Georgia High School Students Initiate Creek Cleanup

by Natalie Eddy
NSFC Staff Writer

A group of high school students from Ellijay, Georgia, recently learned an important lesson in how a small group can make a big difference by raising a community’s consciousness.

Three students from Gilmer High School, along with teacher Mark Stallings, called attention to a point source watershed management problem in a local stream and ended up solving that problem by combining it with the solution to another pollution problem.

During a routine stream investigation, the students discovered that fecal coliform levels in Cox Creek were extremely high, the result of raw sewage being dumped from 22 homes into the two-mile mountain stream. The stream eventually leads into the Ellijay River, one of the major sources of recreation for Gilmer County.

Throughout the process, the students learned about environmental issues, won a national scholarship award contest, and got an opportunity to study water/wastewater issues abroad. But most importantly they discovered some important life lessons along the way, according to Stallings, who teaches 10th and 12th grade biology.

“It was an incredible life experience,” said Stallings. “It taught the kids how much effort it takes to find solutions to problems and not just talk about it. The kids are far more proactive now, and they understand what it takes to solve problems. It made a huge difference in the student body, giving them an improved attitude and community spirit. And it has made the community feel better about the school.”

Project Beginning
The project began during the fall semester of 1992 when Stallings decided to put together a team of students to do water investigations, including one senior, one junior, and two freshmen. The students conducted the investigations as part of a national environmental contest, called the Seiko Youth Challenge.

The students had been studying water/wastewater issues in biology class. Stallings uses a lot of the information from Small Flows to help teach the students about environmental issues and how other small communities are resolving their problems.

“Frankly, we were just doing things at random,” said Stallings. “I asked around looking for resources, and the local sewage treatment plant said they would run 10 fecal coliform tests for us free if we brought in samples.”

When the students tested Cox Creek, they found the fecal coliform organism levels to be extremely concentrated. After contacting Jess Posey of the Gilmer County Environmental Health Department, the students learned that Posey had been trying to address the same problem for 18 years.

Additional fecal coliform tests showed that the rate of organisms increased as the creek progressed to its final destination, the Ellijay River.

“The houses along the creek were built 50 or 60 years ago, and they were built there because it was easy to dispose of their sewage into the

Pollution prevention is also known as “source reduction.” It represents a way of viewing pollution that is different from traditional end-of-pipe methods, which rely on managing and controlling waste once it has already reached its destination.

Once the waste has entered the environment, removing it is often less effective and time-consuming task. In addition, cleaning up pollution after it has occurred is often more proactive now, and they understand what it takes to solve problems. It made a huge difference in the student body, giving them an improved attitude and community spirit. And it has made the community feel better about the school.”

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Small Flows Special Issue Looks at Pollution Prevention

by Nancy Gover
Small Flows Editor

Benjamin Franklin said it first, and perhaps best—an ounce of prevention is worth a pound of cure. That’s the basic idea behind pollution prevention, a strategy that concentrates on reducing pollutants at the source, rather than waiting until expensive methods are required to control or eliminate them.

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Once the waste has entered the environment, removing it is often an expensive and time-consuming task. In addition, cleaning up pollution after it has occurred is often less effective and time-consuming task. In addition, cleaning up pollution after it has occurred is often less effective, and it may also simply transfer pollution from one medium to another.

Background
Pollution prevention became a national objective with the passage of the Pollution Prevention Act of 1990. That act established a hierarchy of environmental protection measures, declaring that pollution should be prevented at its source wherever feasible.

As the act points out, “The opportunities for source reduction are often not realized because existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction.”

Changing Perceptions
Because pollution prevention encourages anticipation on the part of those doing the polluting, implementing it often requires changing the way people perceive pollution. Traditional thinking about pollution puts the blame on those in charge of treating it. The new emphasis is on becoming aware of the environmental repercussions of the actions—both immediate and long term—and learning to change that behavior in ways that are beneficial.

That is precisely the point of

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creek. A long time ago, they even had outhouses built on bridges across the creeks," said Stallings.

Approximately five homes in the area had septic systems; but because of the bedrock just under the soil in the area, all of the systems were failing and leaching back to the stream.

In addition to the poor geologic conditions, Posey said septic systems were not even an option for the remaining 22 homes because of a building code requirement that houses have a 100-foot setback from the drainfield to the creek.

With Atlanta growing northward, Ellijay is becoming more of an urban retreat and is expanding. With expansion comes stricter regulations. Stallings said without some creative solution, these homes might have either continued dumping into the creek or faced some type of closure by the state or local government agencies.

The town has a sewage treatment plant, and most of the residents living within the town’s limits are connected to the plant. The estimated cost of extending the sewer line, including a necessary pumping station, was $400,000 — a price too high for the local water and sewer authority to handle alone.

Ellijay, a rural northern Georgia town, has approximately 1,700 residents with a low-income agricultural base. Stallings said the community simply didn’t have the economic resources to deal with the problem without imposing an impossible burden on the homeowners or an unfair burden on the taxpayers of Gilmer County.

A large percentage of the town receives treated drinking water with the other part relying on well water. An estimated 95 percent of the rural population relies on well water.

Stallings said with a significant portion of the area’s drinking water being groundwater, the potential problem for groundwater pollution is significant. However, the drinking water for the 22 homes was tested and found to have no coliform problem.

“The people living along the banks of Cox Creek have lived there for many years, and fortunately, they agreed that something needed to be done about the sewage problem,” he said.

The Cox Creek pollution was extremely important because of its connection to Ellijay and Catecay Rivers, which form the Coosawattee River. Coosawattee River Park, a major recreation area where people are regularly seen wading, fishing, and boating, is a short distance from where Cox Creek enters the Ellijay River.

Alternatives Investigated
After bringing the problem to the attention of the Gilmer County Board of Health, the students continued studying the issue with the commissioners’ encouragement. They decided to look into alternative technologies as a way of solving the contamination problem.

They met with Larry Vanden Bosch, the director of community and economic services for the North Georgia Regional Development Commission. He set up a meeting with James Watson, a senior environmental engineer for the Tennessee Valley Authority, who has worked with constructed wetlands.

In February 1993, the students and Posey toured the Cox Creek site after hearing a presentation by Watson. However, after visiting Cox Creek, Watson recommended the students find an economic way to hook up with the town’s conventional sewer system at the bottom of the mountain.

Pollution Problems Combined
A 40-year-old landfill located in the same general area as Cox Creek had a leachate pond at its base which runs into a stream that eventually reaches the town’s water supply. Leachate is water carrying materials coming from the landfill after the water percolates through it.

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What do you like most about Small Flows? Least? Please let us know. Fill out and return the Readership Survey Insert located in the center of this issue.
Earth Day 1995: A Silver Anniversary Celebration

Thousands of environmentalists and educators around the world participated in the 25th anniversary celebration of Earth Day on April 22, reaffirming their commitment to the planet’s health and pollution prevention.

A variety of activities were held across the country, ranging from recycling and community cleanup projects to pledge drives and conservation programs.

More than 140 countries joined in the silver anniversary celebration, in cooperation with several organizing groups that worked to advance the event, including, Earth Day USA, Earth Day International, Earth Day Network, Earth Day XXV, the National Oceanographic and Atmospheric Administration, and 2 green groups.

Earth Day USA is a nonprofit organization that works closely with these environmental groups, associations, companies, individuals, community groups, and institutions to promote the annual observance of Earth Day and create year-round programs. Earth Day USA was founded in November 1990 by Earth Day Founder Wisconsin Senator Gaylord Nelson and Earth Day USA President Bruce Anderson to make Earth Day an annual event.

Anderson commented, "The real message of Earth Day 1995, given the fact that our air and water are so much cleaner, is that Americans really do respond to and care about the environment. At the same time, when you look at the increasing environmental challenges that are global in scope, the scarcity of water and potential of climate change, Americans need to redouble our efforts going beyond acting locally, but also acting globally."

Anderson added that there were a lot more local events that happened during Earth Day 1995 than in the past. "This Earth Day had a lot of things happening; there was a huge participation in a way we haven’t seen in previous years. In previous Earth Days, there was a smaller number of activities going on that were larger in scope. We would see huge numbers of people at large events, such as concerts. The fact is that now we have 6,600 curbside recycling programs, and virtually every one of those community organizations responsible for those used Earth Day to accelerate the kind of recycling being done. The kinds, numbers, and types of grassroots activities have multiplied significantly."

Dawn Matthews, press relations director for Earth Day USA, said Earth Day 1995 was a tremendous success, pointing to the large number of requests her organization received for event information and for press and organizer materials and resources.

Matthews said Earth Day USA distributed a wide variety of public relations materials aimed at enhancing Earth Day, including organizer manuals, action sheets, activity and program ideas, newsletters, TV and radio public service announcements, posters, fundraising mechanisms, conferences, and official t-shirts.

In addition to numerous local recycling events, parades, and fairs held in communities around the country, organized celebrations were also held in the larger cities.

In New York City, a “Parade for the Planet” was held with hundreds of marching bands taking part, featuring earth flags sent from Germany, Russia, and Canada. In addition, there were numerous activities around the city, including family-style picnics and eco-exhibits in Central Park.

In Washington, D.C., there were various events, including an Earth Fair, a Native American gathering honoring the planet, and a special benefit concert sponsored by the Concerts for the Environment, which was held near the Washington Monument.

Los Angeles also had several activities, including the Kid’s Challenge and an Adopt-a-Beach Cleanup. The Third Annual Great LA Cleanup, initiating more than 100 community environmental restoration projects, also was launched.

Earth Day Network, a federation of local Earth Day groups which

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This material was the subject of a lawsuit and a judgment against the county.

Prior to the students’ involvement, a special one-cent sales tax assessment was passed and monies had been earmarked to repair the leachate problem.

The students’ proposal was to combine the two problems and build a sewer line from the landfill over to Cox Creek and into town. The cost of the line from the landfill to the road ($275,000) would be paid for by the one-cent assessment, and the rest of the cost ($500,000) could be covered by the CDBG.

The estimated cost increased by $100,000 because of additional work involved in resolving both the leachate and the wastewater problems.

Media Pressure and Politics

With all of this work behind them, Stallings and the students then turned their attention to a harder push through the media. In December 1993, the Gilmer County Board of Health wrote a letter to the Gilmer County commissioners updating their progress on the project, which was publicized on the front page of the local newspaper. The letter called for action on this problem.

In January 1994, the students met with Georgia Governor Zell Miller, who made a one-minute videotape praising the group for their efforts in trying to find a solution to the Cox Creek problem. Again, the group received a lot of media coverage.

Back home again, the group gave a presentation to the Gilmer County Commissioners at a public meeting, submitting a list of all possible solutions, and mentioning the governor’s support of the project. “After presenting this to the commissioners and the approximately 100 people present, our team received a rousing ovation,” said Stallings.

The commissioners voted four to one in favor of the motion. Construction of the sewer line is set to begin this September. The county applied for the CDBG money in June 1994 and received the $500,000 in October 1994.

The students were awarded first place in the Seiko contest June 1, 1994, in New York City, beating out 357 national entries. The students received $25,000 in college scholarship money to be shared evenly ($8,333 each) and an additional $5,000 was awarded to Gilmer High School.

The Seiko Youth Challenge is a national competition challenging high school students to identify research, and propose solutions for environmental problems affecting their communities.

The students involved in the project were Rebecca Smith, Jocelyn Stallings, and David Smith. (There was a fourth member during the first year, Karen Dunsmore, who graduated in June 1993.)

On to Australia

The student team recently returned from New South Wales, Australia, where they toured water/wastewater facilities. Their travel expenses were paid by Coca-Cola and Delta Airlines. They were guests of several Australian government entities.

While in Australia, the students stayed in local homes to get a better feel for the Australian lifestyle. In September, students from New South Wales will be coming to Georgia to experience American life and tour the local water and wastewater facilities there.

Of the students’ success, Stallings commented, “It was an experience, heady and humbling at the same time. I don’t think it’s something any of us will ever forget.”
Stencils Prevent Pollution While Involving Community

Indiscriminate dumping of used oil, antifreeze, and paint into neighborhood storm drains has become a common pollution problem. Most people do not understand the connection between the storm drain and their local stream, lake, or beach.

Contrary to popular belief, most storm drains do not connect into municipal sewer systems. In most cases, whatever enters the drain is discharged directly into a neighboring body of water—without benefit of prior treatment.

In some areas, primarily in the Northeast and Great Lakes regions, sewers may collect both storm water and wastewater. When they overflow, producing what is known as a combined sewer overflow (CSO), untreated wastewater is discharged into the nearest body of water. Storm drains are not the place to dispose of wastes in either type of system.

However, in the last few years a new community approach to the problem has involved people of all ages who stencil messages on streets near storm drains within a particular watershed.

This message includes a picture of a fish and reads: “Dump No Waste. Drains to Stream.” Depending on where the storm sewers discharge, the stencil can also indicate “river,” “lake,” “buy,” or “groundwater.”

Rhonda Hunter, environmental education coordinator for the Washington State Department of Ecology, initiated the storm drain stencil program while working as the used oil recycling coordinator for the Department of Ecology in 1989. She says the department routinely received reports of motor oil that had made its way into nearby streams and rivers.

The source of most of the contamination was used motor oil that was often poured into the nearest storm drain. Hunter devised the stencils as a means of informing people of the effects of that dumping on the stream and on the northwest salmon.

“People were surprised to see a fish painted on the street,” Hunter said, “but the real impact was most apparent in the response of those who did the stenciling. They were amazed at the large number of storm drains that emptied runoff directly into the river.”

Hunter says eventually the participants began to see the streets, and what was dumped there, as connected to their watershed’s creeks and rivers. Armed with that knowledge, city stream team volunteers and classroom students began to educate their own communities.

After successfully establishing a program in Washington, Hunter began to receive calls from people in other states asking where to find the stencils. Seeing a way to reach large numbers of people with an enjoyable environmental stewardship activity they could feel proud to join, she formed her own business, Earthwater Stencils.

Besides providing the stencils used in various locations throughout the country, Hunter now also assists local governments and teachers in setting up stenciling programs for community youth and adults. She points out that classroom students, scouts, senior groups, neighborhood associations, and businesses across the country are volunteering to spread the message of watershed protection and pollution prevention.

“Stencils with whales or reef fish are used in Hawaii: smallmouth bass are featured on the streets of Nebraska: and northwest salmon are the focus of attention in Washington’s watersheds,” she explains.

“People take better care of their watershed when they have a personal stake in it,” Hunter continues. “It gives them an investment in their own local water quality—the streams where they fish or where their children play or the groundwater they drink.”

Hunter is especially pleased with the ripple effect of associated activities. Some of the stencilers go door-to-door in the stenciled neighborhoods, discussing the storm drain’s direct connection to the local stream or lake.

They discuss safer alternatives to pesticides, lawn fertilizers, and household hazardous products, as well as tell residents the location of the nearest local used oil recycling center.

“The real goal is to change that behavior that affects water quality,” Hunter says. Studies have found that information alone, such as that gained by browsing through news articles or brochures, is not enough to change behavior.

She points out that people are more likely to change their behavior once they talk to a concerned citizen, neighbor, or student—especially when they see how their individual action will make a difference. “The ripple effect of the stencilers’ efforts can go a long way beyond the printed reminder on the street,” she says.

Washington’s city and county local governments currently provide stencils and technical support to involve teachers and students in grades four through 12, scout and campfire groups, youth-at-risk programs, businesses, and retired seniors programs.

Bob Spencer, stenciling coordinator for King County, Washington, sees the stenciling program as “a decent program for kids to get involved and really do something. They receive an onslaught of negative information about the environment that makes it seem hopeless. This is a vehicle for turning beliefs into action—something immediate and tangible.”

A group of students in Louisville, Kentucky, enjoyed their door-to-door visits, explaining they liked the stenciling because “people were glad we made an effort to help the community.” The kids liked “knowing that they made a difference.” One fifth grader felt that their project really helped. “We still sort of have a problem but now it’s not so bad.”

For information on how to obtain the stencils, or for a catalog that includes a price list with educational and volume discounts, contact Earthwater Stencils, 4425 140th Ave. S.W., Department SF, Rochester, WA 98579-9703. You may call (360) 956-3774, or fax to (360) 956-7133.
Keeping Wastes out of Drains, Toilets Prevents Pollution

by Nancy Gover
Small Flows Editor

According to a brochure distributed by the Water Environment Federation (WEF), Household Hazardous Waste: What You Should and Shouldn’t Do, the average home contains three to ten gallons of materials that are hazardous to human health or the natural environment.

So what do you do with that half-empty can of paint left over from last summer’s renovation project? That outdated insecticide? Or the used motor oil?

Don’t pour them down the drain. Like storm drains, household drains are not intended to be used as garbage cans. Dumping hazardous chemicals down the drain or toilet may get them temporarily out of sight, but like Arnold Schwarzenegger’s character in the movie, The Terminator, “They’ll be back.”

If you have a septic tank, for example, excessively large quantities of certain chemicals—especially if they’re poured down the drain all at once—can destroy the bacteria that break down the waste. This can interfere with the septic tank’s functioning and possibly clog the drainfield, causing it to fail. (For information on the impact of household cleaning agents on septic system performance, see the WATS Q&A in the spring 1995 issue of Small Flows.)

You may think you’re home free if you’re tied into a municipal sewer, but that just isn’t the case. Automotive fluids, pesticides, solvents, and other substances dumped down the toilet or drain can also cause serious problems once they arrive at the treatment plant.

Just as in the septic tank, substances discarded into home drains can inhibit or destroy the biological processes that break down wastes during secondary treatment.

Keep in mind that the effluent’s journey doesn’t end at the plant or the septic tank. Often, it’s discharged into local aquifers or waterways, the primary source of drinking water for millions of people. This poses a threat to the aquatic life as well as to those who drink the water and use it for recreation.

Toxic metals and other harmful residual materials contained in the household waste may also accumulate in the sludge from the septic tank or the treatment plant. If these substances are present in high enough concentrations, they may make the biosolids unfit for beneficial uses, such as land application or composting.

So unless you are fond of swimming with or drinking those household chemicals, you may want to reconsider how you dispose of them.

A good place to start is the WEF brochure, which gives information on how to dispose of specific substances safely, in an easy-to-read chart, and provides tips for organizing a hazardous waste collection drive in your community.

A publication available from the National Small Flows Clearinghouse (NSFC) describes how a wastewater treatment plant can act as a community collection center for household hazardous wastes. (See related article and ordering information on page 16.)

For further information on the proper care and feeding of your septic tank and a fact sheet containing easy recipes for septic-safe alternatives to common household cleaners, contact the NSFC and order the free STINFOFL packet.

You may also wish to order the free ADDITIVE packet, which contains a selection of articles on additives and a study on the impact of household cleaners on septic systems.

For either packet, call the NSFC at (800) 624-8301, and order them by name: STINFOFL or ADDITIVE. Add $2 for shipping and handling.

Recently updated to include the most current information, the WEF brochure, Household Hazardous Wastes: What You Should and Shouldn’t Do, is available free by contacting WEF at (800) 666-0206.

Another resource for reference materials about household hazardous wastes, including information about how to reduce the production of them, is the Household Hazardous Waste Project. Call them at (417) 889-5000, or write them at 1931 East Battlefield, Suite 214, Springfield, MO 65807.
Lakeside Home Has WV's First Contour Disposal Field

by Nancy Gover
Small Flows Editor

Editor’s Note: The following article describes a typical application of the contour disposal system explained in “Design Process Outlined for Contour Disposal Fields” on page 7. For further information about the technology, see that article or the related article in the winter 1994 issue of Small Flows.

With only $1,000 worth of material and a little sweat equity, Jonathan and Donna Weems recently installed a contour disposal system for their new three-bedroom home on the banks of Cheat Lake, near Stewartstown, West Virginia. The system is the first of its kind in West Virginia.

It was designed by David Pask, P. Eng., National Drinking Water Clearinghouse technical services coordinator. Pask points out that West Virginia’s terrain is very similar to that found in Nova Scotia, Canada, where the contour disposal system concept originated.

The land near the Weems’ home is steeply sloped, with about a foot of clay soil atop a low permeability sandy clay silt. The water table is relatively close to the surface. Pask explains that this is well-suited for a contour system, which works on the principle of horizontal flow.

Pask says that on a site like this, once the effluent enters the ground, its flow develops a horizontal component. The contour disposal trench takes advantage of this horizontal flow by following the land’s contour.

In this case, the trench was constructed along a 35 percent grade in a lot adjacent to the home.

The Weems’ contour system is a relatively simple gravity-fed system, consisting of a concrete septic tank and a connecting line leading to 133 feet of perforated pipe set in a shallow gravel-filled trench that provides 300 square feet of disposal area. An interceptor ditch upslope from the disposal trench helps divert surface runoff away from it.

One alternative was to build a modified septic tank and leachfield, requiring a distribution box, three distribution lines, a pump, and a curtain drain.

The proposed alternative was far more complex and would have been far more expensive, explains Jonathan. Pask’s proposed contour system would cost considerably less. The only hitch was that the alternative did not meet current West Virginia design standards for septic tank/soil/absorption systems.

John Hathaway, a registered sanitarian with the Monongalia County Health Department, explains that the department made an exception when they permitted the Weems’ contour disposal system, but was careful to provide for a backup if it failed.

The contour system was constructed with the understanding that enough area must be retained so that if it fails, a standard system can be installed, points out Hathaway. In addition, the experimental system will be carefully monitored.

He says that the current regulations allow for use of an experimental system to correct an existing failure, but in this case there was none. That explains the provision for the backup.

“We allowed the rules to be bent quite a bit,” he says. “We wanted to see if the contour system would work in this area.

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Jonathan Weems checks the level of the trench bottom as he proceeds with construction of the contour disposal system.

As for the lake, there should be no danger there, either. Pask says that it will take a long time, possibly as long as two years, for the effluent plume to make its way to Cheat Lake. By that time, most of the contaminants will have been removed. He points that the contaminants could move faster if an unusually large amount of rain falls in a short period of time, producing a great deal of surface runoff.

Hathaway feels the theory on which the system is based is sound. However, its application over time will be the real test.

“Some things look good on paper but don’t work when it comes to a real-world application,” he says.

He explains this is probably the best example of an appropriate use of an experimental system. For one thing, he says, an expert designed the system and it will be carefully monitored. There’s also a proviso for a backup if it fails, so if the technology doesn’t work in this area, the problem can be corrected.

“If the homeowner makes a large investment in an experimental system and it doesn’t work, they stand to lose a good deal of money,” points out Hathaway. “The fact that the contour system was relatively inexpensive makes this an especially appropriate use of an experimental system.”

You have to work with people if you can do it and still meet regulations, says Hathaway. He cautions that this only works if you have a viable alternative. Others also stand to benefit from the experiment. “If it works,” he says, “it will be of great use in this area due to the steep slopes and limited soil depths.”
Design Process Outlined for Contour Disposal Fields

by David Pask, P. Eng.

David Pask is technical services coordinator for the National Drinking Water Clearinghouse and a technical coordinator for the National Onsite Demonstration Project (NODP). In the Winter 1994 issue of Small Flows, Pask introduced the concept of the contour disposal field as developed in Nova Scotia, where it is extensively used for new systems and for remediation of failed septic systems. The contour system is based on the theory of predominantly lateral flow in both the saturated and unsaturated zone, which states that there is a horizontal component to the flow of effluent in the unsaturated soil beneath the septic system, in addition to its vertical component. The system’s drainfield, laid out along a contour, is designed to take advantage of this horizontal component.

In this second part of this series, Pask outlines the design of these systems. Site investigation, techniques for measurement of permeability of soils and imported fill material, and the use of contour systems for the renovation of malfunctioning conventional systems will be the subject of future articles.

See the accompanying article on page 9 for additional information on treatment and design considerations for contour systems. Another article on page 6 describes a West Virginia homeowner’s installation of a contour system.

The concept of the contour disposal field is based upon a simplified theory of subsurface hydraulics. This immediately presents the problem: “How do I estimate or measure the soil conductivity or permeability?” The shortcomings of percolation tests are reasonably well documented. I recommend the use of test pits for site evaluation.

For small systems, an estimate of permeability is made from an examination of the soil type and structure. For larger systems (those serving commercial and institutional property) this would be supplemented by permeameter measurement of the in situ permeability.

I have also adopted the engineering classification of soils for its simplicity, and for avoidance of the term “loam,” since almost everyone can claim to have “good loamy soil!” Thus, soils can be classified by use of the terms “clay,” “silt,” “sand,” and “gravel” in various combinations, in order of content, with the last term indicating the predominant constituent. For example, a local form of glacial till might be referred to as “clayey sandy silt.”

It should be possible to produce an evaluation and design from a minimum of two and perhaps more hours, depending on the site’s complexity. The client can be asked to clearly define the boundaries of the site, to indicate the preferred position of the home, and to arrange for the excavation of a test pit either the day before or, preferably, during the actual inspection. Because soils can vary greatly throughout the lot, the test pit should be supplemented with auger samples. At the time of the client’s first application, the discussion will have revealed the basic parameters of the site and any limitations relating to the siting of the home or disposal field will have been explained.

The calculations required have been simplified into a nomogram that can easily be used at the site. (See Figure 1, above.) This nomogram is a graphical representation of Darcy’s equation for the flow of water through a saturated granular soil. If you know the depth of permeable soil, the slope, and the permeability or soil type, it allows you to calculate the drainfield’s length. The nomogram is also suitable for calculating the hydraulic capacity of a site to be used for any form of subsurface disposal, including shallow trench, gravelless trench, at-grade systems, and mounds.

This nomogram represents the design for a single-family home having three bedrooms and an average discharge of 240 gallons per day (gpd). (For other sizes or discharges, extrapolate, as the relationship is linear.)

Using information gained primarily from the test pit, supplemented by local knowledge and experience of prevailing conditions in the area, mark the first column at a point that represents the available and effective depth of soil that will receive the effluent. This may be either the depth to a restrictive horizon or to saturated soil. From this point, continue a line to intercept the second column at the anticipated hydraulic gradient of the effluent plume. In most cases it can be assumed that the gradient will be the local topographic gradient (i.e., the predominant slope of the site). Terminate the first line at the third column, which is simply the turning line—the intercept of which represents the product of the first two parameters.

From this point, start a new line to intercept the fourth column, which is the scale for entry of the soil permeability. For small systems, use the soil type as the guide to permeability, using values at the middle of the range. For larger systems, use an average value of measured permeability (measured by in situ permeameter in meters per second). Continuation of this line to the fifth column will make an intercept that indicates the length of contour that is required to ensure complete entry of the effluent into the subsoil.

The width of the disposal field is based upon an effluent loading rate of 0.8 gpd per square foot of trench bottom (excluding sides). (The effluent is expected to travel vertically down through the biomat, into the sand layer, and then travel laterally in the soil environment.) Thus the three-bedroom home requires a total trench area of 300 square feet. The required width of the trench is therefore 300 divided by the length of the contour. (See the related article in the Winter 1994 issue for more information about loading rates.)

The depth of the trench is dependent upon local climatic conditions, but should be as shallow as possible to allow the effluent to enter the upper horizons of the soil for the most effective contaminant removal. In Nova Scotia, a soil cover of 12 inches above the gravel prevents freezing in all normal circumstances. With four inches of gravel over three inches of coarse sand, the trench depth at the line of the contour becomes 19 inches. Farther south, it should be possible to reduce the depth to 12 or 14 inches.

A single distribution pipe of four inches or less in diameter from the septic tank is all that is required. For a single family home, trickle gravity flow may be used to the center or end of the trench, providing that the pipe has only one hole in the invert per pipe length, with normal spacing of holes in the sides. Conventional perforated...
Design Process Outlined for Contour Disposal Fields

Continued from page 7

distribution pipe, with side holes four to six inches apart, may also be used, but should be drilled with one hole per pipe length in the invert. Pipe with several holes in the invert should not be used.

Trenches longer than 150 feet will require pressure distribution by pump or siphon.

If the indicated length of trench is too long for the available site, modifications to the design can be made. I do not recommend adding the additional length as a second contour parallel to the first as, in theory, the soil has already been saturated by the first upper trench. For these conditions, a shallow trench of as great a length as possible is constructed on the site, and a mound of sand is placed over the trench and downslope. This ensures that when conditions are such that the soil cannot absorb all of the effluent, the surplus overflow and is drawn by capillary action into the sand and is discharged at the surface at the tail of the mound. (Before you design a similar mound-type contour disposal system, check with local authorities to determine if breakout at the toe of a mound is permitted. This surface discharge of effluent is illegal in most states.)

An extensive program of research has shown that lateral flow through the mound effectively reduces the biochemical oxygen demand (BOD) and bacterial count to acceptable levels for transient surface flow. In practice, the flow is through the root zone of the surface vegetation. I have seen only one case where the flow was visible and this was where the owner had stripped off all the topsoil and vegetation down to bare clay. Due to the strategy of placing the distribution trench along an actual contour, the effluent stream is spread over the full width of the site and is undetectable. This version of the contour disposal field, known as the “C2,” is shown in Figure 2.

Another version of the contour was developed for conditions of shallow bedrock where there is danger of raw septic tank effluent entering a fissure and traveling to neighboring wells. In this version, known as the “C3” (shown in Figure 3), the distribution bed is placed in a shallow mound of sand fill, again placed along a contour of as great a length as the site conditions will allow. The depth of fill is dependent on the separation distance between the distribution trench and the bedrock that may be required in a particular state. In Nova Scotia, a depth of 12 inches of sand was found to be adequate, but the distance is not regulated.

Report Compiles State Septic System Inspection Regulations

If you routinely work with septic systems, you are probably aware that septic system inspection regulations vary from one state to the next. Do you know what the laws are in your state? Would you like to compare them with regulations in other states?

A new report from the National Small Flows Clearinghouse (NSFC) provides this information in a 128-page document, Inspections from the State Regulations. This report is a compilation of regulations for septic system inspections from the 23 states that have them on the books. The information was collected from the NSFC’s Regulations Database.

Inspections from the State Regulations may be of interest to design engineers, installers, contractors, and others who work with septic systems. In addition, local officials and others involved in developing onsite and septic system regulations may also find it valuable. Included with the report is a complete list of state regulatory contacts and references for all 50 states that includes names, addresses, and telephone numbers.

Twenty-seven states do not have regulations for septic system inspection. When ordering, be sure to ask if the state regulations you are looking for are included in the report.

To order Inspections from the State Regulations, call the NSFC’s toll-free number, (800) 624-8301 and order item #WWPCRG40. The cost is $3.70. Add $2 for shipping and handling.

Correction

Small Flows regrets that the individuals in this photograph were incorrectly identified in the Winter 1995 issue. The caption should have read “Gloucester Mayor Bruce Tobey (from right, foreground), City Engineer William Robertson, P.E., and Gloucester resident Frank Garrison examine a recirculating trickling filter prior to its installation at one of three onsite demonstration sites in the Massachusetts community.”
Mooers points out they are also beginning to catch on in other provinces, including Prince Edward Island, New Brunswick, Ontario, and British Columbia. Mooers has been researching contour systems for five years. Because there are so many systems in the province, he’s also had an opportunity to observe many of them in the field.

Mooers explains that there are three variations of the contour design that allow them to be adapted to meet various site requirements. The design variations are C-1, C-2, and C-3. (See figures 2 and 3 on page eight.)

“The C-1 system is a trench that is dug and then filled to ground level,” he explains. “The C-2 trench is shallow, and includes a cover layer of sand to contain and treat effluent movement through the system. In the C-3,” he continues, “the configuration is built up above the ground level, much like a standard EPA-style mound system, but laid out along a contour.”

Mooers says that it’s been his experience that properly installed systems do not allow effluent to surface. When the systems do fail, he says, the problem is usually traceable to faulty installation or lack of maintenance.

He explains that a failure that occurs soon after installation is generally due to improper backfill or trenches that are not level. The system may also fail if the fill material used to backfill the trenches is compacted by heavy machinery. If the system fails over the long run, it’s usually due to homeowner habits, such as hydraulic overloading, says Mooers.

He emphasizes that the systems should be installed on a five to 30 degree slope. Below that, the effluent movement doesn’t develop a horizontal component, which is a problem for any disposal system, he explains.

When a conventional system fails in Nova Scotia, he explains, the first choice for a replacement is usually a contour system. However, if the soil’s hydraulic capacity is not sufficient, then another design based on the contour system concept, the Lateral Flow Sand Filter System (LFSF), is often installed.

With the exception of the fill material that covers the trenches (sand for the LFSF versus permeable fill for the contour system), Mooers points out that LFSFs are actually quite similar to contour disposal systems.

Mooers recently collaborated on laboratory research, conducted by Gordon Check, M.A. Sc., intended to document the LFSF’s treatment capabilities. Results of the study were published in “Lateral-flow sand-filter system for septic tank effluent treatment” in the November/December 1994 issue of Water Environment Research.

In the study, researchers used laboratory models of the LFSF with three different imported sand fills that covered a range of permeabilities and grain sizes. The fill was dosed with septic tank effluent for six months.

The research concluded that compared with other onsite wastewater sand-filter systems, the laboratory models show “as good, or better, treatment efficiencies. Bacterial reductions in the laboratory LFSFs are particularly good,” it continues. “The pilot study for virus transport through the system also showed high removals.”

Activities
According to a fact sheet published by the Center for Hazardous Materials Research, wastewater treatment plants can practice pollution prevention (and cut costs) by adopting strategies, such as reducing contaminants where they enter the wastewater stream, segregating the wastewater stream to enhance recovery of polluting substances, and using alternative methods that reduce the volume or toxicity of sludge generated.

The U.S. Environmental Protection Agency (EPA) Municipal Water Pollution Prevention (MWPP) program encourages treatment plants to develop programs aimed at preventing discharge permit violations, maximizing the design lives of sewage treatment plants and ensuring good facility planning. The program is administered through MWPP coordinators in each of the 10 EPA regions. (For further information about the program and a complete list of MWPP coordinators, see the Summer 1994 Small Flows.)

The article on page 4 about a storm drain stencilling project that is promoting an awareness of the consequences of dumping hazardous substances, such as motor oil, into neighborhood storm drains.

Conservation
Another aspect of pollution prevention is that of protecting natural resources through conservation or increased efficiency. For water, that means using it wisely and efficiently. Conserving water also can have indirect benefits in terms of conserving other resources. Using less water, for example, translates into less demand for energy to treat, pump, and heat it.

The article on page 13 highlights findings of a 1994 study on the impact of new plumbing standards mandated by the National Energy Policy Act. These maximum water-use standards (for the manufacture of low-flow and low-flush plumbing fixtures) are a form of pollution prevention because, by conserving water, they help preserve finite resources and reduce the amount of polluted water created.

More Resources Available
In this special issue highlighting pollution prevention, you also will find information about two resources that can provide additional information about pollution prevention—EnviroSense and WaterWiser. The EPA Pollution Prevention Directory described on page 16 serves as a guide to pollution prevention programs throughout the U.S. These resources can help you find what you need to determine a pollution prevention strategy and obtain the assistance you need to implement it.

For immediate information about what you or your community can do to prevent pollution, see the suggestions on pages 10 and 11. This list is also available from the NSFC in the form of an EPA brochure, called Preventing Pollution Through Efficient Water Use.

Throughout this issue, we’ll also be featuring other informational and educational materials available from the NSFC that are specifically geared toward pollution prevention. (See article on page 12.)
Preventing Pollution...

How Efficient Water Use Helps Prevent Pollution

Using water more efficiently can help prevent pollution as well as protect and conserve our finite water resources. More efficient water use by you and your community has many other benefits.

**Fewer Pollutants**
Using less water reduces the amount of wastewater discharged into our lakes, streams, rivers, and marine waters.

The amount of pollutants wastewater carries can also be reduced, as treatment efficiency improves.

Recycled process water can reduce pollutants from industry.

More efficient irrigation can minimize runoff of agricultural pollutants and reduce the use of fertilizers and pesticides.

**Protecting Aquatic Habitats**
Building fewer and smaller new water projects can help preserve wetlands, which naturally treat pollutants.

Diverting less water preserves more streamflow to maintain a healthy aquatic environment.

**Protecting Drinking Water Sources**
Less pumping of groundwater lowers the chance that pollutants will be drawn into a water supply well.

With less water use, septic system performance can improve, reducing the risk of groundwater contamination.

Highest quality water sources are preserved for drinking water by using treated wastewater for other uses.

**Energy Conservation**
Efficient use means less power needed to pump and treat water and wastewater.

Less water use reduces the amount of energy required for heating water.

Less energy demand results in fewer harmful byproducts from power plants.

Other Reasons to Use Water Wisely

Preventing pollution is only one reason why using water efficiently makes sense. Here are a few more:

**Money Saved**
Less water use results in lower pumping and treatment costs.

Saving money on water and wastewater operations frees money for meeting water quality, public health and water treatment goals.

Water saved is also energy, and money, saved for you and your community.

**Improved Reliability**
Water conservation provides a hedge against drought impacts.

Improving water efficiency may be quicker and cheaper than developing a new supply.

Reduced water use may extend the life of your water or wastewater facility.

Reduced water use may increase the efficiency of wastewater treatment, and reduce overflows during storms.

Communities that use water efficiently are better prepared to cope with effects of possible future climate change.
Through Efficient Water Use

What Communities Can Do

A water supplier or wastewater system operator (public or private) has cost-effective options to process and deliver water more efficiently. A community can do the same, and can foster ways to use water wisely.

Not all of these steps are expensive. The best choices vary by region and by community; start by asking if these are appropriate where you live and work.

A Community Can:

- Adopt plumbing and building codes that require water-efficient equipment and practices.
- Adopt a water-efficient landscaping ordinance to reduce the water used for golf courses and commercial landscapes.
- Retrofit older buildings with water-efficient equipment, starting with public buildings.
- Reduce municipal water use for landscaping and other uses.
- Conduct a public education campaign.
- Require developers to build in water efficiency measures.

What Individuals Can Do

More efficient water use begins with individuals, in the home and at work. Taking these and other steps, and encouraging others to do so, makes good economic, as well as, environmental sense.

In the Home

Install a toilet dam or plastic bottle in your toilet tank.
Install a water-efficient showerhead (2.5 gallons or less per minute).
When you buy a new toilet, purchase a low-flow model (1.6 gallons or less per flush).

Outdoors

Water in the morning or evening to minimize evaporation.
Install a drip-irrigation watering system for valuable plants.
Use drought tolerant plants and grasses for landscaping, and reduce grass-covered areas.

At Work or School

Adopt the same water-saving habits that are effective at home.
Ask about installing water-efficient equipment and reducing outdoor water use.
Encourage employers to explore the use of recycled graywater or reclaimed wastewater.

What A Water Supplier or Wastewater Processor Can Do:

- Identify who uses water and reduce unaccounted-for water use.
- Find and repair leaking pipes.
- Consider a new pricing scheme that encourages conservation.
- Reduce excess pressure in water lines.
- Explore the reuse of treated wastewater for uses other than drinking water.

Charge hookup fees that encourage more efficient water use in new buildings.
Build water efficiency into future demand projections, facility planning, and drought planning.

Information on these pages was adapted from the U.S. Environmental Protection Agency’s (EPA) brochure, Preventing Pollution Through Efficient Water Use. The brochure is available free from the National Small Flows Clearinghouse. Call (800) 624-8301 and order item #WWBRPE26. Please add $2 for shipping and handling.
EPA Guide Describes Funding Options

Traditionally, funding for environmental programs has come from general revenue funds. Now that federal, state, and local governments are facing fiscal constraints, alternative sources of funding are becoming important options for implementing nonpoint source pollution controls and other environmental protection measures.

A new U.S. Environmental Protection Agency booklet produced by the Office of Water is available from the National Small Flows Clearinghouse (NSFC), called

**A State and Local Government Guide to Environmental Program Funding Alternatives**, describes some of these funding options.

The booklet covers four basic ways to fund public programs and facilities: current revenues (pay as you go); borrowing (bonding); intergovernmental transfers/assistance (fees or taxes collected by one level of government and passed on to another in the form of loans or grants); and public-private partnerships (private sector involvement in historically public sector activities).

The guide provides an overview of traditional funding mechanisms and introduces state and local governments’ innovative alternatives to traditional funding. The focus is on nonpoint source pollution, but funding sources and mechanisms can be applied to other environmental programs. A list of contacts and references is included in the back of the booklet to answer questions and provide additional information.

It also describes State Revolving Funds (SRFs), probably the best known alternative funding source. SRFs are long-term, low-interest loans made to local governments or individuals for capital investments. The revolving fund concept is that repayment takes place over a period of time, generating funds for new loans.

Other sections define and explain leases, grants, and public-private partnerships, as well as the traditional revenue sources such as taxes, fees, and bonds. The section on taxes details various kinds of taxes available, such as property and sales tax, real estate and transfer tax, commodity taxes, tax surcharges, and tax incentives and disincentives.

Fees include plan review fees, stormwater utility fees, impact fees, inspection fees, and user fees, among others. The last group, bonds, includes short- and long-term bonds; general obligation bonds and revenue bonds, and bond banks. Each section includes case studies of actual programs implemented using each funding method.

Included in the material is a description of a creative alternative funding source called “pollutant trading.” This involves financing reductions for nonpoint source pollution in lieu of undertaking point source pollution reduction efforts.

Another section describes a case study of the Chesapeake Bay restoration project that began with the establishment of the Chesapeake Bay Trust in 1985. The project brought the support of the business community and private donors together with the many community groups and educators that needed financial assistance for their bay projects.

To order your free copy of A State and Local Government Guide to Environmental Program Funding Alternatives, contact the NSFC at (800) 624-8301, and order item #FMBLFN14. The guide is free. Please add $2 for shipping and handling. ♦

NOWRA Calls for Papers on Watertight Septic Tanks

The National Onsite Wastewater Recycling Association (NOWRA) is calling for papers on the construction of watertight septic tanks to be used in the development of a videotape on the topic for presentation at its annual conference.

The videotape will illustrate the recommended construction techniques used to construct a watertight septic tank. Papers should present casting methods, specifications, and drawings, and should be backed up by calculations and data in order to be considered.

For further information about what is required for submissions for the videotape, contact Harold Ball, President, Oreno Systems Inc., at (503) 459-4449.

Abstracts for the NOWRA conference may be submitted to A. Robert Rubin, Ph.D., Extension Specialist, North Carolina State University at phone: (919) 515-6791, or fax: (919) 515-6772.

NOWRA’s Annual Conference and Exhibit is scheduled for September 15–17 in Tacoma, Washington.

Construction of watertight septic tanks will also be a topic of discussion at the University of Washington’s 8th Northwest Onsite Wastewater Treatment Short Course in Seattle, Washington on September 18–19.

See the Calendar of Events on page 27 for further information on NOWRA’s Annual Conference and the Onsite Wastewater Treatment Short Course. ♦

More About Pollution Prevention from NSFC

Would you like to know more about pollution prevention? The National Small Flows Clearinghouse (NSFC) has the following videotapes, case studies, abstracts, and brochures that may fit your needs:

**The Alternative is Conservation:** Twenty-minute videotape discusses conservation as a means of lowering demands on water supply and reducing wastewater volume. Order item number WWVTG13. Price is $29.50.

**Saving Water—the Conservation Video:** Children’s videotape explains easy ways to prevent pollution. Also discusses how pollution threatens our water supply. Order item number WWVTPE24. Available for loan.

**Water Conservation:** More than 100 abstracts of articles related to water conservation. Order item number WWBLC11. Cost is $5.90.

**Water Follies:** Seven-minute animated videotape explains conservation by comically illustrating improper uses of water. Order item number WWVTPE12. Cost is $26.00.


To order, call the NSFC at (800) 624-8301. Please add $2 shipping and handling on all orders. ♦
Water conservation efforts such as those outlined in the National Energy Policy Act (EPAct) are beneficial to the environment and consumers, but water supply companies must carefully plan their conservation strategies.


The EPAct, passed in 1992, established maximum water-use standards for newly manufactured plumbing fixtures. According to the act, any tank-type toilet for commercial use manufactured after January 1, 1994, must use a maximum of 1.6 gallons per flush. The same requirement is mandatory for all tank-type toilets for commercial use manufactured beginning in 1997.

By comparison, some conventional toilets use as much as seven gallons of water per flush. The typical household switching from conventional to more efficient low-flow toilets can save an estimated 76 gallons of water per day, according to the NRRI report.

The EPAct also sets water-use standards for newly manufactured urinals (a maximum one gallon per flush), kitchen and bath faucets, and showerheads. When these fixtures are installed for home use, water savings can mushroom to 147 gallons per day. (See chart at lower right for details of the savings potential of water-efficient fixtures.)

“Many water efficiency technologies are relatively inexpensive to install and can yield a fairly quick payback (from a few months to a few years),” the NRRI report states.

The report also recommends how state and local incentive programs can accelerate voluntary replacement of conventional fixtures with the new, efficient fixtures. Toilet replacement involves such a potentially huge water savings that some municipal water systems have initiated toilet rebate programs.

New York City, for instance, offers its residents a rebate of up to $240 per toilet. City officials started the rebate program after deciding that an expensive expansion in wastewater treatment capacity would be needed soon unless conservation steps were taken. Water supply and environmental issues were also factors in starting the rebate as well as the positive consumer reaction to reduced water and wastewater bills.

The report mentions these water-saving efforts in the context of how water suppliers should view conservation. The report warns utilities to carefully study any plans to use conservation pricing, a means of setting prices in such a fashion that consumers have an extra incentive to conserve.

The report states that conservation can be beneficial in helping systems avoid capital and operational costs in increasing water supply and treatment. But conservation can reduce a system’s income without reducing costs, such as distribution and infrastructure replacement.

*The report is available from the National Regulatory Research Institute, The Ohio State University, 1080 Carmack Road, Columbus, OH 43210; or you may call (614) 292-9404. The cost is $47.40.*

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### POTENTIAL WATER SAVINGS FROM EFFICIENT FIXTURES

<table>
<thead>
<tr>
<th>Fixture (a)</th>
<th>Fixture capacity (b)</th>
<th>Water Use (GPD)</th>
<th>Water Savings (GPD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Per capita</td>
<td>2.7-person household</td>
</tr>
<tr>
<td><strong>Toilets (c)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficient</td>
<td>1.5 gallons/flush</td>
<td>6.0</td>
<td>16.2</td>
</tr>
<tr>
<td>Low-flow</td>
<td>3.5 gallons/flush</td>
<td>14.0</td>
<td>37.8</td>
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<tr>
<td>Conventional</td>
<td>5.5 gallons/flush</td>
<td>22.0</td>
<td>59.4</td>
</tr>
<tr>
<td>Conventional</td>
<td>7.0 gallons/flush</td>
<td>28.0</td>
<td>75.6</td>
</tr>
<tr>
<td><strong>Showerheads</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficient</td>
<td>2.5 (1.7) gallons/minute</td>
<td>8.2</td>
<td>22.1</td>
</tr>
<tr>
<td>Low-flow</td>
<td>3.0 to 5.0 (2.6) gal/min</td>
<td>12.5</td>
<td>33.8</td>
</tr>
<tr>
<td>Conventional</td>
<td>5.0 to 8.0 (3.4) gal/min</td>
<td>16.3</td>
<td>44.0</td>
</tr>
<tr>
<td><strong>Faucets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficient</td>
<td>2.5 (1.7) gallons/minute</td>
<td>6.8</td>
<td>18.4</td>
</tr>
<tr>
<td>Low-flow</td>
<td>3.0 (2.0) gallons/minute</td>
<td>8.0</td>
<td>21.6</td>
</tr>
<tr>
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<td>3.0 to 7.0 (3.3) gal/min</td>
<td>13.2</td>
<td>36.6</td>
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<tr>
<td><strong>Toilets, Showerheads, and Faucets Combined</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Efficient</td>
<td>not applicable</td>
<td>21.0</td>
<td>56.7</td>
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<tr>
<td>Low-flow</td>
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<td>34.5</td>
<td>93.2</td>
</tr>
<tr>
<td>Conventional</td>
<td>not applicable</td>
<td>54.5</td>
<td>147.2</td>
</tr>
</tbody>
</table>

na = not applicable
(a) Efficient = post-1994
Low-flow = post-1980
Conventional = pre-1980
(b) For showerheads and faucets: maximum rated fixture capacity (measured fixture capacity). Measured fixture capacity equals about two-thirds the maximum.
(c) Assumes four flushes per person per day; does not include losses through leakage.
(d) Assumes 4.8 shower-use-minutes per person per day.
(e) Assumes 4.0 faucet-use-minutes per person per day.

Global Conference Looks at Emerging Technologies

“New and Emerging Environmental Technologies and Products for Wastewater Treatment and Stormwater Collection,” a Water Environment Federation (WEF) specialty conference set for Toronto, Canada, June 4-7, 1995, will cover the latest wastewater treatment, effluent disposal, and specialized waste technologies in use throughout the world.

Canadian Minister of Environment Sheila Copps has been invited to open the conference and discuss methods to promote technology transfer. A plenary panel will discuss innovations in wastewater treatment worldwide and anticipated developments in the next 10 years.

The conference, which is conducted in cooperation with the Water Environment Federation Association of Ontario, will focus closely on practical applications and experiences.

Presenters from around the world will discuss collection systems, specialized treatment processes, solids handling, liquid treatment, specialized treatment, and nutrient removal. For example, one presentation will cover a Taiwanese process for removing nitrogen from wastewater via intermittent contact aeration.

To obtain conference information and registration forms, plus travel and hotel information, call WEF toll-free at (800) 666-0206 or (703) 684-2452. ♦

NSFC Offers Watershed Information Package

Watersheds and groundwater protection have become important concerns for many who work with environmental issues. Questions often arise about the role of wastewater and wastewater treatment in maintaining clean watersheds: Are sewage treatment plants causing water quality problems? Can alternative onsite systems alleviate water quality problems?

To answer these questions and more, the National Small Flows Clearinghouse is offering a new information package, “Wastewater in Watersheds.” This helpful package describes the role of onsite systems in maintaining watersheds and groundwater quality, provides examples of successful watershed management projects, and lists additional resources for information.

The package contains all the articles from Small Flows on watershed projects and resources and a watershed search of the NSF’s Bibliographic Database.

The cost of the package is $16.20. To obtain a copy, call the NSF at (800) 624-8301 and ask for Item #WWWPGN57. Please include $2 for shipping and handling. ♦

Earth Day 1995: A Silver Anniversary Celebration

Continued from page 3

Carolyn Chase, executive director of Earth Day Network and founder of the San Diego Earth Day, said this year’s celebration was a great success. “Earth Day 1995 was an incredible showing of human commitment, and it inspired people all over the world. Regardless of various recent environmental controversies, people have demonstrated that they care about a clean, healthy environment and that it’s important to everyone.”

For more information, contact Earth Day Network, P.O. Box 9827, San Diego, CA 92169, or call their 24-hour hotline at (619) 496-3361. To reach Earth Day USA, write to P.O. Box 470, Peterborough, NH 03458 or call (603) 924-7720. ♦

COMPLETE YOUR COLLECTION

Free back issues of Small Flows newsletter are available

A re you missing some past issues of Small Flows? If so, now’s the time to complete your collection. The following issues of Small Flows are available FREE while supplies last. As an added bonus, we’ll also provide free shipping and handling. Sorry, not all issues are available, so order your copies now before they’re all gone!

Please use the order form on the products insert to order or call 1-800-624-8301. Or you may fax your order 24 hours a day to the attention of the NSFC Customer Service Department at (304) 293-3161.

Fall 1994
Watershed management education program; EPA’s Combined Sewer Overflow program. Item #GNLLBI29.

Summer 1994
Effects of water softeners on septic tank systems. Item #GNLLBI28.

Spring 1994
Interview with EPA’s Robert Perciasepe; profile of drip irrigation technology; New York City’s watershed management program. Item #GNLLBI27.

July 1993
Special wastewater treatment plant operators issue; information on 503 sludge regulations. Item #GNLLBI24.

April 1993
Effects of different types of toilet paper on septic tanks; alternative toilets. Item #GNLLBI23.

January 1993
Special cold climate issue (features constructed wetlands, septic tanks, wastewater reuse at a ski resort). Item #GNLLBI22.

October 1992
Septic tank pumping intervals; septic tank effluent pump (STEP) systems. Item #GNLLBI21.

May 1990
Municipal constructed wetlands; community soil absorption systems. Item #GNLLBI11.

July 1991
Wastewater reclamation; self-help. Item #GNLLBI16.

September 1990
Vacuum sewers; spray irrigation systems. Item #GNLLBI12.

Winter 1995
EPA’s new Environmental Technology Initiative; Gloucester, Massachusetts, demonstration project. Item #GNLLBI30.
Dear Editor:

I was very pleased with the front-page article on Gloucester’s National Onsite Demonstration Project in the spring issue of Small Flows. What is happening in Gloucester is important not only for the City but also for many communities in Massachusetts and in other states.

Besides piloting alternative onsite technologies, Gloucester is also building a small-diameter effluent pump (STEP) sewer for part of the North Gloucester area. This latest sewer construction will serve more than 500 residential and commercial dwellings, mainly in the Annisquam, Bay View, and Lanesville areas.

The STEP sewer is relatively new in this part of the world and it has posed many challenges to engineers and policy makers. One of the important issues that the policy makers are struggling with is how to disperse the cost of sewer ing among the citizens.

In 1988, the City constructed a sewer for about 1,000 homes. The sewer includes approximately 100 grinder pumps and 11 pumping stations that transport sewage from the Wheelers Point and Riverdale area to the central treatment plant. The total cost of this project was more than $22 million. The City of Gloucester received about $8 million dollars in grant funding. A little over $4 million of this was absorbed by all the citizens, and a little over $2 million was passed onto the future sewer projects in North Gloucester. The remaining cost was divided among the citizens in the sewer area, bringing the average cost for the sewer project to about $8,000 per house.

The cost for the STEP sewer project is about $11 million and there is no grant funding available for this project. The STEP sewer construction involves installing pipes and appurtenances in the street as well as installing STEP tanks and pump systems on private property.

Thus, the total cost of the STEP project can be divided into two parts: the on-street cost for street work and the on-lot cost for work done on private property. Out of the $11 million total cost, about $6.5 million is for street work and the rest is for on-lot work. (The reason for making a distinction between the on-street and on-lot costs is so that people who own vacant lots and therefore don’t need pumps and tanks installed on their property pay only the on-street share of the sewer project.)

In the past, Gloucester’s policy makers have subsidized the sewer construction by about 25 percent of the total cost. However, for this STEP sewer project the policy makers are baffled by the idea of subsidizing the on-lot cost because the work is being done on private property. Last month, the City Council voted five to four to subsidize only the on-street cost and not the on-lot cost. The Council failed to recognize the fact that the STEP tank and the pump systems are the integral part of the STEP sewer and, irrespective of where they are located, they should be treated no different than pipes installed in streets.

At present, the cost per connection for the STEP sewer is about $17,500 per house, which is almost double the cost of the previous sewer constructed only six years ago. If the Council had decided to subsidize the total cost by 25 percent, the cost per connection could be about $2,000 less. Even then, the cost per connection is quite high for many citizens.

I would like to know how the cost of STEP sewers is dealt with in other communities. Do other communities recognize the STEP tank and pump system as integral part of the sewer system? Communities like Gloucester can really use some help on this issue.

Sincerely,

Anish Santra, Ph.D., P.E.
In-House Consulting Engineer
Gloucester, Massachusetts

Onsite Wastewater Industry Can Learn from Freud

Dear Editor:

Sigmund Freud was a Viennese psychoanalyst who, around the turn of the century, knocked the mental health field on its ear with his monumental and traumatic assertions. What does this have to do with the onsite wastewater industry?

One of the most notable of his contributions to the helping profession of counseling was his controversial theory on personality development. He said that each one of us goes through a series of psycho-developmental stages each with its own characteristic conflict of drives and instincts. The stage to which I, as an on-site wastewater person, specifically refer is Freud’s infamous “anal stage.”

Bear in mind that the anal stage is a serious matter dealing with dysfunctional addiction to control. It also deals with childhood inner conflicts that arise in ones first experience with the social expectations. By exercising ones’ newly-realized control of certain indeclicte body functions, one soon learns how to control/dictate the behaviors and reactions of other people. Thus begins what can be a lifelong insatiable thirst for POWER.

Back to our onsite wastewater industry and to my main point: control is an illusion. As Stephen Covey wrote in his book, Seven Habits of Highly Effective People, interdependence is the apex of fulfilling accomplishments and relationships. This is no more true in any other industry than onsite wastewater. Why?

First, we incorporate an extremely diverse cross-section of the American public. From the computer nerd developing wastewater management programs to the dyed-in-the-wool bureaucrat to the good-ol’ boy septic pumper, we all have in mind the ultimate goal of public health. We desperately need each gift that each element of the group brings to the table. Attempts at control, then, are counter-productive.

Second, our subject matter suffers an unfair public stigma and the resultant epidemic of public ignorance. Still, true to our dignified cause of public health, we press on.

Finally, I contend that we seriously lag behind other professions and industries. One need only peruse the well-honed training programs that some professions have in all 50 states. Witness the massive organizational structures reaching into every nook and cranny of the country that some industries enjoy. The accompanying legislative/lobbying arms of these more mature professions are awesome indeed. By comparison, our industry is but a toddler, yes, a toddler in potty training!

And so I conclude that we have no need to control each other. Our need is to uplift and dignify each other in a mutual gain for all. We indeed are interdependent! All factions—regulators, entrepreneurs, legislators, and property owners alike—must act boldly as we approach the twenty-first century. We are eminently witnessing the awesome dawn of the Sludgie Yuppie! Let’s not “regress” to the antagonistic days gone by. Let’s not “fixate” primarily on special interests. All that refuse must be “eliminated.” (I tried in vain to resist the cheap pun!) Like our friend, Dr. Freud, let’s use our insight and wisdom to knock the industry on its odoriferous ear!

Keep up the great work!

Sincerely,

Frank Aguirre,
Professional Sanitarian
San Antonio, Texas

Responsibility without power is not much of an ingredient in my dealings with the bureaucrat to the good-ol’ boy septic pumper, we all have in mind the ultimate goal of public health. We desperately need each gift that each element of the group brings to the table. Attempts at control, then, are counter-productive.

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Keep up the great work!

Sincerely,

Frank Aguirre,
Professional Sanitarian
San Antonio, Texas

LETTERS TO THE EDITOR
New Water Efficiency Clearinghouse Established

by Lauretta Gallbraith
NSFC Staff Writer

Editor’s Note: This article is adapted from an article that appeared in the Spring 1994 issue of On Tap, a quarterly newsletter that provides drinking water news for America’s small communities.

A new water efficiency clearinghouse, called WaterWiser, has been created to help water and wastewater professionals plan, implement, and evaluate their water efficiency activities.

WaterWiser, which collects and distributes technical and general consumer information about water use efficiency and conservation, was created so water utilities, government facilities, and the public could have one place to go for conservation information.

A cooperative project of the U.S. Environmental Protection Agency and the American Water Works Association, the clearinghouse can help answer such questions as “How can water conservation help prevent pollution?” or “How does efficient water use reduce flows to a wastewater treatment plant that exceeds capacity?”

WaterWiser offers a number of useful resources for water efficiency programs, including referrals; annotated bibliographies, literature searches, information packets, and fact sheets. Most services are provided free of charge; however, a nominal fee is required for some items.

WW Treatment Plants Can Be Waste Collection Sites

Collection and proper disposal of household hazardous waste (HHW) can be an important pollution prevention strategy for small communities. HHWs include pesticides, motor oil, car batteries, common cleaners, paint products, and other materials that may be damaging to human and environmental health. These types of contaminants in wastewater also can result in damage to pipes and injuries to workers.

To reduce the improper disposal of HHWs, communities have implemented a variety of programs, including using wastewater treatment plants as permanent collection centers for HHWs. Wastewater treatment plants can be ideal sites for HHW community collection programs because they’re usually better equipped to handle emergency spills and the disposal of nonhazardous materials. Other advantages of using wastewater treatment plants include the opportunity for public education about HHW and wastewater treatment.

A booklet offered by National Small Flows Clearinghouse (NSFC), Case Study Number 20—Collecting Household Hazardous Wastes at Wastewater Treatment Plants, provides case studies of communities that successfully used their wastewater treatment plants as HHW collection sites. It is a valuable resource for communities planning their own HHW collection programs. The booklet also includes examples of promotional and other materials used by the communities in the case studies.

The booklet is $4.65 plus $2 shipping and handling. To order, call the NSFC at (800) 624-8301, and request Item #WWPCCS20.

EPA Offers Revised Pollution Prevention Directory

The U.S. Environmental Protection Agency’s (EPA) Office of Pollution Prevention and Toxics is offering a newly revised directory of publicly sponsored pollution prevention resources.

Titled the Pollution Prevention Directory, the 103-page publication contains a list of pollution prevention technical assistance programs that are available for small and medium-sized businesses. It also lists universities that conduct pollution prevention research and training available in each state. In addition, it contains information about EPA pollution prevention assistance programs and other federal programs.

According to the EPA, a pollution prevention program is a comprehensive and continual effort to systematically reduce or eliminate pollution and wastes. Part of pollution prevention includes source reduction which, according to the 1990 Pollution Prevention Act, means reducing the amount of hazardous substances, pollutants, or contaminants entering waste streams or that are released into the environment prior to recycling, treatment, or disposal.

By implementing pollution prevention practices, businesses and organizations can reduce the costs of pollution control and waste disposal; improve regulatory compliance; reduce the liability associated with the management of hazardous materials and wastes; and improve employee safety.

This free publication and other information on EPA’s pollution prevention programs may be ordered from the Pollution Prevention Information Clearinghouse at the EPA, 401 M St., SW 3404, Washington, DC 20460, or by calling (202) 260-1023. When ordering the Pollution Prevention Directory, request EPA publication 742-B-94-005.

Pollution prevention information is also available via Internet on EPA’s Main Gopher Server at gopher.epa.gov. By using the Gopher’s word search capability, you can type in pollution prevention when you log-on to the server, and a list of publications will appear, including the Pollution Prevention Directory. (Please limit requests to 10-15 per order.)
Enviro$ense Is Network Link for Environmental Issues

by Natalie Eddy
NSFC Staff Writer

A new 24-hour government electronic library featuring a variety of environmental information ranging from pollution prevention to compliance issues is available to the public.

The new system, called EnviroSense (ES), is actually made up of two sister systems. One offers access through an electronic bulletin board system (BBS) and the other through the World Wide Web (WWW) on the Internet.

Myles Morse, who co-manages the ES project, said it will give computer users immediate access to thousands of environmental documents and professionals worldwide.

Louis Paley, environmental engineer with the Federal Facilities Enforcement Office Compliance and Voluntary Projects, and co-manager of the project, said in addition to pollution prevention, ES focuses on all facets of the environment. “We will not only cover pollution prevention, but federal facilities and compliance and enforcement matters. We will make every effort to cover anything to do with the environment. We will start accumulating things about recycling, cleanup, and disposal type topics,” he said.

ES currently has more than 20,000 pieces of information ranging from information contacts to the Code of Federal Regulations.

Other resources include pollution prevention case studies, the Pollution Prevention Reference Database, Supplemental Environmental Project Database, Federal statutes, federal registers, Solvent Alternative Umbrella (a multi-agency database), training information, toxic release inventory information, environmental enforcement cases, guidance documents, pollution prevention and technology research information, environmental leadership program information, environmental information from other federal agencies, EPA technology information, and a calendar of upcoming events.

Morse pointed out that the system also has a variety of features making it possible to disseminate, collect, and archive information.

Paley added that word and phrase searches of the entire database are possible, making information searches easier. One may also view short documents or download them on longer document.

Other features include the ability to:
- Send and receive topical questions and answers with all users;
- Access online EPA databases;
- Upload and download useful programs or documents for other users;
- Download useful programs or documents for other users;
- Find and order EPA documents;
- Locate expert assistance;
- Register for EPA training courses;
- Receive comments on draft documents; and
- Quickly respond to information requests electronically.

Currently, a user can access three alternative chemical databases to search simultaneously. When all the system upgrades are complete, users may be able to link to 16 databases at once.

To access the ES--BBS, call (703) 908-2092. You will need a computer with a modern and communications software set to the following: baud: 2400 to 14,400; parity: none; data bits: 8; stop bits: 1; emulation: ANSI, BBS, or VT-100.

To use the ES WWW, you will need to have access to the Internet and World Wide Web software. Use the following URL address: http://wastenot.inel.gov/environsense/.

Resources

The Pollution Prevention Information Clearinghouse (PPIC) is a free service of the U.S. Environmental Protection Agency (EPA) Office of Pollution Prevention and Toxics is a distribution center for more than 100 documents, a reference and referral service, and a special collection of pollution prevention related documents.

The clearinghouse’s main function is to reduce or eliminate industrial pollutants through education, technology transfer and public awareness.

The PPIC disseminates selected documents free of charge and acts as a reference and referral service, answering and referring questions on pollution prevention. PPIC also has a quarterly pollution prevention publication listing of documents available by category.

Beth Anderson, director of PPIC, said the clearinghouse is unique because the information it deals with is voluntary, not regulatory. “We give people information to help make changes in their processes or show them how to look at their facility differently. The primary focus of pollution prevention is source reduction. Source reduction refers to practices that reduce the amount of pollutants released into the environment prior to recycling, treatment, or disposal.”

Anderson said the clearinghouse receives between 400 to 600 calls per month. To access PPIC’s hotline, call (202) 260-1023, from 10 a.m. to 4 p.m. EST. 24-hour voice mail is available.

All documents are free, and shipping and handling is paid by the EPA although orders are limited to 10 documents.

Although computer access is no longer available through the former Pollution Prevention Information Exchange System (PIES), access can be gained through its successor, EnviroSense (see related story on this page).

The PPIC special collection is housed in the EPA Headquarters Library. It consists of pollution prevention information, technical data, research, policy, training materials, and case studies all related to pollution prevention. It is available through the inner-library loan program.

For more information or to receive a publications list, call the PPIC hotline at (202) 260-1023, fax requests to (202) 260-0178, send via electronic mail to ppic@epamail.epa.gov, or write to the Pollution Prevention Information Clearinghouse, U.S. Environmental Protection Agency, MC 3404, 401 M. Street, SW, Washington, DC 20460.

Additional information on waste minimization and the treatment of hazardous waste is available from the RCRA/Superfund Hotline (800) 424-9346. Other related EPA resources include:
- Green Lights Hotline, (202) 775-6650; 33/50 Program, (202) 554-1404; and Emergency Planning and Community Response Act Hotline, (800) 535-0202.

Additional free information on waste minimization and pollution prevention is also available from EPA’s Center for Environmental Research Information (CERI) at (513) 569-7562. Out-of-print publications are available for a fee from the National Technical Information Service by calling (703) 487-4780.
AmeriCorps Helps Small Communities Solve Problems

by Lauretta Galbraith
NSFC Staff Writer

Editor’s Note: This article is adapted from an article that appeared in the Winter 1995 issue of On Tap, a quarterly newsletter that provides drinking water news for America’s small communities.

You may have heard about the AmeriCorps program, President Clinton’s national service initiative, and how it provides thousands of Americans with money to help pay for higher education or repay their college loans in exchange for community service. But did you know that AmeriCorps participants might be able to help solve water contamination problems in your area?

Participants must be U.S. citizens or residents who are at least 17 years old (16 for some youth programs). The AmeriCorps program requires that they work a minimum of 140 hours a month in areas of education, public safety, social service, or the environment. In return, participants receive a living allowance of approximately $7,500 per year, health care, and an educational credit of $4,725 per year to finance college tuition or pay back student loans.

President Clinton praised AmeriCorps in his State of the Union Address in January, saying it is “the very best example” of how government can help teach people to solve community problems.

Jamal Kadri, U.S. Environmental Protection Agency (EPA) project officer for the “Neighborhood Improvements: Lead, Radon, and Urban Waters” program, says a wide range of people have shown an interest in being AmeriCorps participants. “Our AmeriCorps team in Newark, New Jersey, includes a 44-year-old who is completing a graduate degree in environmental science and an 18-year-old working on finishing his GED. It’s very diverse.”

Small water systems may be eligible for assistance by establishing a program or—by tapping into an existing program. According to Wendy Grassi, a spokesperson for the Corporation for National Service, which oversees AmeriCorps, there is still money available for organizations that are interested and show a need for AmeriCorps help.

Programs are selected through an ongoing national competition, says Grassi. “[Organizations] can call their state commissions on national service for an application and for deadline information. They can get the number from their state governor’s office. All applications from local programs are submitted to the Corporation for National Service through the state offices.”

Grassi says that currently 350 programs are funded through AmeriCorps: 58 through national nonprofit organizations and 292 through local and state nonprofit agencies. Programs involved include nonprofits, multi-city and multi-state partnerships, schools and universities, and inter-denominational coalitions. Federal agencies involved include the EPA, the Department of the Interior, the Department of Energy, the Department of Agriculture, and the Neighborhood Reinvestment Corporation.

“Each project is tailored to meet local needs with multiple objectives of getting things done,” says Kadri. Environmentally based projects “involve seeing environmental changes and increasing public awareness. We also want to get AmeriCorps [participants] interested in career opportunities in the environmental field.”

In addition to providing funds, AmeriCorps requires programs to raise money on their own. “The programs have to match some of the funding,” says Grassi. “For example, for the minimum wage, programs must raise 15 percent. They also must meet 25 percent of the administrative costs.”

Water Projects Exist

A number of water-related projects have been funded through AmeriCorps with national organizations as their sponsors. For example, the EPA has been awarded approximately $1.5 million for three projects that focus attention on water problems in low-income, disadvantaged communities.

One project is working to improve the water quality of the Anacostia watershed in Washington, D.C. Participants will conduct biological, physical, and water quality monitoring; clean up trash and debris from the river; reforest suitable sites along the river; and record information at inventory sites.

Another project is helping to improve the water quality in South Texas colonias where the water typically is contaminated by human and animal waste. Participants will identify and map potential contaminant sources, enter information into a geographic information system, distribute bilingual educational materials, and conduct educational seminars for the general public.

The EPA also is helping to restore urban streams in four low-income areas across the country: East San Francisco Bay area; Newark, New Jersey; Pierce County, Washington; and Atlanta, Georgia. AmeriCorps participants will map potential contaminants, conduct water quality monitoring, and evaluate urban streams, as well as assess the areas’ habitat and wildlife.

Additionally, the Soil Conservation Service is sponsoring a number of programs in Southern California through water quality and water conservation projects. The Department of the Interior is working with the Bureau of Reclamation and the Metropolitan Water District of Southern California to conduct water conservation initiatives to reduce residential water consumption, save energy, and reduce wastewater discharge.

Participants Needed

People who want to become AmeriCorps participants may call the AmeriCorps information hotline at (800) 942-2677 and talk with an operator who can answer specific questions about the programs.

“People who are interested in performing services should first find out what programs are in their area of the country,” Grassi says. “They should find out where they want to work and then apply to those organizations directly. We don’t recruit participants here in Washington, D.C. . . . Each organization recruits its own participants.”

The selection criteria for participants is based on the organization’s own goals and objectives. For the most part, organizations are looking for participants with a commitment to community service and leadership potential.

To help programs recruit participants, the Corporation for National Service has established a databank that stores information on all the people who have submitted an application.

“When we receive [applications], we put the names in a databank, so when an organization calls us and asks, ‘Who do you have in Kalamazoo, Michigan?’ or ‘Who do you have that can do water quality testing?’ we can refer [participants] to them,” Grassi says.

For more information about becoming an AmeriCorps participant or for information about specific programs, call the AmeriCorps information hotline, (800) 942-2677.
Volunteer Technicians Sought for Overseas Program

Editor’s Note: This article is adapted from an article that appeared in the winter 1995 issue of On Tap, a quarterly newsletter that provides drinking water news for America’s small communities.

Volunteers in Overseas Cooperative Assistance (VOCA) needs assistance from volunteer engineers to help small, environmentally based communities and organizations worldwide. VOCA seeks engineers to volunteer their knowledge with people around the world,” says Linda Lind, director of VOCA’s Environment and Natural Resources Program.

“VOCA provides an excellent opportunity for water professionals to gain overseas experience and share their knowledge with others. Volunteer assignments last from two weeks to three months with the volunteers contributing their time and expertise. VOCA covers all related expenses, including travel, lodging, meals, and all work-related costs.

VOCA’s projects are demand driven. Organizations, agribusinesses, and related government agencies first ask for assistance through VOCA’s 25 overseas offices. Projects are then carried out by U.S. specialists who serve as short-term volunteers.

For more information about VOCA’s Environment and Natural Resources Programs, contact Lind at (202) 383-9767. For volunteer applications, write to Jenny Hughel, VOCA director of recruitment, at 50 F St. NW, Suite 1075, Washington, DC 20001.

ENVEST Encourages Support for Small Communities

by Lauretta Galbraith
NSFC Staff Writer

If your community is considering upgrading an existing wastewater facility or establishing a new one, a program developed by the American Consulting Engineers Council Research and Management Foundation (ACEC–RMF) and the U.S. Environmental Protection Agency may provide some help.

The program, called ENVEST, encourages engineers to volunteer their time and expertise to help small and disadvantaged communities in drinking water, and solid and hazardous waste management.

According to Steve Polk, ACEC–RMF executive director, “Many ACEC–RMF firms are already doing this type of work. ENVEST just gives them another vehicle to consider when determining how best to serve their communities. It is a way to encourage what we believe is the positive thing for firms to do.”

The goal of ENVEST is to provide volunteer support to help small, disadvantaged communities understand the basics of a broad range of tasks, including contracting for services and products when upgrading their systems. Hopefully, with this information and input, a community will experience fewer surprises and will better understand what to expect as the project proceeds.

Volunteers can help in a number of ways, including giving lectures at workshops or conferences and offering expertise to help communities identify problems with their systems. They may also review and give advice on proposals, contracts, and the operation and maintenance of a facility. In addition, volunteer engineers can help small communities select a consultant and understand contract and grant requirements and government regulations.

It is important to note, however, that ENVEST stresses that the pre-project analysis and advice provided by volunteer engineers is only for advisory support before the client or owner requests proposals for a project. ENVEST services are not meant to be a substitute for consulting engineering services obtained through the community’s standard procurement process.

To help communities find volunteers, ACEC–RMF has produced a booklet, called “ENVEST,” which provides a list of local ACEC member firms where communities can call for information about volunteer resources. It also lists programs engineers can contact to find out how they can help communities.

For more information about ENVEST, contact Polk at ACEC–RMF, 1015 15th St., NW, Washington, DC 20005. You also may call him at (202) 682-4331. If you would like a copy of the booklet, please send your request and a self-addressed stamped 9 x 12-inch envelope with 55¢ postage to ENVEST at the address above.
**Resources**

**BBSes Provide Access to Environmental Information**

Editor’s Note: In the spirit of Earth Day, Small Flows is providing you with a selected sample of the many environmental bulletin boards that are currently available. Electronic bulletin boards allow you to obtain up-to-the-minute information on environmental issues and exchange knowledge and ideas with others. All you need to access them is a computer equipped with a modem, communications software, and a telephone. Information used here was adapted from an article that appeared in the October/November issue of Nonpoint Source News Notes (Issue Number 35), which is published by the Terrene Institute under a cooperative agreement with the U.S. Environmental Protection Agency.

Please note that while many of the bulletin boards listed here are free, there is a long-distance charge for modem or voice calls unless they are “800” (toll-free) numbers. In addition, some of the services listed here require a membership or other service charge. Please read all of the information carefully before you log on.

**EPA Alternative Treatment Technology Information Center (ATTIC)**

**Sponsor:** EPA, Releases Control Branch, Superfund Technology Demonstration Division, Risk Reduction Engineering Laboratory.

**Subject:** The most comprehensive network providing up-to-date information on innovative treatment technologies. Provides information on hazardous waste cleanup alternatives, technical experts, and vendors who can help decision makers implement remediation.

**Modem Phone:** (703) 908-2138

**Voice Phone:** (703) 908-2137

**System Operators:** Robert McCurdy or Mike Coccagna

**Baud/Parameters:** Up to 14,400 - N-8-1

**Hours/Cost:** 24 hours/7 days/Free

For more information, contact Daniel Sullivan, P.E., ATTIC program manager, (908) 321-6677

**EPA Cleanup Information Bulletin Board System - (CLU-IN) BBS**

**Sponsor:** U.S. EPA Office of Solid Waste and Emergency Response (OSWER), Technology Innovation Office

**Subject:** Designed for hazardous waste cleanup professionals who need information about innovative technologies, consultation with one another on-line, and access to databases. CLU-IN is used by those involved in Superfund cleanups and Resource Conservation and Recovery Act (RCRA) corrective action sites, including EPA, other federal and state agency personnel, consulting engineers, technology vendors, remediation contractors, researchers, community groups, and individual citizens.

**Modem Phone:** (301) 589-8366

**Voice Phone:** (301) 589-8368

**System Operator:** Beth Ann Kyle

**Baud/Parameters:** 28,800 - N-8-1

**Hours/Cost:** 24 hours/7 days/Free (limit 100 minutes per call)

Note: EPA users can access CLU-IN through EPA’s x.25 network without a modem.

**EPA Center for Exposure Assessment Modeling Electronic Bulletin Board System (CEAM BBS)**

**Sponsor:** EPA’s Office of Research and Development, Athens, Georgia.

**Subject:** Designed to meet increasing demand for exposure assessment models. Provides efficient communication between users and support staff and immediate acquisition of models by users subject to extreme time pressures.

**Modem Phone:** (706) 546-3402

**Voice Phone:** (706) 546-3549

**System Operator:** Dave Disney

**Baud/Parameters:** 1200 to 14,400 - N-8-1

**Hours/Cost:** 24 hours/7 days/Free

For more information, write the Athens Environmental Research Laboratory, 960 College Station Road, Athens, GA 30605.

**Rural Utilities Service Drinking Water Information Exchange Electronic Bulletin Board System (DWIE BBS)**

**Sponsor:** Rural Utilities Service

**Subject:** Information and assistance for drinking water system personnel in towns of up to 10,000 people and those who work with them. Users can post notices or news items and communicate with others. Includes conferences on regulations and finance, articles from On Tap, the quarterly newsletter, and a calendar of drinking water-related events.

**Modem Phone:** (800) 624-8301, ext. 531, (304) 293-4191, ext. 531

**Voice Phone(s):** (800) 624-8301, ext. 531, (304) 293-4191, ext. 531

**System Operator:** Brad Maust

**Baud/Parameters:** 300 - 28,800 - N-8-1

**Hours/Cost:** 24 hours/7 days/Free (limit 60 minutes per day per caller)

**Electronic Environmental Education Bulletin Board System - E2B**

**Sponsor:** National Nonpoint Source Federation

**Subject:** Environmental information, primarily nonpoint source legislation, technical assistance programs, projects, and calendar. Internet, e-mail, and news groups. Subscriber information exchange papers, announcements, and shopping mall.

**Modem phone:** (913) 897-1040 / Also access through CRIS

**Voice phone:** (800) 795-3634 or (202) 833-3380

**System Operator:** Laura Teisl

**Baud/Parameters:** N-8-1; ANSI, duplex full. Up to 38.4 K

**Hours/Cost:** 24 hours/7 days/$7.50/month (first hour free), $30 limit per month. Yearly membership $50.

**EPA’s Environmental Financing Information Network Bulletin Board System - (EFIN-BBS)**

**Sponsor:** EPA National Small Flows Clearinghouse

**Subject:** Formerly available only as part of the WTIIE BBS, this bulletin board system offers access to a database that allows users to view abstracts of publications about financing alternatives and allows them to share questions and comments.

**Modem Phone(s):** (800) 291-0349 or (304) 293-8016

**Voice Phone(s):** (800) 624-8301, ext. 531, (304) 293-4191, ext. 531

**System Operator:** Brad Maust

**Baud/Parameters:** 300 - 28,800 - N-8-1

**Hours/Cost:** 24 hours/7 days/Free (limit 60 minutes a day per caller)

**EnviroSense (ES) Bulletin Board System (BBS) and World Wide Web (WWW)**

**Sponsor:** EPA Office of Research and Development and Office of Enforcement and Compliance Assurance, Department of Defense, Department of Energy, and the National Pollution Prevention Roundtable.

**Subject:** Pollution prevention, federal facilities, compliance and enforcement information, federal statutes, federal registers, policies, guidelines, case studies, extensive list of contacts, and a calendar of environmental activities.

**Modem Phone:** (703) 908-2092

**Voice Phone (BBS):** (703) 908-2007

**Voice Phone (WWW):** (208) 526-6956

**System Managers:** Miles Morse and Louis Paley

**Baud/Parameters (BBS):** 1200 to 14,400 - N-8-1 ANSI or VT100

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Continued from page 20

URL: http://wastenot.inel.gov/environsense/
Hours/Cost: 24 hours/7 days/free

EPA Region 4 Technology Transfer Bulletin Board System
Sponsor: Technology Transfer Unit, Municipal Facilities Branch, Water Management Division, EPA Region 4
Subject: Topics relating to wastewater, small communities, innovative and alternative technology, water supply, water quality, and stormwater. Emphasis on EPA Region 4 activities.
Modem Phone: (404) 547-1767
Voice Phone: (404) 347-3633
System Operator: John Harkins, ext. 6542
Baud/Parameters: 1200, 2400, 9600 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit one hour per day)

EPA Region 10 Bulletin Board System
Subject: Facilitates communication on environmental concerns among EPA, state and local governments, and the public. Offers free hazardous waste report. Currently working on Internet connection.
Modem Phone: (206) 553-2241
Voice Phone(s): (206) 553-6519, (206) 553-1026, (206) 553-4017
System Operators: Bill Clugston, Tom Denning, or Ken Kerner
Baud/Parameters: T1200, 2400, 9600 - N-8-1
Hours/Cost: 24 hours/7 days/free

FEDWORLD
Sponsor: National Technical Information Service
Subject: Many subjects of national importance. Provides gateway from Internet to many Bulletin Board systems.
Modem Phone: (703) 321-3339
Voice Phone: (703) 487-4850
System Operator: Bob Bunge or Allen Willard
Baud/Parameters: Up to 14,400 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit 180 minutes per day)

Greenpeace Environet
Sponsor: Greenpeace
Subject: For groups and individuals interested in ecological and peace issues.
Modem Phone: (415) 512-9108
Voice Phone: (415) 512-9025
System Operator: Dick Dillman
Baud/Parameters: 28.8 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit 60 minutes per call)
For more information, contact Greenpeace, 508 Howard St., San Francisco, CA 94105.

Gulf of Mexico Program Bulletin Board System (GULFLINE II)
Sponsor: EPA Gulf of Mexico Project
Subject: Free exchange of environmental information. Includes searchable on-line databases of Gulf specialists, as well as the EPA National Telephone Directory. Access Florida Coastal Information Exchange and Louisiana Board.
Modem Phone(s): (800) 235-4662 or (601) 688-2677
Voice Phone: (601) 688-7671
System Operator: Kay McGovern ext, 2522
Baud/Parameters: Up to 28,800 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit 20 minutes per call, three calls a day. No membership.)

EPA’s Nonpoint Source Electronic Bulletin Board System (NPS-BBS)
Sponsor: EPA
Modem Phone: (301) 589-0205
Voice Phone: (703) 385-6000
System Operator: Chebbie Billingsley
Baud/Parameters: 1200 or 9600, N-8-1
Hours/Cost: 24 hours/7 days/free

EPA’s Office of Research and Development Electronic Bulletin Board System (ORD-BBS)
Sponsor: EPA Office of Research and Development (ORD).
Subject: Eleven conferences and more than 20,600 ORD document abstracts on subjects ranging from Sewage Sludge, Biosolids, Residuals Groundwater Information Retrieval System (GRITS).
Modem Phone(s): (513) 569-7610 or (513) 569-7770
Voice Phone: (513) 569-7727
System Operator: Charles Tuion
Baud/Parameters: 1200, 2400, 9600 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit 60 minutes per call)

The Point Source Information and Provision Exchange System (PIPES)
Sponsor: EPA Office of Wastewater Management Permit Division
Subject: The Point Source Information and Provision Exchange System (PIPES) is an electronic bulletin board system owned by the U.S. EPA Office of Wastewater Management’s (OWM) Permits Division. While the original intent of PIPES was to support state and local pretreatment coordinators, OWM expects to expand its focus to support other OWM interests, such as combined sewer overflows (CSOs), stormwater, and sludge.
Modem Phone: (703) 821-4695
Voice Phone: (703) 821-4697
System Operator: Technical support person on duty
Baud/Parameters: Up to 14,400 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit 60 minutes per day)

EPA Wastewater Treatment and Information Exchange (WTIE-BBS)
Sponsor: EPA National Small Flows Clearinghouse
Subject: Forum for exchanging ideas related to wastewater systems that serve small communities and for those trying to implement regulations for small community wastewater systems. As many as three callers at a time can use WTIE-BBS, or can leave electronic messages.
Modem Phone(s) (800) 544-1936 or (304) 293-5969
Voice Phone(s): (800) 624-8301, ext. 531, (304) 293-4191, ext. 531
System Operator: Brad Maust
Baud/Parameters: 300 - 28,800 - N-8-1
Hours/Cost: 24 hours/7 days/free (limit 60 minutes per day)
New Internet Address: See box below.

Resources

Announcing a New Route to WTIE-BBS
Via the Internet

Are you aimlessly cruising the information superhighway without destination in sight? Is highway hypnosis beginning to set in? If the answer is "yes," and you are looking for the latest information about small and alternative wastewater systems for small communities, you are in luck.

You can now access the Wastewater Treatment and Information Exchange Bulletin Board Service (WTIE-BBS) through the Internet if you have telnet access. Once you are in the Internet, just type “telnet” and “dialout.wvnet.edu,” and press enter. Then type “ATDT 35969.” Then proceed with the standard login procedure.

While you’re on the WTIE-BBS, you can exchange information with others on a variety of wastewater-related topics by participating in a discussion group. You can also search databases or download files and other information.

Of course, getting to WTIE-BBS via the Internet is only an alternative. You can still log on using the dial-up method. Using a computer equipped with modem and communications software, dial 1 (800) 544-1936 or (304) 293-5969. Questions and comments? Direct them to Brad Maust, systems operator, at (800) 624-8301, or (304) 293-4191, ext. 531.
Spring Finds NSFC Staff Busy with Outreach Activities

Staff members at the National Small Flows Clearinghouse (NSFC) have been busy as usual assisting small communities and attending conferences to introduce new audiences to NSFC services. Additionally, the NSFC has hired a new program coordinator.

**Staff Update**

The NSFC welcomed Peter J. Casey, P. Eng., as program coordinator on April 3. Casey will represent the NSFC to other organizations and provide technical and programmatic leadership. (See article on page 23 for more information.)

Additional staff changes include the addition of Chris Smith as a graduate research assistant with the NSFC. He assists Brad Maust, wastewater treatment information exchange bulletin board service (WTIE-BBS) system operator, with handling customer service requests.

Jeanne Allen was recently promoted to NSFC senior information assistant. In this position, Allen manages the NSFC’s customer service department and handles all customer concerns.

**Combined Sewer Overflows**

The NSFC has been active collecting and disseminating information about combined sewer overflows (CSOs) in conjunction with the U.S. Environmental Protection Agency’s (EPA) new national policy for controlling CSOs.

Murty Susarla, NSFC technical assistance specialist, attended the CSO Partnership’s annual meeting March 12 in Washington, D.C. There he promoted the Spring issue of Pipeline, which focuses on CSOs. (See story on page 23 about Pipeline.) The CSO Partnership works with the federal government and private industry to develop policy and guidance documents for CSOs. (The NSFC will be distributing these documents when they become available.)

The NSFC also recently mailed an information package to the 1,100 communities determined by the U.S. EPA to be affected by CSOs. The package contains the spring issue of Pipeline, information on the NSFC, and a survey form to allow the NSFC to collect further information about CSO issues.

**Outreach**

Patricia Miller, NSFC outreach coordinator and staff members have been traveling the country as usual, gathering information and promoting the NSFC’s services.

Miller attended a meeting of the Consortium of Institutes for Decentralized Wastewater Treatment Systems in Gainesville, Florida, February 17 to 19. The group discussed how it would work, possible university research directions, and the possibility of establishing onsite wastewater training programs in Florida.

Next, she attended the Third Texas On-Site Wastewater Treatment Research Council Conference, February 26-28 in Austin where she exhibited NSFC materials and presented “National Perspectives in Onsite Wastewater Implications and Interactions in Texas.”

From there, Miller ventured to San Diego, California, where she attended the Rural Community Assistance Corporation’s Annual Training Conference. There she and Len Coffelt from the Midwest Assistance Program presented a workshop on small community wastewater treatment options.

Several NSFC representatives attended the Twelfth Annual Pennsylvania Septage Management Association Conference and Trade Show March 31 and April 1 in Mechanicsburg. Miller presented “Alternatives to Public Sewers” while technical assistance specialists Brock McCracken and Clement Solomon staffed an NSFC exhibit booth.

In addition, Miller and technical assistance specialists Tricia Angoli, Jennifer Hause, McCracken, and Solomon passed the PSMA’s septic inspection certification course held in conjunction with the annual conference.

GJ Anderson, NSFC technical assistance specialist, attended the Granite State Designers and Installers Association Conference in Windham, New Hampshire, on March 22. He displayed information about NSFC services and distributed information packets there. Conference participants included septic system designers and installers, manufacturers, and regulators.

Miller attended the Missouri Milk, Food, and Environmental Health Conference in Columbia April 5 to 7 where she spoke about onsite wastewater treatment alternatives.

Richard Piluk, chief of sanitary engineering for Anne Arundel County in Maryland, represented the NSFC at the Rhode Island On-Site Wastewater Training Program held April 11 to 13 in Kingston, Maryland. He was one of four instructors for sessions entitled “Designing Innovative Septic Systems” and “New Technology for Septic Systems Installers.”

Angoli and Hause attended the 11th Annual Operation and Maintenance Regional Conference sponsored by the Massachusetts Department of Environmental Protection on April 11 and 12 in Northampton. Hause gave a presentation highlighting NSFC services and recent technical assistance activities.

The NSFC also participated in West Virginia University’s (WVU) statewide environmental conference, “WVU and the Environment, A Celebration of the 25th Anniversary of Earth Day,” held April 21 and 22 at WVU’s Law Center. The NSFC exhibited materials and provided speakers. Franklin Schultz, P.E., project coordinator for the West Virginia Onsite Wastewater Demonstration Project, presented a session on wastewater and drinking water issues. David Pask, technical coordinator for the National Onsite Demonstration Project (NODP) moderated the event, presented a talk about the NODP, and explained services provided by the Environmental Services and Training Division.

**Poster Lists Resources for Help**

A poster from the U.S. Environmental Protection Agency (EPA), “Do More with SCORE: Small Community Outreach and Education Helps Solve Wastewater Problems,” is available free from the National Small Flows Clearinghouse (NSFC).

This colorful poster explains how EPA’s small community outreach program can help communities solve their wastewater treatment problems. It lists national and state government agencies, public interest and advocacy groups, educational institutions, small community outreach coordinators and environmental training centers for each state, and EPA’s regional SCORE coordinators, in an attractive chart that is suitable for display.

Single or multiple copies of the poster are available by calling the NSFC at (800) 624-8301 and requesting item #WWBLP203. Please include $2 for shipping and handling.

**NSFC Publications Index Updated, Available**

A helpful resource for anyone working in the field of small flows will be the National Small Flows Clearinghouse’s Publications Index.

The 53-page index provides a complete listing and description of all the articles ever published in Small Flows, Pipeline, The Small Flows Journal, and Managing Small Flows. The index is divided by topic area and includes sections on constructed wetlands, onsite systems, management, and many others.

The index is free and is available by calling the NSFC at (800) 624-8301.

Articles from the index can then be ordered at a cost of 10¢ per page plus $2 shipping and handling charges.
NSFC Welcomes New Program Coordinator

Peter J. Casey, P. Eng., recently joined the staff of the National Small Flows Clearinghouse (NSFC) as program coordinator.

In this position, he serves as the NSFC’s liaison with the U.S. Environmental Protection Agency; the NSFC’s funding agency; develops program initiatives; works with the NSFC’s national network; fosters cooperative agreements with other assistance organizations; represents the NSFC at conferences; and provides overall leadership for the organization.

Casey comes to the NSFC following a career of nearly 25 years with the Nova Scotia, Canada, Department of Health. Most recently he served as director of environmental health where he was responsible for all environmental health issues in Nova Scotia and represented the province on federal and provincial committees. From 1976 until 1991, Casey was director of public health engineering for the department, coordinating all health engineering matters for the province.

Alternative wastewater treatment disposal technologies are not unfamiliar to Casey, who was responsible for the Nova Scotia introduction of a new onsite sewage disposal system using contour disposal fields. (See related articles on pages 6 to 9.) This work included acceptance of the basic concept and design, installation of demonstration projects, drafting and implementation of regulations, licensing and training of installers, and providing design courses for engineers.

While in Nova Scotia, Casey was also instrumental in organizing provincial government funding for a research program on onsite sewage disposal at the Technical University of Nova Scotia’s Centre for Water Resources Studies. Funding from this program has resulted in improvements in disposal technology and regulations, and has led to some changes in technical guidelines.

Casey was attracted to the NSFC by the challenge of working in a field where technology is still being developed. He is impressed with the services provided by the NSFC and hopes to make a contribution by developing optimum systems for providing information and recommending appropriate technology.

Casey says he is always emphasizing the importance of taking care of all aspects of wastewater treatment systems. “To be successful you have to look at all aspects of the system—planning, design, construction, regulations, operation, and maintenance. You have to address all of these things.”

Casey holds a master’s degree in public health in environmental engineering from the University of North Carolina at Chapel Hill and a bachelor’s degree in civil engineering from the University of Toronto.

Peter Casey, P. Eng., (right), NSFC’s new program coordinator, and Sanjay Saxena, newly appointed program coordinator for the National Drinking Water Clearinghouse, discuss their respective roles and future plans.

Saxena Named NDWC Program Coordinator

Sanjay Saxena has been appointed program coordinator of the National Drinking Water Clearinghouse (NDWC) at West Virginia University (WVU).

A “sister” organization of the National Small Flows Clearinghouse (NSFC), the NDWC assists small communities by collecting, developing, and providing timely information relevant to drinking water issues.

Saxena, who served as NDWC’s interim coordinator from its inception in 1991 was formally named coordinator in December 1994. As such, he will continue to perform outreach functions and explore cooperative projects with other drinking water-related organizations, as well as provide overall program guidance and direction.

“I am very pleased to play a more permanent role in NDWC’s work to help small communities,” Saxena said. “In these challenging times, I believe my experience with local officials, drinking water issues, and related organizations can definitely help the NDWC further its mission of assisting communities in need.”

For a short while last year, Saxena simultaneously served as interim program coordinator of the NSFC, where he had been employed as outreach coordinator and technical assistant before joining the drinking water program.

Saxena holds an engineering degree from Mysore University in India and is completing graduate work in technology education at WVU.

Pipeline Has New Look and Focus

Subscribers to Pipeline, a quarterly newsletter published by the National Small Flows Clearinghouse (NSFC), will notice some big changes beginning with the spring 1995 issue. Because most of the local officials, county extension agents, and engineers who subscribe to Pipeline use the articles to inform and educate the public, the newsletter has a new main focus—to present and explain small community wastewater issues.

Pipeline covers technical topics in such a way that makes them easy for everyone to understand, making it a valuable educational tool. Readers are encouraged to distribute the articles at town meetings or to print them in local newspapers.

To further encourage Pipeline’s use as an educational tool, each issue will have a specific focus or theme. The theme of the spring 1995 issue was combined sewer overflows, or CSOs, and how CSOs and the new national CSO policy affect small communities. Upcoming issues of Pipeline will focus on septic tanks and watershed issues for small communities.

The newsletter also has a new, more inviting look. Pipeline’s new layout is designed to make it more reader-friendly and interesting for its readers.

To request a free subscription to Pipeline, call NSFC at (800) 624-8301.
In the last issue of Small Flows, I outlined the most common reasons for septic system failure. Because the “negligence” category is where most liability issues exist, we will now look more closely at the legal theory that potentially can be considered in the case of a malfunctioning septic system.

The term “negligence” has a precise and specific meaning for lawyers that differs from its use in everyday conversation. When examining an issue under negligence law, a lawyer makes the following analysis:

Does the defendant (the person who is suspected of negligence) owe a duty of care to the plaintiff (the person with the malfunctioning system)? If the answer is “yes,” one must then determine what standard of care the defendant must exercise.

The traditional standard of care is defined as being that of a reasonably prudent person. If it is determined that the defendant’s conduct has fallen below the appropriate standard of care, then the next step is to establish causation (the action that created or led to the effect).

Causation
Typically, causation must be examined at two levels. First, the claimed damage to the plaintiff must have been caused by the defendant’s substandard conduct. In many states a concept known as “proximate cause” is recognized. Proximate cause considers policy issues related to whether or not one person’s conduct is sufficiently foreseeable or is too remote to create a causative relationship. Second, the plaintiff must have suffered some type of damage as a result of the defendant’s alleged negligence.

Onsite Professionals
An analysis of negligence can be applied to virtually anyone associated with the septic system. It can be applied to the person(s) who performed the site evaluation, the person(s) who designed the system, the person(s) who installed the system, and the person(s) who inspected the system.

For example, if a person owned a facility that was served by a malfunctioning septic system, he or she might hire an engineer to determine the cause of the malfunction. Perhaps the engineer determines that the system consists of a 1,000-gallon septic tank with two compartments, a distribution box, and four 75-foot leach lines. The malfunction is a surface discharge located at the end of one leach line. The system is only a year old and has been properly maintained by the owners. However, the regulatory agency actually requires the system for this facility to have a 1,200-gallon septic tank with two compartments and 300 feet of leach line.

We will presume that a site evaluation has shown the original site analysis to be proper and adequate. However, there does appear to be a problem with the design. The design engineer specified a tank that was not up to code (a 1,000-gallon septic tank was specified when a 1,200-gallon septic tank was required). As a matter of law, the original design engineer has a duty to the property owner. It is also clear that the design engineer’s conduct fell below the conduct of a reasonably prudent engineer in specifying a tank that did not meet local code requirements. This breach of the standard of care is traditional negligence.

Having determined that the designer acted negligently is not enough however. The next step requires us to find that the negligence of the engineer was the cause of the malfunction. In this case, it is very unlikely that the smaller septic tank had anything to do with the malfunction. Consequently, while the designer’s conduct was negligent, it was not a cause of the malfunction.

In fact, the system evaluation demonstrates that the problem with the system is that the distribution box has been improperly installed. This would make the installer and/or the inspector liable. The conduct of each of these individuals would then be put through the negligence analysis outlined above to determine their respective liabilities.

It should be noted that more than likely there are special rules that apply to public officials and/or entities. There may be various immunities that eliminate or limit liability.

Pathogen removal in a properly sited, designed and constructed system can be considered at least adequate. Problems occur when the subsurface conditions are not adequate for pathogen removal. Seasonal high groundwater tables and groundwater mounding under drainfields can shorten the separation distance and prevent complete removal of pathogens. Soils with low or high permeabilities, or fractured or cavernous bedrock underneath drainfields, could provide substandard conditions for pathogen removal.

Pathogens are removed from the effluent by the soil in a variety of ways. Bacteria are primarily removed by being filtered through the soil. As the soil particle size decreases, the rate of bacterial removal increases. The addition of septic tank effluent to soils can cause swelling and dispersion of soil particles that leads to a decrease in pore space between particles. This provides greater surface area for filtering bacteria out of the effluent, but eventually restricts flow through the pores.

Virus adsorption is favored at a soil pH below 7.0, with a value of 5.0 being most effective for adsorption of a wide variety of viruses. At higher pH values, adsorption is not as effective.

Low flow rates promote virus adsorption by soil. As the flow rate increases, so does the virus movement through the soil. A velocity at or below 0.6 m/day was found to be most effective for virus removal.

Virus adsorption is enhanced in soils with a clay or organic matter content. Both materials have greater surface area and a larger number of active sites where viruses can adsorb. Sands and silts do not have as many active sites to adsorb viruses.

Pathogen removal can also occur due to antagonistic microorganisms living in the soil. These soil microorganisms prey on the microorganisms present in the septic tank effluent.

For additional information on separation distances and the factors affecting them, call the National Small Flows Clearinghouse at (800) 624-8301, and request the Separation Distance package. It contains articles about separation distances, interactions between soil and pathogens, and the studies mentioned above. The package is free. Please allow $2 for shipping and handling.

Continued on page 25
NPDES Guides Help Communities Comply

Two new guides available from the National Small Flows Clearinghouse (NSFC) are intended to help communities prevent water pollution by reducing or eliminating pollutants discharged directly into our waterways.

The major instrument used to achieve this goal is the National Pollution Discharge Elimination System (NPDES) Permit, a legally-enforceable agreement that sets regulatory standards on the discharge of pollutants.

Both NPDES-related publications were published by the EPA. The NPDES Self-Monitoring System User Guide: Volume Two helps communities organize a self-monitoring program, which is required by the NPDES permit.

Guide for EPA Sludge Standards Available

Understanding the language of government regulations can be an obstacle for non-technical people. For owner/operators working with sewage sludge, help is now available for understanding The Standards for the Use or Disposal of Sewage Sludge (Title 40 of the U.S. Code of Federal Regulations, Part 503).

A new publication available from the National Small Flows Clearinghouse (NSFC), entitled A Plain English Guide to the EPA Part 503 Biosolids Rule, explains the intent and requirements of the rule and assists in determining the extent to which a specific biosolids management operation is covered by the rule.

The document provides detailed answers to questions about the general applicability of the NPDES storm water permit, the definition of storm water discharges associated with industrial activity, individual permits, EPA general permits, sampling, and other stormwater issues.

To order either publication, call NSFC’s toll-free number, (800) 624-8301. The NPDES Storm Water Program Question and Answer Document: Volume Two is Item #WWBLCG39, and it is free. The NPDES Storm Water Program and Answer Document: Volume Two is Item #WWCRBG37. Cost is $5.40. The NPDES Storm Water Program Question and Answer Document, Volume 1 is also available. Order Item #WWBLCG31. Cost is $4.00. Add $2 shipping and handling on all orders.

Law is Potential Fix for Faulty Septic System

Continued from page 24

legal actions against them. They may also be the beneficiaries of other special considerations, such as a shorter statute of limitations than a private (non-governmental) party.

All civil actions have statutes of limitations—the time period during which a person may bring a lawsuit. If a lawsuit is not brought within the applicable statute of limitations, a party will then be barred from bringing an action, regardless of the merit. All states have various statutes of limitations. Therefore, it is very important that you contact a local attorney to see what particular statutes apply in your area. In California, statutes of limitations vary from only several days to 10 years.

In conclusion, proving a negligent action against any party is a complex and sophisticated matter. Some cases may require the use of an expert witness, and there are almost certainly limitations concerning the liability of public officials. Additionally, there are various limitations of time in filing a lawsuit. Consequently, it is very important to immediately seek the assistance of qualified legal counsel when a potential for a negligence claim may arise relative to a malfunctioning septic system.

Report Evaluates Alternative Collection Systems

Alternative wastewater collection systems were developed to use where site constraints or high construction costs make conventional sewers prohibitive.

Many small communities, in particular, have also found alternatives to be more cost-effective. A report published by the U.S. Environmental Protection Agency (EPA)-titled Alternative Sewers—Operation & Maintenance (A Special Evaluation Project) is based on a study of 40 communities using alternative collection systems and their operation and maintenance programs.

This study is a follow-up to a 1985 Special Evaluation Project (SEP) study of communities in EPA Region 5, which includes Illinois, Indiana, Ohio, Michigan, Minnesota, and Wisconsin.

The current SEP report provides a general description of the alternative collection systems used; the management, operation, maintenance, and costs of the systems; and any problems occurring during construction and operation. It focuses primarily on pressure systems and septic tank small-diameter gravity (ST-SDG) sewers, the alternative systems most commonly used in Region 5.

The report offers recommendations for management of these systems based on the experiences of the communities surveyed. The descriptions of the systems are very practical and easy to read and include a discussion of the costs. The report would be helpful to any community evaluating the economic viability of using alternative sewer systems.

To order this report, contact NSFC at (800) 624-8301 and request item #WWPCGN56. The cost is $2.40. Add $2 for shipping and handling.
Papers are now being accepted for upcoming issues of The Small Flows Journal, the only juried technical journal devoted specifically to small community wastewater issues. The Small Flows Journal presents important information about wastewater treatment for small communities, and it provides a forum for the exchange of new ideas and methodologies for solving small flows issues. Manuscripts submitted now will be reviewed for inclusion in the late spring and early fall 1995 issues. Papers in the following categories will be considered for review:

- technology/research
- operation and maintenance
- regulations
- management
- finance
- public education

For more information about the journal, manuscript submission guidelines, and publication deadlines, call Cathie Falvey, editor, at (800) 624-8301, ext. 526.

Domestic Septage Guidance Now Available from NSFC

The U.S. Environmental Protection Agency (EPA) has published a guidance document designed to help communities understand federal regulations for domestic septage under Title 40 of the U.S. Code of Federal Regulations, Part 503. The Part 503 Rule regulates the use and disposal of sludge to ensure that the public health and environment are protected.


The primary purpose of the guide is to explain the Part 503 regulations to septic tank pumpers and haulers and others who apply domestic septage to nonpublic contact sites. The EPA encourages the beneficial use of domestic septage to fertilize crops and improve the tilth of soil of agricultural land, forests, and reclamation sites not frequently visited by the public.

Some of the Part 503 rule standards covered in the guide include permits, record keeping, avoiding nitrogen contamination of groundwater, pathogen reduction, crop and site restrictions, and sampling and testing. The guide also devotes a section to discussing the relationship of the federal regulations to state requirements.

It also includes lists of state and federal contacts for septage.

The guide is available for $7.80 from the NSFC. To order, call (800) 624-8301, and request Item #WWPCRG36. Please add $2 for shipping and handling.

New Edition of “Natural Systems” Text Available

Co-authors Sherwood “Woody” Reed, Ronald Crites, and E. Joe Middlebrooks recently released the 433-page, second edition of their textbook Natural Systems for Waste Management and Treatment.

The updated McGraw-Hill textbook summarizes design information for constructed wetlands and other natural wastewater treatment systems.

It describes how these methods, including ponds, aquatic plant systems, constructed wetlands, land treatment, onsite systems, and biosolids management can help improve water quality. And this second edition contains more detailed information about constructed wetlands and sludge management than the first.

“Since the first edition was published in 1988, we’ve learned a tremendous amount about wetlands,” says Reed. For example, Reed and his co-authors outline the plants’ role and function in the wetland and explain design procedures for predicting temperature conditions, thus aiding constructed wetland users in a variety of climates.

Also, specific information on hydraulic design and wetland design models that improve the rate of removal of biochemical oxygen demand (BOD), suspended solids, nitrogen, and phosphorus have been added to the constructed wetland chapter, says Reed.

Other improvements include an expanded, fully revised chapter that explains the new Part 503 Federal Regulation related to land application of sewage sludge (40 Code of Federal Regulations, Part 503). The sludge management chapter is intended to allow the reader to understand the regulation, as well as apply it to specific needs.

This second edition also contains a new chapter on onsite systems, says Reed. The chapter covers conventional septic tanks, leachfields and beds, and mounds. It also includes intermittent sand filters, recirculating fine gravel filters, and alternative nitrogen removal methods.

However, he stresses that this new chapter not only details how onsite systems work, it also explains their benefits. “Using these new technologies ensures the production of a high quality effluent,” Reed explains. “And that protects the groundwater and allows for final disposal on a much smaller leachfield or bed.”

### Calendar of Events

If your organization is sponsoring an event that you would like to have advertised in this calendar, please send information to the Small Flows Editor.

#### May

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<th>Event</th>
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<tr>
<td>Michigan State University’s 38th Annual Conference, “International Association for Great Lakes Research”</td>
<td>May 28–June 1</td>
<td>East Lansing, MI</td>
<td>(517) 353-9618</td>
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<td>Water Environment Federation’s “Toxic Substances in Water Environments: Assessment and Control”</td>
<td>May 14–17</td>
<td>Waterloo, Ontario, Canada</td>
<td>(519) 888-4567 X2892</td>
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<tr>
<td>National Environmental Training Center for Small Communities’ “Basics of Environmental Systems Management (BESM) for Local Officials”</td>
<td>June 12–13</td>
<td>Atlanta, GA</td>
<td>(800) 624-8301</td>
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<tr>
<td>Minnesota Extension Service, “Basic Onsite Sewage Treatment Workshop”</td>
<td>June 22–23</td>
<td>Fergus Falls, MN</td>
<td>(800) 955-8636</td>
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<tr>
<td>“Solutions ’95: A Congress and Exposition on Managing the Effects of Man’s Activities on Groundwater”</td>
<td>June 4–7</td>
<td>Edmonton, Alberta, Canada</td>
<td>(403) 429-1472</td>
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<tr>
<td>National Environmental Training Center for Small Communities’ “Basics of Environmental Systems Management (BESM) for Local Officials”</td>
<td>June 29</td>
<td>Washington, DC</td>
<td>(800) 624-8301</td>
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<td>Event: National Environmental Training Center for Small Communities’ “Basics of Environmental Systems Management (BESM) for Local Officials”</td>
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<td>Atlanta, GA</td>
<td>(800) 624-8301</td>
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<tr>
<td>Event: National Environmental Training Center for Small Communities’ “Basics of Environmental Systems Management (BESM) for Local Officials”</td>
<td>June 24–25</td>
<td>Denver, CO</td>
<td>(800) 624-8301</td>
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#### June

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#### July

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Place</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event: National Ocean Service’s “Coastal Zone 95—Spotlight on Solutions”</td>
<td>July 17–22</td>
<td>Tampa, FL</td>
<td>(301) 713-3086</td>
</tr>
<tr>
<td>Event: Westford, MA</td>
<td>September 13–14</td>
<td>Westford, MA</td>
<td>(800) 624-8301</td>
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<td>Event: National Environmental Training Center for Small Communities’ “Basics of Environmental Systems Management (BESM) for Local Officials”</td>
<td>September 13–14</td>
<td>Westford, MA</td>
<td>(800) 624-8301</td>
</tr>
<tr>
<td>Event: Infrastructure Assistance Coordinating Council’s 7th Annual Local Government Conference</td>
<td>September 13–14</td>
<td>Wenatchee, WA</td>
<td>(360) 586-7656</td>
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<tr>
<td>Event: University of Washington’s 8th Northwest Onsite Wastewater Treatment Short Course and Equipment Exhibit</td>
<td>September 18–19</td>
<td>Seattle, WA</td>
<td>(206) 543-8974</td>
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</tbody>
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### Additional Events

- **Water Environment Federation’s "Seventh Annual Conference on Water Pollution Control"**
- **University of Rhode Island Cooperative Extension’s "Seventh System Operation and Maintenance for Home Owners, Buyers, and Sellers"**
- **University of Rhode Island Cooperative Extension’s "Seventh System Operation and Maintenance for Home Owners, Buyers, and Sellers"**
- **Event: National Environmental Training Center for Small Communities, "Basics of Environmental Systems Management (BESM) for Local Officials"**
- **Date: June 12–13**
- **Place: Atlanta, GA**
- **Phone: (800) 624-8301**
- **Sandy Miller, ext. 536**