SDSU Extension

iGrow Corn

BEST MANAGEMENT PRACTICES

Chapter: 17
Online Soil Survey Information – SoilWeb Application (SWA)

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The SoilWeb app is a new approach for obtaining digital soils information. This program can be accessed online at casoilresource.lawr.ucdavis.edu (click on SoilWeb Apps). The purpose of this chapter is to provide a hands-on example on how to access SoilWeb (SWA) information (Fig. 17.1).

Introduction

Digital soils information can be obtained from the USDA-NRCS Web Soil Survey (WSS) website (websoilsurvey.sc.egov.usda.gov) and the University of California Davis, California Soil Resource Lab (casoilresource.lawr.ucdavis.edu/soilweb-apps/). The SoilWeb app (SWA) works on desktop computers, tablets, iPads, or smartphones. Other apps that are available at this website include: 1) SoilWeb Earth, 2) SEE: Soil Series Extent Explorer, and 3) Soil Properties. These websites are regularly updated with new options, features, and data.

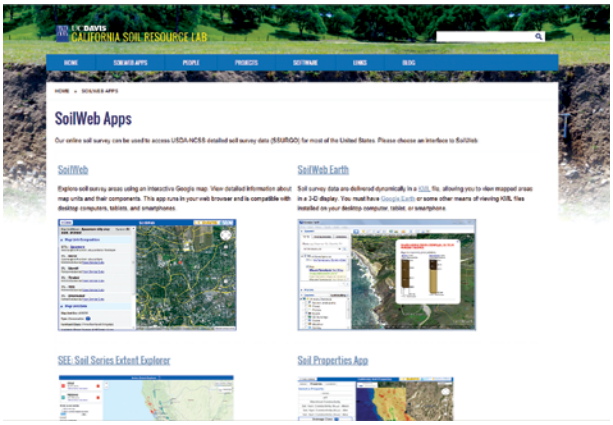


Figure 17.1 SoilWeb Apps home page (casoilresource.lawr.ucdavis.edu/soilweb-apps/).

SoilWeb Application (SWA)

SoilWeb (SWA) provides detailed information about the soil map units and their components (casoilresource.lawr.ucdavis.edu/gmap/). Figure 17.2 shows the startup window for SWA. To select an area to study, use the drop-down menu found in the upper left-hand corner of the page (Fig. 17.3). Select Zoom to Location and another drop-down box appears. You can select either your present location or enter a location using: 1) complete address, 2) city and state, 3) zip code, 4) landmark, or 5) latitude and longitude. Once the map appears, it can be

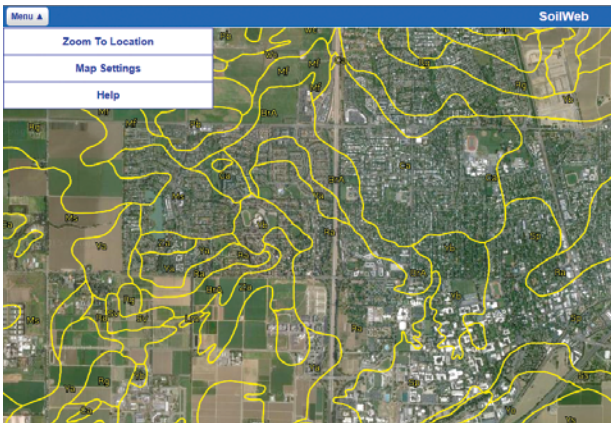


Figure 17.2 Opening page of SoilWeb application. Note the drop-down options in the upper left-hand corner of the page when the Menu button is clicked.

moved (left, right, up, down, or diagonally) by holding down the left button on your mouse and moving the cursor to the location of your study site.

The map background can be changed by selecting Map Settings from the Menu. Another drop-down list appears, offering the following map types: 1) satellite image, 2) a highway-only image, 3) a hybrid (satellite and highway) view, or 4) a terrain image (Fig. 17.4). Selections can be saved for the next session (Fig. 17.4). The Menu's Help tab provides a list of soil survey terms employed in the website and their definitions (Fig. 17.5).

Once the image background and location is determined, the latitude and longitude values of specific points are determined by moving the mouse cursor (+) to the desired location. You can zoom in or out by using the features (e.g., rotary wheel or other) of your mouse. At the bottom right-hand corner of the image the latitude and longitude information for the + is provided (Fig. 17.6).

To obtain soils information for a specific study area, double-click the cursor and a red circle with a white x will appear, and the soil mapping unit (MU) information at that specific location is displayed on the left side of the image (Fig. 17.7). The soil (MU) information available incudes: MU name; MU symbol and surface texture; MU composition (what soils are present); MU slope and flooding or ponding; and MU data (type, farmland classification, plant available water holding capacity for 0 to 100 cm depth, flooding frequency, drainage class [dominant condition, wettest component], % hydric soils, water table depth [maximum and minimum], minimum bedrock depth, and source of the soils data). Additional information on a soil term or property can be obtained by clicking on a blue button containing a question mark (Fig. 17.7).

Click on a soil name under the Map Unit Composition tab to obtain specific information about a map unit component. A drop-down list appears with additional information about each soil (Fig. 17.8). The soils information available under the soil series selected (Brandt series) tab includes:

1. Soil Data Explorer – this link provides soil series information for the selected soil (Fig. 17.9). The information available includes: official series description, available lab data {e.g., % sand, % silt, % clay, bulk density, % total carbon, % organic carbon, % organic matter, pH, base saturation, CEC [cation exchange capacity], % gypsum, % $CaCO_3$ [lime], SAR [sodium adsorption ratio], and others} (Fig. 17.10), component and series associations (Fig. 17.11), block diagrams of typical landscapes (Fig. 17.12), a listing of the soil mapping units where the selected soil is dominant (Fig. 17.13), and a visual map of where the selected soil is found in the US (Fig. 17.14).
2. Soil profiles
    a) Profile sketch – visual image of the typical profile including horizons and depths.
    b) Selected soil property values are graphically shown by soil depth: % organic matter (Figs. 17.15 and 17.16 [shows help information]), % clay, % sand (Fig. 17.17), Ksat (saturated hydraulic conductivity or permeability), K factor (soil erodibility), pH by water, EC (electrical conductivity, salinity), SAR (sodium adsorption ratio), % $CaCO_3$ (lime content), % gypsum, CEC (cation exchange capacity at pH 7.0), linear extensibility % (shrink-swell potential), and data source.

Additional information about the selected soil can be found in the Soil Taxonomy, Land Classification, Hydraulic and Erosion Ratings, and Soil Suitability Ratings sections in the drop-down list (Fig. 17.18). The information available under the Soil Taxonomy tab includes: order, suborder, great group, subgroup, family, series, and source of the data. The information available in the Land Classification tab includes: Land Capability Class (irrigated and nonirrigated), Ecological Site Description (Fig. 17.19), and Forage Suitability Group. In the Soil Suitability Ratings tab (Fig. 17.18) information can be obtained about Waste Related (manure, food-processing waste, and wastewater), Engineering (e.g., construction materials, septic-tank filter fields, roads and excavations, shallow excavations, dwellings, commercial buildings, lawns, landscaping, landfills), Irrigation (ponds, dikes, irrigation methods, water management, and pond reservoirs [Fig. 17.20]), Urban Recreational (camps, picnic areas, paths/trails, playgrounds, and off-road motorcycle trails), Wildlife, and Runoff. NOTE – Not all states, counties, or areas will have data for all options within a category.

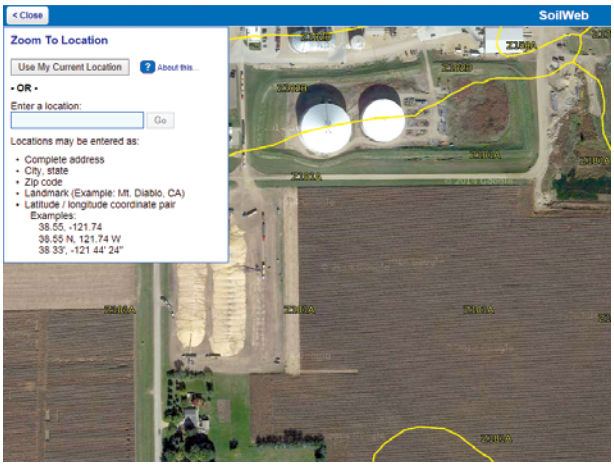


Figure 17.3 Zoom To Location options available from the Menu in SWA.

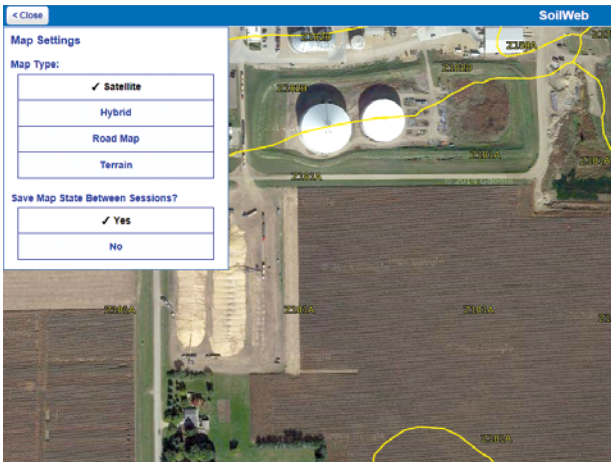


Figure 17.4 Map Settings options accessed via the SoilWeb Menu.

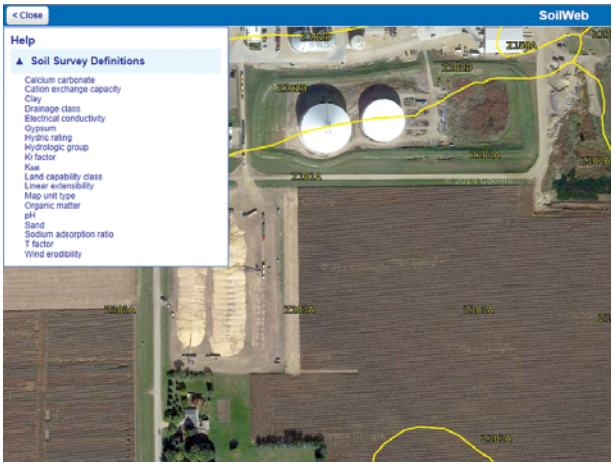


Figure 17.5 Soil Survey Definitions accessed via the Help tab in the SoilWeb Menu.

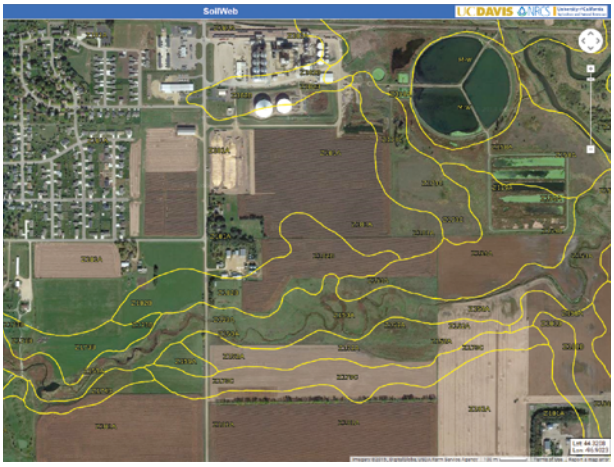


Figure 17.6 SoilWeb application image for Section 24, T110N, R50W, Brookings County, SD. The cross (+) location (latitude and longitude) is shown in lower right-hand corner.

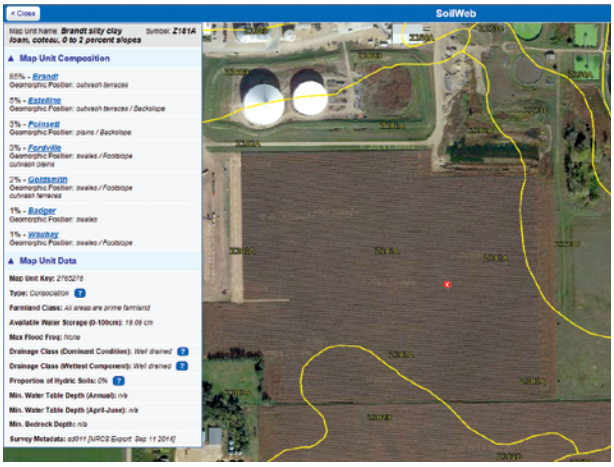


Figure 17.7 Soil Mapping Unit drop-down list for site located (red spot with a white x) in SoilWeb application.

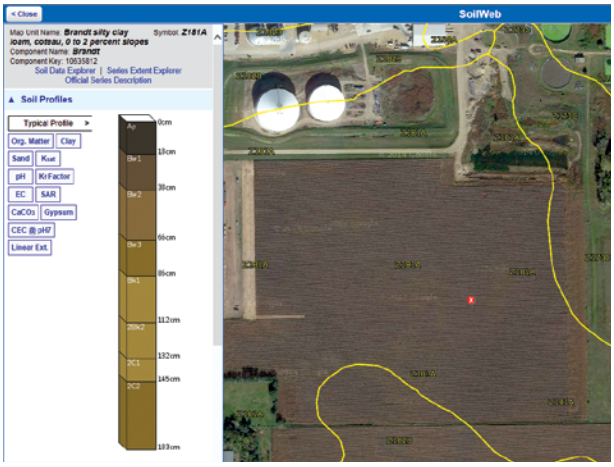


Figure 17.8 Soil profile sketch in the drop-down list for Brandt soil in map unit Z181A in SoilWeb application.

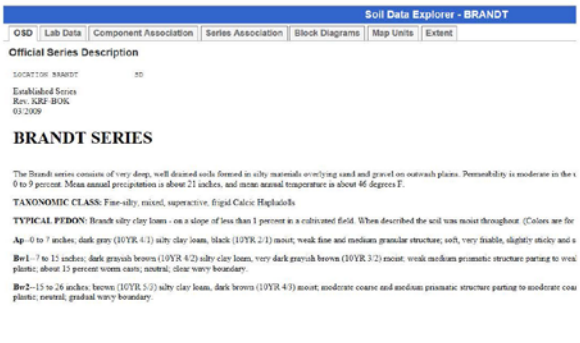


Figure 17.9 Soil Data Explorer page for Brandt soil in map unit Z181A in SoilWeb application. The page opens with the Official Series Description.

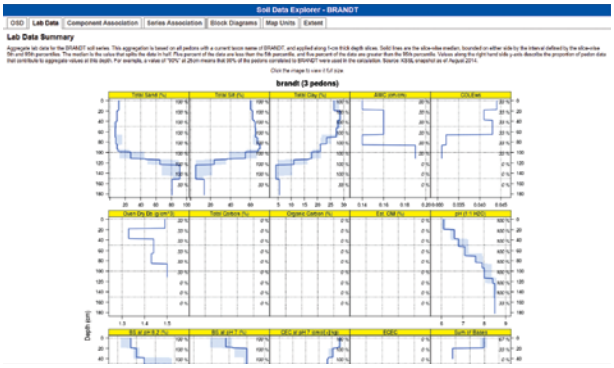


Figure 17.10 Lab data available for Brandt soil in map unit Z181A in SoilWeb application. There are three pedons of data available.

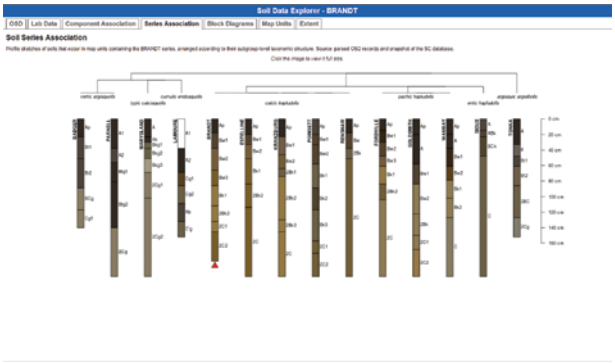
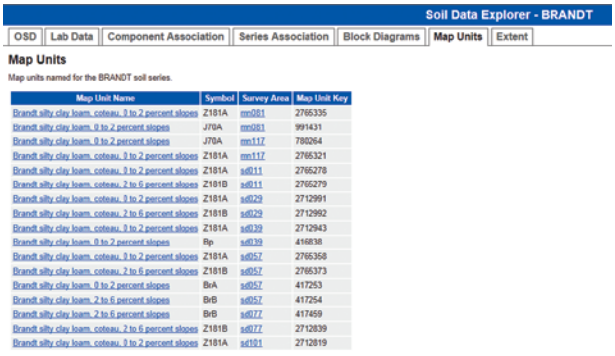


Figure 17.11 Soil Series Association profile sketches for the Brandt series in map unit Z181A in SoilWeb application.

Figure 17.12 Sample block diagram available from SoilWeb, Soil Data Explorer option.



Map Unit Name	Symbol	Survey Area	Map Unit Key
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	mn081	2765335
Brandt silty clay loam, 0 to 2 percent slopes	J70A	mn081	991431
Brandt silty clay loam, 0 to 2 percent slopes	J70A	mn117	780264
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	mn117	2765321
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	sd011	2765278
Brandt silty clay loam, cotleau, 2 to 6 percent slopes	Z181B	sd011	2765279
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	sd029	2712991
Brandt silty clay loam, cotleau, 2 to 6 percent slopes	Z181B	sd029	2712992
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	sd039	2712943
Brandt silty clay loam, 0 to 2 percent slopes	Bp	sd039	416838
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	sd057	2765358
Brandt silty clay loam, cotleau, 2 to 6 percent slopes	Z181B	sd057	2765373
Brandt silty clay loam, 0 to 2 percent slopes	BrA	sd057	417253
Brandt silty clay loam, 2 to 6 percent slopes	BrB	sd057	417254
Brandt silty clay loam, 2 to 6 percent slopes	BrB	sd077	417459
Brandt silty clay loam, cotleau, 2 to 6 percent slopes	Z181B	sd077	2712839
Brandt silty clay loam, cotleau, 0 to 2 percent slopes	Z181A	sd101	2712819

Figure 17.13 List of soil map units in the United States where Brandt soil series is dominant using the SoilWeb application.

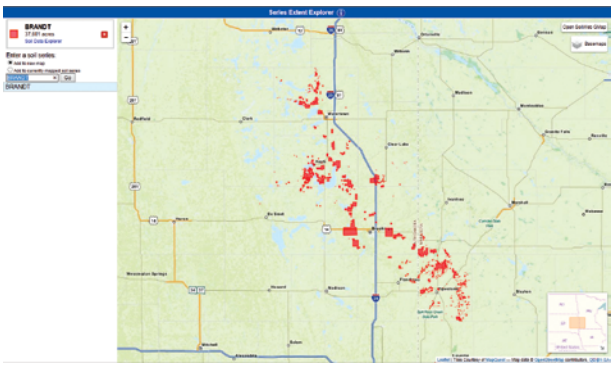


Figure 17.14 Series extent map in the United States for the Brandt soil in map unit Z181A using the SoilWeb application.

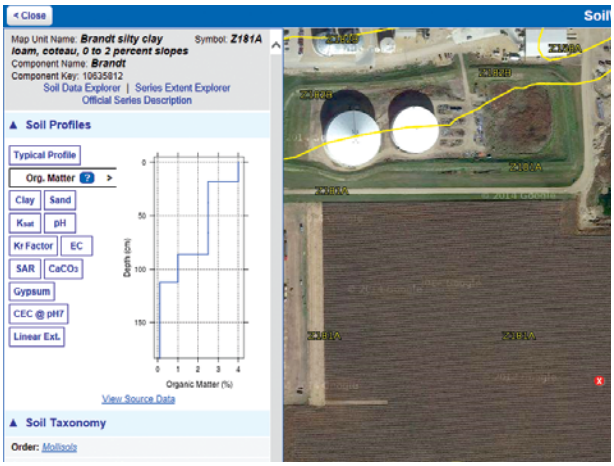


Figure 17.15 Soil organic matter levels data for the Brandt soil in map unit Z181A using the SoilWeb application.

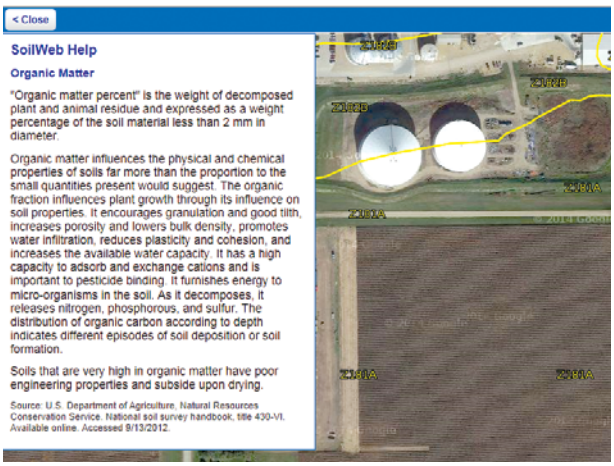


Figure 17.16 Example of help information for Brandt soil organic matter data in map unit Z181A using the SoilWeb application.

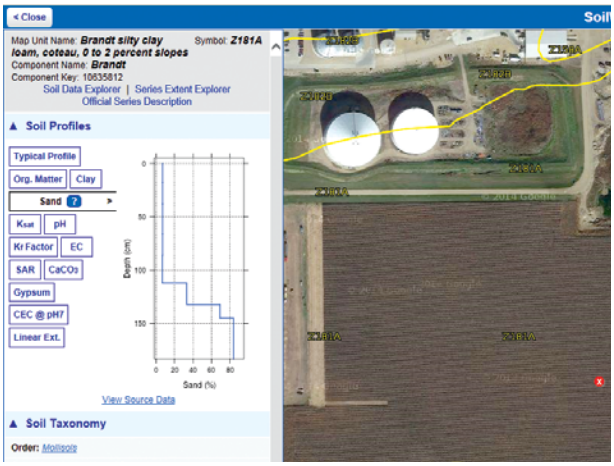


Figure 17.17 Percent sand data for the Brandt soil in map unit Z181A using the SoilWeb application.

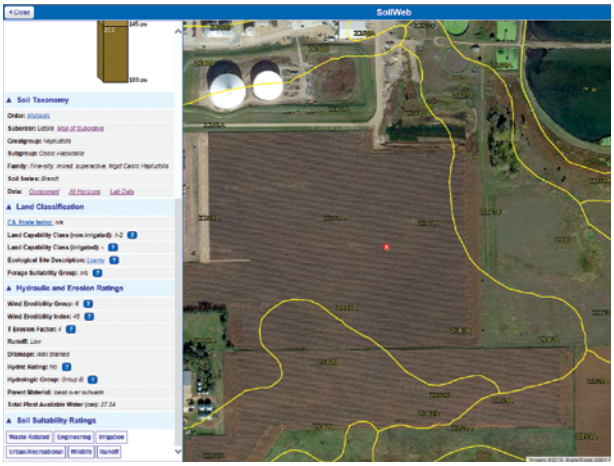


Figure 17.18 Additional soil information available in the drop-down sections for the Brandt soil in map unit Z181A using the SoilWeb application.

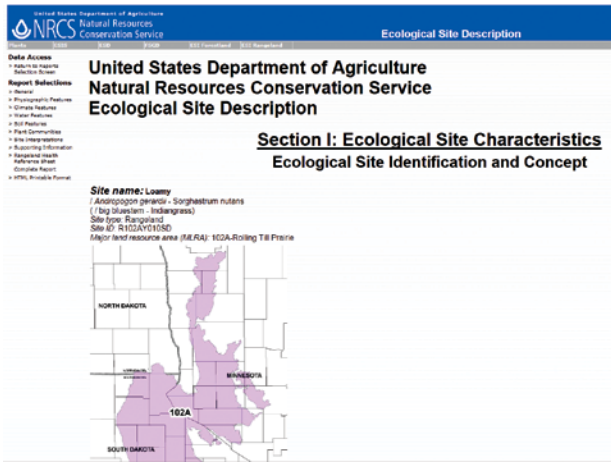


Figure 17.19 Example of the Ecological Site opening page for the Brandt soil in map unit Z181A using the SoilWeb application.

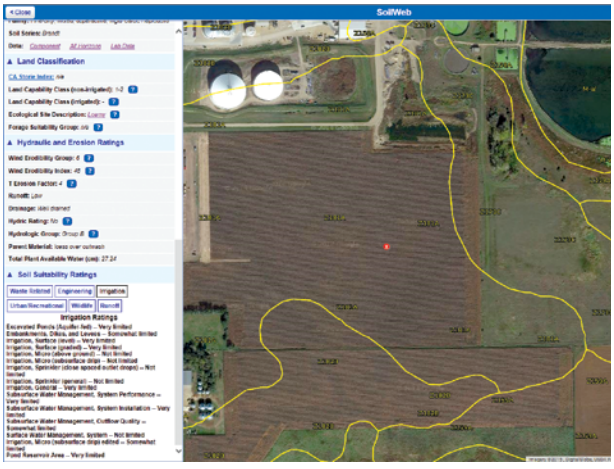


Figure 17.20 Irrigation Ratings for the Brandt soil in map unit Z181A using the SoilWeb application.

Other SoilWeb Apps

SoilWeb Earth Application

The SoilWeb Earth application delivers soil survey data in Keyhole Markup Language (kml) files allowing you to observe mapped areas in 3-D using Google Earth™ or some other means to view the kml files (casoilresource.lawr.ucdavis.edu/soilweb-apps/).

SEE: Soil Series Extent Explorer Application

The SEE: Soil Series Extent Explorer application allows you to visually observe the geographic distribution of named soil series. The app allows up to three series to be observed at one time. (casoilresource.lawr.ucdavis.edu/see/).

Soil Properties Application

The Soil Properties application is an interactive map that allows you to visually explore soil properties aggregated on a regional and statewide basis. This app is currently available only for California.

Use and Limitation of SoilWeb Application (SWA) Information

SoilWeb application (SWA) information is useful in understanding how soils differ and will perform under various land-management systems. Producers can integrate SWA data with yield-monitor information and other data to improve seeding, fertility, pest management, water/erosion conservation, tillage, and other crop-related management decisions (Reitsma and Malo, 2011).

It is important to point out that the SWA maps are based on NRCS soil maps, which were originally prepared in South Dakota at scale of 1:20,000 or 1:24,000. As a result, the smallest delineation that can be shown on a South Dakota soil survey maps is about 2 acres. Soils located in areas less than 2 acres are generally noted in the unit descriptions as inclusions. If higher resolution is needed, a more detailed soil map is required.

Conclusions

This chapter outlines how to use SWA to obtain soil and land attributes for making land-use and management decisions. Samples of output and the SWA website use are presented to demonstrate the potential and capabilities of SWA. There are numerous useful, credible, and user-friendly websites providing soil and natural resource information. Explore the sites and see the incredible wealth of information available to you online.

Abbreviations are provided in Chapter 16.

References and Additional Information

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