



Reconnect with your environment

Learn about environmental issues, their effect on your community and actions for your involvement.



'Great Lakes Water Wars' writer speaks at Behrend

By ANNA MCCARTNEY
Contributing writer

Many areas in the southern and western regions of the country are facing water shortages because they are depleting their groundwater resources faster than they can be replenished. Serious droughts in these areas are making the problems worse, leading to growing pressure to divert water from the Great Lakes to meet their needs.



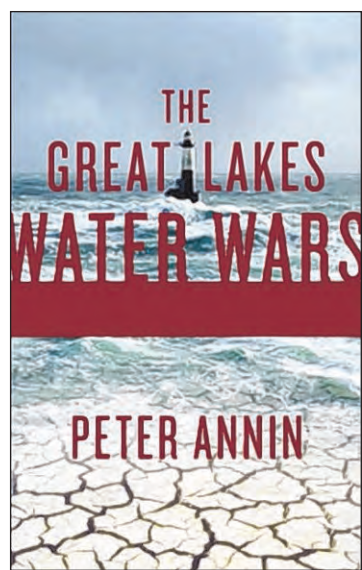
Peter Annin

Should this water be shared with hydrologically challenged areas? This will be the topic of the next Speaker Series event at Penn State Behrend: "The Great Lakes Water Wars: Will Erie Fight?"

Former Newsweek journalist Peter Annin, author of the book "The Great Lakes Water Wars," will discuss historical and future water-sharing controversies and other environmental pressures on the Great Lakes on Monday, Feb. 18, at 7:30 p.m. His talk will be in the McGarvey Commons of the college's Reed Union Building; admission is free and open to the public.

Annin spent years writing about the environment, including droughts in the Southwest, hurricanes in the Southeast, forest fires in the mountain West, recovery efforts on the Great Lakes and the causes and consequences of the "dead zone" in the Gulf of Mexico.

He is currently the managing director of the University of



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Former Newsweek journalist Peter Annin will speak at Penn State Behrend.

Notre Dame's Environmental Change Initiative, which studies the interrelated problems of invasive species, land use and climate change and their synergistic impacts on our nation's water resources.

The "Great Lakes Water Wars" Speaker Series event is supported by Penn State Behrend's School of Science, the student activity fee, the Division of Student Affairs and the Harriet Behrend Ninow Memorial Lecture Series Fund. For more information, contact the Office of Student Activities at 898-6171.

ANNA MCCARTNEY, a communications and education specialist for Pennsylvania Sea Grant, can be reached by e-mail at axm40@psu.edu.



BUCKNELL SUSQUEHANNA RIVER INITIATIVE

Bucknell students drill groundwater monitoring wells near Montandon marsh in the Susquehanna River watershed. Understanding how groundwater is connected to surface water and how they are both related to the hydrologic cycle is essential for the successful management of our water resources.

Drip-dry material

Guzzling too much water threatens our watersheds

By ANNA MCCARTNEY
Contributing writer

Must we wait till the well is dry to know the worth of water?

This buried treasure moves slowly beneath our feet through spaces and cracks underground but it is intimately connected to surface water. All life depends on this water that can't be seen.

When precipitation falls to Earth, some flows downhill as runoff into a stream, lake or ocean. Some evaporates, and plants take up some. The rest soaks into surface soil and trickles through rocks.

This water eventually reaches the water table — the top of a saturated zone of soil or rock, which is called an aquifer. These saturated underground areas can be found close to the Earth's surface or hundreds of feet underground where this subterranean water has been stored in the pores of rocks for thousands of years. However, we are guzzling this water faster than the rains can replace it.

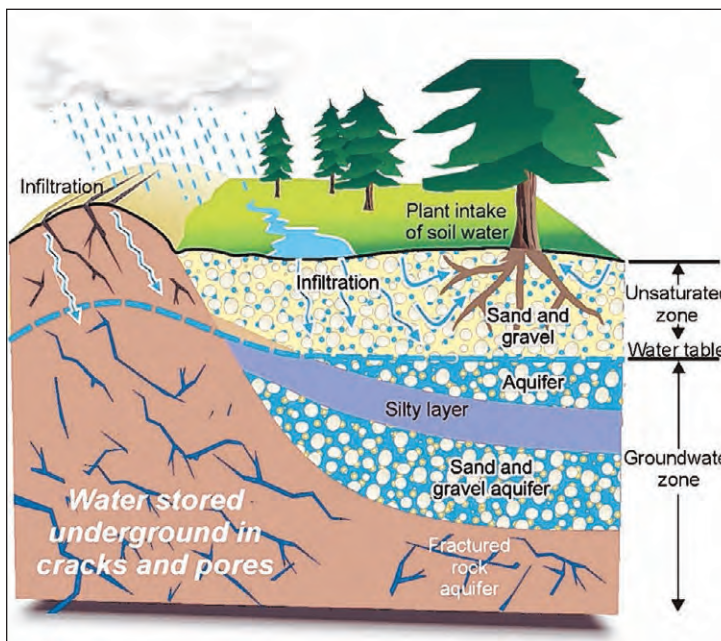
Groundwater is discharged in wetlands, lakes and streams — the low places where the water table meets the land surface — to replenish your favorite fishing hole or the wild rafting rapids that you love. Streams, lakes and wetlands can dry up without groundwater replenishment. The U.S. Geological Survey (USGS) estimates that about 30 percent of U.S. streamflow is created by groundwater, although in some locations it may be higher and in others lower. The geology of an area controls the amount of groundwater stored and the rate of movement. The speed with which water moves into, through and out of an aquifer depends on the type of rocks, the size of the cracks in the rocks and the pores between soil and rock particles, and whether pores are connected.

In coarse sand, water generally moves as much as several feet per day because openings between the grains are large and interconnected, resulting in high permeability. Fine-grained materials like clay have many small pores where water can be stored, but because clay materials are relatively impermeable, water may move only a few inches a year. Permeability in limestone primarily depends on the size, frequency and distribution of fractures and cracks.



ANNA MCCARTNEY/Contributed photo

Streams, lakes and wetlands are replenished by groundwater discharge called baseflow, which remains at a relatively constant temperature year-round — about 50 degrees F. It is the reason streams stay icy cold in the summer.



PRINCE EDWARD ISLAND CANADA DEPARTMENT OF ENVIRONMENT, LABOUR AND JUSTICE

Groundwater is not like an underground pond or river. Rather, it soaks into the tiny spaces in the soil and bedrock until it becomes saturated, just like a sponge. The boundary between the unsaturated soil and the saturated aquifer beneath it is called the "water table."

Groundwater moves toward a surface opening or "discharge" area; it follows the slope of the water table, moving from upland recharge areas (those places where rain or melt water infil-

trates the ground and reaches the water table) to lowland discharge areas. Most precipitation seeping into the soil moves only a few miles to the point where it is discharged; in the vast majority

of cases, it stays within the same watershed. Water never follows political boundaries.

Our future requires that we take care of our water supplies. However, not even the hydro geologists (scientists who study water) are certain of how much is available so that we can prevent depletion. While they base their knowledge on estimates, they know for certain that we are polluting and depleting this limited resource at an unsustainable rate. Water tables are falling around the world as countries pump dry the water buried beneath our feet. Water that once could be brought to the surface with a bucket on a short rope is now a mile or more down.

With growing political, economic and development pressures, it will take cooperation across political borders and better management policies to protect this elixir of life. In the coming weeks you can learn more about water and actions you can take to ensure it will be available for future generations.

ANNA MCCARTNEY, a communications and education specialist for Pennsylvania Sea Grant, can be reached by e-mail at axm40@psu.edu.



CONTRIBUTED PHOTO

Northwestern High School students and guests take part in a videoconference on pharmaceutical and personal care products.

Videoconference looks at dangers of PPCPs

By ANNA MCCARTNEY
Contributing writer

The chemicals in pharmaceuticals and personal care products (PPCPs) have been found in surface water, sewage effluent and sludge, groundwater and drinking water.

High school students in chemistry, biology, and environmental science classes in the area were able to actively participate in a videoconference to learn about this serious issue.

Guest speaker Steve Mauro, Ph.D., a microbiologist at Mercyhurst University, presented his findings on PPCPs in the Pennsylvania Lake Erie watershed. He discussed his research on Fluoxetine, a chemical of concern, and the possible effects it may have on our environment. An active ingredient in Prozac,

Fluoxetine has been found in the waters off Presque Isle beaches.

Northwestern High School, Environment Erie (Earth Action), Jr-PLEWA, Pennsylvania Sea Grant and the Intermediate Unit 5 (IU5) teamed up to host the environmental videoconference.

For more information on PPCPs contact Marti Martz at mam60@psu.edu. For information on future videoconferences, please contact Northwestern High School teacher Cindy Murray at cmurray@nwsd.org, or Environment Erie Education Director Nate Millet at nmillet@environmenterie.org.

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Check out these websites to learn more:

- www.usgs.gov/water/
- <http://waterwatch.usgs.gov>
- <http://newswatch.nationalgeographic.com/2011/12/22/the-water-costs-of-the-choices-we-make/>
- www.paseagrant.org

Groundwater replenishment relies on precipitation. Use the weather section to determine if precipitation for our region is above, below or at normal levels. Is rain or snow in the local forecast? Visit the NOAA site <http://water.weather.gov/precip/> to see the observed, normal, departure from normal and percent of normal precipitation for the entire country and then for the following states: Pennsylvania, California and Texas. Which state varied the most from its normal levels?

Share your thoughts on protecting groundwater for possible publication in the "your space" feature. Send them to axm40@psu.edu.

