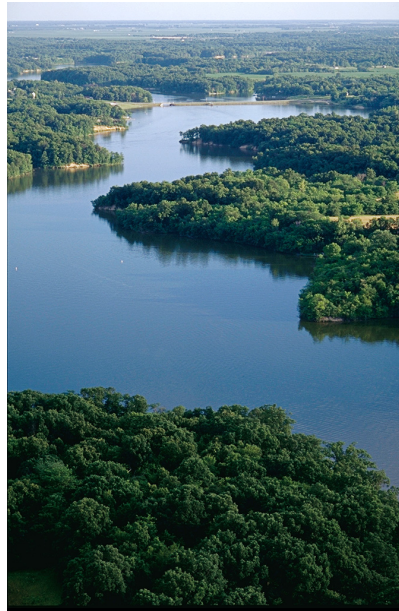


New Drainage System Dramatically Cuts Nutrients in Lakes, Rivers



Researchers at the University of Illinois are evaluating a modified drainage water management system that dramatically reduces the amount of nutrients moving into rivers and streams.

The modified system has been shown to reduce nitrates flowing from drainage tile into streams by 46 percent and phosphorus by 80 percent. These nutrients are two leading sources of contamination in U.S. rivers and streams.

The new system works by reducing the volume of drainage water flowing from a tile outlet, said Richard Cooke, U of I agricultural engineer. An automated control structure placed at the outlet of a tile system controls the level of the water table in the soil. By adjusting the opening of the gate on the structure, researchers can control the rate at which water flows out.

"For example, the water level can be raised after harvest," said Cooke. "This reduces the flow rate from the tile, which in turn reduces the nutrient load in the tile drainage water. We aren't changing the concentration of nutrients; we're just reducing the flow."

Cooke also wants to use the control structure to retain water in the soil during the growing season.

"Normally, we try to keep the water table at the level of the tile until harvest," said Cooke. "Now, we're going to try to bring the water table back up after planting. That way, the soil will have the potential of storing about six days of water."

"Six days doesn't seem like much," he continued, "but there are times when the plant is more susceptible to stress. Six days of water can make the difference."

Cooke has several structures on sites located around the state. His goal is to have 12 sites located on the 12 major soil types in Illinois.

He also hopes to combine the structures with other drainage water management practices he has developed, including shallow tiles and bioreactors. A shallow drain tile is placed 2.5 to 3 feet deep instead of the traditional 4 feet, which reduces the water flow coming from the tile. A bioreactor is an underground trench filled with carbon material (such as wood chips or corn cobs) that may be mixed with gravel.

Cooke plans to place the new control structure at the outlet of a shallow drain tile system. The drainage water from the control structure would pass through the bioreactor, and bacteria in the soil would break down nitrates in the tile water, greatly decreasing the nitrate concentration in the effluent.

"We believe the results of that combination could even exceed the sum of the individual components," Cooke said.



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