

ON-FIELD OHIO ACTIVITY

There are two types of phosphorus (P) that can cause trouble in freshwater ecosystems. One is sediment or particulate P. This is the P that is attached to sediment particles. When sediment is washed into a ditch, stream or river, the P that is bound to the particles will travel into the water. The other is soluble P, which is dissolved in the water that runs off into a stream or river.

Dissolved phosphorus is the phosphorus that remains in water after that water has been filtered to remove particulate matter. Phosphorus attached to the particulate matter that remains on the filter is called particulate phosphorus. Together these two forms of phosphorus make up the total phosphorus concentration in a water sample. In laboratories, water samples are typically analyzed for total phosphorus and dissolved phosphorus. Particulate phosphorus is calculated by subtracting dissolved phosphorus from total phosphorus.

Source: <http://lakeeriealgae.com/different-types-of-phosphorus/>

On-Field Ohio measures and quantifies the risk of P loss from a field. This exercise was developed by soil science researchers at The Ohio State University. Farmers across the state are using this tool as a guide to lower their risk by allowing them to enter different management practices on the same field to see what the resulting risk will be. Follow the instructions below to compare different methods of cultivation to predict the risk of phosphorus loss and the predicted amounts lost due to erosion.

Start by choosing one of the options below. Each option includes a set of management practices you will use to run comparisons, the soil organic matter percentage and the phosphorus levels based on a soil test:

<p><u>Option 1</u> Organic Matter: 2% Soil test P (Mehlich 3): 20</p> <p>Management: In the first scenario, choose fertilizer application, surface broadcast. In the second scenario, select fertilizer application, strip-till 30 inches.</p>	<p><u>Option 2</u> Organic Matter: 3% Soil test P #1 (Mehlich 3): 40 Soil test P #2 (Mehlich 3): 100</p> <p>Management: Same management practices and rotation for both scenarios. In the second scenario, increase the soil test P level.</p>	<p><u>Option 3</u> Organic Matter: 4% Soil test P (Mehlich 3): 60</p> <p>Management: Select different management practices and crop rotations over same period of years.</p>
<p><u>Option 4</u> Organic Matter: 4% Soil test P (Mehlich 3): 120</p> <p>Management: Same management practices. Use different fertilizer types in the two scenarios i.e., liquid and solid.</p>	<p><u>Option 5</u> Organic Matter: 3% Soil test P (Mehlich 3): 220</p> <p>Management: Same management practices and rotation. In second scenario only, choose to plant a cover crop.</p>	<p><u>Option 6</u> Organic Matter: 5% Soil test P (Mehlich 3): 80</p> <p>Management: Same management practices. Apply fertilizer on only one crop in the first scenario. In the second scenario, fertilize the opposite crop only.</p>

Using the On-Field Ohio Tool

1. Visit the On-Field Ohio tool located at <http://18.220.141.142/>.
2. Select Map New Field.
3. Name your field in the box at the top left above the map.
4. Select Satellite View to find a field near you.
5. Draw a field of your choosing by clicking on the polygon shape at the top center of the map.
6. Click on each corner of the field to draw the outline of the field.
7. After clicking **Next**, the chosen field will fill in on the map in different colors to represent different soil types.
8. Click **Next** again to get to the crop rotation information.
9. Select default crop management template, the two-year template, and then choose "Corn nt (no-till), Drill CC (cover crop) rye, Soybean, nt (no-till)"
 - At this step, take note of all the operations that could take place on a field within a given crop year. These can be changed, but it is important for this activity to record any changes so you can run an effective comparison.
 - Optional: You will see a column that allows a more accurate yield estimate per acre. Research the average yield at USDA to see what is realistic for corn and soybeans in the county where you live. For reference, the [average corn yield](#) for Northwest Ohio is 171 bushels per acre and the [average soybean yield](#) for Northwest Ohio is 47 bushels per acre.
10. Click **Next** in the upper right-hand corner of the page to move on to enter field info.
 - Check "yes" for tile drainage.
 - Choose the percent of organic matter based on the Option you selected for this activity.
 - Choose the amount of phosphorus based on the Option you selected for this activity.
 - Click Next to advance.

Note: Many farmers choose to add solid or liquid manure or additional fertilizer based on the soil test data. We are going to skip this step to see what effect the rotation template has on the outcome. You may choose this step if you are comparing fertilizer types or timing. Click Next to advance
11. Download your report for the first trial.
12. Re-run the simulation altering the management practices or other variables based on the instructions provided for the Option you chose for this activity.
13. Download the report for the second trial.
14. Compare your reports.

Excel tip: The data is reported in a spreadsheet. Before trying to compare, line up different management practice data in consecutive columns by crop year.

Analysis

1. Compare the values from each report. Which rotation and management strategies result in less P loss?
 - a. Why do you think this combination of rotation and management strategies resulted in less P loss?

2. What can a farmer do to lessen the risk of erosion?

3. What advice would you give a farmer about how to reduce their P loss? Describe your advice in terms of a claim (what action should be taken), evidence (data as a result of action) and reasoning for the action (science behind the data).