



## More about Groundwater...and Septic Systems

### In this Pines Update....

This *Pines Update* provides additional information about groundwater. As you may recall, *Pines Update* #7 provided an introduction to groundwater, explained what it is, and how it can be impacted. This and other past issues can be found at [www.pinesupdate.com](http://www.pinesupdate.com).

While the focus of the Remedial Investigation is to investigate the impacts of coal combustion by-products, including impacts on groundwater, it is important to understand that there are many influences on groundwater, especially where groundwater is shallow in sandy soils. This update elaborates more about septic impacts to groundwater.

### Did you Know....

- ☞ Three sampling events have been conducted so far: August 2006, October 2006, and January 2007.
- ☞ During each sampling event, a total of 34 monitoring wells are sampled; a total of 9 private wells are sampled; a total of 23 surface water samples are collected; and measurements of groundwater and surface water levels are made at 67 locations.
- ☞ A total of 19 sediment samples have been collected.
- ☞ Sampling will be conducted again in April 2007 and water level measurements will be taken again in July 2007.

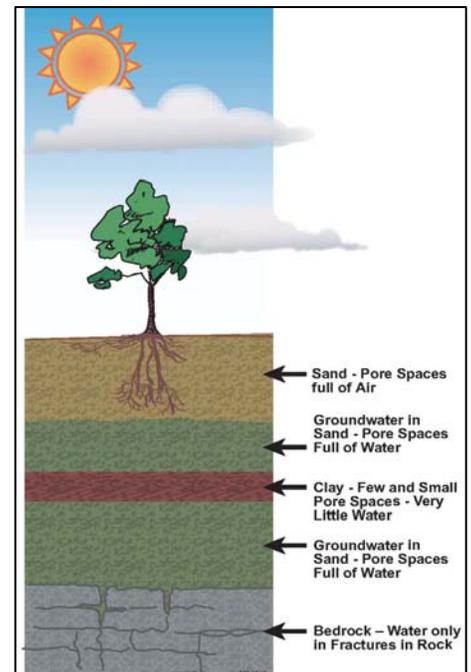
### What is Groundwater?

Groundwater is water present beneath the ground surface in spaces between dirt and sand (called “pore spaces”) or in cracks in rocks. Groundwater is present beneath most of the surface of the earth; some is found at shallow depths, while some may be much deeper. Most of the world’s fresh (unfrozen) water is stored as groundwater. Groundwater provides the primary source of drinking water to 50% of Americans, and is also used for irrigation and industrial purposes (for process water or cooling water). It supports rivers and other aquatic systems during dry periods of the year.

### What can impact groundwater?

Groundwater exists under many different conditions, which can impact its quality. For example, where groundwater is located near the ocean or in very deep aquifers, it may be salty or have a high mineral content, which makes it unsuitable for some or even all uses.

Man-made conditions can affect groundwater. For example, in industrialized areas, groundwater may not be suitable for drinking due to runoff from roadways infiltrating the ground. Also, shallow groundwater is much more vulnerable to impacts than deep groundwater, because the deeper groundwater is more isolated from potential impacts. Impacts such as surface runoff, tank leaks, spills, etc. can reach shallow groundwater much quicker than deep groundwater.



### What are the most common man-made impacts to groundwater?

According to the USEPA, the most common man-made impacts to groundwater are:

- Improper use of fertilizers, animal manures, herbicides, insecticides, and pesticides;
- Improperly built or poorly located and/or maintained septic systems for household wastewater;
- Leaking or abandoned underground storage tanks (such as underground storage tanks for heating oil or gasoline) and piping;
- Storm-water drains that discharge chemicals in storm-water runoff to groundwater; and
- Improper disposal or storage of wastes.

In communities not serviced by municipal sewer systems, the most significant of these impacts is septic systems. Septic systems are being used in approximately 25% of all U.S. homes. Septic systems that are properly planned, designed, installed, managed, and maintained *can* provide effective treatment of wastes. However, poorly planned, designed, installed, managed or maintained septic systems have been identified as a groundwater quality concern by nearly every federal and state program with responsibility for water resource issues.

### How can septic systems impact groundwater?

Septic systems (see text box, below) are used to treat and dispose of small volumes of wastewater, usually from houses. Underground soils can provide a natural mechanism for treatment or filtration for septic waste. Septic systems are not, however, designed to treat all wastes. For example, chemicals used for household cleaning, solvents and other car maintenance materials, soaps and detergents, and fertilizers and pesticides if disposed through a septic system, will not necessarily be treated, and will likely end up in groundwater.

According to various reports and studies, an estimated 10% to 20% of septic systems fail each year, having a direct impact on groundwater and/or surface water. Many older septic systems were installed in unsuitable conditions and/or before adequate design standards were in place. Today, the Indiana State Board of Health and local health departments protect groundwater from septic impacts by specifying design and other requirements for septic systems:

- **Indiana State Board of Health, Rule 410 IAC 6-8.1: Residential Sewage Disposal Systems:** This rule regulates residential sewage disposal systems.
- This rule has been adopted without amendments by Porter County, under *Porter County Code, Chapter 8.032: Residential Sewage Disposal Systems.*

These state and county rules require that all new systems obtain a permit prior to construction, and all systems in need of repair obtain a permit prior to repairing. Certain older systems are “grandfathered” under these rules; however, the rules do apply if the system has “failed.” The following conditions are considered to render a system “failed” whether the system is grandfathered or not:

- Any system within 50 feet of a drinking water well.
- Any septic tank connected to an agricultural field tile drainage system.
- Any system connected to a dry well (or cistern or cess pit) instead of a soil absorption field.
- Any system that discharges wastewater to a stream, river, drainage ditch, pond or soil surface.
- Any system connected to a storm water drainage system.

### A Properly Designed Septic System has four main components:

- **Pipe from the home:** All household wastewater exits the home through a pipe to the septic tank.
- **Septic tank:** The septic tank is a buried, watertight container typically made of concrete, fiberglass, or polyethylene. It holds the wastewater long enough to allow solids to settle out (forming sludge) and oil and grease to float to the surface (as scum).
- **Drainfield:** The wastewater exits the septic tank and is discharged into the drainfield for further treatment by the soil. The partially treated wastewater is pushed along into the drainfield for further treatment every time new wastewater enters the tank.
- **Soil:** Septic tank wastewater flows to the drainfield, where it percolates into the soil, which provides final treatment by removing harmful bacteria, viruses, and nutrients. If septic leachfields have been properly engineered/located, microbes in the soil digest or remove most contaminants from wastewater before it eventually reaches groundwater.

If your septic system has any of these potential failures, you should probably have your system inspected by a licensed professional. As a matter of fact, regulators and engineers suggest that a typical septic system be inspected at least every 3 years by a professional, and that the tank be pumped as recommended by the inspector (generally every 3 to 5 years). These professionals would be able to assess whether your system meets the current protective standards, or has “failed.”

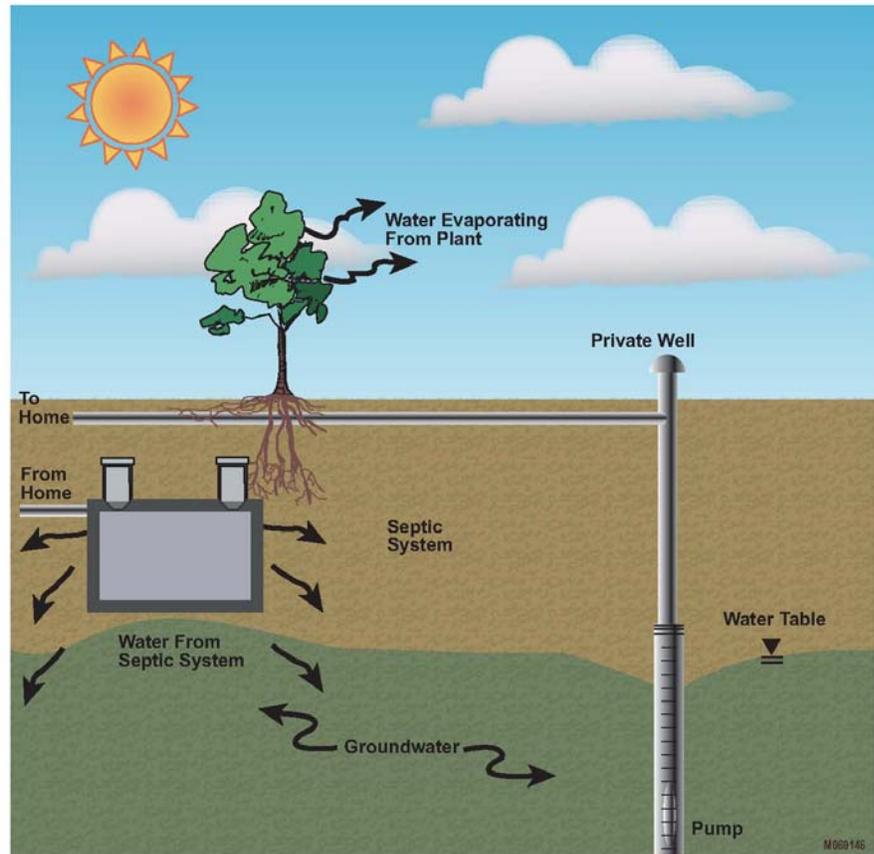
### How can I protect my drinking water from septic impacts?

About 15% of Americans have their own source of drinking water, such as wells, cisterns, and springs. Unlike public drinking water systems serving a large population, individuals with their own source of drinking water do not have experts regularly checking the source of the water and its quality before it is consumed. Thus, to help protect individuals with their own wells, almost all states license or register water-well installers (in Indiana, this is regulated under the Indiana Administrative Code, 312 IAC Article 12, Water Well Drilling and Groundwater). Further, certain city and county health departments maintain construction standards for drinking water wells (in Porter County, these regulations are found in the Porter County Code at 18.008, Water Wells).

The most important factor in protecting your drinking water from septic impacts is to consider where your well is located and how it is constructed. USEPA and IDEM guidance suggest the following well construction “To-Do’s:”

- Place the well uphill from septic systems (yours and your neighbor’s);
- Experts suggest a well be placed 50 feet from a septic tank and 100 feet from a septic leach field;
- The head of the well (the part you can see at the ground surface) should protrude from the ground such that surface run off (from rain and snow) drains away from well; and
- A well should be cased to a minimum of 25 feet below the ground surface (this means that the well should be at least 25 feet deep).

Many wells in the Pines community were constructed prior to 1985 (the effective date of the regulations), and some homeowners sought special dispensation to install a shallower well on their property or to construct a well not in accordance with the IDEM regulations or Porter County codes. It is the responsibility of each private well owner to understand the risks and benefits of the placement and construction of his/her well.



## Where can I get more information about septic systems?

- USEPA's Septic System Basic Information homepage:  
<http://cfpub.epa.gov/owm/septic/basics.cfm>
- National Small Flows Clearinghouse: [www.nesc.wvu.edu](http://www.nesc.wvu.edu)
- Rural Community Assistance Program: [www.rcap.org](http://www.rcap.org)
- Septic System Basic Design (from the Home Inspection and Information website): <http://www.inspect-ny.com/septic/SepticDesign.htm>
- Purdue University Extension Program, Home and Environment:  
[www.ces.purdue.edu/HENV/](http://www.ces.purdue.edu/HENV/)
- Porter County Health Department:  
<http://www.porterco.org/?0/33/3/8.032>

### Our Commitment....

NIPSCO and Brown are committed to keeping you informed on the progress of the investigation of the Pines Area of Investigation. Look for future *Pines Updates* to update you to our progress. We also have a website to provide continual updates on the project:

**[www.pinesupdate.com](http://www.pinesupdate.com)**

Please contact the Communications Coordinator at the address listed below to be placed on the mailing list.

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