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# What is PaOneStop? ([www.PaOneStop.org](http://www.PaOneStop.org))

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- ▶ Pa One Stop provides online tools to help farmers meet regulatory requirements for Conservation (Ag E&S) and Nutrient Management Planning
- ▶ Consists of two operational modules:
  - Farm Mapping Module – allows farmers to develop maps that are required for Nutrient Management Planning, Nutrient Balance Sheets, Manure Manure Management Plans, AgE&S Plans
  - Ag E&S Module – allows farmers to develop AgE&S Plans to reduce soil loss and protect water quality
- ▶ Manure Management Planning and Nutrient Balance Sheet modules under development.



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# Farm Mapping Module

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- Pa regulations require completion of Nutrient Balance Sheets for manure transfers, Nutrient Management Plans, Manure Management Plans, and Ag E&S Plans for farms
- Methods to complete Nutrient Balance Sheets, MMPs, and NMPs are available to farmers but require maps as part of the process.
- Maps are expected to contain field boundaries, acreages, stream and water features, wells, sinkholes, application setbacks and buffers, soils, aerial images and more.
- Production of maps is difficult for most farmers and costly



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# Draw and Label Fields

The screenshot displays the PaOneStop Farm Planning System interface. At the top, it says "You are currently logged in as: [User Name] Log out". Below this is a navigation bar with "Home / About / Help" and "Manage farm". The main area is titled "Edit Fields for Lancaster" and includes instructions: "Click on the outline below to open a farm field on the map to the right. You will need to click this number each time you add a field to the map." There is a "Draw Field" button and a checked checkbox "Updates soils after each field is added". Below this is a table of farm fields:

Field	Acre	Suitable Acres
0 1	20.00	21.00
1 2	17.45	18.54
2 3	13.12	13.00
3 4	15.51	14.44
4 5	11.86	13.86
5 6	14.37	12.07
6 7	3.38	3.22

Summary statistics at the bottom of the table:

- Total Farmable Acres: 101.22
- Total Suitable Acres: 92.94

On the right side of the map, there is a legend with the following items:

- Base Layer
- Older Photos
- Topo Map
- Slope
- Overlays
- Labels
- USCS Soils
- Streams
- Lakes & Ponds
- Soils
- Top Management Lines
- Boundary Setbacks
- Vegetative Buffers
- Farm Features
- Municipalities
- Courts

- ▶ Outline field boundaries
- ▶ Describe fields
- ▶ Acreages automatically calculated
- ▶ Fields can be added, edited, or deleted as needed.
- ▶ Air photo background automatically provided



# Extract Soils/Slopes for Fields

The screenshot shows a web application interface for field soil extraction. At the top, it says "You are currently logged in as: RKK Log out". The main area features a map of a farm with field boundaries outlined in white. A "Soil Information" table is overlaid on the map, showing soil types and their corresponding acreages. A "Field Information" form is also visible, allowing users to input field details. At the bottom, a "Farm Fields" table displays a list of fields with their IDs, descriptions, and acreages. The total farmable and suitable acres are also shown.

Map Unit	Acres	Orange	Farmable Class	Slope
C08	2.34	Well drained	All areas are prime farmland	0.32
C09	7.44	Well drained	All areas are prime farmland	0.37
C05	8.35	Moderately well...	All areas are prime farmland	0.32
P1	0	Well drained	Not prime farmland	0.32
P2	1.00	Somewhat better...	Not prime farmland	0.40

Field ID	Description	Acres
0	Field	28.20
1	Field	17.45
2	Field	18.12
3	Field	15.59
4	Field	15.06
5	Field	14.37
6	Field	1.80
7	Field	1.42

Total Farmable Acres: 101.22  
Total Suitable Acres: 93.94

USDA-NRCS  
SSURGO soils  
data extracted  
via web for each  
field  
soil types  
soil properties  
acreages  
updated after  
each field edit  
automatically





# Draw Farm Features



**Draw other farm features needed for map**

water wells

sinkholes

streams

manure staging areas

non-farmed areas of fields

**Generate Manure setbacks**

**Generate Buffers**

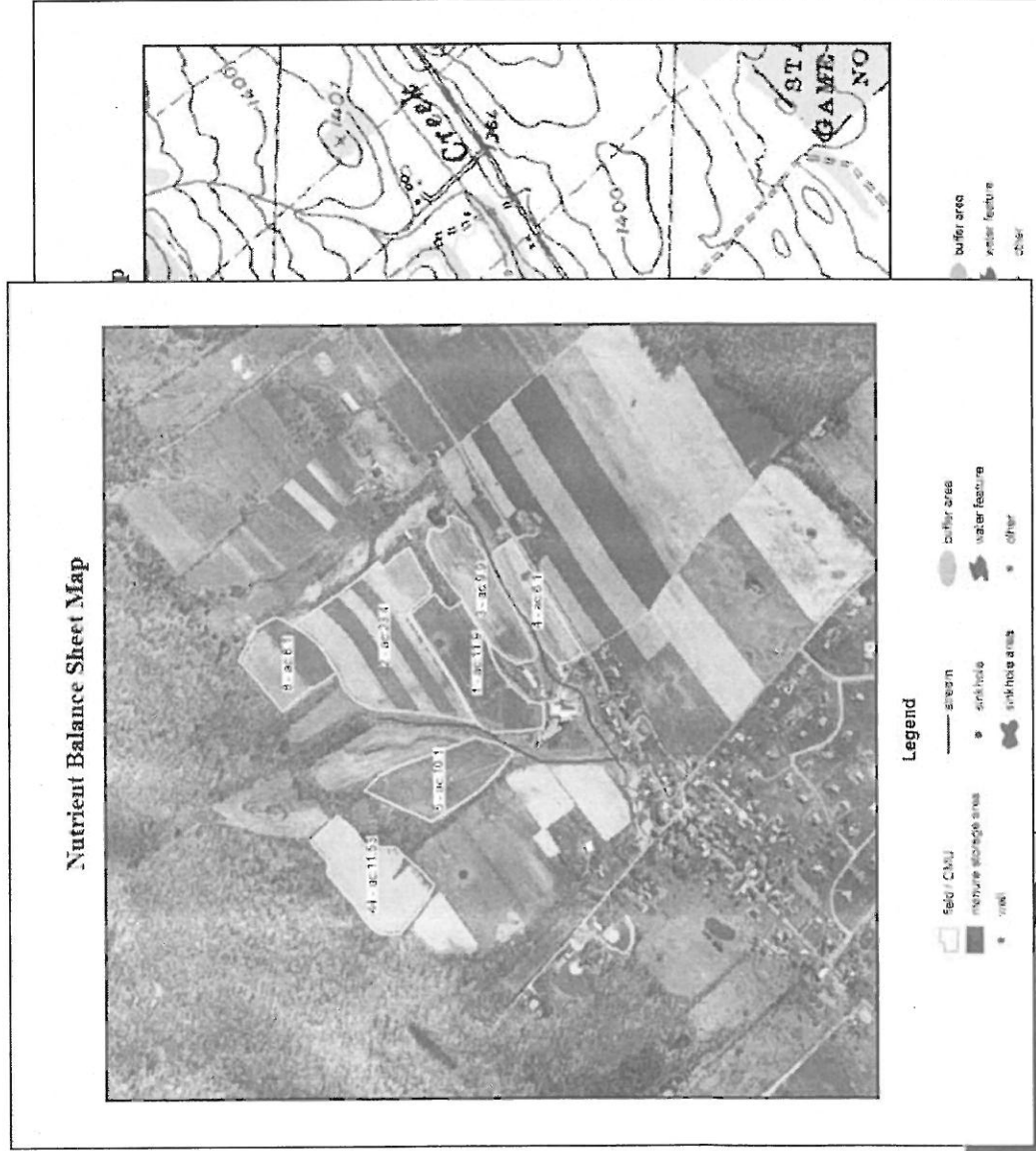


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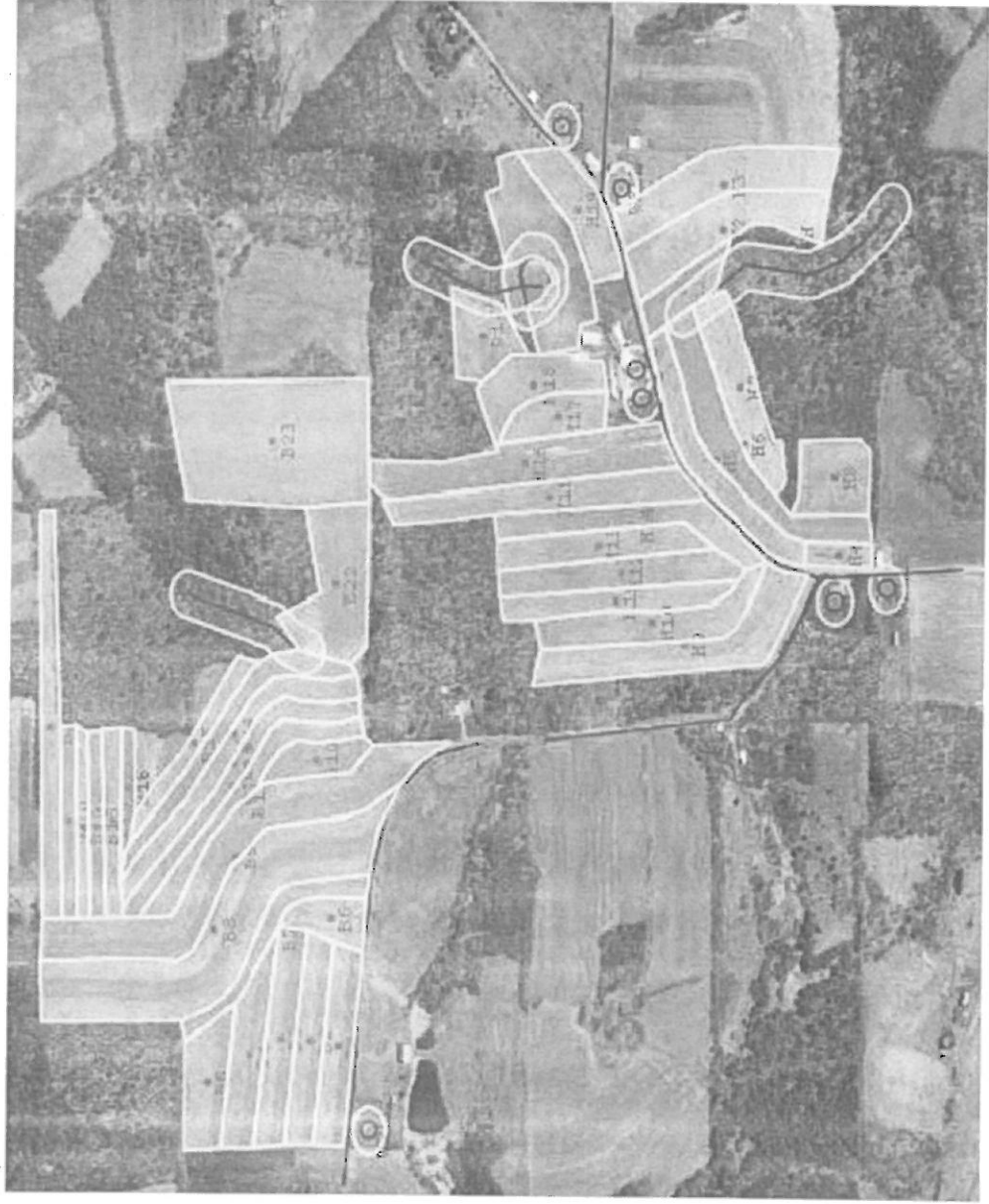
# Generate Maps



- ▶ PaOneStop generates maps on air photo or topographic base maps
- ▶ Farmers can save maps for reference
- ▶ Farmers can save farm data for future mapping
- ▶ Only need to draw fields and farm features once



# Example User Map





# AgE&S: Chapter 102 Requirements

- written Ag E&S Plans for all “agricultural plowing and tilling activities” greater than 5,000 square feet that must:
  - limit **soil loss** from accelerated erosion to the soil loss tolerance (T) over the planned crop rotation
  - contain additional BMPs for fields within 100 feet of river or perennial or intermittent stream and less than 25% plant or residue cover
  - contain plan maps that show the location of features including surface waters of this Commonwealth, and drainage patterns, field and property boundaries, buildings and farm structures, animal heavy use areas, roads and crossroads, and BMPs; soils maps; and a description of BMPs including animal heavy use area practices and procedures, tillage systems, schedules, and crop rotations
  - contain an implementation schedule
  - be available for review and inspection at the agricultural operation
- Ag E&S Plans required for Nutrient Management Plans (Act 38)
- P-Index requires soil loss calculations



# Soil Loss Calculator

Scenarios for field 2

Scenarios: **current management** Implementation Date:

Use Scenario For Plan Save Save As Delete

Field Characteristics

Soils: Lancaster DB8 Duffield silt loam, 3 to 8 percent slopes - Duffield silt loam 90 percent

Slope Length (ft): 180 Slope Percent: 4

Rock Percent/age: 3

Restore Defaults

Conservation Practices

Contouring: 10% off contour

Strip/Barrier:

Division/Terrace:

Management Rotation

Your fields within 100 feet of a stream. Click here to see if additional P&Ps are required.

Rotation Year	Crop Planted Previous Year	First Crop	Second Crop	Third Crop
1		corn grain		
2		corn silage	winter wheat	
3	winter wheat	corn silage dc		
4		soybeans drilled		
5		alfalfa brome year 1		
6		alfalfa brome year 2+	full year	
7		alfalfa brome year 2+	full year	

Soil loss - t value: 3

Calculate Soil Loss

Calculated soil loss: 3.15 (t/ac/yr) allowable soil loss: 3 (t/ac/yr)

Results

Start with current management

Calculate soil loss

If acceptable  
Use for Ag E&S plan

If not acceptable  
create new scenario by  
modifying  
management practices  
until acceptable

Can save many scenarios but  
only have one for Ag E&S plan



# Simplified RUSLE2 Options

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- ▶ County –climate
- ▶ Field soil
- ▶ Rock content
- ▶ Slope/length
- ▶ Crop Management
  - crops
  - Tillage methods
  - Single crop and rotations
  - crop yield
  - manure applications
  - planting date
- ▶ BMPs:
  - Contouring
  - Buffers/ Strips/Barriers
  - Diversions/terraces/basins/ditches



# PaOneStop Makes Assumptions

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- ▶ To simplify operation for farmers and others not familiar with RUSLE2, PaOneStop:
  - Selects default field properties
    - Representative soil (Kfactor)
    - T-value
    - Slope
    - Slope length
    - Rock fragments
  - Assumes second crop in a year starts 7 days after first crop ends



# Field Characteristics - defaults

- Representative soil
- Slope steepness
- Slope length
- Rock percentage
- T-value

Scenarios for field 2

Scenarios: current management  Implementation Date:

Use Scenario For Plan Save Save As Delete

**Field Characteristics**

Soils: Lancaster: Dbl Duffield silt loam, 3 to 8 percent slopes - Duffield silt loam, 90 percent

Slope Length (ft):  Slope Percent:

Rock Percentage:

Conservation Practices

Contouring:

Strip Barrier:

Diversion/Terrace:

**Management Rotation**

Rotation Year:  First Crop

Your field is within 100 feet of a stream. Click here for more information.

County	MUSym	Map Unit Name	Component	Comp %	T value	K factor	acres
Lancaster	CtB	Chester silt loam, 3 to 8 percent slopes	Chester	87	5	0.32	2.34
Lancaster	GdE	Glenville silt loam, 3 to 8 percent slopes	Glenville	90	3	0.32	6.35
Lancaster	Hc	Hagerstown-Urban land complex	Hagerstown	50	5	0.32	0
Lancaster	Hc	Hagerstown-Urban land complex	Urban land	30	5	0.32	0
Lancaster	DdB	Duffield silt loam, 3 to 8 percent slopes	Duffield	90	5	0.37	7.44
Lancaster	Nc	Newark silt loam	Newark	85	5	0.43	1.33





# Representative Soil

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- ▶ Most fields have many different soils with varying areas
- ▶ Some soils will have multiple soil components with varying erosion rates. PaOneStop uses all major soil components.
- ▶ PaOneStop does not always choose the dominant soil (largest mapunit) to represent the field
- ▶ In PaOneStop, the representative soil is chosen based on K-factor since that is the soil property used in RUSLE2 calculations.
  - A K-factor value representing 75% of the field area is first selected. This means that 75% of the field will have soils with K-factors less than or equal to the selected value. 25% or less of the field could have higher K-factors.
  - The largest soil mapunit with the representative K-factor value is then selected as the representative soil.



# Representative Soil

- ▶ Representative soil for a field not always the largest mapunit

Field's soils

County	MuSym	Map Unit Name	Component	Comp %	T value	K factor	acres
York	Gbb	Geneg channery silt loam, 3 to 8 percent slopes	Glenelg	85	5	0.32	29.97
York	MOC	Mt. Airy and Manor soils, 8 to 15 percent slopes	Mt. Airy	55	3	0.37	11.25
York	MOC	Mt. Airy and Manor soils, 8 to 15 percent slopes	Manor	25	5	0.37	5.11
York	MOB	Mt. Airy and Manor soils, 3 to 8 percent slopes	Mt. Airy	56	3	0.37	0.01
York	MOB	Mt. Airy and Manor soils, 3 to 8 percent slopes	Manor	30	5	0.37	0



# T-value

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- ▶ PaOneStop does not always use the T-value from the dominant soil.
- ▶ The distribution of T-values of all soils within a field are ranked from highest to lowest. The 75<sup>th</sup> percentile T-value is selected so that:
  - 75% or more of the field area will have T-values greater than the selected value, and
  - 25% or less of the field area will have T-values less than the selected T-value



# Field Slope Length

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Slope length is one of the least sensitive input parameters to RUSLE2 and one of the most difficult to determine....even in the field.

Slope length importance increases as slope increases.

0-2 percent	no effect
> 10%	no major effect
10-20 %	less important than slope
> 20 %	importance equal to slope

More attention should be given to estimating slope than slope-length

Later versions may add optional methods to determine slope length

- developed relationship from existing Conservation Plans
- GIS / terrain analysis methods

User may override default



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# Rock Fragments

Rock cover on the surface can significantly reduce erosion by lowering rainfall impact and surface runoff. A rock particle is defined as one at least 5mm in diameter. PaOneStop estimates rock cover on the surface based on the textural modifier of the representative soil for a field. (NRCS Pennsylvania RUSLE2 Users Guide (2010):

<u>textural modifier</u>	<u>rock fragments (%)</u>
none	3
channery, shaly, gravelly,	15
cherty, flaggy, cobbly	15
very channery, very shaly	35
very gravelly, very cherty	35
very flaggy, very cobbly	35

User may override default value





# Crop Rotation Builder -

Crop Year 6

First Crop    Second Crop    Third Crop

**Select Crop**

- corn grain
- double-crop
- early
- full season
- narrow row
- normal row
- corn silage
- cover crops not harvested
- forages
- small grains
- sorghum
- soybeans

**Select Tillage**

- chisel sweep shovel
- chisel twisted shovel
- cultivator - 2 pass
- cultivator- 1 pass
- disk, offset, heavy
- disk, tandem heavy primary
- disk, tandem secondary
- moldboard plow
- moldboard plow - 2 pass post planting cultivation
- no-till
- strip-till

Start Date: 4/10    Planting Date: 5/5    End Date: 10/10    Yield: 140

**Manure Application**

Manure applied the previous fall: none

Manure applied at planting: bedded

selected crop: none

selected tillage: none

Save Crop    Remove Crop    Remove Year    Close

Selects a RUSLE2 Management file

Adds it to a RUSLE2 crop rotation

managements\CMZ 65\a. Single Year/ Single Crop Templates\corn grain\Corn, grain; sp, z65



# BMPs - conservation practices

Scenarios for field 2

Scenarios: Ag EBS: current management    Implementation Date: 07/12/2013

Use Scenario For Plan    Save    Save As    Delete

Field Characteristics

Conservation Practices

Contouring: 10% off contour

Strip/Barrier: Filter Strips    Select

Diversion/Terrace:    Select

Your field is within 100 feet of a stream. Click here to see if additional BMPs are required.

Management Rotation

Rotation Year	Crop Planted Previous Year	First Crop	Second Crop
1		corn grain	
2		corn silage	winter wheat
3	winter wheat	corn silage dc	
4		soybeans drilled	
5		alfalfa brome year 1	
6		alfalfa brome year 2+ - full year	
7		alfalfa brome year 2+ - full year	

Soil loss - t/acre: 3

Calculate Soil Loss    Calculated soil loss: 2.34 (t/ac/yr)    allowable soil loss: 3 (t/ac/yr)

Strip Width: 20-ft Cool season grass filter strip

Strip Cropping    Filter Strips    Buffer Strips

Select    Close

- Contouring
- Strip cropping
- Buffer Strips
- Filter Strips
- Diversions
- Terraces



# AgE&S Plan

▶ Printed plan on demand, including:

- Plan Summary Checklist
- Field by field management information
- Soil loss calculations
- T-values
- Implementation schedule per field
- mapping

▶ Data stored online for future retrieval

### Chapter 102 Agricultural E Plan Summary

Agricultural E plan for (Owner/Operator) \_\_\_\_\_

Address \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Agricultural E plan preparer \_\_\_\_\_

Date of plan \_\_\_\_\_

The attached Ag E plan includes the following elements:

Plan	BMPs on plowed and tilled cropland ensure that soil loss does not exceed the soil loss tolerance (T) for the planned crop rotation(s)
	Additional BMPs to minimize accelerated erosion and sedimentation for fields within 100 feet of a stream, that have less than 25% plant cover or crop residue cover
	BMPs to minimize accelerated erosion and sedimentation from animal heavy use areas. These BMPs may include Heavy Use Area Protection, Critical Area Planting, Fencing, Wastewater Treatment Strip, Constructed Wetland, Use Exclusion, Animal Trails and Walkways, Diversion and Roof Runoff Structure and/or others
	An implementation schedule describing when (season and year) the planned BMPs will be implemented.
	Operation and maintenance criteria describing how BMPs will be operated and maintained throughout the lifespan of the practices.

Maps that show the location of features consistent with the current and planned conditions on the farm, including:

1	surface water and drainage patterns (topographic map)
	field and property boundaries
	buildings and farm structures
	animal heavy use areas
	roads and crossroads
	existing and planned BMPs
	soils map

Created by Dr. Paul Stone, Computer Technology Program, Land Analysis, Ltd. <http://www.pennstateag.org> Created on: 07/11/13



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