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What is PaOneStop? (www.PaOneStop.org)

- ▶ Pa One Stop provides online tools to help farmers meet regulatory requirements for Conservation (E&S) and Nutrient Management Planning
- ▶ Consists of two modules:
 - Nutrient Management Planning Mapping Module – allows farmers to develop maps that are required for Nutrient Management Planning and completion of Nutrient Balance Sheets
 - Conservation Planning Module – allows farmers to develop Conservation Plans to reduce soil loss and protect water quality
- ▶ Development of Pa One Stop is ongoing and will be released to the public incrementally. A version of the Nutrient Management Planning Mapping Module has been released.



Who is developing PaOneStop?

- ▶ Pa One Stop is being developed by Penn State Cooperative Extension in collaboration with and support from:
 - Pa State Conservation Commission
 - Pa Dept of Agriculture
 - Pa Dept of Environmental Protection
 - USDA Natural Resources Conservation Services
 - Chesapeake Bay Foundation
 - National Consortium for Rural Geospatial Innovations in America



Nutrient Management Mapping

- Pa regulations require completion of Nutrient Balance Sheets for manure transfers and nutrient management plans for many farms
- Pa State Conservation Commission estimates that more than 50,000 nutrient balance sheets are completed annually
- Methods to develop Nutrient Balance Sheets and plans 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



Create User Login

The screenshot shows the Penn State Nutrient Balance Sheet Mapping web application. The page title is "Nutrient Balance Sheet Mapping". The user is logged in as "rick". The interface includes a navigation menu with "Home / About / Help" and "Account / Manage Listing". The main content area is titled "Manage Farm Listing" and "My Farm". The "My Farm" section contains instructions: "Update or post your farm listing. If you are creating a new listing, click on 'Edit Farm Listing' to begin." Below this are four steps, each with a green checkmark and a button: 1. Edit Farm, 2. Draw / Edit Fields, 3. Draw / Edit Features, and 4. Maps. The central part of the page is a map showing a road network with a red pin marker. The map is powered by Google and includes a "Map" control with "Map", "Satellite", and "Hybrid" options. The bottom of the screenshot shows a Windows taskbar with various application icons and the system clock showing 11:56 AM.

- ▶ Username
- ▶ Password
- ▶ Data secured and not shared
- ▶ Data stored on server for future access and editing
- ▶ Four easy steps !!



Step 1: Locate Farm

Farm Map

Home / About Search Your Account Help

You are currently logged in as: Rick Log out

Account Manage Listing

Map Your Listing

Use the form below to update your farm location

Address: 250 Houtz Lane

City: Port Matilda

State: Pa

Zipcode: 16870

Locate Farm Address on Map

Save Listing Home

Map

Map Satellite Hybrid

Map data ©2009 Tele Atlas - Terms of Use

- ▶ Locate farm using address and Google maps
- ▶ Map as many farms as you like

Step 2: Draw and Label Fields

Nutrient Balance Sheet Mapping

Home / About / Help You are currently logged in as: Rick Log out

Account Manage Listing

Edit Farm Fields

Zoom to Farm

Click on the button below to trace a farm field on the map to the right. You will need to click this button each time you add a field to the map.

Draw Fields

ID	Field	Acres
0	1	11.9
1	2	23.43
2	3	9.9
3	4	6.1
4	5	10.1
5	8	8.1
6	44	11.53
7	66	23.26

Return to Farm Editing

Field Information

Field ID (max. of 10 characters)
2

Description:
Crop Rotation

Save Delete Field

Map

Base Layer

- Air Photos
- Aerial - Local
- Topo Map
- Infra-red Photos (IAIP)

Overlays

- Streams
- Lakes & Ponds
- Crop Management Units
- Manure Setbacks
- Vegetative Buffers
- Farm Features

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

Edit Fields

Farm Map

Home / About Search Your Account Help

You are currently logged in as: Rick Log out

Account Manage Listing

Edit Farm Fields

Zoom to Farm

Click on the button below to trace a farm field on the map to the right. You will need to click this button each time you add a field to the map.

Draw Fields

ID	Field
0	field1
1	field2
2	field3

Listing Home

Field Information

Description:
Woodlot

Save Delete Field

Base Layer

- Air Photos
- Aerial - Farm
- Topo Map - PASDA
- PA
- Infra-red Photos (IAIP)

Overlays

- NRCSS Soils WMS
- Farm Fields
- Farm Features

50 m
100 ft

Field boundaries can be edited and resaved

Errors can be deleted

Extract Soils for Fields

The screenshot displays the 'Nutrient Balance Worksheet Map' application. The main interface shows an aerial map of a farm with a yellow boundary and red soil lines. A 'Soil Information' popup window is open, displaying a table of soil data for various map units. The table includes columns for Map Unit, Acres, Drainage, Farmland Class, and K-factor. The 'Farm Fields' table at the bottom left lists field IDs and their respective acreages.

Map Unit	Acres	Drainage	Farmland Class	K-factor
HaA	1.46	Well drained	All areas are prime farmland	0.32
HaB	4.98	Well drained	All areas are prime farmland	0.32
HcB	7.57	Well drained	All areas are prime farmland	0.32
HuB	2.23	Well drained	All areas are prime farmland	0.32
OhB	0.02	Well drained	Farmland of statewide importance	0.32

ID	Field	Acres	Acres
0	45A	20	
1	8787	10.43	10.37
2	565	9.96	8.58
3	656	5.36	5.36
4	989	16.27	13.91
5	1	3.36	3.36
6	454	2.7	2.7
7	454	5.13	3.91

► **USDA-NRCS SURGO soils data extracted via web for each field**

- soil types
- soil properties
- acreages
- updated after each field edit automatically

Step 3: Draw Farm Features

Feature Information

Please describe the feature you have just selected.

Type: Stream

Description:

Has Vegetative Buffer
Setback distance (feet)
150

Description:

Save Delete Feature

Create Setback Delete Setback

ID	Shape	Type
0	line	Stream
1	area	Sinkhole
2	point	Well
3	line	Stream
4	line	Stream

- ▶ Draw other farm features needed for map
 - water wells
 - sinkholes
 - streams
 - manure staging areas
 - non-farmed areas of fields
- ▶ Generate Manure setbacks
- ▶ Generate Buffers

Determine Unsuitable Acreages

Nutrient Balance Sheet Mapping

Home / About Help i You are currently logged in as: rick Log out

Account **Manage Farm**

each time you add a field to the map.

Draw Field

Update soils after each field edit

Update Soil Information for Entire Farm

Farm Fields

ID	Field	Acres	Suitable Acres
0	45A	20.06	18.34
1	8787	10.43	10.37
2	565	9.9	8.57
3	656	5.36	5.36
4	989	16.27	13.91
5	1	3.36	3.36
6	454	2.7	2.7
7	454	5.13	3.91
8	343	10.88	10.88
9	dfd	9.97	9.97

Total Farmable Acres: 94.06
Total Suitable Acres: 87.37

Return to Farm Editing

Measure

Field Information

Field ID (max. of 10 characters)
565

Description:

Zoom To Field

Description	Acres
field area	9.9
area within setbacks and buffers	1.33
area suitable for manure application	8.57

View Soil Data

Save Delete Field

Field and soils successfully saved

Base Layer

- Air Photos
- Topo Map
- Infra-red Photos (NAIP)

Overlays

- NRCs Soils
- Streams
- Lakes & Ponds
- Soils
- Crop Management Units
- Manure Setbacks
- Vegetative Buffers
- Farm Features
- Municipalities

100 m
200 ft

<https://www.paonestop.org/nutrientmgmt/yourAccount/index.aspx#>



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Step 4 : Create Map

Nutrient Balance Sheet Mapping

Home / About / Help You are currently logged in as: Rick Log out

Account Manage Listing

Zoom to Farm

Click map to select fields or features:
Select Feature

ID	Field	Acres	On Map
0	1	11.9	visible
1	2	23.4	visible
2	3	9.9	visible
3	4	6.1	visible
4	5	10.1	visible
5	8	8.1	visible
6	44	11.53	hidden

ID	Shape	Type	On Map
0	point	Sinkhole	visible
1	line	Stream	visible
2	line	Stream	visible
3	line	Stream	visible
4	line	Stream	visible
5	area	Manure Stacking Area	visible
6	line	Stream	visible
7	point	Other	visible
8	point	Sinkhole	visible

Print Return to Farm Editing

Map

Base Layer

- Air Photos
- Aerial - Local
- Topo Map
- Infra-red Photos (NAIP)

Overlays

- Streams
- Lakes & Ponds
- Crop Management Units
- Manure Setbacks
- Vegetative Buffers
- Farm Features

Field Information

Show on map

Field ID: 44

Description:

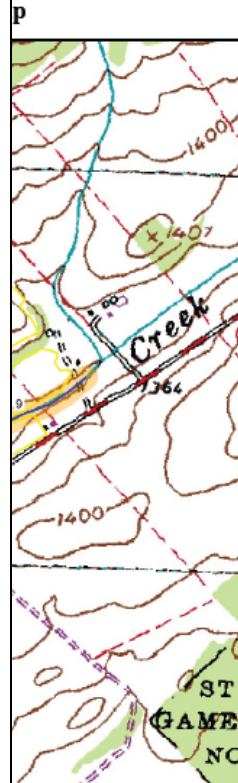
- ▶ Select features to appear on map
- ▶ Only impacted fields need to be mapped
- ▶ Hide any field or feature not needed for map
- ▶ Select background for map
 - air photo
 - topography

Generate Maps

Nutrient Balance Sheet Map



Legend



- ▶ PaOneStop generates a map that is acceptable for PA Nutrient Balance Sheet submission
- ▶ Farmers can save maps for reference
- ▶ Farmers can save farm data for future mapping
- ▶ Only need to draw fields and farm features once

Generate Custom Maps

PENNSSTATE Nutrient Balance Sheet Mapping

Home / About Help You are currently logged in as: rick Log out

Account Manage Listing

Zoom to Farm

Click map to: Select Feature

Farm Fields

ID	Field	Acres	On Map
0	1	10	HIDDEN
1	2	5.77	visible
2	3	24.74	visible
3	5	12.6	HIDDEN
4	444	2.78	HIDDEN
5	777	8.86	HIDDEN

Total Farm Acres: 64.55

Farm Features

ID	Shape	Type	On Map
0	line	Stream	visible
1	area	Sinkhole	visible
2	point	Well	HIDDEN
3	line	Stream	visible
4	line	Stream	HIDDEN

Print Return to Farm Editing

Map

Base Layer

- Air Photos
- Air Photos (State) - PASDA
- Topo Map
- Infra-red Photos (NAIP)

Overlays

- Streams
- Lakes & Ponds
- Crop Management Units
- Manure Setbacks
- Vegetative Buffers
- Farm Features

100 m
200 ft

Done

- ▶ Hide Features not needed for map
- ▶ Features only need to be digitized once
- ▶ Saves time

Account: Edit / Delete Farms

Farm Map

Home / About Search Your Account Help You are currently logged in as: Rick Log out

Account Manage Listing

- asfasdf**
Listing Type: Property for Sale
Date Posted: 7/24/2009 11:12:00 AM
Location: Centre County - any
Acres:
Views: 0 Status: Listed
Edit Listing Delete Listing
- test4**
Listing Type: Property for Lease
Date Posted: 7/24/2009 10:46:00 AM
Location: any County -
Acres: asfasdf
Views: 1 Status: Listed
Edit Listing Delete Listing
- Rick Day**
Listing Type: Property for Lease
Date Posted: 5/26/2009 10:33:00 AM
Location: Centre County - any
Acres:
Views: 13 Status: Listed
Edit Listing Delete Listing
- asfasdf**
Listing Type: Property for Sale
Date Posted: 5/11/2009 10:10:00 AM
Location: any County -
Acres:
Views: 1 Status: Listed
Edit Listing Delete Listing
- Tim's Farm**
Listing Type: Property for Lease
Date Posted: 3/13/2009 11:19:00 AM
Location: Centre County - Potter Township
Acres: 200
Views: 30 Status: Listed
Edit Listing Delete Listing
- Day Farm**
Listing Type: Property for Sale
Date Posted: 2/27/2009 11:55:00 AM
Location: Centre County - Half Moon Township
Acres: 55
Views: 118 Status: Listed
Edit Listing Delete Listing

Map

Map Satellite Hybrid

Tim's Farm
Type: Property for Lease Acres: 200
Operation Type: Crop Operation
County: Centre
[Edit Listing](#)

Map data ©2009 Tele Atlas - Terms of Use

- ▶ User can add, edit, delete, listings as needed
- ▶ User can have one or many listings

Benefits to Farmers

- ▶ Generate high-quality maps on aerial imagery
- ▶ No specialized software needed
- ▶ Farm information can be saved online for future usage
- ▶ Farm only needs to be drawn once
- ▶ Field acreages automatically calculated
- ▶ Helps meet regulatory requirements designed to protect PA water resources

Conservation Planning Module

▶ Problem:

- 59,000 Pa farms – 40,000 without current Conservation Plans
- Current rate of plan development too slow
- Farmers interaction limited – work done by USDA–NRCS
- Pa must reduce nutrient loads to Chesapeake Bay or face regulatory pressure
- EPA forcing compliance with conservation planning
- PaOneStop will increase the rate of plan development and bring farms into regulatory compliance (Ch 102, WIP)



How will it work?

- ▶ Digitize field boundaries
- ▶ Collect farm management information from farmer (tillage, crops etc)
- ▶ Extract soil, terrain, climatic conditions from online GIS servers
- ▶ Determine soil loss for each field (RUSLE/RUSLE2 model?) $A=R \times K \times LS \times C \times P$
- ▶ Compare soil loss to NRCS tolerable soil loss values (T)
- ▶ Modify crop management and/or implement conservation practices necessary to achieve tolerable soil loss for each field.
- ▶ Store farm information online for future modification or access
- ▶ Print reports and maps summarizing the Conservation Plan
- ▶ Submit Conservation Plan to regulatory agencies for review



Field Characterization – Soils

Listing Details

create report | image gallery

Action to take when map is clicked:
Get Soil Information | Zoom to Farm

Day Farm

250 Houtz Lane
Port Matilda, Pa 16870
Latitude: 40.78860001 Longitude: -78.00687790
Farm Location: Centre, Half Moon Township
General Directions: 0.7 miles se of Stormstown on Houtz lane
Listing Type: Property for Sale
Acres: 55
Operation Type: Mixed Operation
Posted: 2/27/2009
Description: great spot near the gamelands lots of deer and turkeys
Water Supply: Upper Halfmoon Water company and rainfall
Terms: cash on the barrel
Reservations: No hog farms

Contact: Rick Day

116 ASI Building
University Park, Pa 16802
Phone Numbers: or
Email: rdav@psu.edu

Farm Fields

ID	Field	Acres
0	field1	93.49
1	field2	27.5
2	field3	19.5

Soil at Location

Hagerstown silt loam, 3 to 8 percent slopes

MapUnit: HaB
Acres: 44.88
Capability Class: 2
Drainage Class: Well drained
Minimum Depth to Bedrock (cm): 200
Minimum Depth to Watertable:

Base Layer
 Air Photos
 Topo Map - PASDA
 PA

Overlays
 NRCS Soils WMS
 Farm Soils
 Farm Fields
 Farm Features

Penn State Geospatial Technology Program, Land Analysis Lab * Problems? Contact Webmaster

- ▶ USDA-NRCS SSURGO soils
 - K-factor
 - T-factor
- ▶ Soils extracted from NRCS GIS service
- ▶ Soils clipped locally to field boundary
- ▶ Acreages within fields calculated
- ▶ SSURGO data tables accessed



Field Topography

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Account Manage Listing

Edit Farm Fields

Zoom to Farm Manage Air Photos

Click on the button below to trace a farm field on the map to the right. You will need to click this button each time you add a field to the map.


Draw Field

Farm Fields

ID	Field	Acres
0	1	7.5
1	2	6.9
2	3	16.39
3	4	10.7
4	7	17.6
5	12	11.62
6	555	7.94
7	999	7.62

Total Farm Acres: 86.27

Map



Done

- ▶ Terrain Models
 - LiDAR data
 - 10m/NED
- ▶ Slope
- ▶ Slope Length

RUSLE2

RUSLE2 Version 2.0.4.0 (Jul 23 2010)

File Database Edit View Options Tools Window Help

Worksheet: day2*

Tract # MyFarm
Owner name day
Field name 22

Info Can use worksheet to start a worksheet for your site.

Compare management alternatives for a single hillslope profile

Location ...er county average (Lancaster)
Soil ...am\silt loam (l-m DM, m perm)

Slope length (horiz), ft 160
Avg. slope steepness, % 5.0

Temp. scenario	Management	Contouring	Strips / barriers	Diversion/terraces, sediment	Cons. plan, soil loss, t/ac/yr	Sed. delivery, t/ac/yr
Profile	...g\com\150 bu ac spring plow	... grd	(none)	(none)	5.6	5.6
Profile	...com corn hay hay hay (4 ton)	... grd	(none)	(none)	3.2	3.2

Management alternative table

- continuous cropping
 - corn
 - cotton
 - forage
 - small grain
 - soybeans
 - vegetables
- rotation cropping
 - conv 112 bu ac corn 25 b
 - conv 112 bu ac corn 25 b

- ▶ Soil loss estimates consistent with USDA-NRCS
- ▶ Multiple management scenarios
- ▶ Conservation practices
- ▶ Web operation possible

RUSLE2

Management: Cropland\ continuous cropping\corn\150 bu ac spring plow

Graphic Long-term natural rough., in. 0.24
 Rel. row grade, % 100 Normally used as a rotation? Yes
 Duration, yr 1

Add to this management to make new one
 View/edit rotation builder used to make this mana

Operations Info

Management Operations

Date, m/d/y	Operation	Vegetation	Yield (harv. units), #/ac	Type of cover material	Cover matl add/remove, lb/ac	Cover from addition, %
4/15/0	Cropland\moldboard plows\moldboard plow					
5/1/0	Cropland\disks\disk, tandem secondary op.					
5/5/0	Cropland\cultivators\cultivator, field					
5/10/0	Cropland\planters\planter, double disk oprn	Cropland\corn\150 bu ac	150			
6/10/0	Cropland\cultivators\cultivator, row					
10/15/0	Cropland\harvest\harvest killing crop					

Vegetation: Cropland\corn\150 bu ac

Residue type Info ARS Core Data
Columba, MO

Yield is measured in units of
 Weight of one unit, lb

Assumed yield (# of units)?, #/ac

Above-ground biomass at max. canopy, lb/ac
 Biomass-yield ratio

Rel. moisture dep. rate

Growth chart

Age, day	Rootmass in top 4 in, lb/ac	Canopy cover, %	Fall height, ft	Live surf. cover, %
0	0	0		
15	54	6		
30	210	12		
45	430	58		
60	640	87		
75	1000	100		
90	1300	100		

Develop new growth chart based on yield
 Adjust fall height based on canopy shape
 Adjust biomass-yield relationship
 Adjust canopy-biomass relationship
 Adjust yield / flow-retardance relationship



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RUSLE2

RUSLE2 Version 2.0.4.0 (Jul 23 2010)

File Database Edit View Options Tools Window Help

Auto update

Worksheet: day2*

Tract # MyFarm
 Owner name day
 Field name 22

Info: Can use worksheet to start a worksheet for your site.

Compare management alternatives for a single hillslope profile

Location: ...er county average (Lancaster)
 Soil: ...am'silt loam (l-m OM, m perm)
 Slope length (horiz), ft: 160
 Avg. slope steepness, %: 5.0

Management alternative table

Temp. scenario	Management	Contouring	Strips / barriers	Diversion/te race, sediment	Cons. plan. soil loss, t/ac/yr	Sed. delivery, t/ac/yr
Profile	...g\com\150 bu ac spring plow	..._grd	(none)	(none)	5.6	5.6
Profile	...com corn hay hay hay (4 ton)	..._grd	(none)	(none)	3.2	3.2

Operation: Cropland\moldboard plows\moldboard plow

Rec. speed, mph: 5.0
 Min speed, mph: 3.5
 Max speed, mph: 6.0

Info: ARS Core Data
 Standard moldboard plow that performs primary tillage by inverting soil

Sequence of processes

- Process: Kill veg.
- Process: Flatten standing res.
- Process: Disturb surface

!!!YOU MUST CANCEL OR CLOSE THIS MODAL WINDOW BEFORE MOVING TO ANOTHER WINDOW!!!

Tillage type: Inversion (some mixing)

Tillage intensity, fraction	1.0
Rec. till. depth, in.	10
Min till depth, in.	6.0
Max till depth, in.	12
Ridge height, in.	1.0
Initial roughness, in.	1.9
Final roughness, in.	0.24
Surf. area disturbed, %	100

Residue burial ratios (by mass)

Residue type	Burial ratio, fraction	Resurfacing, fraction
fragile-very small (soybeans)	0.99	0.010
mod. tough-short (wheat)	0.98	0.020
non-fragile-med. (corn)	0.98	0.040
woody-large	0.85	0.10
gravel-rock	0.97	0.020

Apply Apply/Close Cancel



Benefits

- ▶ Actively engage farmers in conservation planning
- ▶ Efficient production of Conservation Plans
- ▶ Meet Chapter 102 / WIP compliance standards
- ▶ Simplify plan updates
- ▶ Evaluate various management scenarios
- ▶ Reduce soil loss
- ▶ Improve water quality
- ▶ Provide valuable database of agricultural management and conservation practices statewide



Outreach

- ▶ Penn State Cooperative Extension Nutrient Balance Sheet Training Session – March 19, 2010, Lancaster, PA.
- ▶ Penn State Cooperative Extension Nutrient Balance Sheet Training Session – March 30, 2010, Middletown, PA.
- ▶ Penn State Manure duJour Webinar – April 21, 2010
- ▶ Manure Expo – July 15, Rock Springs, PA – 3 hands-on training sessions
- ▶ Ag Progress Days Exhibit – August 15–18, Rock Springs, PA
- ▶ Keystone Farm Show – York
- ▶ PACD Bay Conference – Jan 5, Lewisburg
- ▶ Rob Meinhem – Act 49 training – 8 sessions (Jan/Feb 2011)
- ▶ Kristen Saacke–Blunk – newsletter, Conewago sessions (Spr 11)
- ▶ Penn State CMET – newsletters, trainings
- ▶ NACD Webinar – June 3





Thank You

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