

## Conservation

# Putting P in its place

By THOMAS GREEN

**I**N the 1970s, Lake Erie was in big trouble, frequently making national news for pollution from industrial waste, sewage and agricultural runoff. Since then, improvements in farming practices and industrial and municipal wastewater treatment have contributed to cleaner water, better fishing, less algae and fewer beach closings.

Voluntarily, Sandusky River Watershed farmers have greatly reduced tillage, cutting farmland soil lost to streams, rivers and Lake Erie by nearly half since 1975. Reducing tillage also has other benefits, such as cutting fuel costs, retaining soil moisture and reducing nutrient losses, especially “particulate” phosphorus, which is attached to soil particles.

### A new challenge

Since the mid-’90s, algal population explosions, or “blooms,” in Sandusky Bay and Lake Erie have been on the rise, and fish catches have declined. Over the same time

period, water monitoring by scientists at the National Center for Water Quality Research at Heidelberg University has shown an increase in phosphorus, providing a food source for algae. The greatest increase has been in “dissolved” phosphorus, which is not attached to soil and is readily available as algae food.

What happened? Evidence points to losses of commercial fertilizer from cropland. Often fertilizer is applied in the fall, when time and equipment are available, increasing the number of months surface-applied fertilizer is vulnerable to losses.

Mark Scarpitti, state agronomist with the Ohio Natural Resources Conservation Service, explains, “Fertilizer applied to the soil surface without incorporation is vulnerable to wash off whether you are tilling, conservation tilling or no-tilling.”

In the Sandusky River Watershed, water monitoring has shown that the highest levels of phosphorus are detected during snowmelt and rainstorm events, and in areas with high concentrations of cropland acres. Livestock, industrial, municipal and residential sources do not appear to be important factors at this time.

### Call to action

This past year, in cooperation with the Sandusky River Watershed Coalition, ag retailers and farmers in the Sandusky River Watershed have been taking part in a series of meetings focused on the phosphorus problem and solutions. Despite the efforts of the coalition within this very large

PHOTO CREDIT: JOHN GRUMIRINE

**LESS FISH:** This is water from Lake Erie during an algal bloom in August.



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**CONSERVATION STEPS:** Dwight Clary of Kansas, Ohio, (left) explains how his no-till system helps infiltration and reduces runoff to Mark Adelsperger and Rem Confesor. Clary seeds a rye cover crop by air before corn harvest to ensure a good stand through winter.

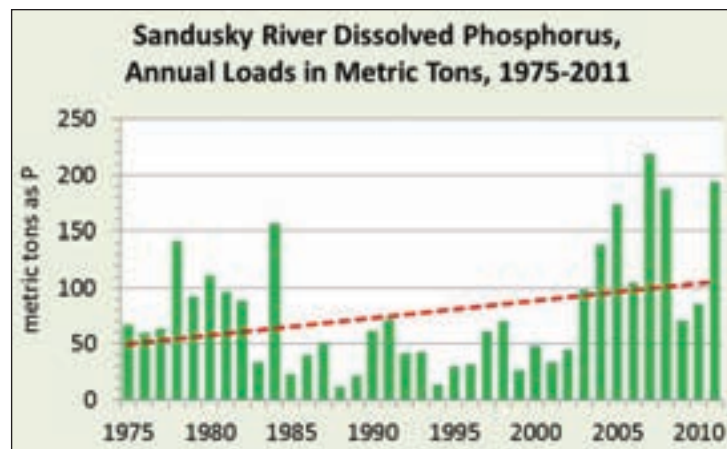
watershed, many participating agronomists and farmers have been hearing about the problem for the first time, and are signing on to make changes in practices to help solve the issue.

Using a computer model, scientist Rem Confesor at Heidelberg University will analyze information about the changes and practices, and estimate how much phosphorus losses will be reduced as a result.

“We’re concerned about conserving soil and keeping nutrients where we put them,” says Lee Orians, an agronomist with Heritage Cooperative. “These are important for farmer profitability as well as environmental stewardship,” he adds.

What changes in practice are expected to reduce phosphorus losses? Planting cover crops in the fall, applying fertilizer in spring versus fall, precision soil sampling and fertilizer application, using liquid fertilizer formulations, and banding fertilizer applications are among the practices being implemented.

Scarpitti reports: “No-till helps reduce erosion, and therefore total phosphorus losses, and increases water infiltration, soil organic matter and the microorganisms in the soil that help recycle nutrients. Proper nutrient management includes applying the right amount of fertilizer in a way that it will create contact with the soil and a chance to bond to the minerals in the soil. Cover crops increase infiltration, reduce erosion, recycle nutrients and radically increase the amount and



**P RISING:** Water monitoring data over 40 years shows the initial improvement and subsequent increase in dissolved phosphorus.

diversity of microorganisms in the soil.

“All of these practices are tools we have readily available to improve the health of the soil. If we improve the health of our soil, we will improve the health of our

streams and lakes, as well,” Scarpitti says.

The Fertilizer Institute is supporting the effort with information from its Four R Nutrient Stewardship Program, promoting the “right fertilizer source at the right rate, at the right time and the right place.” These four principles are key to maximizing economic returns as well as preventing unintended consequences from fertilizer use.

The International Plant Nutrition Institute published “The right place to put phosphorus” in its *Plant Nutrition Today* this summer, cautioning that “when phosphorus fertilizer is left on the soil surface, rainfall-induced runoff within the next several weeks will contain much-elevated levels of soluble phosphorus.”

### Group effort

Participating Sandusky retailers include The Anderson’s, Bascom Elevator, Central Ohio Farmers Cooperative, Crop Production Services, Heritage Cooperative, Mid-Wood Inc., S & D Applications and Sunrise Cooperative. The project is being led by the Sandusky River Watershed Coalition, Heidelberg University and the IPM Institute of North America, with funding support from the Great Lakes Protection Fund and the Ohio NRCS.

The project aims to enlist 80 to 100 farmers in the Sandusky River Watershed over the next year. Farmers in the watershed who are interested in participating can call their retailer or Mark Adelsperger at 419-294-8960.

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## Avoiding phosphorus losses

**M**ANY practices can help keep phosphorus where it is applied and make cropland more productive:

- **Soil-test.** This basic practice ensures application rates match crop need.
- **Apply only what is needed for the current crop.** Although applying enough fertilizer for several crops in a rotation can be convenient and save application costs, those savings can easily be lost if rainfall or snowmelt result in runoff.
- **Avoid applying fertilizer to saturated, snow-covered or frozen ground.** Fertilizer that sits atop soil for any length of time is at risk of loss from runoff.
- **Apply at planting, in the planted row.** Applying phosphorus with the seed makes nutrients readily accessible to the growing plant and reduces runoff risk. Subsurface injection or incorporation with an Aerway or other cultivator that preserves surface residue are also options.
- **Use variable-rate application.** Applying phosphorus where it is needed within the field can reduce over-application and ensure maximum use by the crop.
- **Repair gullies and washouts.** Heavy rains this past spring and summer have damaged a number of fields. Making repairs this fall, including installing grassy waterways and filter strips where needed, will be key to preventing additional soil and nutrient loss next year.
- **Plant cover crops in the fall.** Keeping a crop on the field over winter can hold nutrients and soil in place. Cover crops can also contribute organic matter, improving soil quality and ability to retain moisture. Some producers are flying on cover crop seed before harvest to help ensure a good stand.
- **Use conservation tillage.** Reduced tillage practices, maintaining residue cover to hold soil and nutrients in place, deserves much credit for the water quality improvements in Lake Erie and elsewhere over the past 40 years.