UNIVERSITY OF DELAWARE
COOPERATIVE EXTENSION

Basic Tips for Using the Web Soil Survey to Retrieve Information for Nutrient Management Planning

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June 2025

Introduction

The USDA-NRCS has created the Web Soil Survey (WSS) as a clearance house for soil survey data from the Soil Survey Geographic Database (SSURGO). Currently, there are data available for almost all counties in the U.S. The WSS can be used to access county specific information about local soils including soil properties and suitability for various land uses (e.g., irrigation, cropping systems, wastewater disposal, septic systems, and construction, among others).

Soil survey data can also be retrieved using other tools, including the Soil Web app created by the California Soil Resource Lab at the University of California Davis in cooperation with USDA-NRCS. The California Soil Resource Lab offers a web based portal, a .kml file that will import soils data into Google Earth, and a smartphone app (for retrieving soils data on-the-go). Detailed soil survey information is also available through various geographic information systems.

The purpose of this fact sheet is to facilitate use of the WSS to identify soils in Delaware. This information can be used to identify the soil series and soil properties that are important for nutrient management planning and cropping (e.g., depth to seasonal high water table, Revised Universal Soil Loss Equation (RUSLE) erosion factors, yield estimates by soil productivity class).

We provide step-by-step instructions on how to locate your area of interest (AOI) and obtain soil map unit descriptions/data including "depth to water table" and "yields of irrigated crops" for your selected area. Lastly, we describe how to export and save reports.

More comprehensive instructions for using the WSS are available via the WSS website.

Basic Instructions for Using the WSS

The WSS is located at http://websoilsurvey.nrcs.usda.gov (Figure 1). The green "Start WSS" button on the landing page will open the interactive portal where soil data can be retrieved. The landing page also includes information on a variety of soil information and also has a brief tutorial about how to use the Web Soil Survey tool.

Figure 1: The home page for the USDA-NRCS Web Soil Survey. Use the green Start WSS button to start exploring soil information, or get help with the tool.

Defining the Area of Interest (AOI)

The WSS opens on the "Area of Interest" (AOI) tab (Figure 2). There are several options for selecting an AOI using the "Quick Navigation" dropdown menu (located in the left hand toolbar).

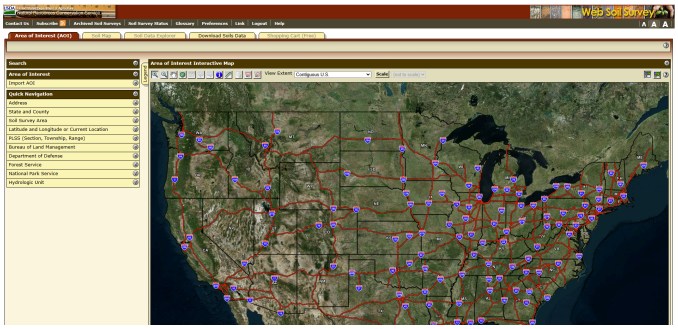


Figure 2: The Area of Interest (AOI) tab is used to navigate to a specific location within the U.S.

There are several methods by which you can define the area of interest (AOI). For example, you can retrieve information on all soils in a county using the "Soil Survey Area" tab in the "Quick Navigation" menu on the left side of the screen (Figure 2). To set the AOI for a whole county:

1. Select the state
2. Select the county
3. Click the radio button under "name" to select the appropriate county soil survey
4. Click the "Set AOI" button at the top of the dropdown menu.

The selected AOI will be outlined in blue (Figure 3).

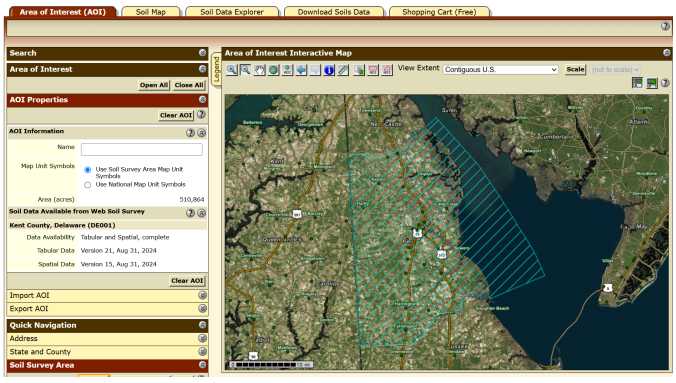


Figure 3: Kent County, Delaware was selected as the area of interest (AOI) using the Soil Survey Area option in the Quick Navigation menu of the Web Soil Survey. Kent County is highlighted in blue on the map.

The AOI can also be set for a smaller region by using the shape tools to select a specific area. An easy way to do this is to navigate to a specific address using the "Address" tab in the "Quick Navigation" menu on the left side of the screen and then draw the AOI (Figure 4). To draw an AOI based on a specific address:

1. Type the address
2. Zoom in or out using the tools on the map view (magnifying glasses with + or -) and pan by using the hand tool to get to the correct land parcel
3. Select the desired area using the AOI tools in the map. There are two AOI selection tools, one for rectangular shaped (left) and one for customized shapes (right).

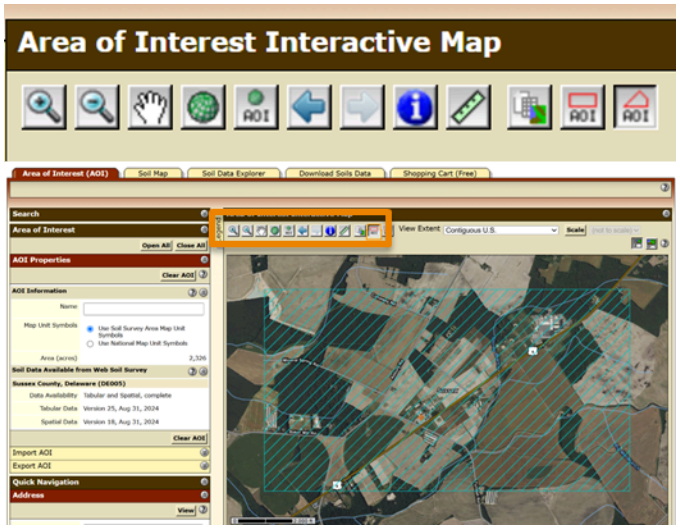


Figure 4: Users have the option to draw a specific AOI using the tools in the toolbar at the top of the map. The AOI is shown in blue after the shape tool was used to select the appropriate location.

Generating a Soil Map

Once an AOI is selected, the "Soil Map" tab is used to open the soil map view (Figure 5). The orange outlines on the map depict the individual soil map unit boundaries. Each map unit is assigned a map unit symbol, which is defined in the map unit legend (located on the left). The legend shows the map unit name (based on the predominant soil series), the acres of that map unit in the AOI, and the percentage of the AOI covered by that map unit.

Be aware that if your AOI is very small, you may receive a warning that "the soil survey may not be valid at this scale". If you receive this warning, it is an indication that the accuracy of the map may be lower. Use caution in interpreting data if continuing at small scales or consider expanding the AOI to a scale that is supported by the data.

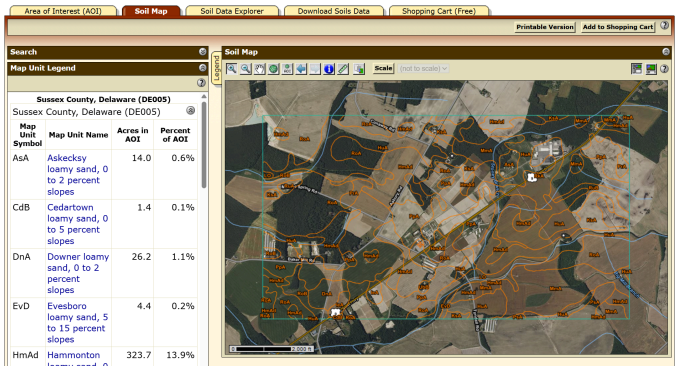


Figure 5: The soil map shows soil series outlined in orange and includes the map unit legend for the AOI.

Obtaining Detailed Soil Information

More information about the soil map units that are located within the AOI is available under the "Soil Data Explorer" tab. Information about land use suitabilities, soil properties, and other information is available in the Soil Data Explorer tab. Here, we provide some examples of the type of data you can obtain.

Suitabilities and Limitations for Use

The "Suitabilities and Limitations for Use" tab of the "Soil Data Explorer" provides ratings and suitabilities for a variety of land uses. Here you can determine if your soils are suitable for a variety of land classifications (e.g., soil capability class, soil moisture class, etc.) and land management options (e.g., dwellings with basements, septic drainfield, irrigation, roads, etc.).

For example, the "Irrigated Capability Class" option under the "Land Classifications" dropdown (located in the menu on the left side of the screen) provides information about the suitability of soils for production of field crops with irrigation. Ratings range from class 1 to class 8, with class 1 being soils with few limitations for crop production. To generate a soil map with ratings for irrigated capability class (Figure 6):

1. Select the "Land Classification" from the dropdown menu
2. Select "Irrigated Capability Class"
3. Select "View Report"
4. Click on the "Legend" tab to the left of the map to see the layer properties

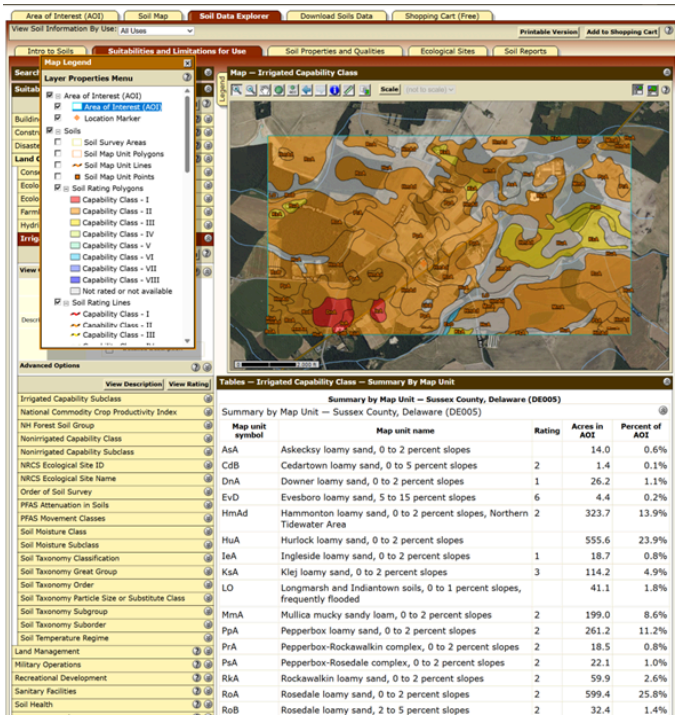


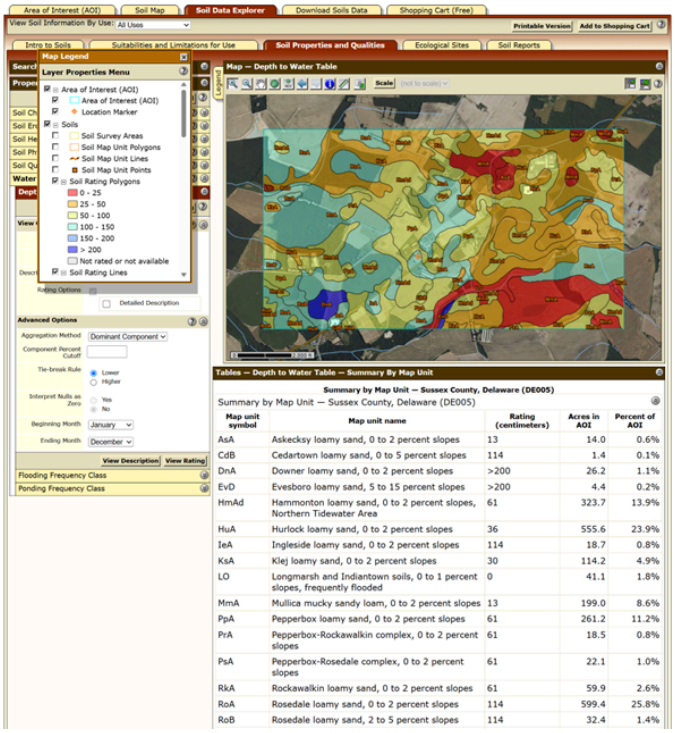
Figure 6: Ratings map of irrigated capability class for production of crops as generated using the USDA-NRCS Web Soil Survey. The legend can be toggled on to show the color coded rating scales and other features of the map. The table below the map will give more details about each map unit, including the irrigated capability class rating and the extent of the map unit in the AOI.

Soil Properties and Qualities

The "Soil Properties and Qualities" tab of the "Soil Data Explorer" provides information about various soil chemical (e.g., cation exchange capacity, electrical conductivity), soil health (e.g., bulk density, organic matter), and soil physical properties (e.g., available water capacity, hydraulic conductivity), as well as soil erosion factors, soil qualities and features (e.g., depth to bedrock, hydrologic soil group), and water features (e.g., depth to water table).

For example, the "Depth to Water Table" option under the "Water Features" provides an estimation of the depth below ground surface to the seasonal high water table (i.e., saturated zone in the soil) based on the presence of soil features that suggest saturation (Figure 7). To generate a soil map showing the depth to water table for each map unit:

1. Select "Water Features" from the dropdown menu
2. Select "Depth to Water Table"
3. Select "View Rating"
4. Click on the "Legend" tab to the left of the map to see the layer properties



Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
AsA	Askecksy loamy sand, 0 to 2 percent slopes	13	14.0	0.6%
CdB	Cedartown loamy sand, 0 to 5 percent slopes	114	1.4	0.1%
DnA	Downer loamy sand, 0 to 2 percent slopes	>200	26.2	1.1%
EvD	Evesboro loamy sand, 5 to 15 percent slopes	>200	4.4	0.2%
HmAd	Hammonton loamy sand, 0 to 2 percent slopes, Northern Tidewater Area	61	323.7	13.9%
HuA	Hurlock loamy sand, 0 to 2 percent slopes	36	555.6	23.9%
IeA	Ingleside loamy sand, 0 to 2 percent slopes	114	18.7	0.8%
KsA	Klej loamy sand, 0 to 2 percent slopes	30	114.2	4.9%
LO	Longmarsh and Indiantown soils, 0 to 1 percent slopes, frequently flooded	0	41.1	1.8%
MmA	Mullica mucky sandy loam, 0 to 2 percent slopes	13	199.0	8.6%
PpA	Pepperbox loamy sand, 0 to 2 percent slopes	61	261.2	11.2%
PrA	Pepperbox-Rockawalkin complex, 0 to 2 percent slopes	61	18.5	0.8%
PsA	Pepperbox-Rosedale complex, 0 to 2 percent slopes	61	22.1	1.0%
RkA	Rockawalkin loamy sand, 0 to 2 percent slopes	61	59.9	2.6%
RoA	Rosedale loamy sand, 0 to 2 percent slopes	114	599.4	25.8%
RoB	Rosedale loamy sand, 2 to 5 percent slopes	114	32.4	1.4%

Figure 7: Map showing the depth to water table for each map unit as generated using the USDA-NRCS Web Soil Survey. The legend can be toggled on to show the color coded rating scales and other features of the map. The table below the map will give more details about each map unit, including the depth to water table rating and the extent of the map unit in the AOI.

Soil Reports

The "Soil Reports" tab of the "Soil Data Explorer" provides detailed information about the soils in the AOI, as well as various soil properties and suitabilities.

For example, the "Soil Map Unit Descriptions" option in the "Soil Reports" tab provides more detailed information about the soil series included in the AOI (Figure 8). To obtain information about the dominant and minor soil series in the AOI"

1. Select "AOI Inventory" from the dropdown menu
2. Select "Map Unit Descriptions"
3. Select "View Soil Report"

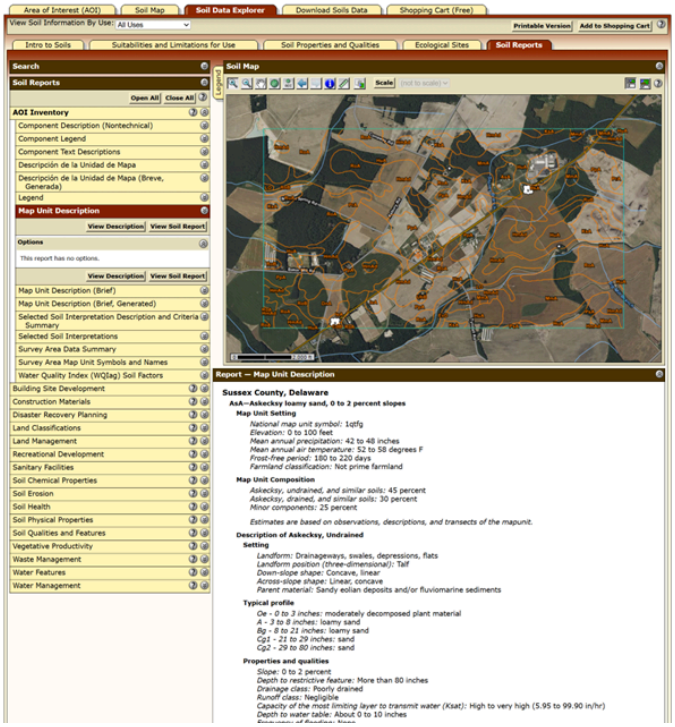


Figure 8: Map showing the soil map units in an AOI as generated using the USDA-NRCS Web Soil Survey. The table below the map will give a detailed description of each map unit, including the map unit composition and a description of the soil series properties and qualities.

Creating Printable Reports

There are various ways you can create high quality printable reports including the maps that were generated for your AOI. One option is to select the "Printable Version" button at the top right hand corner of the map. This option will generate a downloadable PDF for the specific information you are currently viewing.

If you want to download a variety of maps, a more efficient way is to select "Add to Shopping Cart" in the upper right corner as you select data. This option will consolidate all of your maps into the shopping cart. You can then navigate to the "Shopping Cart" tab and generate a single printable PDF report with multiple maps.

Summary

These instructions were written to help consultants and farmers start using the WSS to retrieve information from the NRCS SSURGO databases. The WSS is a comprehensive tool with options that extend well beyond the scope of this fact sheet. More comprehensive instructions for using the WSS are available via the WSS website. There are also a variety of other tools available to retrieve SSURGO data including the resources created by the California Soil Resources lab and various GIS platforms.

References

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University of California, Davis, California Soil Resource Lab; University of California, Division of Agriculture and Natural Resources; Natural Resources Conservation Service (2019). SoilWeb. University of California; USDA-NRCS. Dataset. https://hdl.handle.net/10113/AA23078

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About the Publication

Original publication date: 2016
Revision date(s): 2025

Peer Reviewers

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