—then eat ‘em” campaign.

After years of messaging to get Chesapeake Bay area residents to change their use of fertilizers and pesticides on their lawns citing a severe decline in the health of the Bay, the Program re-framed the problem in a manner that spoke to personal concerns. The blue crabs that the Chesapeake is well known for will disappear, unless everyone chips in to help.

Encouraging the exchange of one (bad) behavior for one (good) consequence is a key to successful social marketing. Showing how someone personally benefits by a new behavior works. Collectively, society (and the environment) then benefits.

Changing the time of year to fertilize was one of the key message points. At the end of the campaign more than 40 percent of people surveyed planned to alter when they fertilized.

That's a tasty exchange.

Changing Septic Tank Maintenance Behaviors

Just north of Tampa, Florida's west coast begins its long slow curve to where the peninsula ends and the panhandle begins. Along the way the coastline flattens to breathtaking scenes of salt marshes and clear, spring fed rivers. Home to commercial and sport fishing, scuba diving in the springs, and a lifestyle in step with the tides, it was considered a sleepy part of the state. That is, until the 1990s, when the population exploded.

The Southwest Florida Water Management District (SFWMD) monitored changes in water quality especially in the Crystal River/Kings Bay Watershed. Once iconic crystal clear waters, the Crystal River and tributaries were

The SFWMD employed an education outreach coordinator who conducted workshops and presentations for the community, while the campaign used newspaper ads and inserts, direct mail, radio ads, outdoor billboards, and even a crawling message on the local weather station.

Messages were clear, direct and used a little humor to get the point across. In one set of ads, a bride's outdoor wedding proved to be the wrong time for septic tank failure. An outdoor billboard of a child rafting on an inner tube, reminded people they need to “Know Where it Flows.”

The exchange? With proper septic tank use and maintenance, the outdoor and water-related activities that drew people to live there would be maintained. (Oh, and the environmental stressors abated.)

Post campaign research showed significant increases in people being aware of their responsibilities of owning septic tanks and for getting maintenance done.

How to Put Social Marketing to Work for You

Now that you've gotten your feet wet, let's talk about application of best practices.

But first—a truism. Almost every social marketer will tell you

the same. No matter what the issue, no matter how important it is for your community, there exist two populations you'll never reach. Imagine them sitting at either end of a perfectly shaped Bell Curve. (You enjoyed statistics class, right?) These are The Choir and the Never Wills. The Choir you know. They already show up at all the workshops and seminars you give—and clamor for more change. The Never Wills, you may know, but they fall on the other side of the curve as stubborn, egocentric, or possibly just anti-social.

Don't waste your resources on either group.

Here are five keys to making septic tank maintenance social marketing sparkle (so to speak).

- **Make Sure the Problem Fits the Target**—If you've identified poor septic tank practices as being a problem, don't forget that presently, it's just your problem. To make it your target's problem, it has to be real, it has to be fixable, it has to have a simple solution, and you have to tie it to a personal benefit. Protecting your water source may be your issue, but preventing expensive repairs or embarrassment may be the target's.
- **Identify Reluctance to Change**—Compliance with good septic tank maintenance may be a simple matter of reminders. We're told to test the batteries in our smoke detectors when Daylight Savings Time begins. Why not

something similar for tank inspections? If reluctance is due to costs, you may consider a rebate program for part of the cost of an annual inspection.

- **Find a Credentialed Spokesperson**—You may find having a person of trust speak on behalf of your efforts can go a long way to success. The person doesn't need to be technical, just believable. Keep in mind that the person has to be real and somewhat recognizable, otherwise he or she could be disregarded as an actor. Politicians and pitchmen usually don't work. (My apologies to your county officials.)



- **Make Your Messages Vibrant and Memorable**—Tell the truth. You turn away from dull advertising, too. Most people do. The use of humor or upbeat messaging usually works best. Fear only works if something tragic has happened (and even then it's only temporary; after threats pass, we all lull ourselves into some feeling of security). Don't forget to tell, show or imply why the action you want taken is necessary—for the individual and for society.

- **Know How to Measure Success**—Will you gather maintenance reports from septic tank inspectors? Will you survey your target to gauge compliance? What would be considered a first-year goal? A second-year goal? Behavior change takes time. You need to be realistic in projecting goals, and committed to long-term messaging. If hearing one message was enough to change our minds, we'd all be driving Chevrolets and drinking Coca-Cola.

Successful social marketing is not easy. Throwing out messages and hoping they stick is. When you do your homework—and are sincere in your expectations—good, the social good, will happen.

Thanks for fighting the fight.

Jeffrey R. Hoffman is president of BlueWater Outreach, a social marketing, advertising, and behavior change



communications firm working with water-related issues throughout the U.S. He can be reached at jhoffman@bluewateroutreach.com or by calling 904.206.1854.

More information about social marketing may be found at <http://www.social-marketing.org/sm.html>.

Decentralized Wastewater Treatment Glossary Now Available

The Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT) announces the completion of The CIDWT Decentralized Wastewater Treatment Glossary. CIDWT views this document as a starting point for discussion across the field of decentralized wastewater treatment.

"We are extremely pleased at all of the requests to download, print, forward, and distribute, because it validates the need for the document," says Nancy Deal, extension associate for North Carolina State University Soil Science.

This glossary contains definitions of decentralized wastewater treatment terms that industry professionals frequently use. CIDWT writers chose the terms after consulting many existing glossaries, and the final definitions were chosen on the basis of the best fit to the industry.

CIDWT requests that those who download the glossary document how they intend to use it. CIDWT is accepting comments and suggestions about the glossary at decent_words@ncsu.edu. "Your feedback is certainly appreciated," says Deal.

Copies of the glossary may be downloaded at <http://www.onsiteconsortium.org>.



Q&A: Source Water Protection and Onsite Wastewater Treatment Systems

By Ann Codrington, Chief, Prevention Branch,
Drinking Water Protection Division,
Office of Groundwater and Drinking Water



Editor's note: We asked Ann Codrington to provide information about the U.S. Environmental Protection Agency's position on onsite wastewater treatment systems and source water protection. Codrington supplied us with the following comments.

Why is source water protection important?

Whether a public water system relies on surface water, groundwater, or a combination of the two, protecting a water system's source is important for several reasons. First, source water protection can reduce threats to public health from substances that may cause acute or long-term illness. Because some substances, such as the protozoan *Cryptosporidium*, are resistant to typical disinfectants used in water treatment, it is important to keep them out of the source water in the first place. Second, source water protection can save water systems and communities money. Clean source water allows water systems to avoid expensive treatment or replacement of a contaminated water supply. Finally, there are important secondary benefits from clean source waters, such as providing a safe source of water for recreational activities.

What is The U.S. Environmental Protection Agency's (EPA) role in source water protection?

EPA has been providing leadership and support of wellhead protection, which protects groundwater sources of public water supplies, since 1986. In 1997, EPA promoted source water protection by developing guidance, supporting organizations engaged in protecting public water supplies, supporting regional/state source water protection workshops, and creating partnerships such as the Source Water Collaborative. The Source Water Collaborative is a group of 19 national organizations, including EPA, that actively promotes source water protection activities at all levels: national, regional, state, and local.

What can small communities do to protect their source water?

A good place to start is with the community's water system's source water assessment. Ideally, the assessment has described the sensitivity of their water source(s) to contamination and has identified the priority contamination threats to the source(s). If the information in the assessment is outdated due to new, potentially threatening activities occurring near the water supply since the assessment was conducted, the community could update the

assessment and revise the priority threats if appropriate.

A community can form a team or steering group to identify priority threats and develop a source water protection plan to deal with them. The plan should specify the protection measures (whether voluntary, regulatory, or a combination of both) to be undertaken, the resources (human and financial) needed to implement the plan, and spell out who does what when. Part of the plan could identify potential sources of funding and technical assistance. For example, these could include EPA regional source water or wastewater programs, state drinking water or wastewater programs, national organizations (and their regional and local affiliates) that provide technical assistance in relevant areas, and others. Accompanying the planning should be an outreach or public education campaign to emphasize the importance of source water protection to the community and to enlist the support of local officials for the implementation of the plan.

What are the public health issues related to contamination of source water by improperly maintained onsite systems?

Improperly sited, designed, operated, or maintained septic systems can be a significant source of groundwater contamination leading to waterborne disease outbreaks and other adverse health effects. The bacteria, protozoa, and viruses found in sanitary wastewater can cause numerous diseases, including gastrointestinal illness, cholera, hepatitis A, and typhoid. Nitrogen is also present in sanitary wastewater and consumption of nitrogen in the form of nitrate at levels above the drinking water standard (10 mg/l) can cause methemoglobinemia (blue baby syndrome) in infants. Methemoglobinemia reduces the ability of the blood to carry oxygen and can be fatal to affected infants. Improper use of septic systems to dispose of chemicals such as solvents and pesticides can lead to groundwater contamination and expose humans to chronic health effects, including nervous disorders, organ damage, impaired vision, speech, and memory, and cancer (if exposure is prolonged).

How can onsite system maintenance protect source water?

Proper operation and maintenance of septic systems is perhaps the most crucial prevention measure to prevent source water contamination. Inadequate operation and maintenance can lead to failure even when

systems are designed and constructed according to regulation. If a tank isn't pumped frequently enough, an excessive amount of sludge collects in the bottom of the septic tank, and wastewater will not spend sufficient time in the tank before flowing into the drainfield. The increased concentrations of solids in the flow can reduce soil permeability.

Because percolation of the wastewater through the soil allows chemical and biological processes to remove some of the contaminants, reduced soil permeability can result in surface ponding and increased risk of contamination of surface waters or to groundwater through percolation. Reducing wastewater volumes through water conservation can also help avoid hydraulic overloading of the drainfield and consequent surface ponding.

Finally, taking advantage of local hazardous waste collection programs to dispose of household chemicals rather than disposing of them through septic systems can help prevent mal-functioning of the systems and reduce the risk of source water contamination.

What can small communities do to promote an onsite management program?

Small communities can conduct public education campaigns to educate their citizens about the importance of proper onsite management. Good management not only provides public health benefits, it can help a community become economically viable as well as protecting its environment.

The community should review a copy of its source water assessment and most recent sanitary survey for its public water system to determine if septic systems are identified as significant potential sources of contamination. If they are, this would provide cause for establishing a campaign among local officials and the general public to improve management of onsite systems. The campaign could include activities such as a booth about the topic at the county fair or other public event, or involving elementary or high school students in a local project to increase community awareness of proper onsite management. Some communities have established requirements or incentives for periodic inspection of septic systems as part of watershed protection programs.

Further information on proper maintenance of onsite systems is available at: cfpub.epa.gov/safewater/sourcewater/sourcewater.cfm?action=Septic. To learn more about working with volunteer groups, visit the watershed section on NES's Web site at www.nesc.wvu.edu.



RCAP Will be the “On-the-Ground” Force for SMART About Water

By Dave Clark

RCAP DIRECTOR OF ENVIRONMENTAL PROGRAMS

One of the largest contributors to water quality degradation is untreated wastewater from failing septic and sewer systems. This is a problem that the Rural Community Assistance Partnership (RCAP) has been aware of for a long time. Until now, however, RCAP lacked the resources to do anything about it. In partnership with West Virginia University's National Environmental Services Center (NESC), RCAP is taking on an 18-month project to provide training and technical assistance about source water and well-head protection to small and rural communities.

Funded by a \$3 million grant from the U.S. Environmental Protection Agency, the SMART About Water project allows RCAP to use its skills as a non-profit service delivery agency that provides technical assistance and training to assist small rural communities with their drinking water and wastewater problems. RCAP provides this assistance to board members and operators and provides onsite, embedded technical assistance as well.

RCAP's role in the SMART project is to be the “on-the-ground” force that disseminates information, trains participants, and provides over the shoulder assistance to rural communities. RCAP also will be participating in the national training design workshop held by NESC and other invited organizations, associations, operators, state, and federal agencies. RCAP will be engaged in (along with the other participants) developing unique ways to train and obtain buy-in from communities and

systems to solve unique problems with their source water. By getting participation from a very diverse group, we are hopeful that the resulting training curricula and methods of facilitation with communities and water system operators will be something not known before, and will be accepted as well as effective.

RCAP staff in nearly every state, Puerto Rico, and U.S. Virgin Islands will use their new expertise to train board members, operators, and community residents of approximately 245 systems nationwide. RCAP staff will then identify approximately 20 community projects across the nation that require intensive technical assistance. These special Trailblazer projects will be monitored and the environmental data recorded to demonstrate progress toward meeting the environmental outcomes specified in the EPA grant agreement.

NESC and RCAP have had a solid working relationship for many years. RCAP has regularly invited NESC to participate in its Office of Community Services (OCS) projects and RCAP staff have been frequent attendees of the various trainings that NESC has held over the years. RCAP has been a frequent user of NESC documents, guides, curricula, and has disseminated these to small communities, systems, boards, and operators. With the SMART About Water project, NESC and RCAP continue the tradition of collaborating to assist small, rural communities with their infrastructure challenges.

We, at the National RCAP Office, are excited by the opportunity to participate in developing the training

curricula and to be trained in a unique method of approaching Source Water Protection Planning. We are confident it will assist our 170 RCAP staff members around the country to carry out the workshops and projects throughout the nation.

Dave Clark is the Director of Environmental Programs at the National Rural Community Assistance Partnership Office. Clark is currently very involved with managing the EPA cooperative agreements, writing articles for the Safe Drinking Water Trust's "eBulletin," and the RCAP Native American Task Force.



For 11 years he served as an RCAP technical assistance provider in West Virginia. He has worked in all areas of the RCAP program, including drinking water, wastewater, and solid waste infrastructure. He has also received grants extending RCAP's work in the watershed, source water, and telecommunications areas. Clark has a B.A. in Biology from West Virginia University, specializing in Environmental Sciences (water) and Recombinant DNA Technology.

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The National Environmental Services Center (NESC)

exists to help small and rural communities with their drinking water, waste water, environmental training, solid waste, infrastructure security, and utility management needs and to help them find solutions to problems they face. Our staff of environmental specialists, engineers, certified operators, technical writers, editors, and trainers understand the latest technologies, regulations, and industry developments. Over the last 25 years, we've helped thousands of communities find solutions to their environmental problems. We've also helped thousands of individuals learn more about environmental issues.



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