



## BMPs for high risk P loss sites:

8

Monitor fields for P loss using the Ohio P risk index and field scale hydrologic and water quality models. For sites with predicted high P losses, consider one or more of the following water management practices based on fitness and cost effectiveness for field site:

- Production practices that increase soil organic matter to retain water on site
- Drainage Water Management (NRCS 554)
- Nutrient removal wetlands (NRCS 656)
- P Precipitating Filter
- Saturated Buffer (NRCS 604)
- In-field water storage or detention basins

For more detailed descriptions and supporting data for these recommendations, visit [agbmps.osu.edu](http://agbmps.osu.edu).

Find answers to agronomic fertilizer questions at [agcrops.osu.edu](http://agcrops.osu.edu).

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1

Evaluate field erosion from concentrated water flows leaving a field. Use grassed areas, conservation tillage, and cover crops or other appropriate best management practices (BMPs).

OHIO STATE UNIVERSITY EXTENSION

# Phosphorus Nutrient Management for Yield and Reduced P Loss at Edge of Field

Eight steps to maximize returns to phosphorus in row crop production while reducing downstream contributions to streams and lakes



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Replace surface tile connections with designed structures (i.e., blind inlets) to reduce soil and nutrient losses.

2



No application of P containing fertilizer or organic (i.e., manure, biosolids, compost) nutrient sources to frozen or snow-covered soil unless applied to a growing cover crop.

3

Take a representative soil sample, testing for a minimum of pH, buffer pH, phosphorus-Mehlich III, and potassium for all fields where crops are harvested.

4

Use soil test results to monitor soil pH (for corn, soybeans, and wheat, desired pH is 6.5–6.8) and follow next step for soil test phosphorus (STP) value in Mehlich III.

5

If STP is 40 PPM or less, go to step 6.

If STP is above 40 PPM, go to step 7.



## STP value of 40 PPM Mehlich III or less:

6

**CROP YIELD**—Reduce risk of crop yield losses with nutrient application.

- A STP of 20 PPM defines the critical level. At 20 PPM or less, the risk of yield loss increases. Annual in season P nutrient application recommended. Recommendations to build STP to critical level are available.
- The maintenance STP range is 20–40 PPM. Recommended rate of P is equal to P removed in harvested crop. Annual application is not required. Risk of yield loss is low with flexibility to delay application one (or more) growing seasons, if needed.

**WATER QUALITY**—The greatest risk for event P losses occur when nutrient application is followed by runoff-producing rainfall. Use the following steps to reduce P loss risk at application:

- Use an agronomic rate of no more than two years' worth crop removal as recommended in the Tri-State Fertilizer Recommendations.
- Time fertilizer applications so predicted rainfall 12 hours after application is less than a 50 percent chance of more than 1 inch of rainfall.
- Time organic nutrient applications so predicted rainfall 24 hours after application is less than a 50 percent chance of more than 0.5 inches of rainfall.
- Subsurface placement reduces losses over surface application.

## STP value above 40 PPM Mehlich III:

7

**CROP YIELD**—Response to fertilizer with STP greater than 40 PPM is highly unlikely.

- Do not apply additional fertilizer due to lack of economic return.
- Organic applications should be determined using P content from testing the organic source and not exceed P crop removal rate for the next two (and no more than three) crops in the rotation.
- Consider in-crop application to a nitrogen-using crop to reduce purchased N, maximizing economic return to organic application.
- Where in-crop application is not used, incorporate organic nutrients.

**WATER QUALITY**—The risk of P loss increases with STP values over 40 PPM, with greater risk after 150 PPM.

- Do not apply additional fertilizer due to lack of economic return.
- Do not make organic applications when STP is greater than 150 PPM. Follow NRCS 590 site and rate criteria between 40 to 150 PPM.
- Time organic applications so predicted rainfall 24 hours after application is less than a 50 percent chance of more than 0.5 inches of rainfall.
- Use the Ohio P risk index, field scale hydrology/water quality models, or monitoring to evaluate site risk for P losses and need for further site BMPs. See step 8.