

Water Under Our Feet

By managing our resources wisely above ground, we can help protect "the environmental bottomline."

by Lori Gilmore

Hidden beneath the Earth's surface just under our feet, lies an oft-forgotten and misunderstood treasure. This buried fortune is essential for life and its worth is determined—directly or indirectly—by our actions. And too often, its true value is not fully appreciated until it's too late.

What is this mysterious natural resource?

"Groundwater is the environmental bottomline," says Cindy Kreifels of the nebraska-based national Groundwater Foundation. This "environmental bottomline" philosophy is based on the premise that individuals actively protecting groundwater are, at the same time, wisely managing other natural resources.

"Everything we do eventually reaches the groundwater supply," adds Amy Killham, The Groundwater Foundation, director of youth programs. "Our everyday actions can make a difference in protecting this precious resource."

Individuals can become better stewards by implementing management practices which prevent contamination before it occurs.

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Today across the nation, environmental concerns are not only focusing on water quantity issues, but the ability to secure quality groundwater. The increasing demand for clean, fresh drinking water is spurring efforts for groundwater protection in areas where the groundwater has become contaminated and places where it remains safe.

According to The Groundwater Foundation, approximately half of the people in the United States depend on groundwater as their drinking water source. In rural areas, as many as nine out of 10 households draw water from private or public wells.

Since it's hidden from view, groundwater is often misunderstood. Some think groundwater is stored in vast underground lakes, while others believe it flows in underground rivers. The truth is groundwater moves through the voids, spaces and cracks between particles of soil, sand, rock or other materials to a saturated zone under ground, known as an aquifer. Precipitation that infiltrates past the root zone and water percolating downward from streams and lakes help replenish aquifer levels.

Groundwater does not remain under ground forever. It surfaces naturally in springs, feeds rivers and lakes, and is pumped to the surface by wells.

Groundwater quality varies greatly depending on the location, soil type and depth of the aquifer. Unlike surface water—which we can see flowing in streams, rivers and lakes—groundwater travels very slowly, sometimes only a few inches or feet each year. Precipitation can carry pollutants through the soil into the groundwater supply and remain unnoticed. Since groundwater moves gradually, it can take years to detect a problem in a supply well. Once contaminated, an aquifer is

Making a difference. What you can do

Best Management Practices (BMPs) are measures designed to prevent or reduce pollution that rural or urban residents can easily adopt. Examples of BMPs which help protect groundwater include:

In rural areas:

- I Provide for proper waste management
 - 🔥 Reduce use of potential pollutants such as nitrogen, phosphorus, heavy metals and pesticides
- 1 Implement structural controls to reduce infiltration of pollutants. Such controls could include terraces, grassed waterways, buffer strips, tile drains, irrigation systems, livestock waste storage facilities or sediment detention basins
 - I Base efficient pesticide and fertilizer use on factors such as soil permeability, climate and the potential for surface water and groundwater contamination
 - 🔥 Ensure proper timing and placement of chemicals for maximum effect and minimum potential contamination
 - I Use application methods for livestock waste that reduce potential for pollution
 - I Schedule irrigation to minimize water use and excessive leaching
 - I Adopt conservation tillage to reduce runoff and erosion control
 - I Select crop systems that reduce pesticide use
 - I Abandon wells properly

In urban areas:

- I Plant filter strips in order to control runoff from construction sites
 - I Test soil to determine nutrient needs for lawn and garden fertilization
 - I Begin a compost pile for future fertilization
 - 🔥 Install low-flow sprinkler systems
 - 🔥 Utilize drought-resistant plants in landscaping
 - 🔥 Determine setbacks and follow specific construction guidelines
- I Utilize wetland areas as part of a natural landscape design

Source: *A Community Guide to Groundwater Guardian*, 1997 Edition, The Groundwater Foundation, Lincoln, Neb.

difficult and expensive to clean.

Potential groundwater contamination sources range from leaking municipal landfills to over-applying lawn and agricultural fertilizers, says Killham. Other possible pollutants include industrial solvents, livestock wastes, septic tank effluents, manufacturing chemicals and leaking underground petroleum storage tanks.

In many communities, individuals are working together to reduce the harmful effects caused by human carelessness.

"Many activities to protect groundwater start at the surface," says Kreifels, coordinator of The Groundwater Foundation's Groundwater Guardian program. The Groundwater Foundation, established in 1985 from one person's passion for groundwater education, is attracting a tidal wave of support nationally and internationally for groundwater education programs and community-based protection activities. The Groundwater Guardian program recognizes communities actively protecting their groundwater. Now in its fourth year, 170 communities in 37 states and Mexico are participating in the results-oriented program.

A predominantly rural area in south-central Minnesota provides one example of a successful Groundwater Guardian partnership making a difference. Concerned citizens and agency personnel from three counties joined forces in 1990 after a township rural well-testing program identified high levels of nitrate-nitrogen, says Bonnie Holz, director for Brown-Nicollet Environmental Health, St. Peter, Minn. Holz also serves as the team leader for the Brown-Nicollet-Cottonwood Groundwater Guardian project, a group that

Protecting and Improving

Gary Rector is dedicated to protecting the land and improving the natural resources on Eaglestone Farm.

Stewardship and management work hand in hand for many Angus breeders. Successful operations understand the importance of maintaining a productive farm, while protecting the environment for future generations.

Gary Rector, Carlisle, Ky., realizes the limitations of the resources he manages at Eaglestone Farm, located in northeastern Kentucky. This *Angus Journal* Land Stewardship Award nominee not only protects what he manages through the use of various conservation practices, but is deeply committed to improving natural resources.

"In our area you must protect the soil, it's so thin that you can't lose any and still expect to farm," Rector says. He has been managing Eaglestone Farm for owners William and Margaret Marquard for the past 12 years. In all, Rector has been responsible for the 780-acre rolling farm for nearly 20 years.

Rector has been using conservation practices like controlled grazing; grass waterways; fencing ponds and streams; soil testing pastures; and interseeding clover to reduce nitrogen fertilizer application.

These careful stewardship activities are also productive practices that have allowed the management team to increase the farm's carrying capacity. Today, Eaglestone Farm manages 100 registered Angus cows, 250 commercial cows and 1,700 stockers.

Controlled grazing has

been an integral part of Eaglestone Farm's management plan for many years. With the assistance of the University of Kentucky Extension, Rector established a controlled grazing program that provided increased grass tonnage.

Fences surround the ponds and the streams on the farm keeping cattle out and preserving the water quality both on the farm and

downstream. Grass waterways filter the runoff and keep fertilizer and animal waste out of the streams, protecting groundwater. Pastures are interseeded with clover to increase productivity and to reduce the need for additional nitrogen fertilizer.

Burley tobacco is grown on the flattest land in contours and is rotated with grass to maintain the soil's organic matter. Every winter a cover

crop is sown for added soil protection.

Rector uses these Best Management Practices (BMPs) on Eaglestone Farm to maintain productivity, while at the same time conserving soil and water. He believes his actions could have a lasting effect.

"We are trying to save the resources we have for ourselves and preserve it for the next generation," Rector says.



Controlled grazing is an important management tool to improve production at Eaglestone Farm, Carlisle, Ky. As a result, farm manager Gary Rector has been able to increase the herdsize without overgrazing the land.

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joined the Groundwater Guardian movement in 1995.

This ongoing campaign is working to improve groundwater quality in two areas within the three counties. Near St. Peter, faulty septic systems and agriculture chemical runoff polluted ditches responsible for recharging the aquifer, says Holz. While the chief concern at the other location, a site with more hills, is improving surface water quality closely connected with local groundwater supplies.

In addition to receiving federal dollars to improve failing septic systems, this Minnesota group began promoting the use of Best Management Practices (BMPs). BMPs are voluntary practices designed to prevent or reduce pollution, while still being profitable.

According to Holz, the team set up public demonstrations addressing a variety of BMPs including: rotational grazing; manure management nitrogen timing; variable rate fertilizer technology conservation tillage; and lawn fertilization.

"We wanted to show that everyone is in this together," Holz says of the educational efforts. The group believes that urban and rural residents share the stewardship responsibility of caring for their water supply.

Although it could take years to document a significant improvement in groundwater quality, this group is starting to see improvements in a local reservoir.

By learning more about this hidden natural resource, using common sense and implementing management practices, we too can protect this buried treasure.

For more information about The Groundwater Foundation or the Groundwater Guardian program, contact: Cindy Kreifels, PO Box 22558, Lincoln, NE 68542; or (402) 434-2740.



Creeks and ponds are fenced off to preserve water quality both on the farm and downstream.

When should you have your water tested?

Public water supplies are regulated by state and federal laws that require periodic testing. But in most cases, testing of private water supplies is an individual decision. According to a recommendation in the *University of Nebraska Cooperative Extension NebGuide Water Testing Laboratories*, if you have your own well, have it checked once per year for contamination.

Both governmental and commercial laboratories offer water testing. Contact the Department of Health in your state for a list of certified water testing laboratories. Your local Extension office may also be able to provide more information on well testing.



Seeded and mulched grass waterways slow down runoff and help keep precious topsoil in place.