2011 Maryland Soil Survey Work Planning Conference

What are Soil Map Units and Web Soil Survey

James Brewer

Resource Soil Scientist

USDA-NRCS

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Objectives

- Explain the concepts of scale and map unit design
- Identify the official source of soil survey information
- Describe Web Soil Survey and explain how it can be used to develop soil maps and reports

Soil Survey

- Soil surveys describe kinds of soils that exist in an area
- Soils are described in terms of their
  - location on the landscape
  - profile characteristics
  - relationships to one another
  - suitability for various uses
  - needs for particular types of management
- Soils are grouped into map units for display purposes

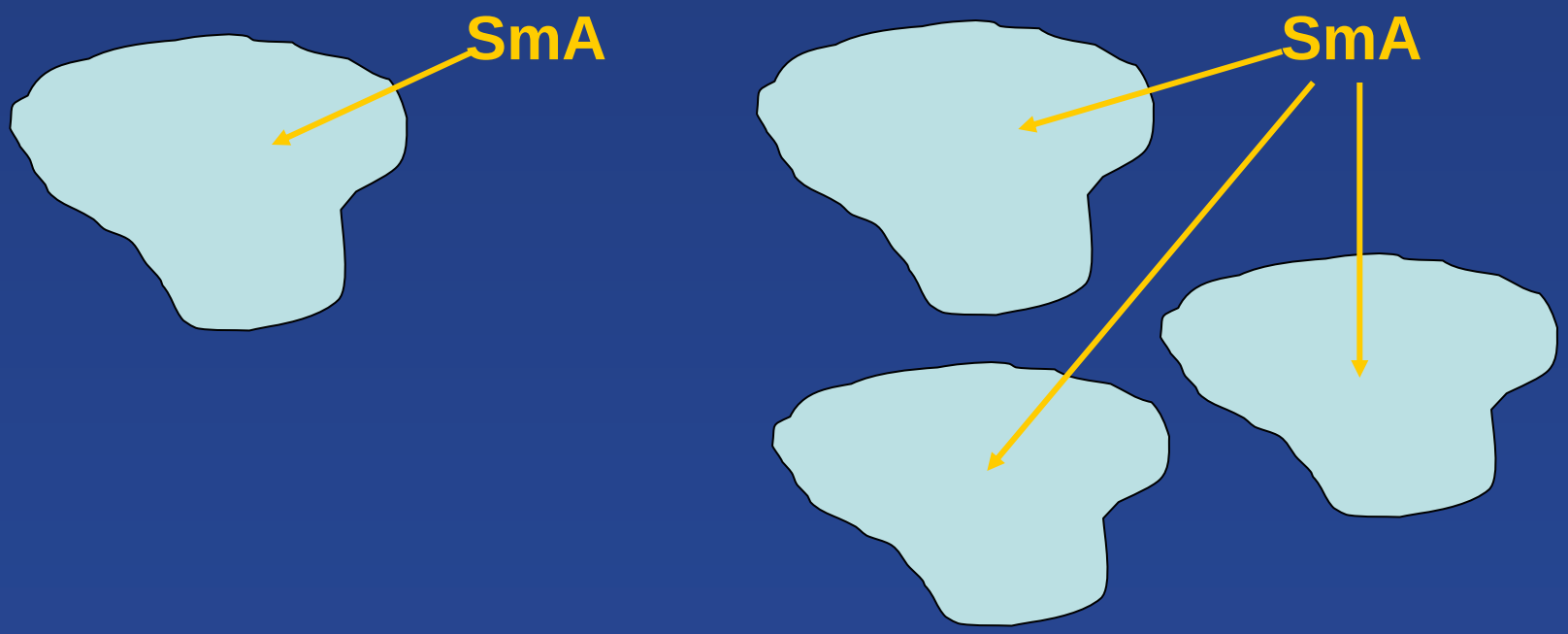
Soil Map Units

- A soil map unit is a collection of areas defined and named the same in terms of their soil components (e.g., series) or miscellaneous areas or both
  - Fallsington sandy loam, 0 to 2% slopes
  - Marr-Dodon complex, 2 to 5% slopes
- Soil map units are the basic unit of a soil map
- Each soil map unit differs in some respect from all others in a survey area

Soil Map Units

- Each map unit has a unique symbol (numbers or letters) on the soil map
  - FaA
  - MnB
- "Mono-taxa" units are dominated by a single soil type
- "Multi-taxa" units include two or more main soil types

Which is a “Map Unit”?



A Delineation

A collection of delineations named the same, a.k.a. a Map Unit

Soil Delineations

- Each individual area of soil on a map is a *delineation*
- Soil delineation boundaries are drawn wherever there is a significant change in the type of soil.
- Soil delineations typically relate to the underlying landform (e.g., floodplain, backslope, terrace)

Types of Map Units

- **Consociations**
  - **Delineated areas are dominated by a *single soil component and similar soils***
    - **FaA Fallsington sandy loam, 0 to 2% slopes**
    - **CrC Croom gravelly sandy loam, 5 to 10% slopes**

Types of Map Units

- **Complexes and Associations**
  - **Delineated areas consist of *two or more dissimilar components that occur in a consistent, repeating pattern***
  - **Major components in a complex CAN NOT be separated at mapping scale**
  - **Major components in an association CAN be separated at mapping scale**

    - **MnA Marr-Dodon complex, 2 to 5% slopes**
    - **GbB Galestown-Urban land complex, 0 to 5% slopes**

Types of Map Units

- **Undifferentiated Groups**
  - **Delineated areas consist of *two or more soil components that are not related in a consistent, repeating pattern***
  - **The overriding factor is often some factor that limits use and management (e.g., steepness, stoniness, flooding)**

    - **ZS Zekiah and Issue soils, frequently flooded**
    - **HZE Howell and Dodon soils, 15 to 25% slopes**

Working with Multi-Taxa Map Units

- In older soil surveys, interpretations were given for each map unit based on the 'most limiting' interpretation or the dominant component
- NASIS now provides properties and interpretations for each component in a map unit, along with % composition
- User may decide how to aggregate the data
  - dominant condition, dominant component, most limiting, least limiting, weighted average
- Web Soil Survey and Soil Data Viewer contain tools to help users analyze data

Mapping Scale

- Scale depends on the intricacy of the soil pattern in relation to the expected intensity of land use
  - It may not be necessary to delineate complex soil patterns in areas of low intensity land use
- Most modern surveys are conducted at scales of 1:24,000 or 1:12,000
- The amount of detail displayed on a soil map is limited by the legibility of that map at publication scale
  - As map scale decreases, minimum delineation size increases

Mapping Scale

- **Minimum delineation size for many MD surveys is ~ 1.4 acres**
  - **Areas smaller than this will not be delineated**
  - **Larger soil delineations may contain areas of soil that are quite different than the named soil map unit (dissimilar soils)**
- **Care must be taken when viewing or using these maps at scales larger than the mapping scale**
  - **Line placement may not be accurate at larger scales**
  - **Mapping concepts reflect the mapping scale; additional complexity visible at larger scales is not accounted for**

Reporting Problems with Soil Survey Data

- **Send an email to the State Soil Scientist**
  - **Include the location, a description of the problem, and if possible, a map**
- **The State Soil Scientist will forward problems to the appropriate MLRA Soil Survey Office**

Official Soil Survey Data

- Digital soil data ("SSURGO") warehoused on NRCS's Soil Data Mart is the official source of soil survey data
- Data stored on the Soil Data Mart *supersedes* all other sources of soil survey information
- Where digital soil survey data does not exist, the most recent hard copy publication contains the official soil survey data

Web Soil Survey

- **Web Soil Survey is the National Cooperative Soil Survey's principal data exploration and delivery tool**
- **Web Soil Survey has replaced traditional hard copy publications as the primary means of distributing soil survey data**

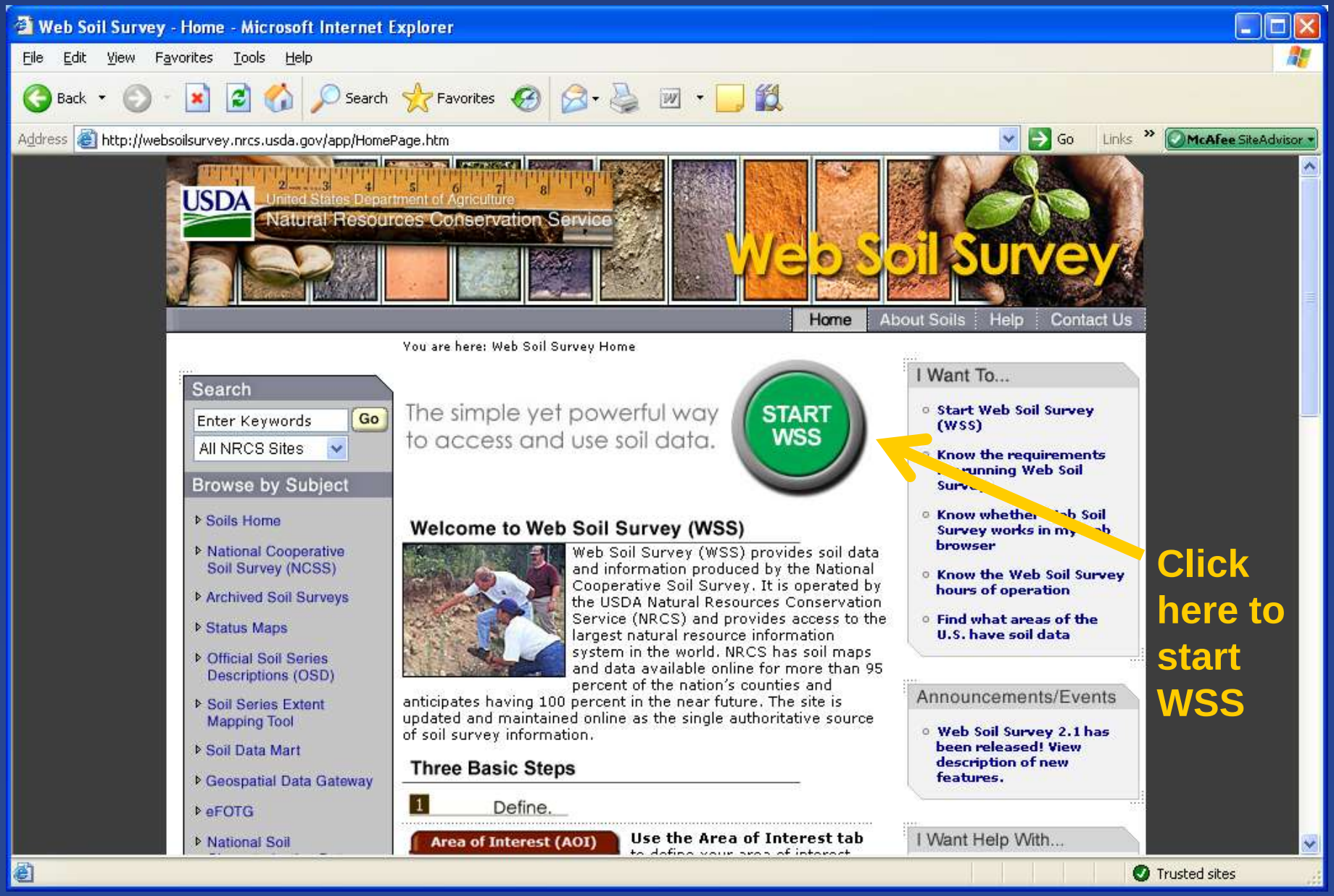
http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

Why Use Web Soil Survey?

- Immediate access to the most up-to-date soil data…**WSS is NEVER out of date!**
- Develop **custom reports** that address specific soil questions or concerns
  - for a soil survey area
  - for a specific property (< 10,000 acres) or **"Area of Interest"**
- Reduce publication and storage costs
- Reduce environmental impact

Requirements for Running WSS

- **Display Resolution**
  - 1024 x768 or higher
  - Will work for resolutions as low as 800 x 600, but not optimal
- **JavaScript must be enabled**
- **Cookies**
  - Session Cookies required to maintain a WSS session
  - Persistent Cookies not required, but do allow you to save your WSS preferences
- **Popup Blocker should be configured to allow popups from this site**



Click here to start WSS

How to Use Information

- Soils Home
- National Cooperative Soil Survey (NCSS)
- Archived Soil Surveys
- Status Maps
- Official Soil Series Descriptions (OSD)
- Soil Series Extent Mapping Tool
- Soil Data Mart
- Geospatial Data Gateway
- eFOTG
- National Soil Characterization Data
- Soil Geochemistry Spatial Database
- Soil Quality
- Soil Geography
- Geospatial One Stop

Welcome to Web Soil Survey (WSS)

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world. NRCS has soil maps and data available online for more than 95 percent of the nation's counties and anticipates having 100 percent in the near future. The site is updated and maintained online as the single authoritative source of soil survey information.

Three Basic Steps

1 Define.

Use the Area of Interest tab to define your area of interest.

Click to view larger image.

2 View/Explore.

Click the Soil Map tab to view or print a soil map, or click the **Soil Data Explorer** tab to access soil data for your area and determine the suitability of the soils for a particular use. The items you want saved in a report can be

- Know whether Web Soil Survey works in my web browser
- Know the Web Soil Survey hours of operation
- Find what areas of the U.S. have soil data

Announcements/Events

- Web Soil Survey Release History

I Want Help With...

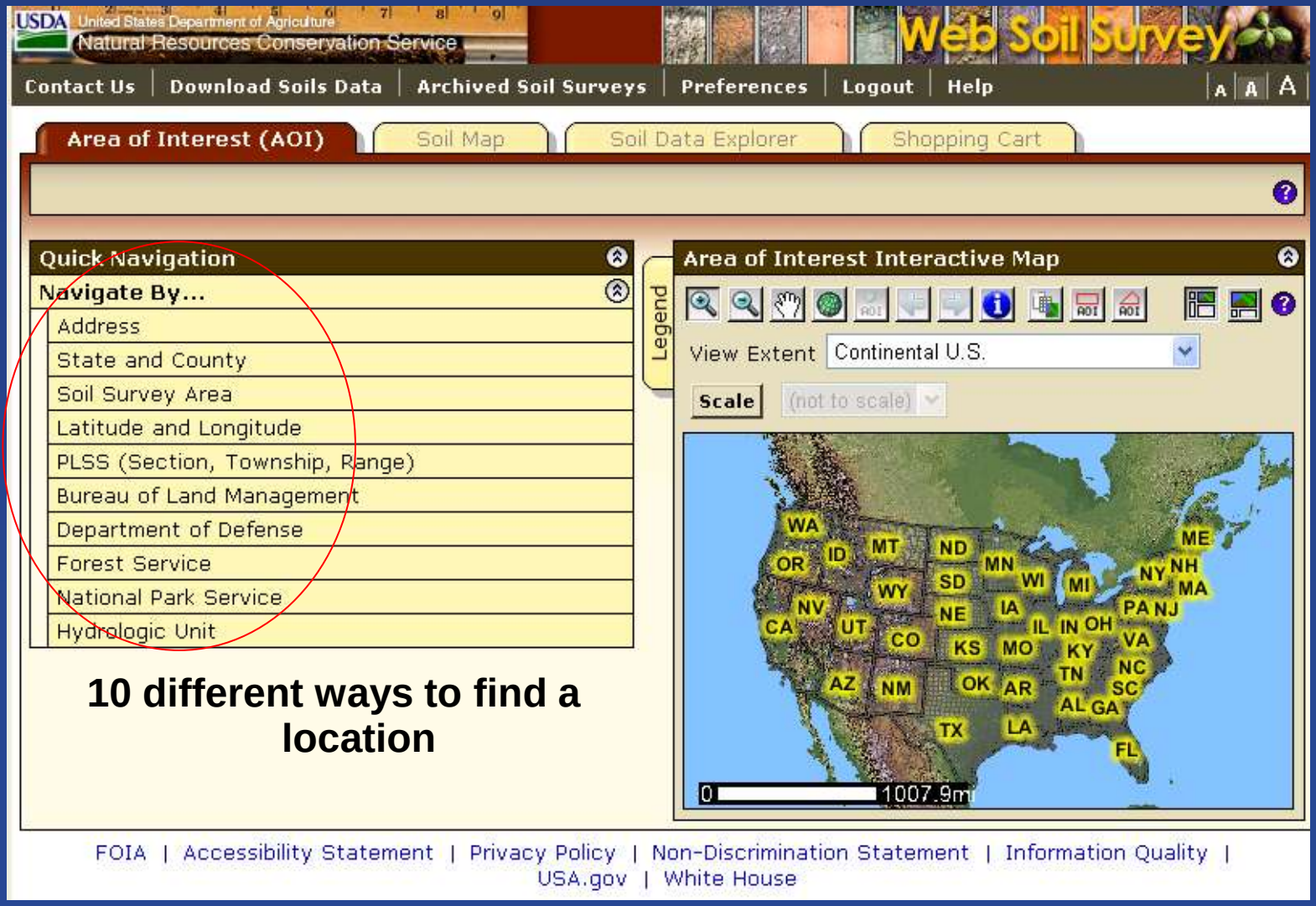
- How to use Web Soil Survey
- How to use Web Soil Survey Online Help
- Known Problems and Workarounds
- Frequently Asked Questions
- Citing Web Soil Survey as a source of soils data

Basic Steps

- Define your Area of Interest (AOI)
- View and/or print your Soil Map
- Explore your Soils Information (map, tables, reports)
- Add to Free Shopping Cart and Check Out

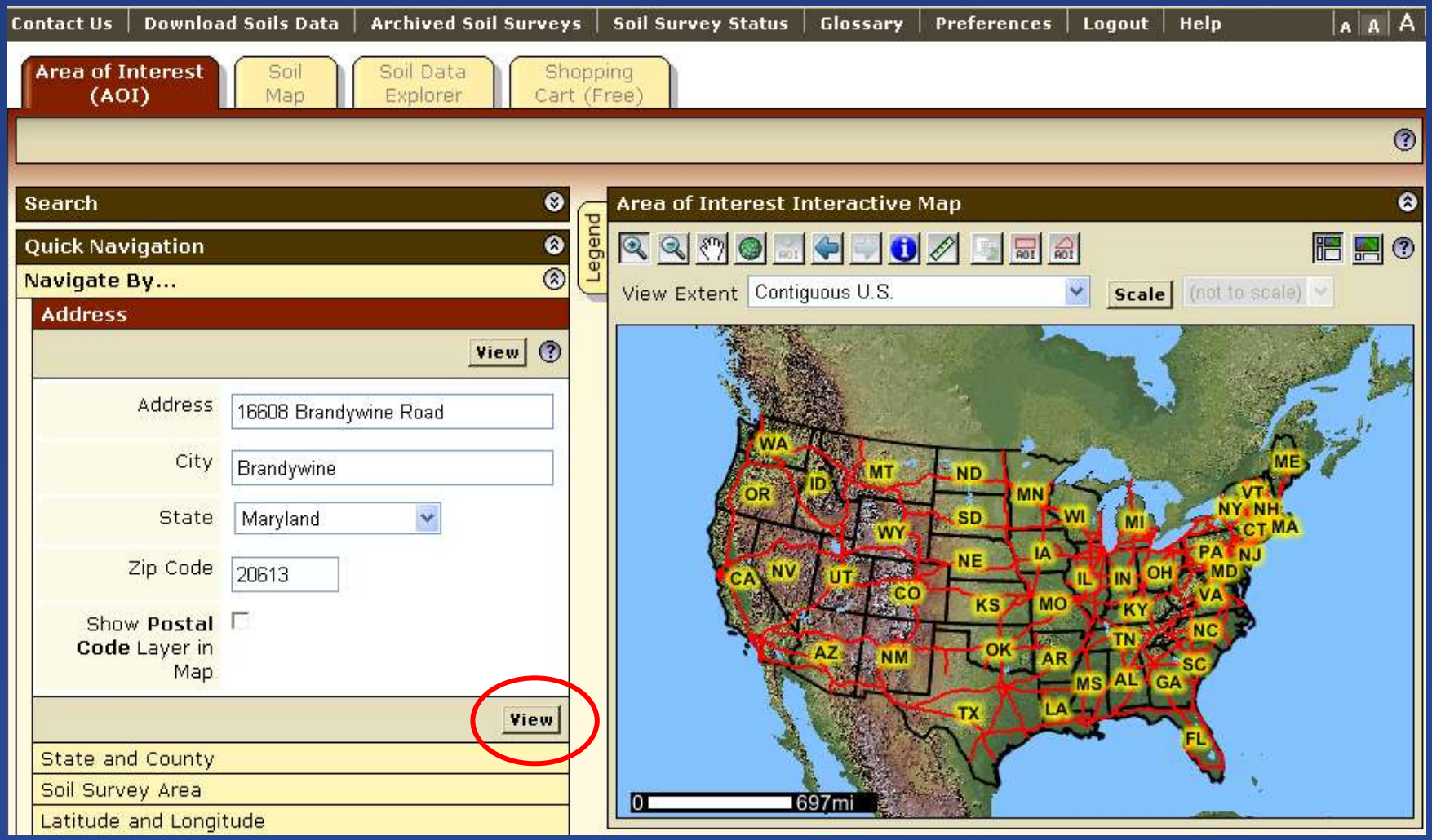
Web Soil Survey Functions

Navigate to an Area of Interest (AOI)

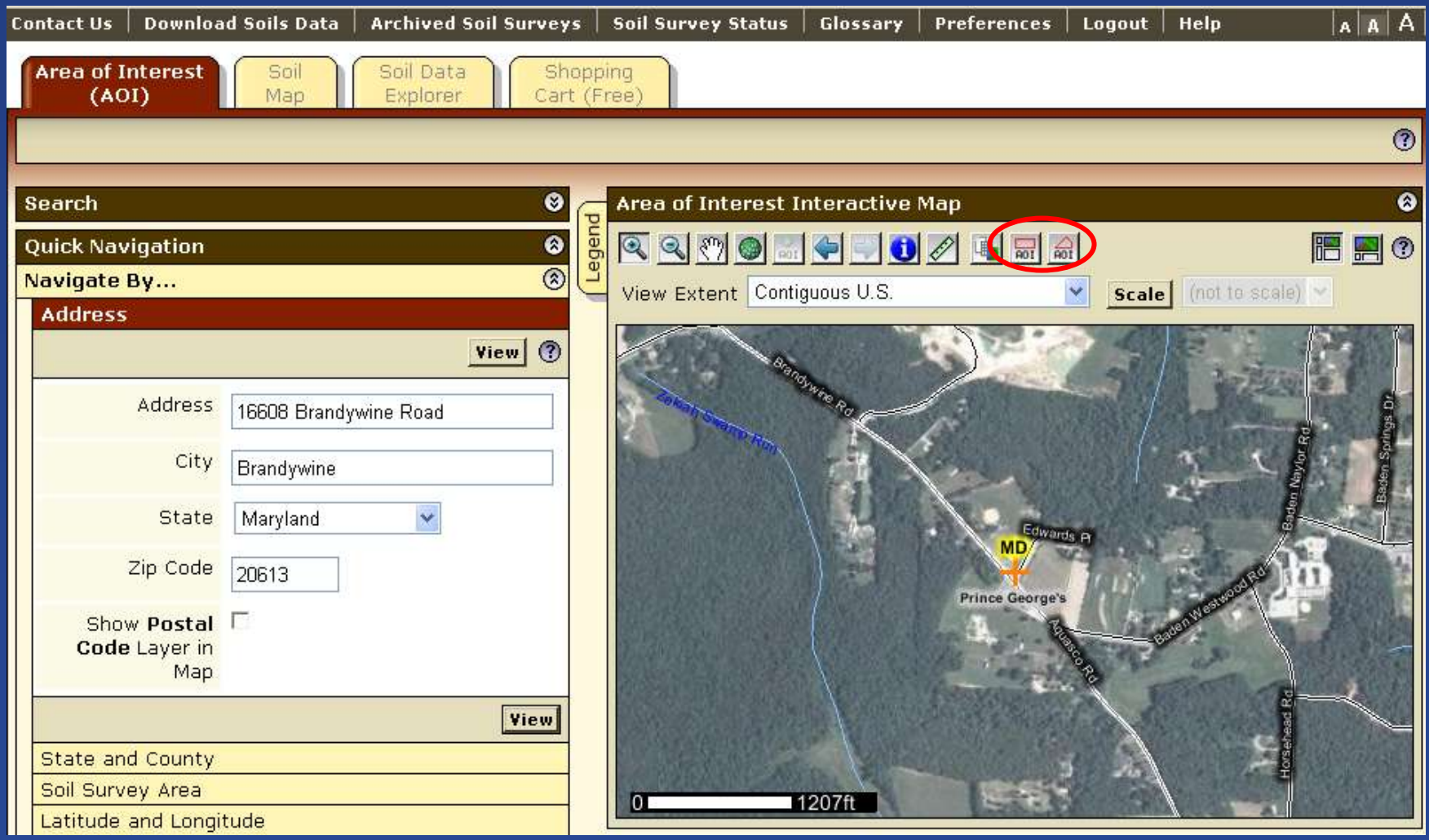


10 different ways to find a location

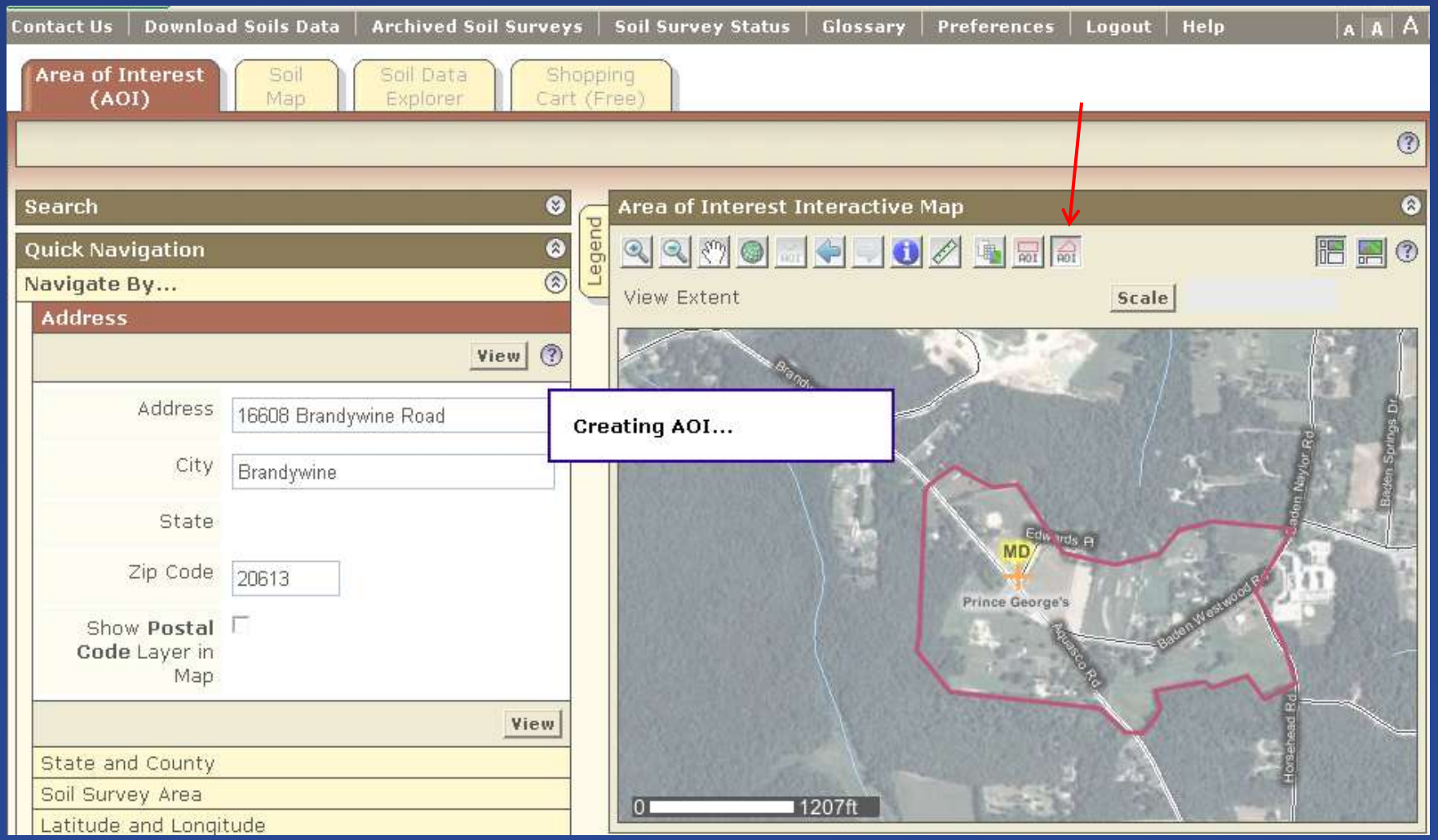
Zoom to a Location or Region



1. Define the Area of Interest (AOI)



Draw the AOI


Contact Us
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Area of Interest (AOI)
Soil Map
Soil Data Explorer
Shopping Cart (Free)
Search
Quick Navigation
Navigate By...
Address
View
Address
16608 Brandywine Road
City
Brandywine
State
Zip Code
20613
Show Postal Code Layer in Map
View
State and County
Soil Survey Area
Latitude and Longitude
Legend
Area of Interest Interactive Map
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Creating AOI...
MD
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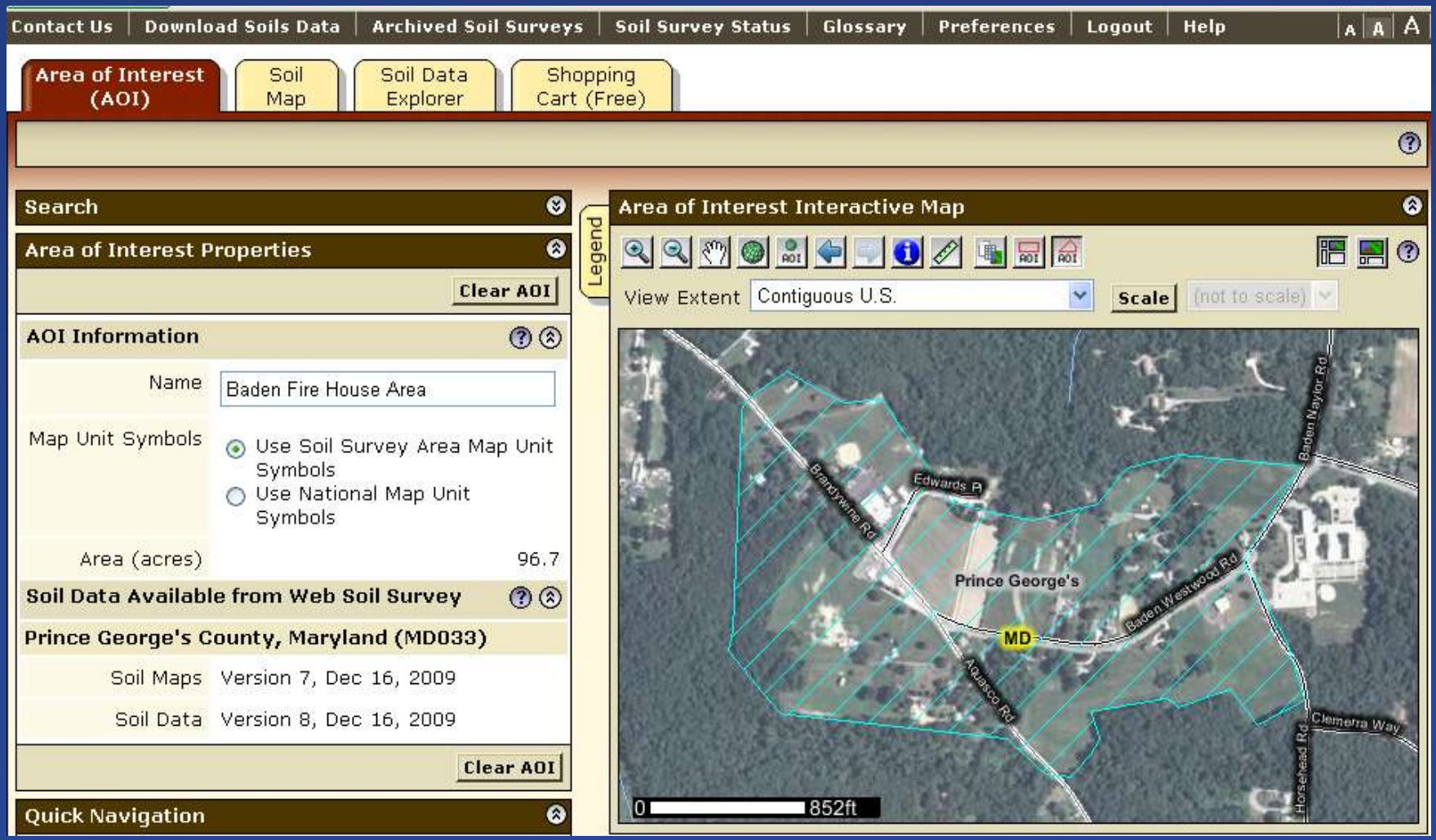
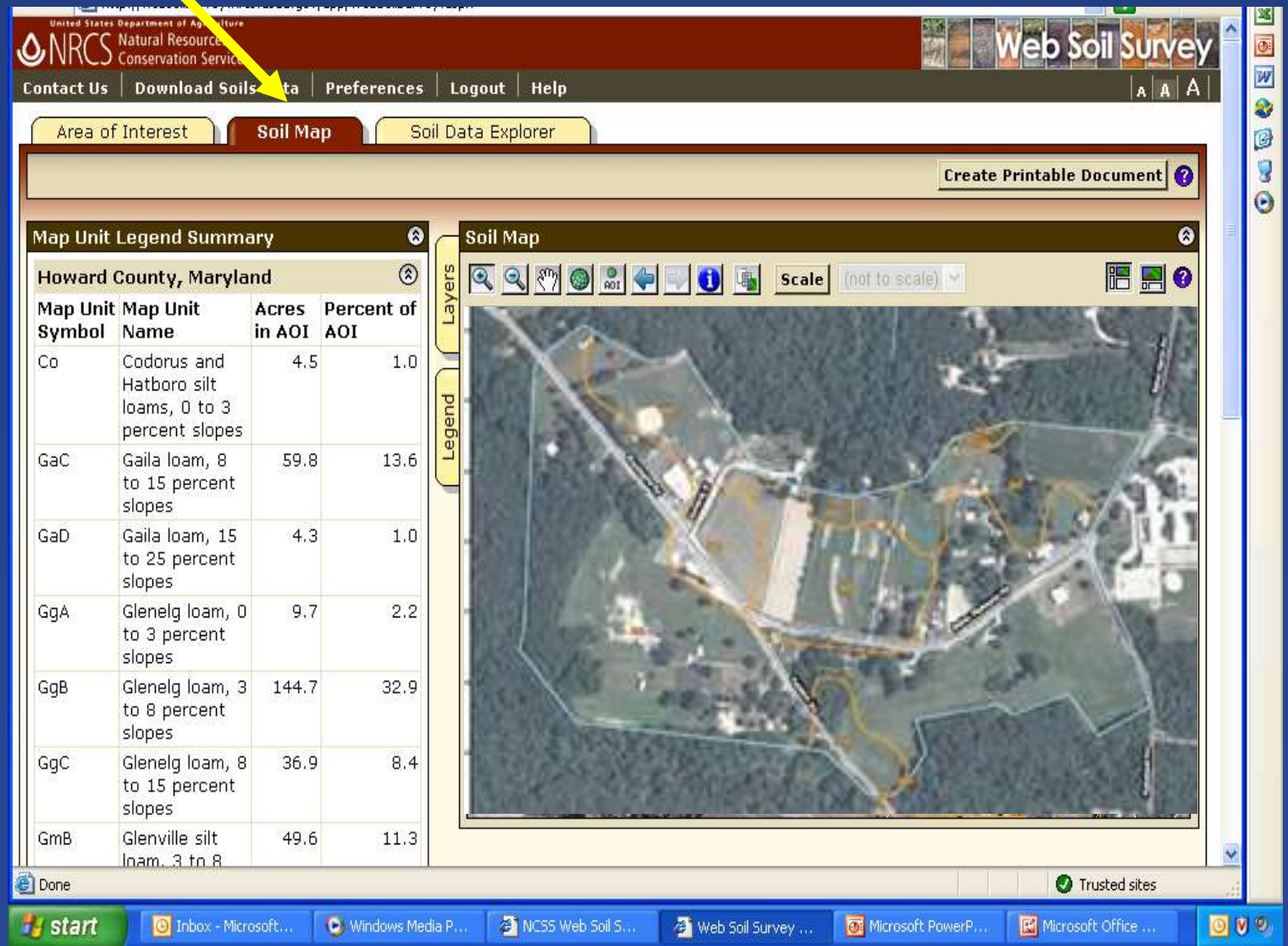
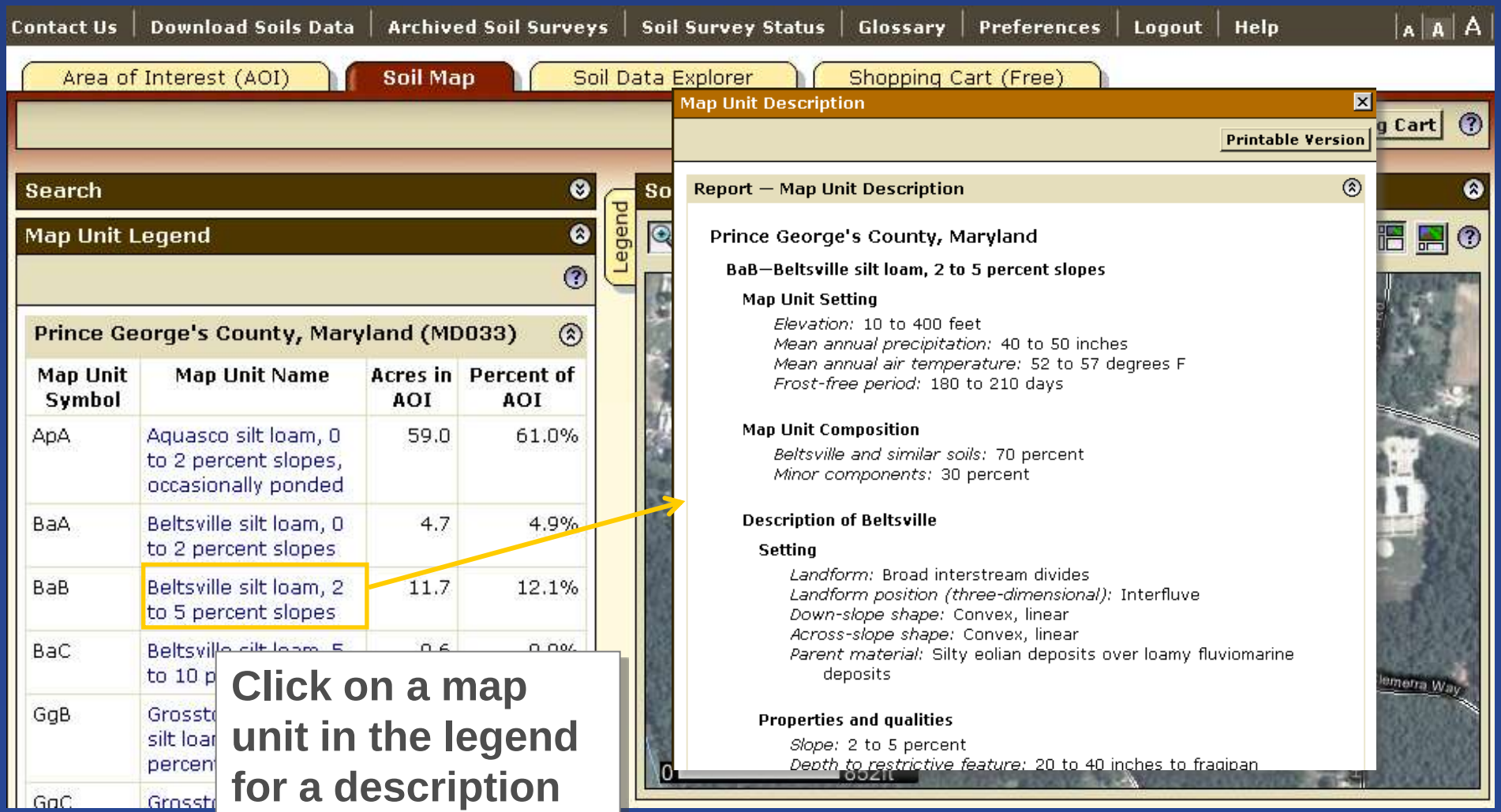
View and Label the AOI



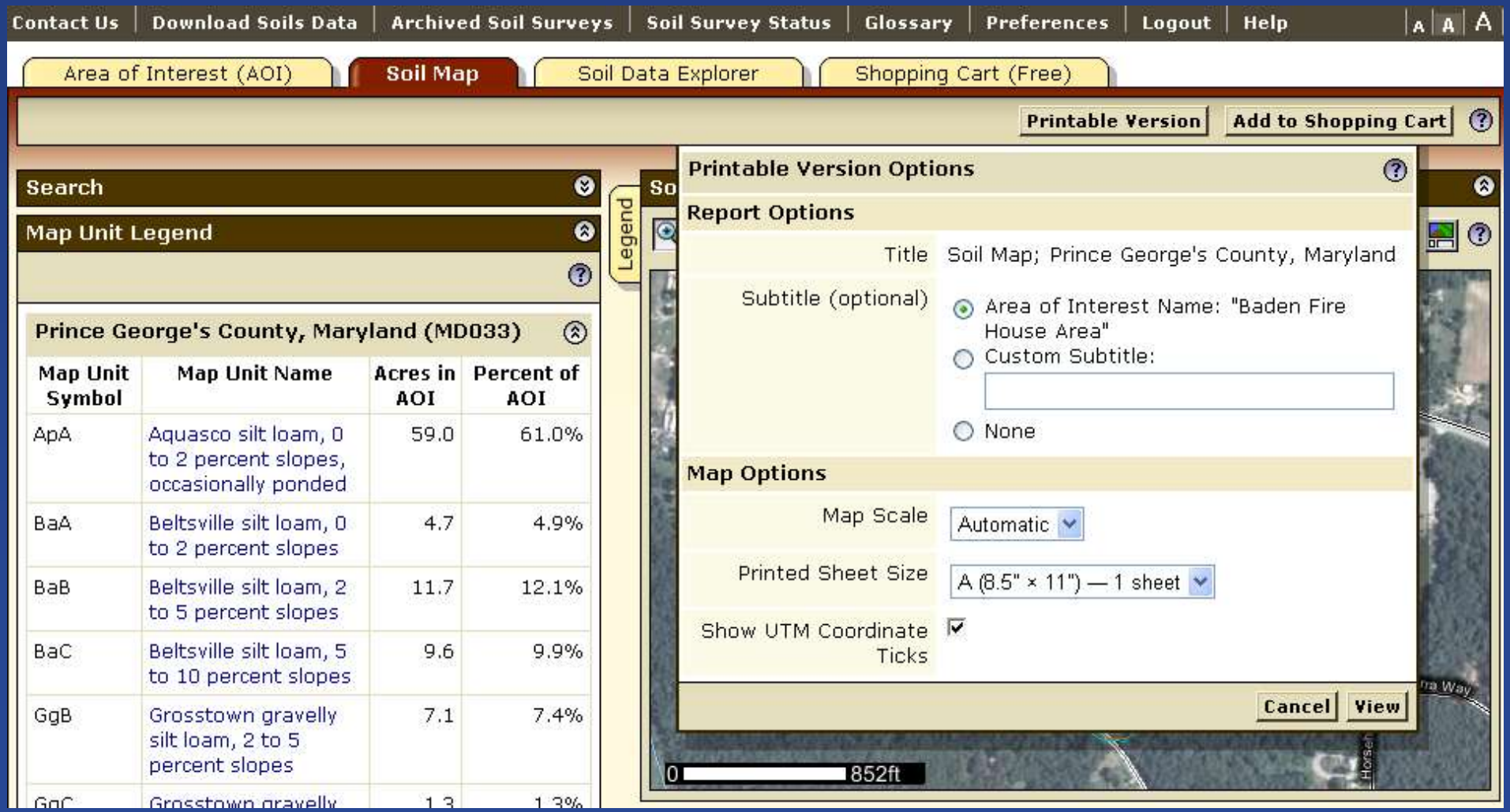
2. Create and View a Soil Map

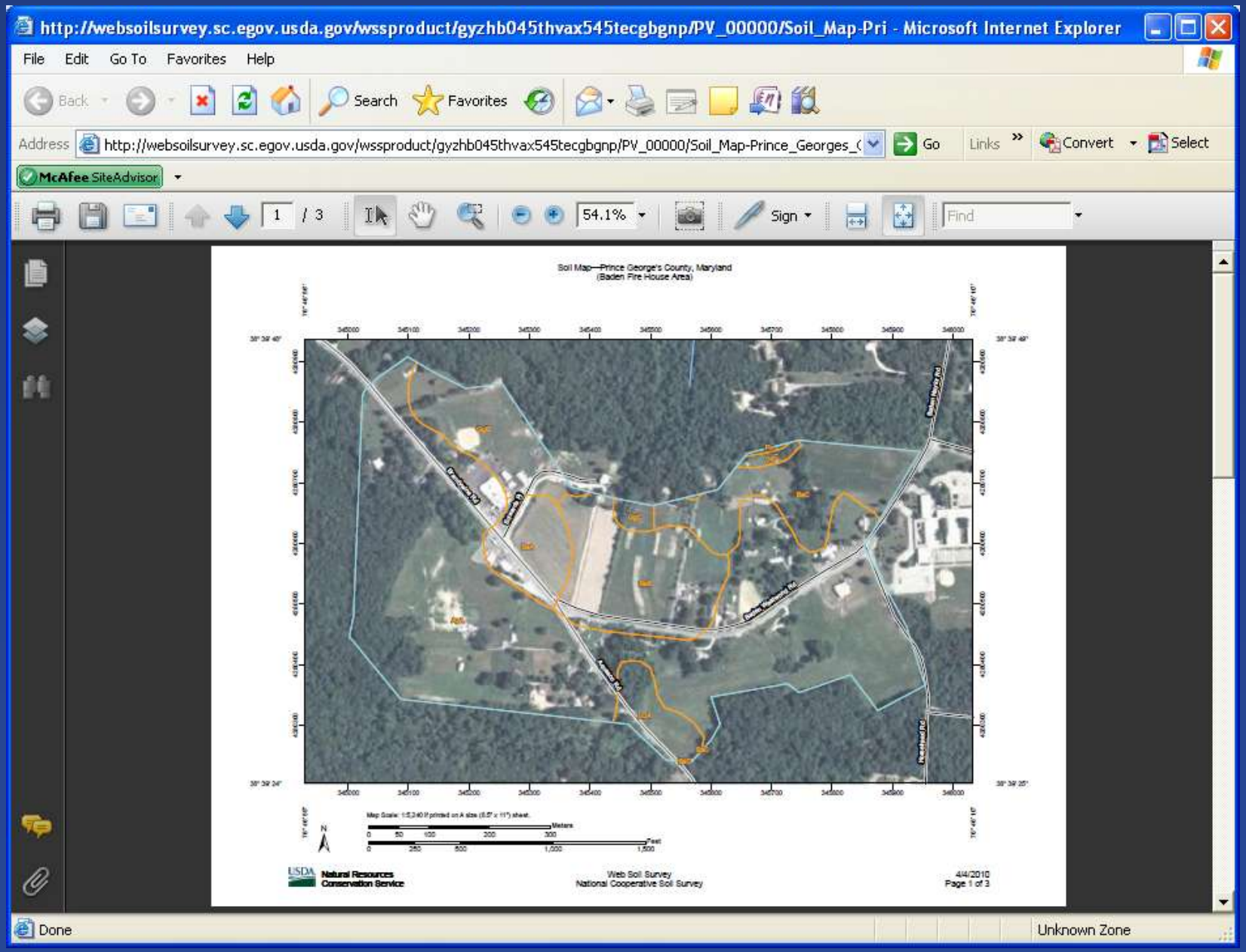


View Map Unit Descriptions



3. Print a Soil Map

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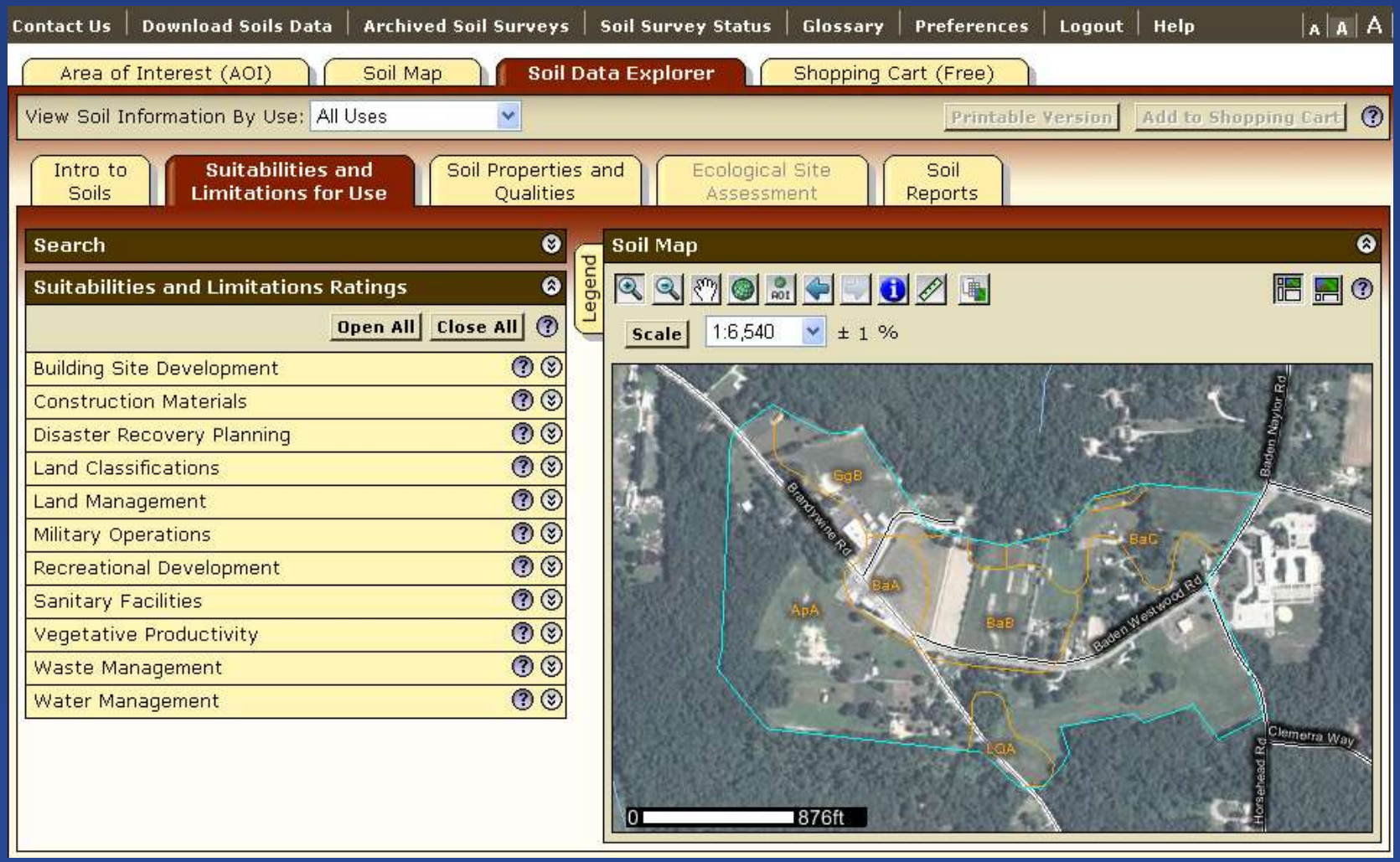
54.1%
Sign
Find
Soil Map—Prince George's County, Maryland
(Baden Fire House Area)
Natural Resources Conservation Service
Web Soil Survey
National Cooperative Soil Survey
4/4/2010
Page 1 of 3
Done
Unknown Zone

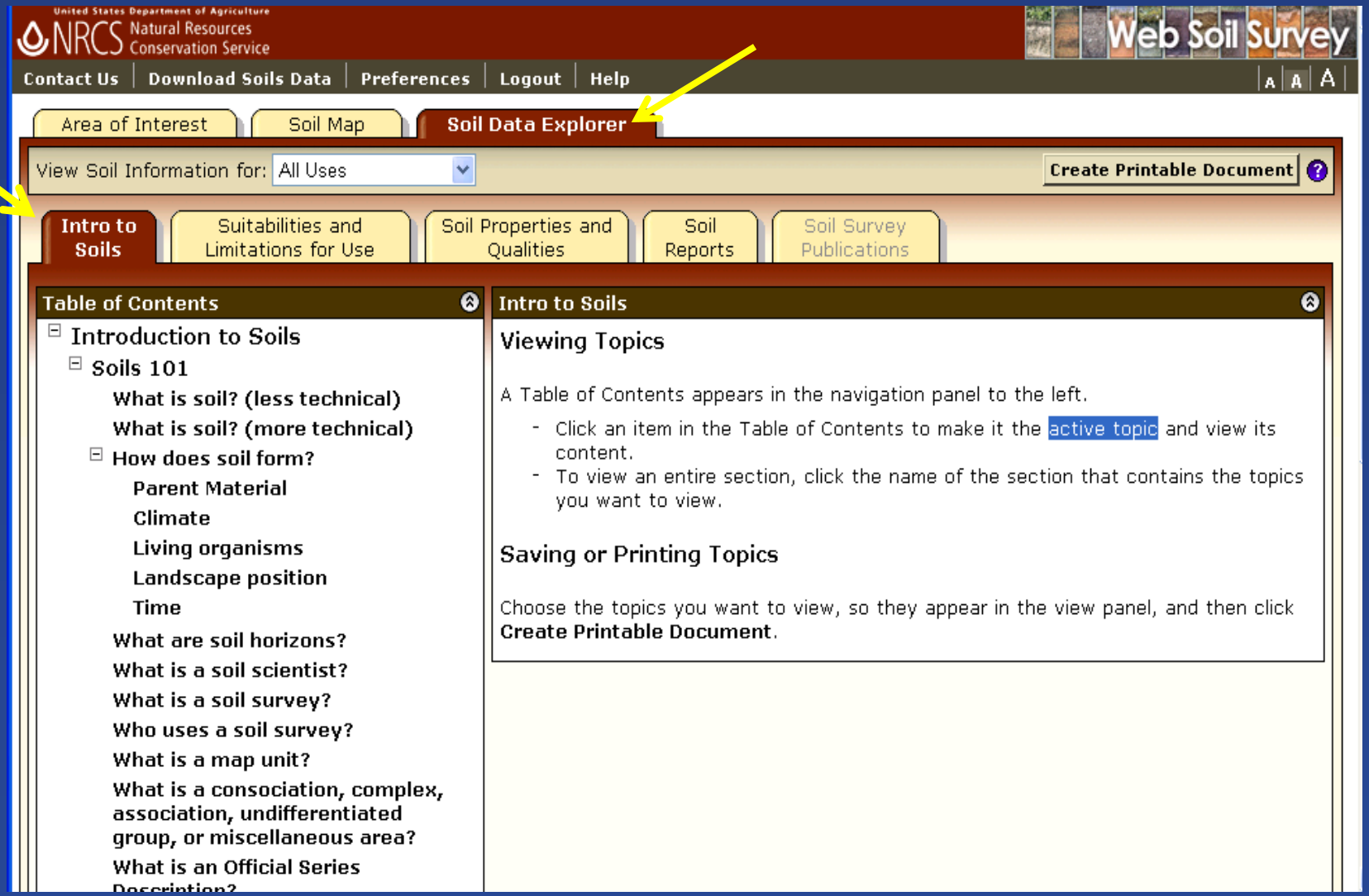
Explore and Analyze Soil Data with WSS Soil Data Explorer

- Learn the terminology and concepts associated with soils, soil interpretations, and land uses
- Create maps and reports of soil interpretations and properties
- Minimal learning curve and hardware requirements

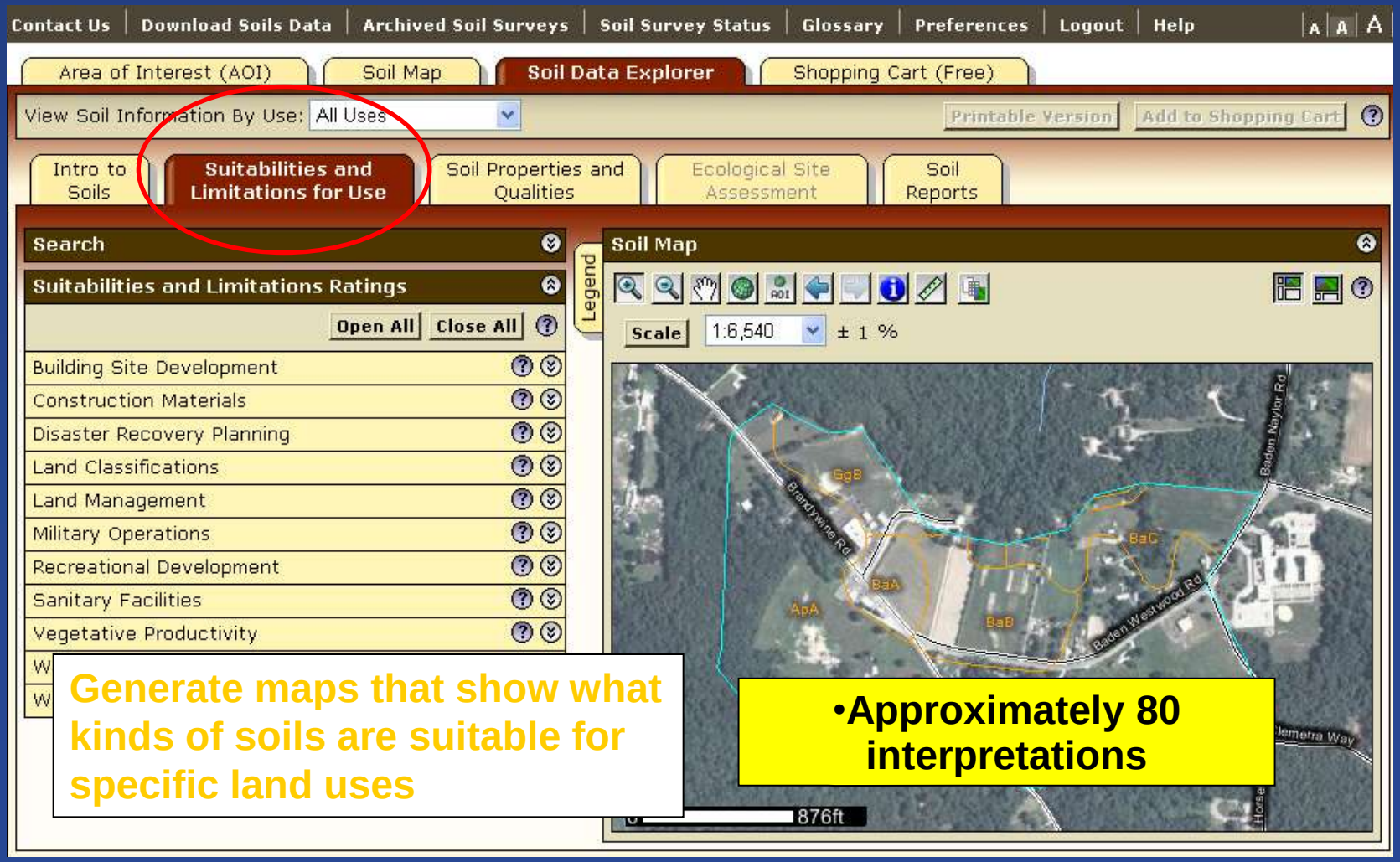
4. Explore Soil Data



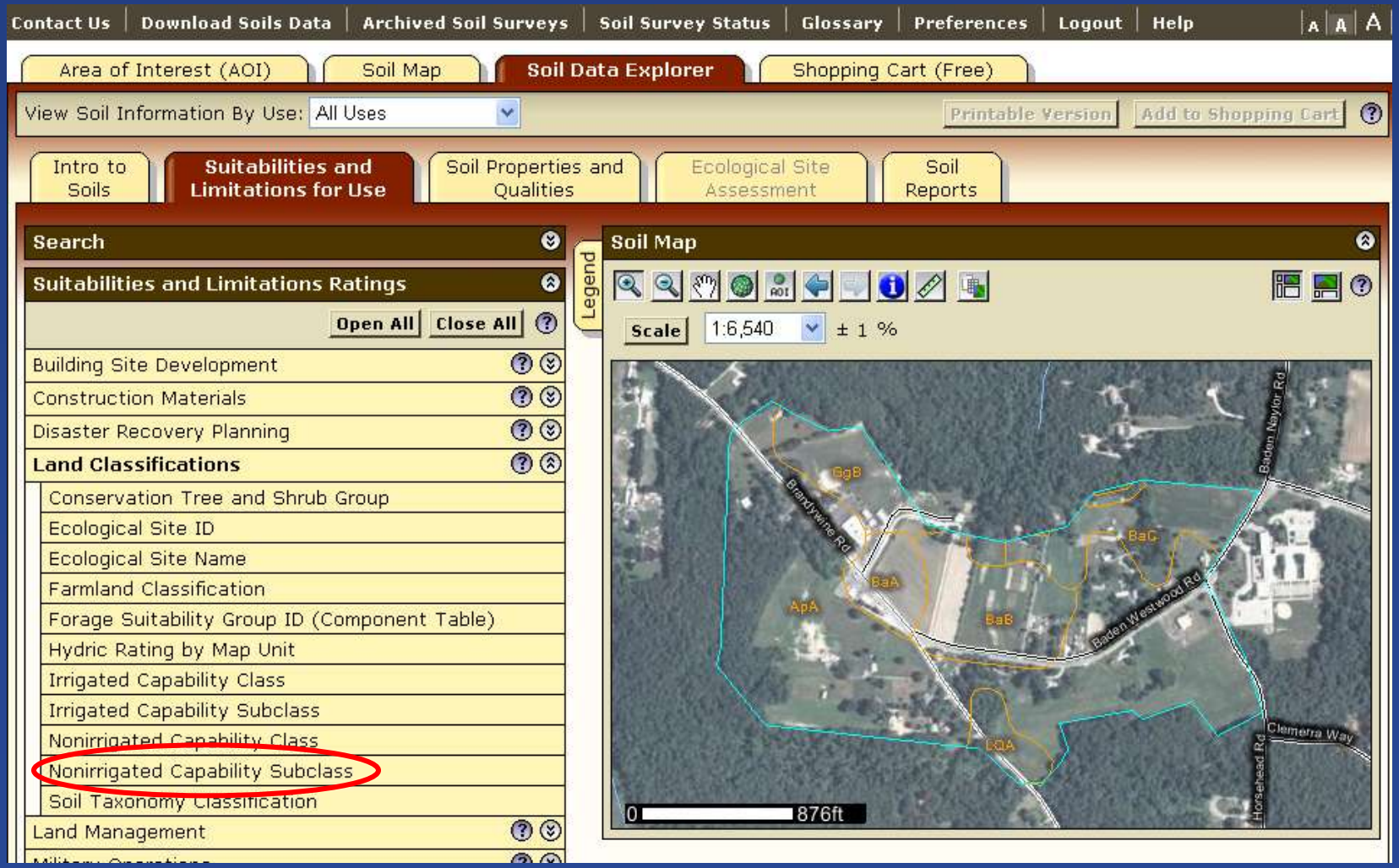
Soil Data Explorer – Intro to Soils



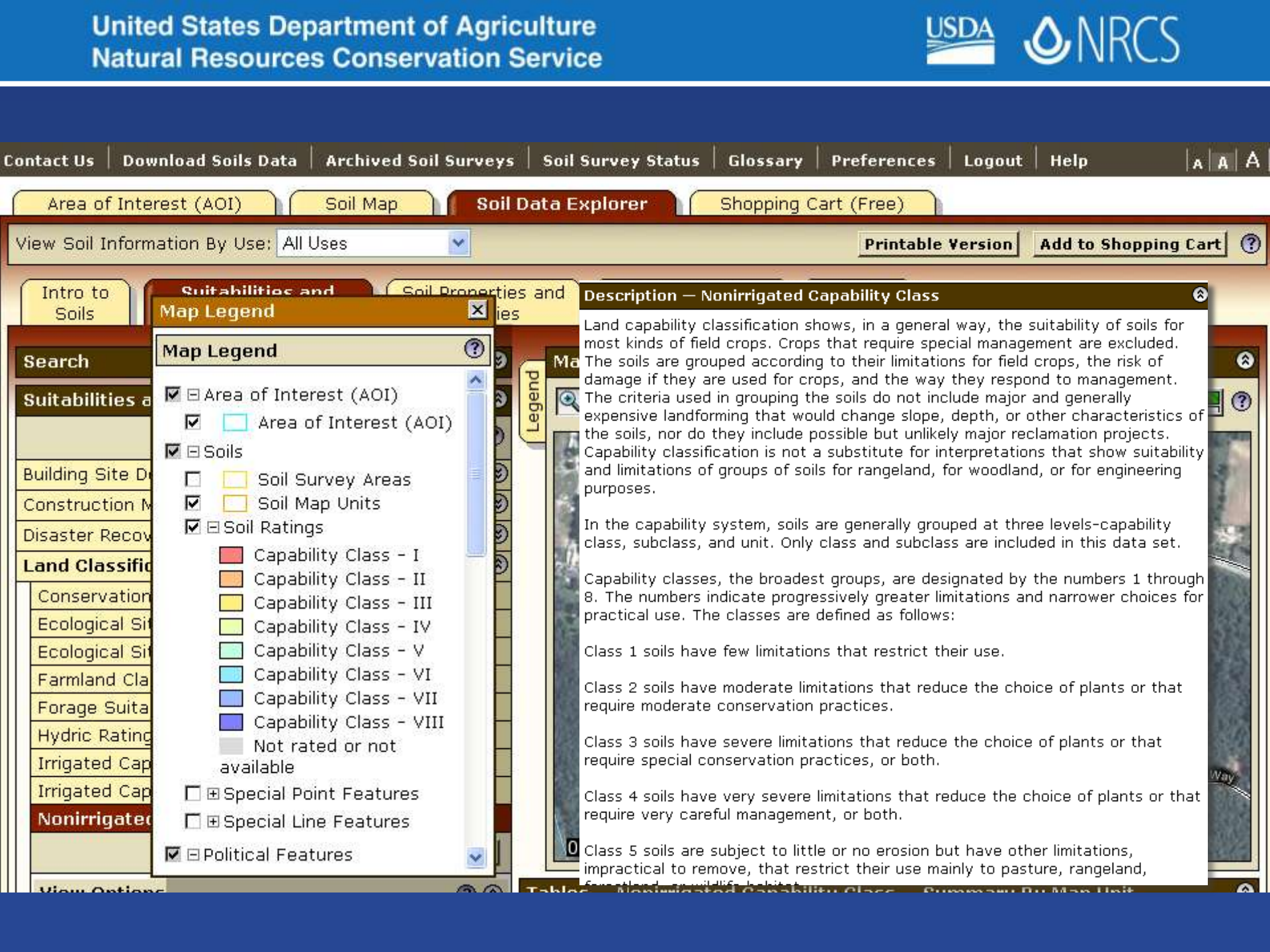
Determine Appropriate Uses for a Soil



Land Capability Class Example



Land Capability Class Map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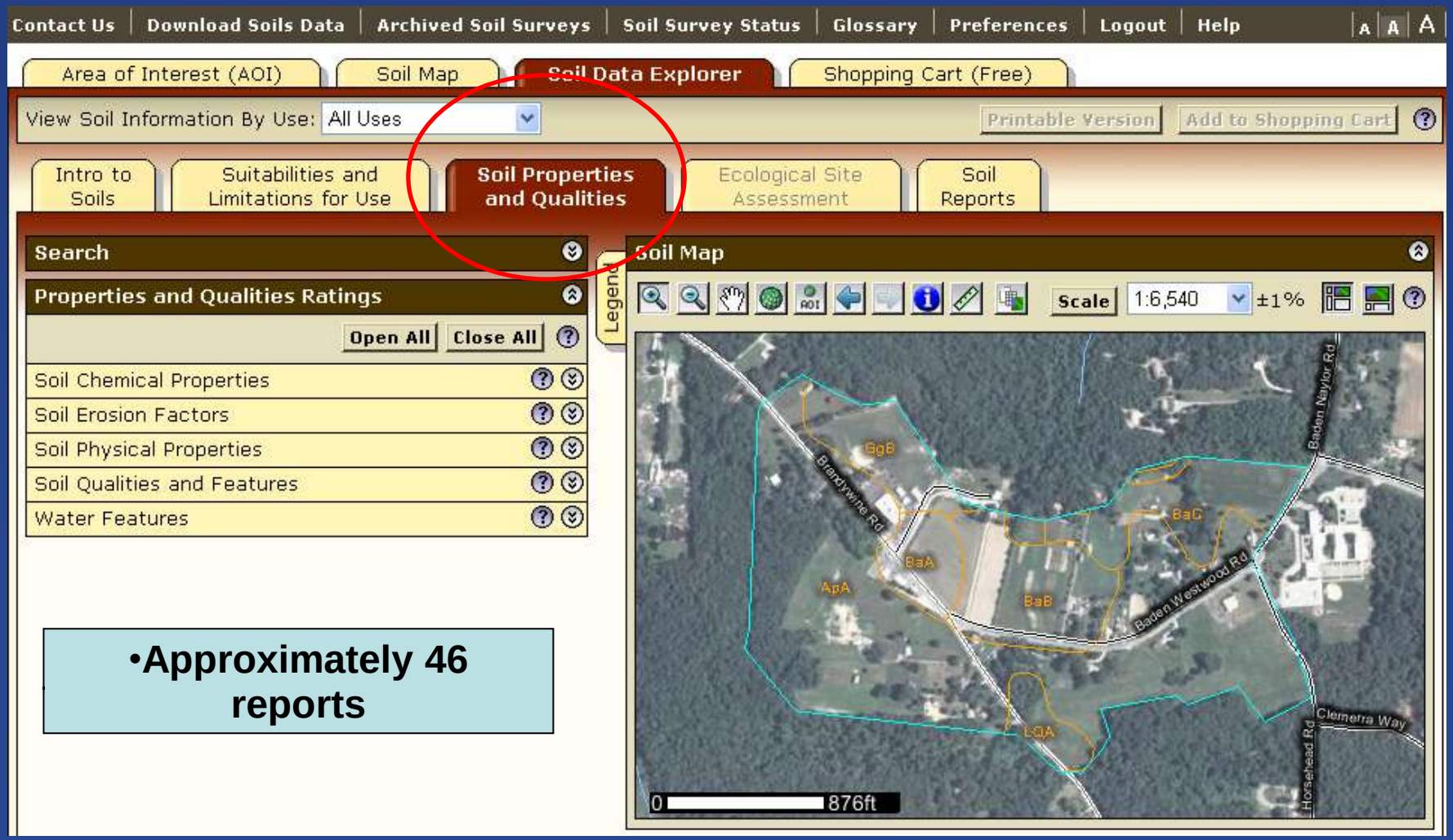
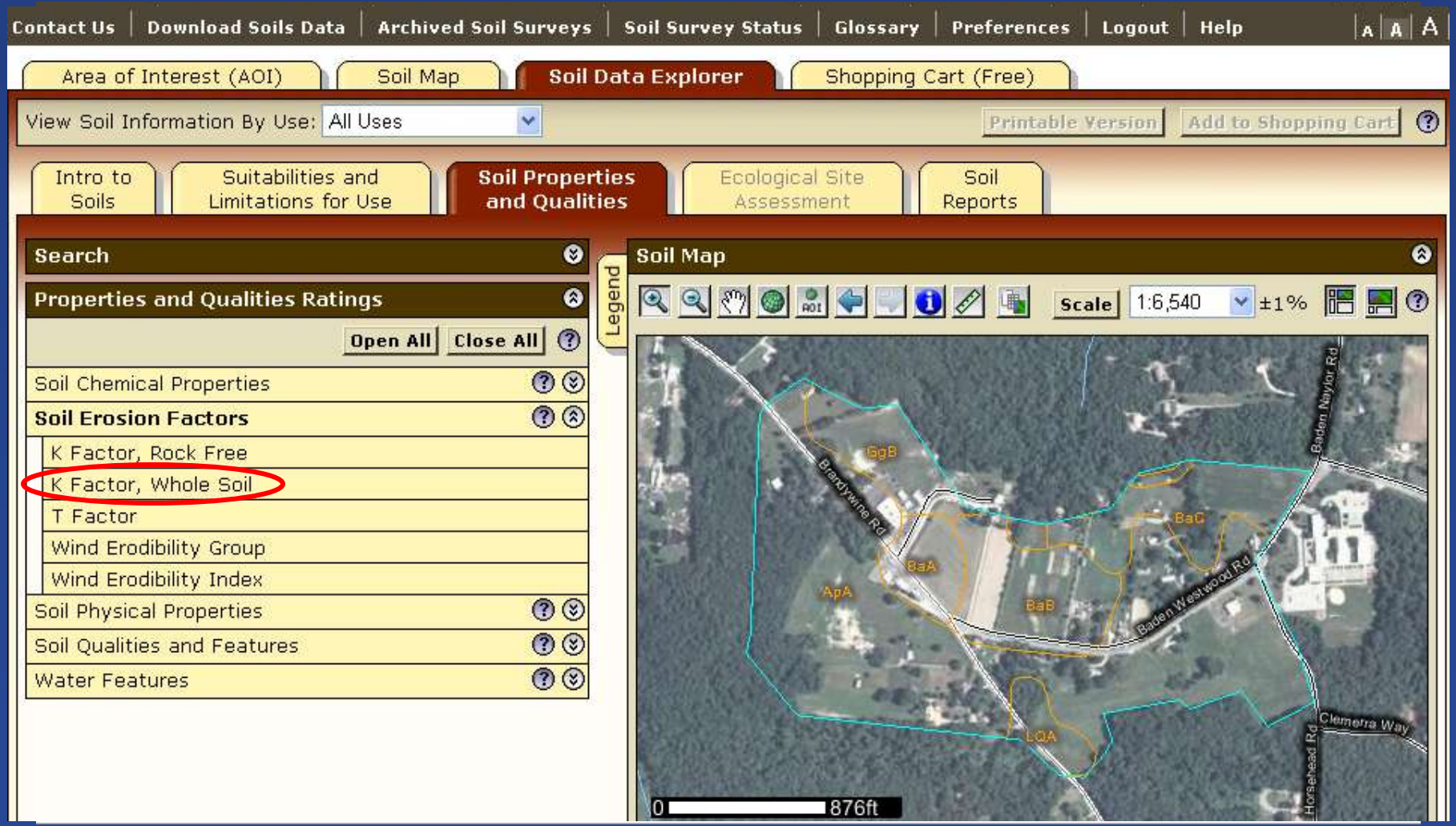
Area of Interest (AOI)
Soil Map
Soil Data Explorer
Shopping Cart (Free)
View Soil Information By Use: All Uses
Printable Version
Add to Shopping Cart
Intro to Soils
Map Legend
Map Legend
Area of Interest (AOI)
Area of Interest (AOI)
Soils
Soil Survey Areas
Soil Map Units
Soil Ratings
Capability Class - I
Capability Class - II
Capability Class - III
Capability Class - IV
Capability Class - V
Capability Class - VI
Capability Class - VII
Capability Class - VIII
Not rated or not available
Special Point Features
Special Line Features
Political Features
Search
Legend
Description — Nonirrigated Capability Class
Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.
In the capability system, soils are generally grouped at three levels-capability class, subclass, and unit. Only class and subclass are included in this data set.
Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:
Class 1 soils have few limitations that restrict their use.
Class 2 soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
Class 3 soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.
Class 4 soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.
Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland,

View Soil Properties and Qualities

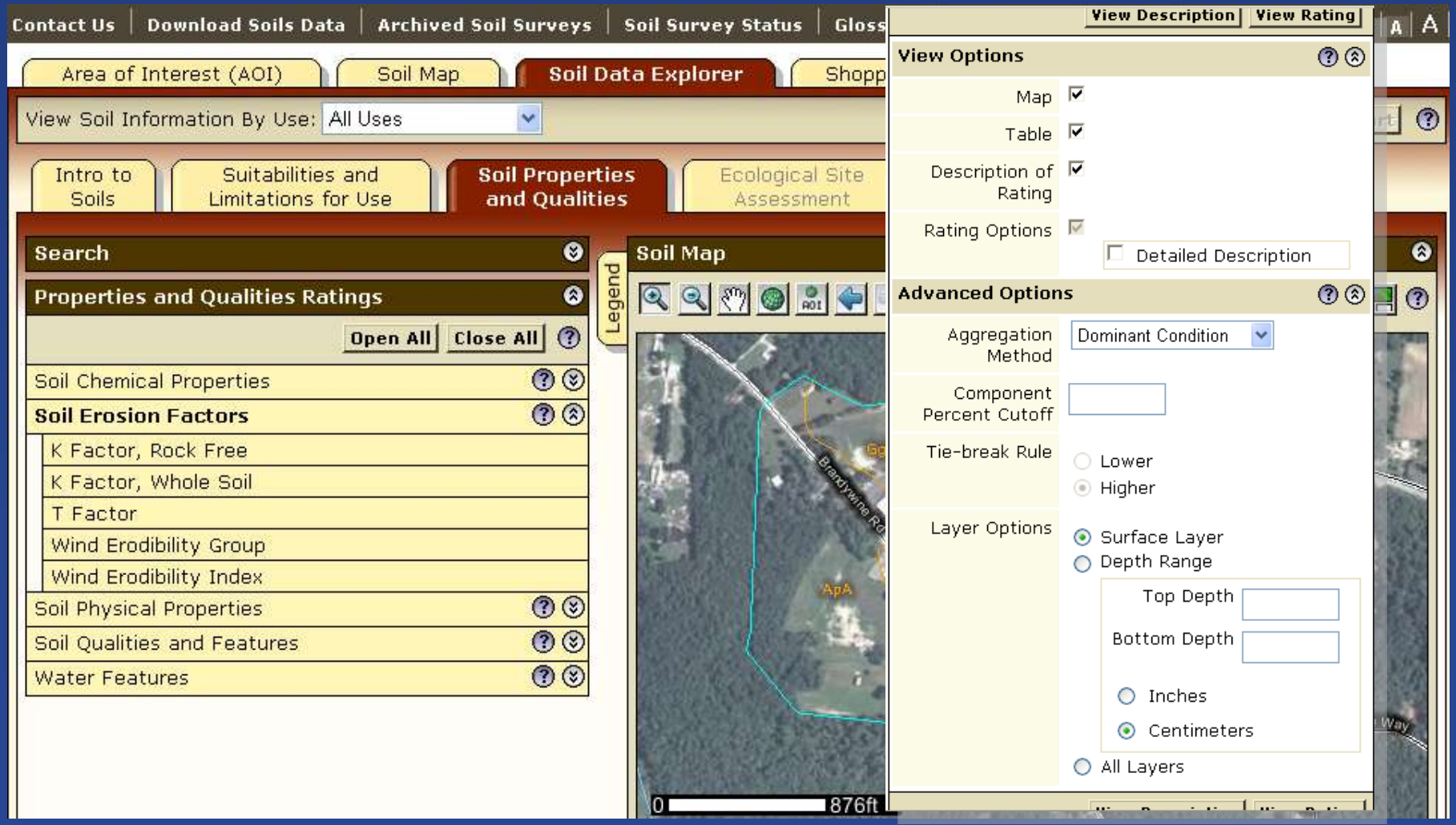


- Approximately 46 reports

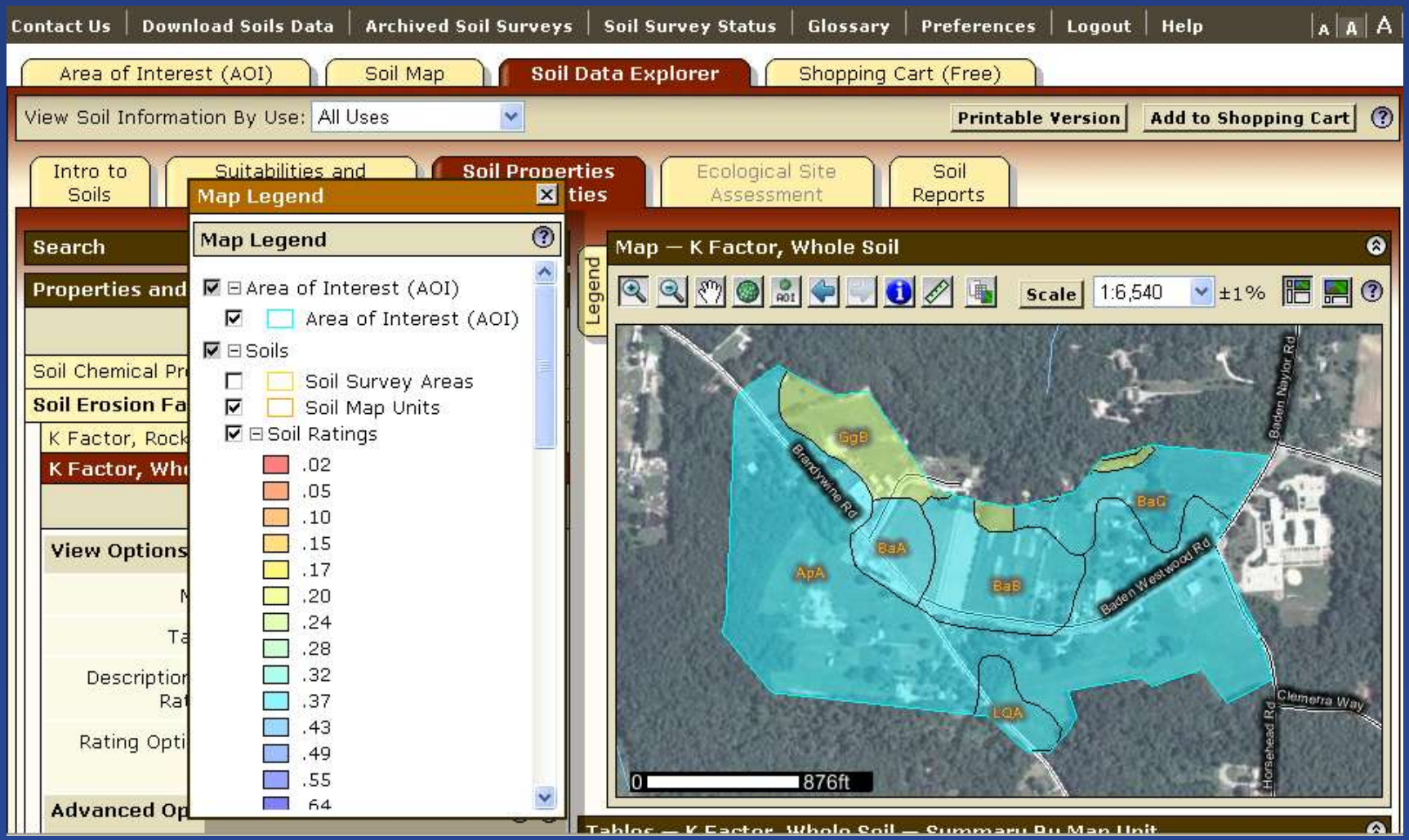
Soil Erosion Factors



Soil Erosion Factors



Kw: Surface Horizon



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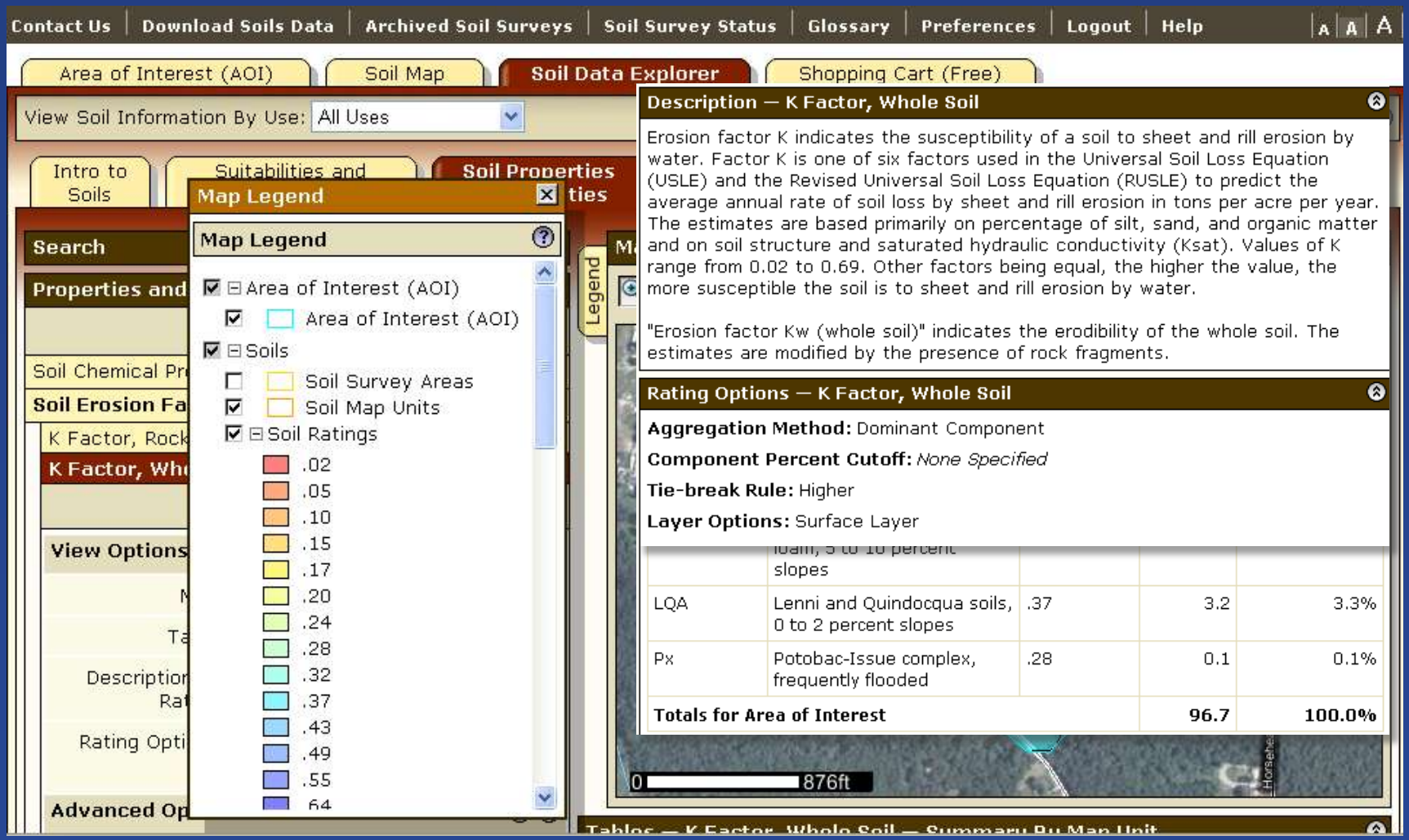


Soil Properties and Qualities
Available Water Supply 0-100cm

Search

Properties and Qualities Ratings

Open All | Close All

Soil Chemical Properties

Soil Erosion Factors

Soil Physical Properties

Available Water Capacity

Available Water Supply, 0 to 100 cm

View Description | View Rating

View Options

Advanced Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: ○ Lower ◉ Higher

View Description | View Rating

Available Water Supply, 0 to 150 cm

Available Water Supply, 0 to 25 cm

Available Water Supply, 0 to 50 cm

Bulk Density, 15 Bar

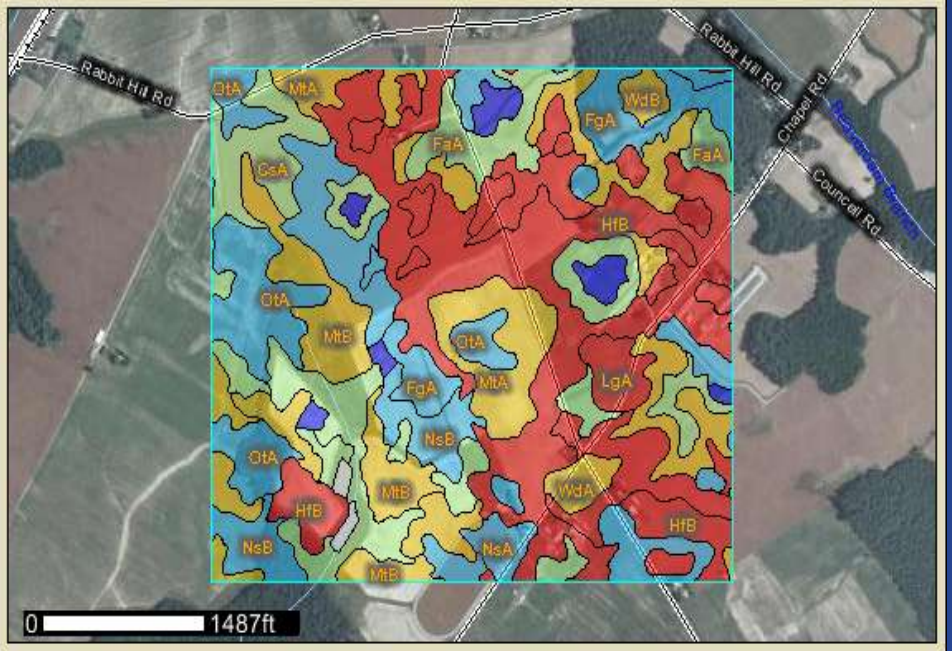
Bulk Density, One-Tenth Bar

Bulk Density, One-Third Bar

Legend

Map — Available Water Supply, 0 to 100 cm

Scale (not to scale)



Tables — Available Water Supply, 0 to 100 cm — Summary By Map Unit

Summary by Map Unit — Talbot County, Maryland

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
CoA	Corsica mucky loam, 0 to 2 percent slopes	21.84	2.9	0.6%

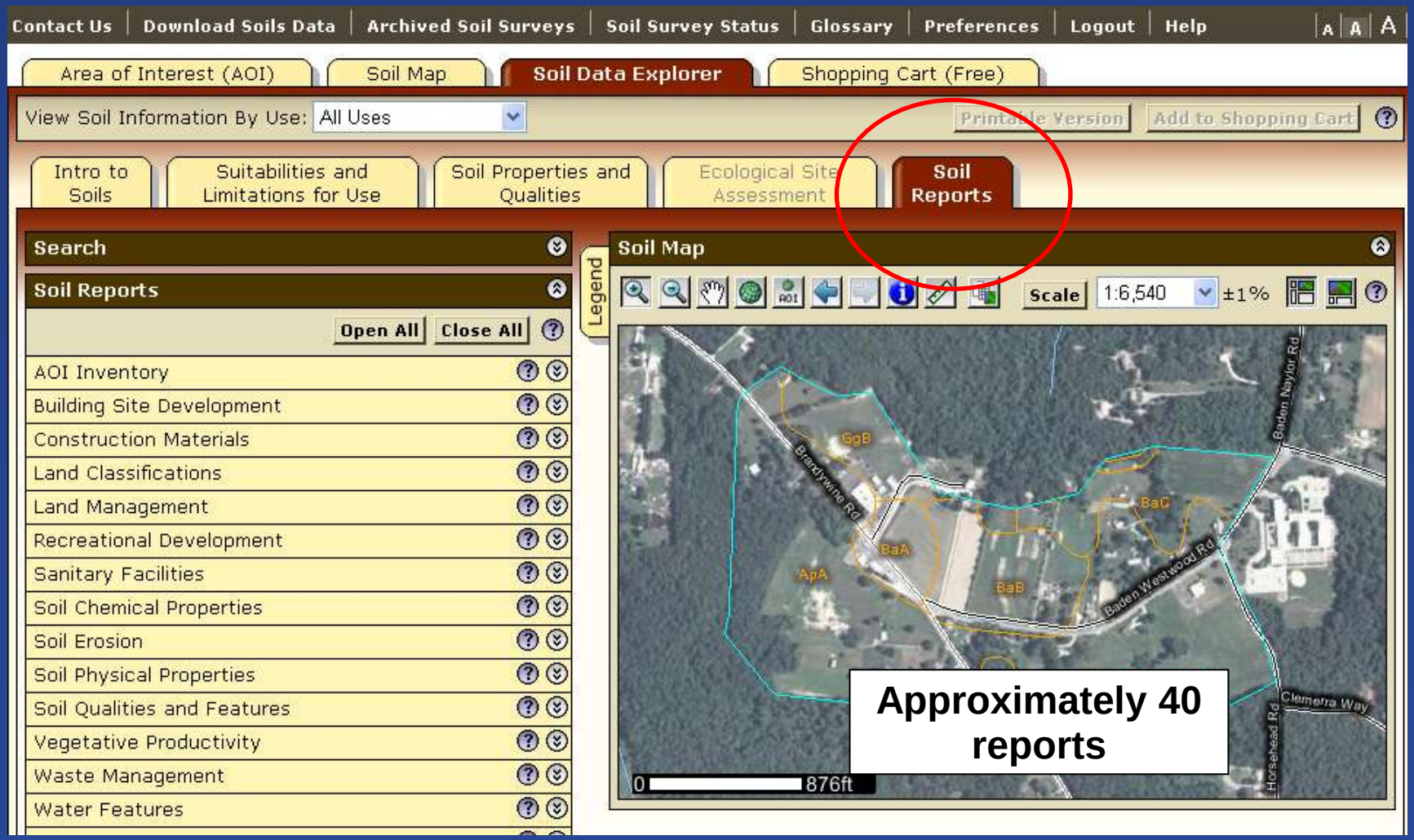
Soil Physical Properties

Soil Physical Properties
Available Water Capacity
Available Water Supply, 0 to 100 cm
Available Water Supply, 0 to 150 cm
Available Water Supply, 0 to 25 cm
Available Water Supply, 0 to 50 cm
Bulk Density, 15 Bar
Bulk Density, One-Tenth Bar
Bulk Density, One-Third Bar
Linear Extensibility
Liquid Limit
Organic Matter
Percent Clay
Percent Sand
Percent Silt
Plasticity Index
Saturated Hydraulic Conductivity (Ksat)
Saturated Hydraulic Conductivity (Ksat), Standard Classes
Surface Texture
Water Content, 15 Bar
Water Content, One-Third Bar

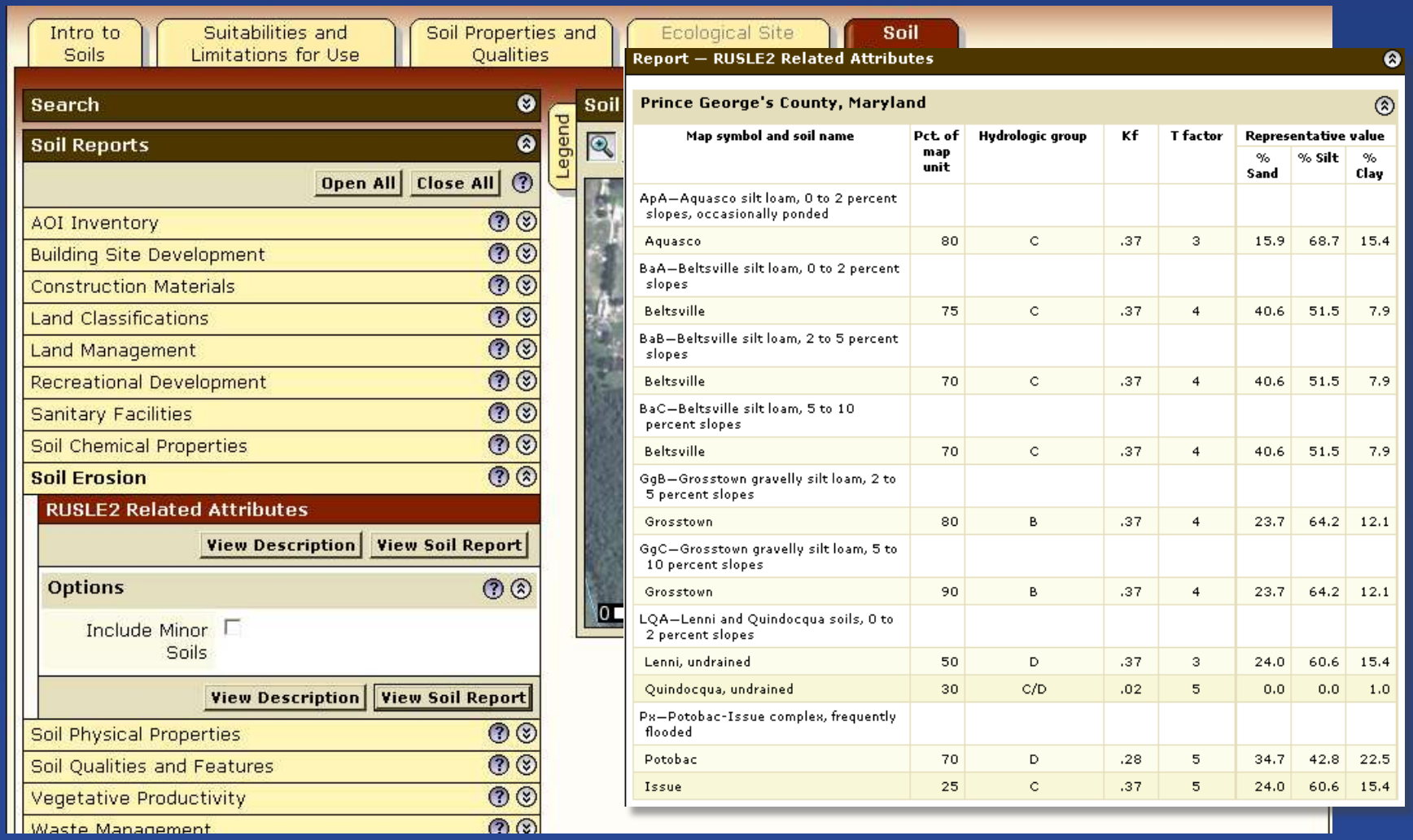
Soil Qualities and Features

Soil Qualities and Features
AASHTO Group Classification (Surface)
Depth to a Selected Soil Restrictive Layer
Depth to Any Soil Restrictive Layer
Drainage Class
Frost Action
Frost-Free Days
Hydrologic Soil Group
Map Unit Name
Parent Material Name
Representative Slope
Unified Soil Classification (Surface)

View Soil Reports

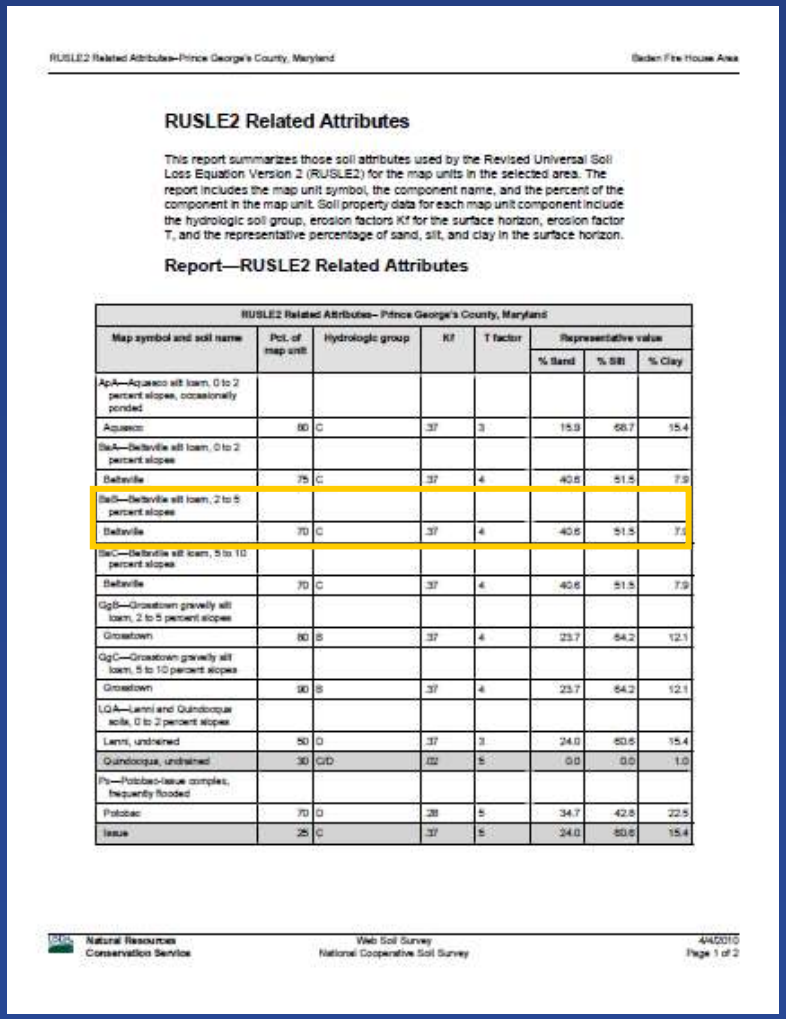


Soil Erosion Reports



Map symbol and soil name	Pct. of map unit	Hydrologic group	Kf	T factor	Representative value		
					% Sand	% Silt	% Clay
ApA—Aquasco silt loam, 0 to 2 percent slopes, occasionally ponded							
Aquasco	80	C	.37	3	15.9	68.7	15.4
BaA—Beltsville silt loam, 0 to 2 percent slopes							
Beltsville	75	C	.37	4	40.6	51.5	7.9
BaB—Beltsville silt loam, 2 to 5 percent slopes							
Beltsville	70	C	.37	4	40.6	51.5	7.9
BaC—Beltsville silt loam, 5 to 10 percent slopes							
Beltsville	70	C	.37	4	40.6	51.5	7.9
GgB—Grosstown gravelly silt loam, 2 to 5 percent slopes							
Grosstown	80	B	.37	4	23.7	64.2	12.1
GgC—Grosstown gravelly silt loam, 5 to 10 percent slopes							
Grosstown	90	B	.37	4	23.7	64.2	12.1
LQA—Lenni and Quindocqua soils, 0 to 2 percent slopes							
Lenni, undrained	50	D	.37	3	24.0	60.6	15.4
Quindocqua, undrained	30	C/D	.02	5	0.0	0.0	1.0
Px—Potobac-Issue complex, frequently flooded							
Potobac	70	D	.28	5	34.7	42.8	22.5
Issue	25	C	.37	5	24.0	60.6	15.4

Create a Printable Report



RUSLE2 Related Attributes–Prince George's County, Maryland — Baden Fire House Area

RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factors Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the surface horizon.

Report—RUSLE2 Related Attributes

RUSLE2 Related Attributes– Prince George's County, Maryland

Map symbol and soil name	Pct. of map unit	Hydrologic group	Kf	T factor	Representative value		
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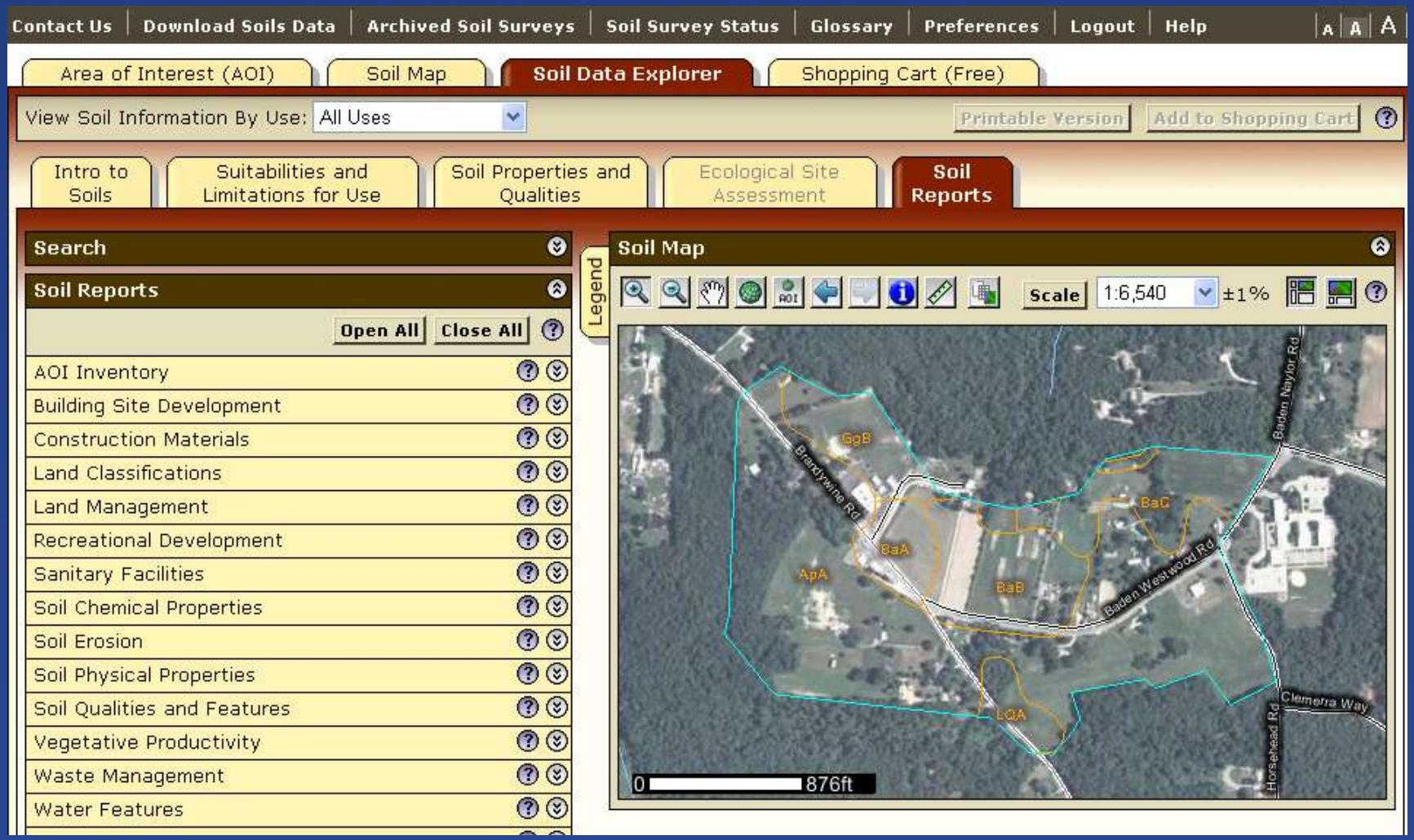
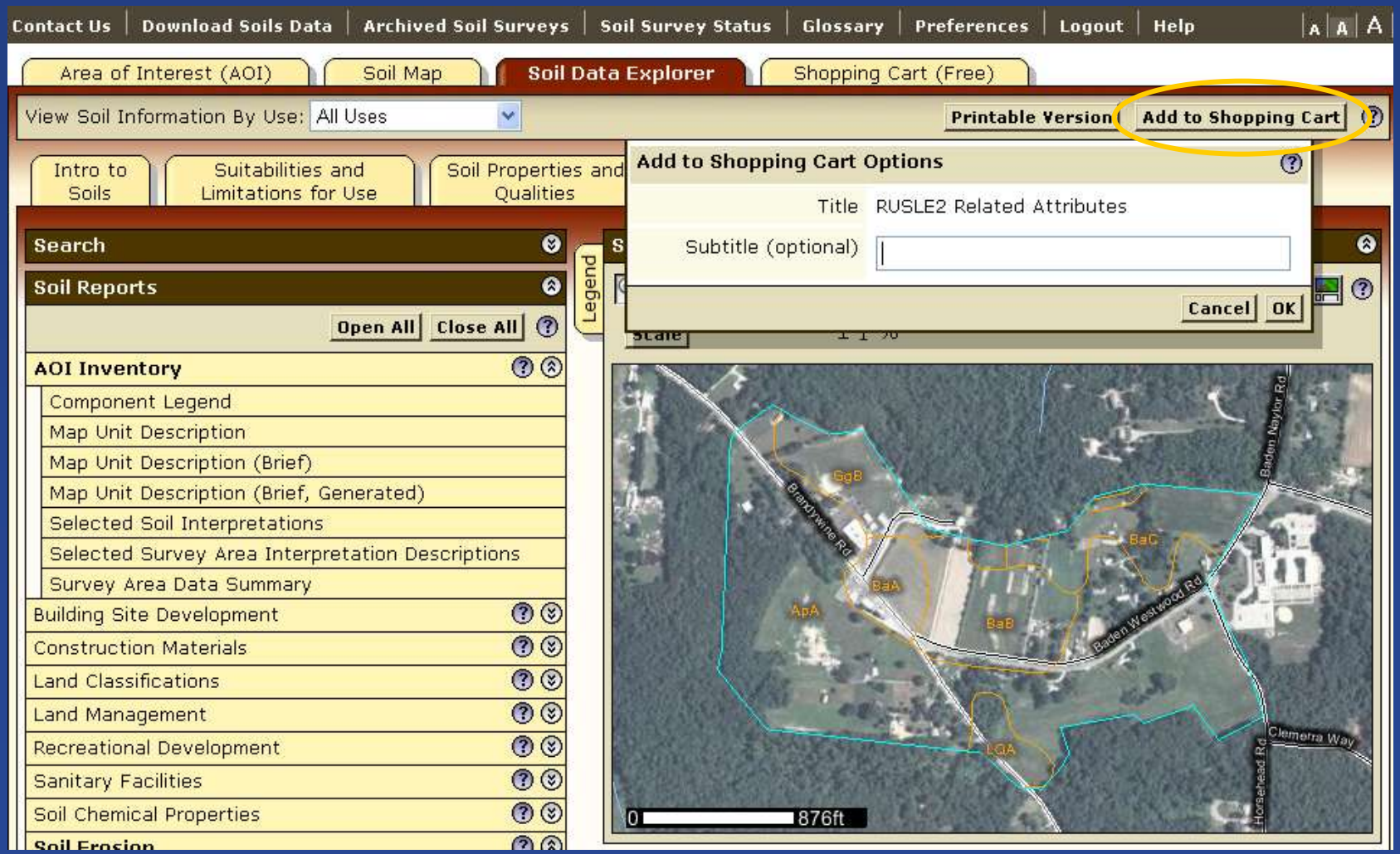
Grosstown	90	B	.37	4	23.7	64.2	12.1
LQA—Lenni and Quindocqua soils, 0 to 2 percent slopes							
Lenni, undrained	50	D	.37	3	24.0	60.6	15.4
Quindocqua, undrained	30	C/D	.02	5	0.0	0.0	1.0
Po—Potobac-Issue complex, frequently flooded							
Potobac	70	D	.28	5	34.7	42.8	22.5
Issue	25	C	.37	5	24.0	60.6	15.4

Natural Resources Conservation Service — Web Soil Survey, National Cooperative Soil Survey — 4/4/2010 Page 1 of 2

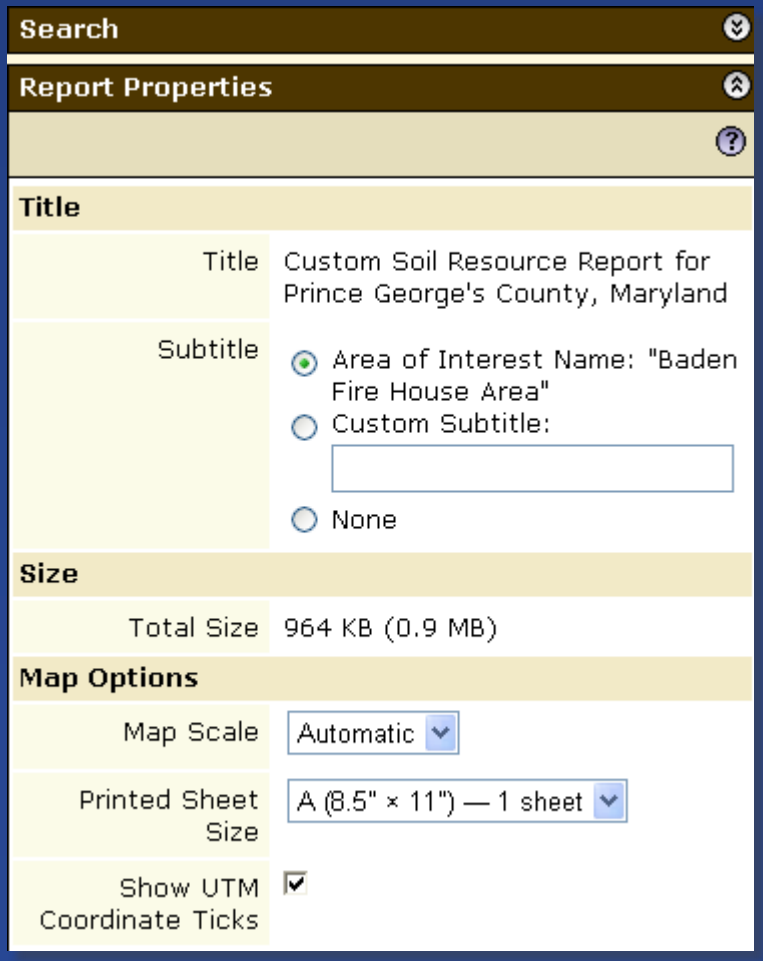
5. Build Your Own Soil Survey

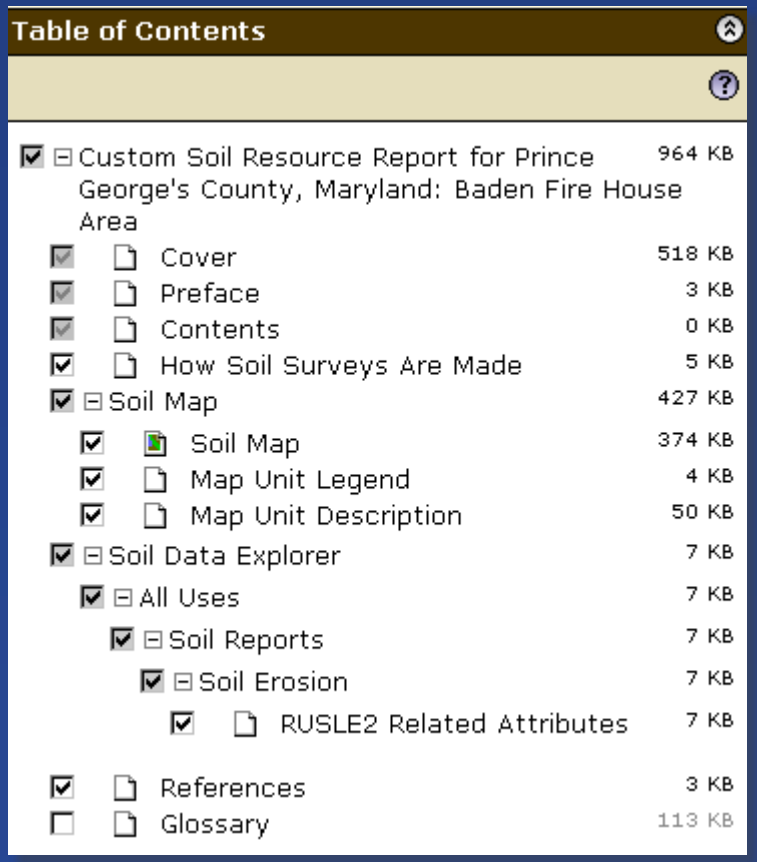


Add Content to Shopping Cart

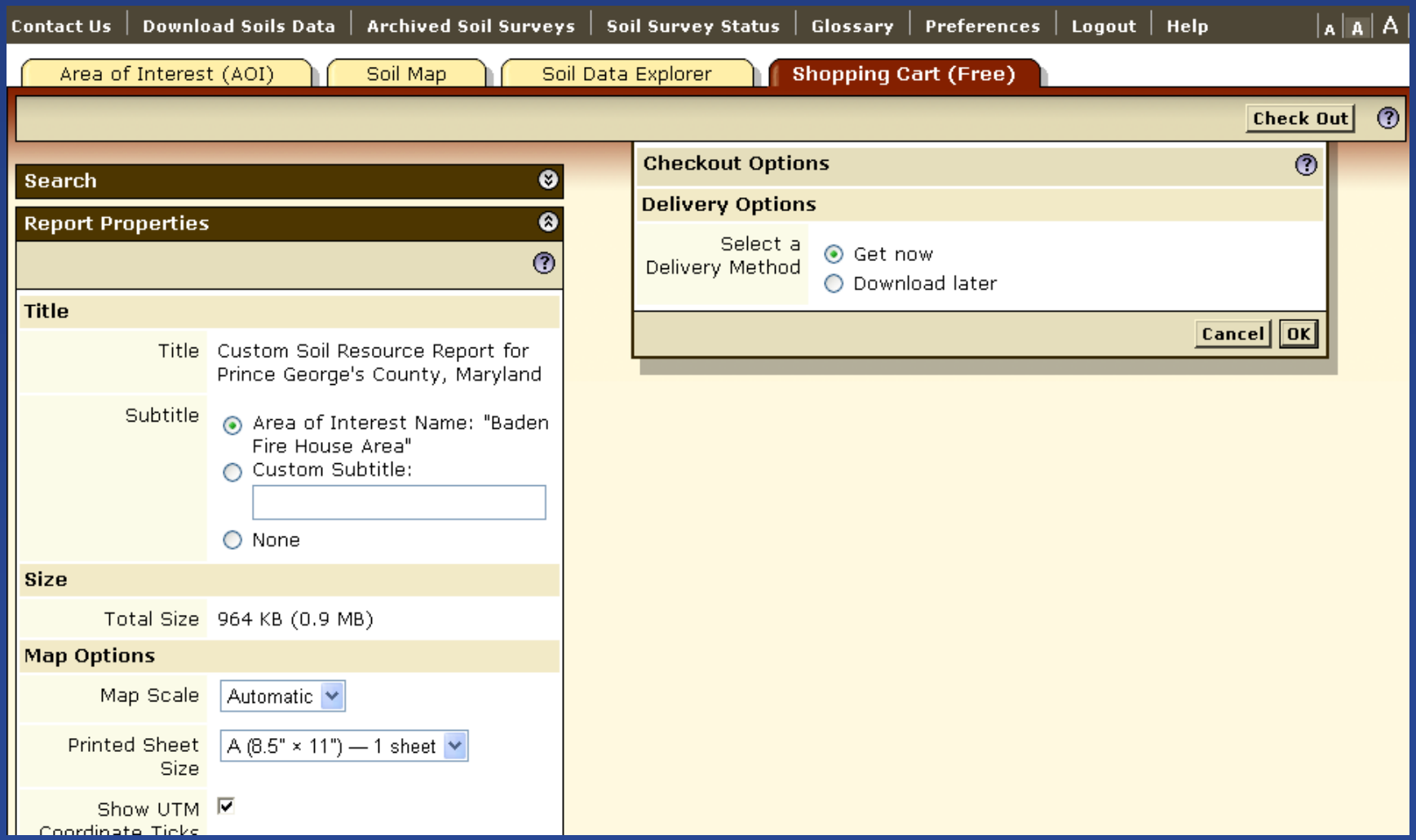


Parts of a Custom Soil Survey

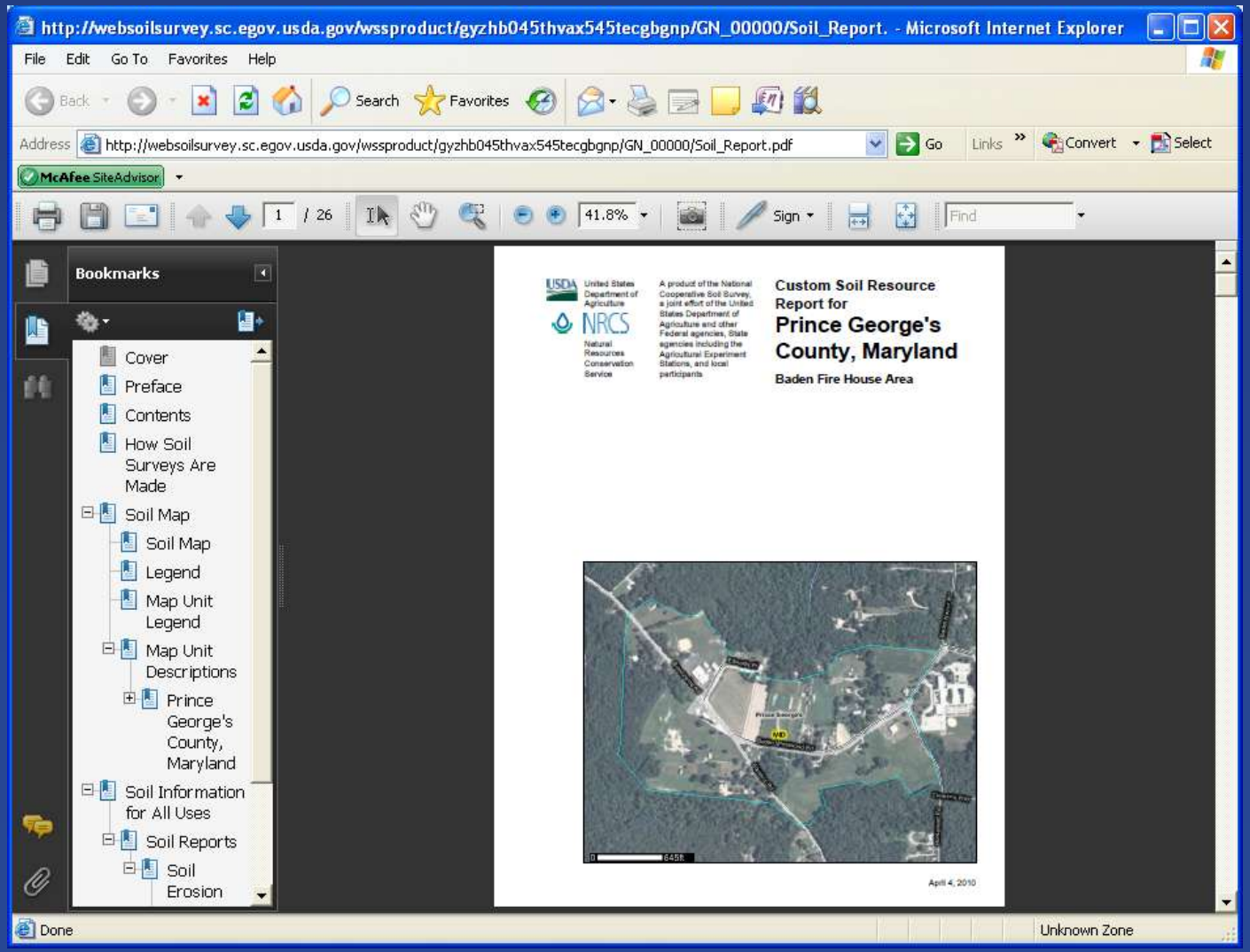




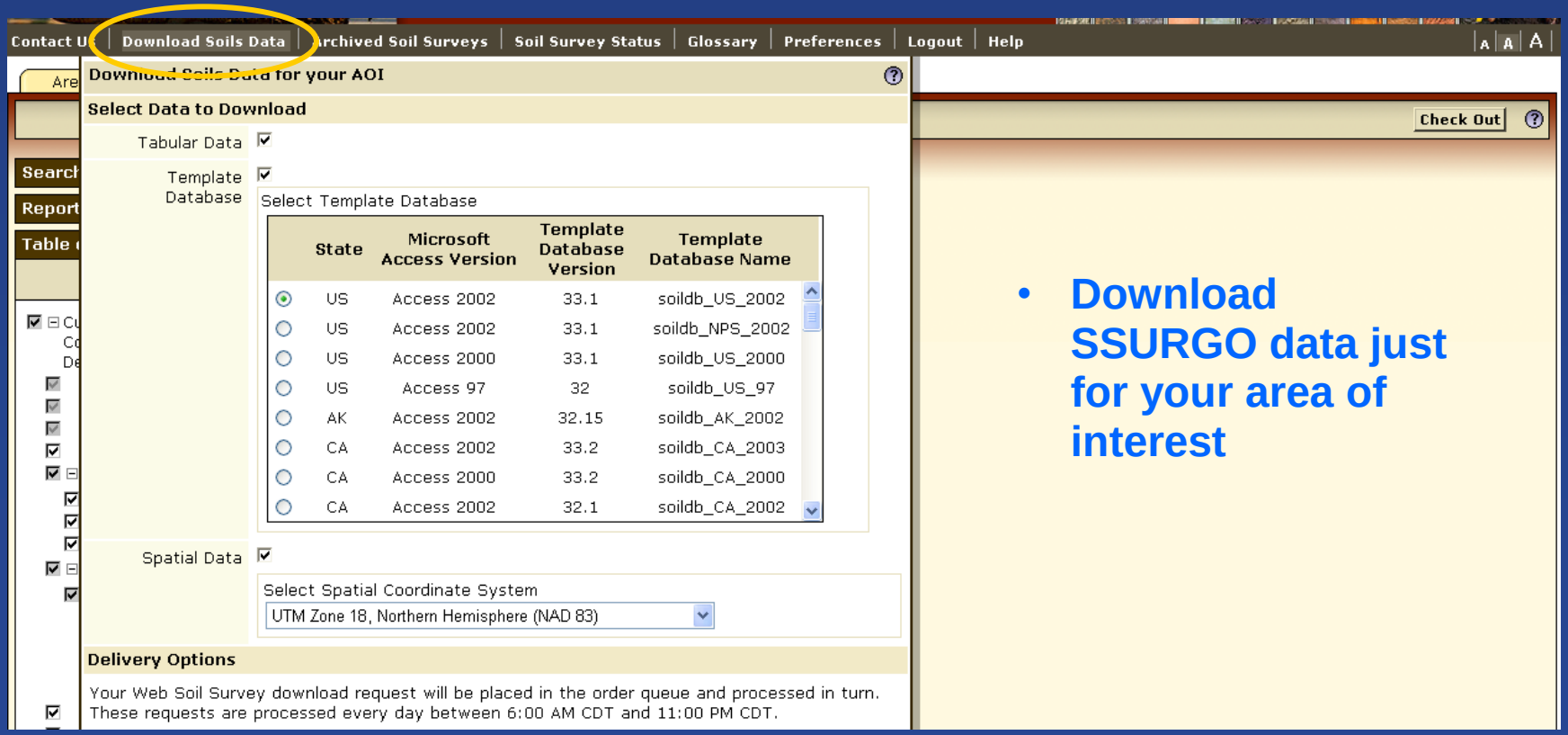
Check Out


Contact Us | Download Soils Data | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Logout | Help
A A A
Area of Interest (AOI)
Soil Map
Soil Data Explorer
Shopping Cart (Free)
Check Out
Search
Report Properties
Title
Title
Custom Soil Resource Report for Prince George's County, Maryland
Subtitle
Area of Interest Name: "Baden Fire House Area"
Custom Subtitle:
None
Size
Total Size
964 KB (0.9 MB)
Map Options
Map Scale
Automatic
Printed Sheet Size
A (8.5" × 11") — 1 sheet
Show UTM Coordinate Ticks
Checkout Options
Delivery Options
Select a Delivery Method
Get now
Download later
Cancel
OK

My Soil Survey…



6. Download SSURGO Soil Data



- **Download SSURGO data just for your area of interest**

Coming Soon…

- **In the next release of WSS (sometime this spring), users will be able to save, export, and import Area of Interest boundaries in shapefile format**
- **In a subsequent release, the AOI size limit will be increased to 40,000 acres**


Questions?