



## Instructions for Using the Agronomic Rate Calculation Worksheet

Ohio EPA's agronomic rate calculation worksheet serves to ensure compliance with Ohio Administrative Code Chapters 3745-40-08(A)(2)(b) and 3745-40-08(A)(3). This worksheet will automatically calculate the nitrogen agronomic rate, the single-year phosphorus agronomic rate, the multi-year phosphorus rate, and the phosphorus index.

Please note that in order for the worksheet to function correctly all “blue boxes” must be completed either via data entry or information selection within a drop down list. When selecting information from an applicable drop down box, click within the “blue box” and a “” will appear. Simply click on the “” and select the applicable information.

### 1. General Information

**Comment:** If you click on Ohio EPA's logo located in the upper left-hand corner of the agronomic rate calculation worksheet, your internet browser should open to Ohio EPA's Biosolids Program webpage where additional resources related to the beneficial use of biosolids can be obtained.

Enter the information that is requested.

- a. “Ohio EPA #” means the specific identification that is provided by Ohio EPA for each beneficial use site authorized in the State of Ohio.
- b. “Field ID #” means the specific identification for a beneficial use site that is utilized by a generator.
- c. “Generator Name” means the name of the treatment works generating biosolids for beneficial use via a valid NPDES permit or a management plan.

### 2. Biosolids Data and Beneficial Use Methods

- a. Enter the analytical results for ammonia nitrogen, total kjeldahl nitrogen, and total phosphorus in mg/kg. Please note that organic nitrogen, available nitrogen, and phosphate concentration, in lbs/ton, are automatically calculated.
- b. Answer the question “will immediate incorporation / injection be performed?” by selecting either “yes” or “no” from the drop down box. When “yes” is selected, the beneficial user receives a 50% reduction in the calculated phosphate concentration.

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**3. Beneficial Use Site Information**

- a. Enter the analytical result for a beneficial use site's soil phosphorus in parts per million (ppm) and select the extraction method performed (i.e. Bray-Kurtz P1 or Mehlich 3) from the drop down box. The agronomic rate worksheet automatically calculates the Bray-Kurtz P1 soil phosphorus extraction result if the Mehlich 3 extraction method was performed.
- b. Based upon the analytical results entered for soil phosphorus, the agronomic rate worksheet spreadsheet will automatically determine the applicable agronomic rates that can be utilized in accordance with OAC 3745-40-08.
- c. Select the county the beneficial use site is located in from the drop down box.
- d. Based upon the county selected for the beneficial use site's location, the spreadsheet will automatically provide a drop down box containing all of the soil types available with the selected county. Select the soil type that encompasses the largest percentage of the beneficial use site.

**Comment:** The soil type percentages information can be obtained from the United States Department of Agriculture's Web Soil Survey, which is available at:

<http://websoilsurvey.nrcs.usda.gov/app/>

- Step 1 - Use the Web Soil Survey program to define Area of Interest (AOI), which is the beneficial use site.
- Step 2 - After AOI has been defined, select the "Soil Data Explorer" tab near the top of the webpage.
- Step 3 - Select the "Soil Properties and Qualities" tab, located below the "Soil Data Explorer" tab.
- Step 4 - In the "Properties and Quality Ratings" tab, located on the left side of the webpage, select "Soil Qualities and Features."
- Step 5 - Select "Hydrologic Soil Group".
- Step 6 - Select "View Rating" to obtain the specific hydrologic soil group information for the beneficial use site.
- Step 7 - Create a printable version to generate a PDF document that can be saved or printed out for your records.

- f. Select the most hydric hydrologic soil group located at the beneficial use site from the drop down box.

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**Comment:** Hydrologic soil group information can be obtained from the United States Department of Agriculture's Web Soil Survey, which is available at:

<http://websoilsurvey.nrcs.usda.gov/app/>

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- g. This portion of the worksheet is arranged by crop year (i.e. Year 1 through Year 5) and the crop rotation for the specific crop year (i.e. Crop 1 through Crop 5). Select the crop type(s) expected to be grown on the beneficial use site. Below each crop type selected, enter the reasonably expected crop yield as either **bushel per acre** or **tons per acre** for the type(s) of crop(s) grown during a specific crop year.

Ohio EPA recommends that supplemental information be maintained to verify how the reasonably expected crop yield(s) were determined. Supplemental information would include the recommended expected crop yields published within *Tri-State Fertilizer Recommendations* or other available technical document. For your convenience, the *Tri-State Fertilizer Recommendations* can be obtained from the following website:

<http://ohioline.osu.edu/e2567/index.html>.

**Comment:** Five years of crop rotations are provided. You are not required to fill in all crop years for the worksheet to function. In addition, five crop types are available for each crop rotation within a crop year. You are not required to fill in all crop types for the worksheet to function.

- h. Enter the Crop Nitrogen Requirement (Year 1) in lbs/acre. Crop Nitrogen Requirement (Year 1) means the amount of nitrogen needed for the crops to be grown during Year 1.

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- i. Enter the Existing Available Nitrogen in lbs/acre. Existing Available Nitrogen means the total amount of nitrogen remaining at the beneficial use site from previous beneficial use events and crop residuals.
- j. Enter the Non-Biosolids Nitrogen Application in lbs/acre. Non-Biosolids Nitrogen Application means the total amount of available nitrogen from commercial fertilizers, septage application, animal waste applications, and other non-biosolids materials that have been or will be applied to the beneficial use site for the single crop year.
- k. Enter the Phosphate ( $P_2O_5$ ) Fertilizer Application in lbs/acre. Phosphate ( $P_2O_5$ ) Fertilizer Application means the total amount of commercial phosphate fertilizer that has been or will be applied to the beneficial use site during the planned crop rotation.
- l. Enter the Non-Biosolids Organic Phosphate ( $P_2O_5$ ) Application in lbs/acre. Non-Biosolids Organic Phosphate ( $P_2O_5$ ) Fertilizer Application means the total amount of phosphate that has been or will be applied to a field from manure, septage, and/or food waste applied to the beneficial use site during the planned crop rotation.
- m. The Biosolids Phosphate ( $P_2O_5$ ) Beneficial Used cell will automatically be calculated based upon the nitrogen agronomic rate and the phosphate concentration of the biosolids.

**4. Phosphorus Index**

- a. The Soil Loss for a beneficial use site will automatically be calculated based upon the county and soil type selected above.
- b. Select the appropriate Connectivity to “waters of the State” from the drop down box.
- c. Select the appropriate Runoff Class – Slope Range from the drop down box. This information can be obtained from either the soil type entered above or United States Department of Agriculture’s Web Soil Survey.
- d. Select the appropriate Method - Phosphate ( $P_2O_5$ ) Fertilizer from the drop down box.
- e. Select the appropriate Method - Organic Phosphate ( $P_2O_5$ ) Fertilizer from the drop down box.
- f. Answer the question “does runoff flow through a filter strip designed in accordance with United States Department of Agriculture (USDA) Ohio Natural

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Resources Conservation Service's (NRCS) Field Office Technical Guide Standard 393?" by selecting either "yes" or "no" from the drop down box.

**Comment:** Information regarding USDA NRCS Field Office Technical Guide Standard 393 can be obtained from the following websites:

United States Department of Agriculture - Electronic Field Office Technical Guide  
[http://www.oh.nrcs.usda.gov/technical/ohio\\_eFOTG.html](http://www.oh.nrcs.usda.gov/technical/ohio_eFOTG.html)

United States Department of Agriculture – Natural Resources Conservation Service  
<http://efotg.sc.egov.usda.gov/references/public/CO/CO393.pdf>

**Comment:** The phosphate removal rates utilized in this calculation worksheet have been obtained from the Ohio State University Extension's *Ohio Agronomy Guide*, 14<sup>th</sup> Edition, which is available on the internet at:

[http://agcrops.osu.edu/specialists/fertility/fertility-fact-sheets-and-bulletins/agron\\_guide.pdf/at\\_download/file](http://agcrops.osu.edu/specialists/fertility/fertility-fact-sheets-and-bulletins/agron_guide.pdf/at_download/file)

## **5. Calculated Agronomic Rates**

- a. Once all of the above information has been entered into the worksheet, the nitrogen agronomic rate, single-year phosphate agronomic rate, multi-year phosphate agronomic rate, and the phosphorus index will automatically be calculated. Based upon analytical results entered for soil phosphorus, the worksheet will automatically inform the user of the correct agronomic rate(s) that can be utilized at the specific beneficial use site.

The spreadsheet allows a beneficial use rate to be entered manually for the nitrogen agronomic rate in the event that the beneficial use rate will be lower than the calculated nitrogen agronomic rate. Please note that the blue box automatically provides the calculated nitrogen agronomic rate for the beneficial use site as a default; however, if a beneficial use rate will be utilized on the beneficial use site that is lower than the calculated nitrogen agronomic rate, simply enter the beneficial use rate, in dry tons/acre, in the blue box.

**Comment:** The most limiting agronomic rate or the phosphorus index must be utilized for the purpose of protecting "waters of the state."

## **6. Beneficial Use Information**

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- a. Enter the total quantity of biosolids, in dry tons, that were beneficially used on the specific beneficial use site.
- b. Based upon data entered on the worksheet, the Phosphate ( $P_2O_5$ ) Beneficial Used Per Acre will automatically be calculated.
- c. Enter the acreage of the beneficial use site where beneficial use of biosolids occurred.
- d. Enter the date when biosolids were initially delivered to the beneficial use site for beneficial use site.
- e. Enter the dates when beneficial use of biosolids commenced and terminated.
- f. The Total days Biosolids Stored at Beneficial Use Site cell will be automatically calculated based upon the dates provided above.
- g. Enter the dates when appropriate signage was posted and removed at the beneficial use site. In addition, answer the question regarding if a permanent sign has been posted at the beneficial use site by clicking "Yes" or "No".

**Comment:** Please note that the dates should be in a "month/day/year" format.

**7. Additional Information**

Should you have any questions regarding the use of this worksheet or the biosolids beneficial use program, please contact your respective biosolids coordinator:

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