Legacy Phosphorus Project

A Collaboration of NRCS-CEAP and ARS-LTAR

CEAP GOAL

- ❑ To improve efficacy of conservation practices and programs by quantifying conservation effects

CONSERVATION PRACTICES

- ❑ Practices have been implemented to reduce P losses to surface waters

LEGACY PHOSPHORUS

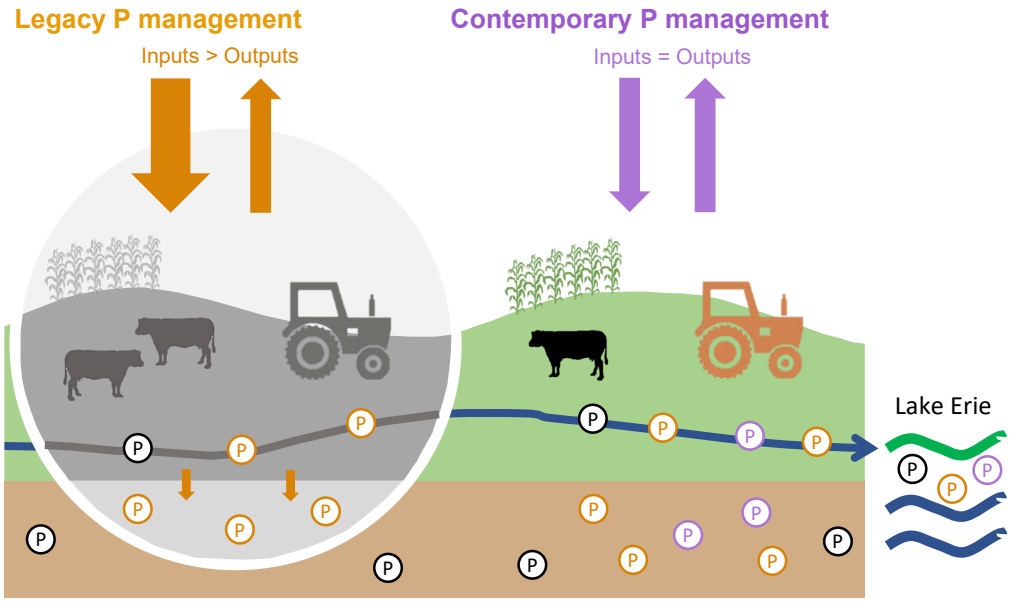
- ❑ Historical P application to fields in excess of crop uptake has in some cases resulted in P buildup in soils
- ❑ Over time, agriculture, altered hydrology, and stream bank processes have led to P accumulation in agricultural soils and within streams or ditches
- ❑ This legacy P can serve as a chronic source of pollution to surface waters for decades

WHY IT MATTERS?

- ❑ Untreated sources of legacy P can mask the effects of present day conservation efforts
- ❑ P management strategies will vary depending on the primary source of P – legacy vs. contemporary, in-field vs. in-stream

Project objective

To improve recommendations for phosphorus (P) management in the Western Lake Erie Basin through assessment of the relative contributions of legacy phosphorus from fields and watersheds



Phosphorus transported to Lake Erie is a combination of legacy P and contemporary P losses. Understanding the contributions of these sources is critical to selecting effective conservation and restoration strategies and ultimately decreasing P losses.

Data-driven science utilizing working farms

- ARS scientists in Ohio and Indiana monitor water quality from nearly 50 privately-owned paired fields and several small watersheds located throughout northwestern Ohio and northeastern Indiana
- The extensive monitoring network encompasses a range of agricultural practices, resulting in a large range of soil test P levels and P management strategies
- Continuous discharge and daily water quality sampling of surface runoff and subsurface tile drainage are monitored from the edge-of-field sites – ***totaling nearly 250 site years of data***

Edge-of-field site located in northwestern, OH, with surface runoff and subsurface tile drain monitoring

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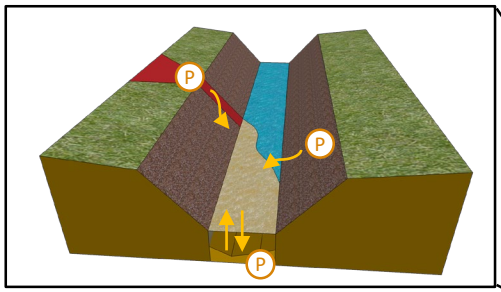
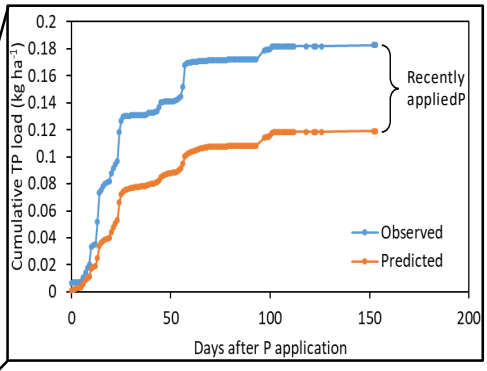
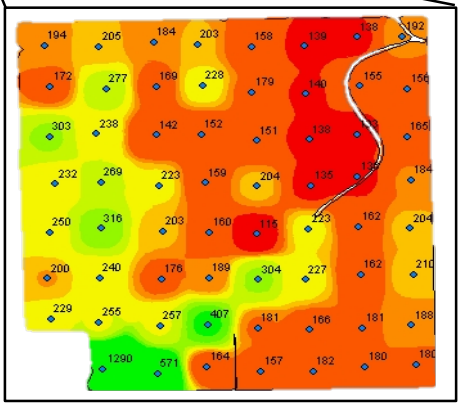
Assessing legacy phosphorus from the soil particle to the watershed

Utilize an extensive edge-of-field dataset that includes a range of agricultural practices and data-analysis techniques to estimate legacy P losses

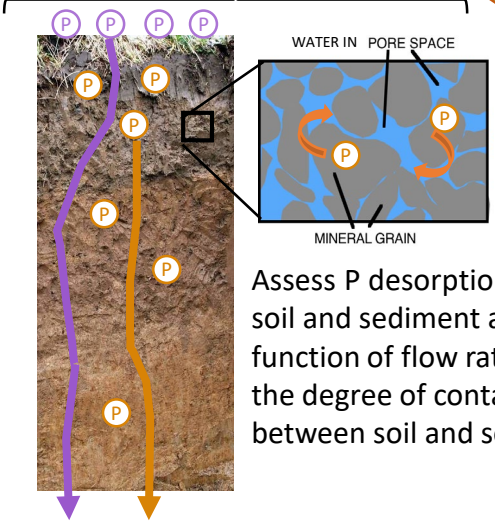




Evaluate reach-scale P uptake rate and residence time as influenced by aquatic vegetation and flow depth using in-stream tracer experiments



Quantify the impact of areas of elevated soil test P concentration or 'hotspots' on field and watershed P losses



Assess P desorption from soil and sediment as a function of flow rate and the degree of contact between soil and solution

Separate legacy and contemporary P sources using stable isotope tracers

CONTACTS

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