

# Effects of Conservation Practice Adoption on Cultivated Cropland Acres in Western Lake Erie Basin, 2003-06 and 2012

## Key Findings

*Farmers maintained conservation practices, cropland acreage, and crop mixes despite higher commodity prices.* Between the 2003-06 and the 2012 CEAP surveys, average corn prices nearly tripled, rising to \$6.67 per bushel, and average soybean prices nearly doubled, rising to \$13.24 per bushel. Despite these increases, cultivated cropland acreage and crop mixes did not change significantly between the two surveys. Average annual phosphorus application rates decreased from 21.5 pounds per acre in 2003-06 to 18.7 pounds in 2012. In addition, application methods that reduce the risk of phosphorus runoff and leaching losses increased from being in use on 45 percent of acres to being in use on 60 percent of acres, and edge-of-field trapping practices that reduce runoff losses, such as filter strips, increased from being in use on 18 percent of acres to being in use on 31 percent of acres.

*The cost of conservation practices in place represents a significant annual investment.* Using NRCS conservation practice cost data, the costs of reported conservation practices were estimated for recognized NRCS practices, regardless of whether the practice was funded through federal or state programs, through local initiatives, or by producers. Practices reported in the CEAP-1 survey (2003-06), represented a \$208 million annual investment in conservation; an average of 1.8 practices were applied per acre, at an average annual cost of \$43.39 per acre. The 2012 CEAP survey indicates the regional investment in conservation increased by nearly \$69 million since the CEAP-1 survey, to a total annual investment of \$277 million. The average number of practices adopted per acre increased to 2.36, with an annual investment of \$56.98 per acre.

*Voluntary conservation is making significant headway in reducing nutrient and sediment losses from farm fields.* Compared to a scenario simulating the removal of all conservation practices in WLEB, conservation practices in use in 2012 reduce annual sediment losses by 81 percent (9.1 million tons per year), reduce total nitrogen losses by 36 percent (40.6 million pounds per year), and reduce total phosphorus losses by 75 percent (11.4 million pounds per year). In the 2012 conservation condition, harvested crops remove an average of 16.3 pounds of phosphorus per acre per year, which is 87 percent of the average phosphorus applied per acre annually (18.7 pounds). Simulations suggest average annual total phosphorus loss is 1.9 pounds per acre with 1.3 pounds lost via subsurface pathways, primarily tile drainage; 0.5 pounds of phosphorus remain on the field as legacy phosphorus, which may reside in the soil for years, be used by a following crop, or eventually be lost from the field. In the 2012 survey, farmers report phosphorus application rates at or below crop removal rates on 58 percent of acres, indicating some level of phosphorus mining of the in-field legacy load.

*No single conservation solution will meet the needs of each field and farm.* Western Lake Erie Basin croplands are diverse in terms of soils, farm fields, farming operations, and management, which creates differences in conservation needs and potential solutions. Soils that make up small portions of fields can be significant sources of nutrient and sediment loss, especially when their loss vulnerabilities differ from the vulnerabilities of the soils that make up the majority of the field. Comprehensive field-scale conservation planning and conservation systems are needed to accommodate different treatment needs within and across farm fields, while maintaining productivity.

*Additional progress in nutrient and erosion control will depend on advanced precision technologies.* Nutrient and erosion control needs vary across cropped fields, requiring management of unique zones or soils within field boundaries. Precision agriculture techniques that involve potential yield effects, zoned or gridded soil testing, and variable fertilizer rates can help achieve additional nitrogen and phosphorus loss reduction. Producers can use these technologies to identify low yielding or highly vulnerable portions of fields that may benefit from more intensive management or alternative uses.