



United States Department of Agriculture



# Using Web Soil Survey – the Four Steps

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[nrcs.usda.gov/](http://nrcs.usda.gov/)

# Access digital soils data in four easy steps

## 1 Define.



Use the **Area of Interest** tab to define your area of interest. You can navigate to an area by zooming in on a map or by selecting from a Quick Navigation choice list. After you find the area, define it as the Area of Interest (AOI) by drawing a rectangle or a polygon around it using a map tool. You must complete this step before you can go on to the next three steps.

## 2 View.



Click the **Soil Map** tab to view or print a map of the soils in your area and view a description of the soils.

## 3 Explore.



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 added to your shopping cart.

## 4 Check Out.



Use the **Shopping Cart** tab to get your custom report immediately or download it later.

<https://websoilsurvey.sc.egov.usda.gov/>



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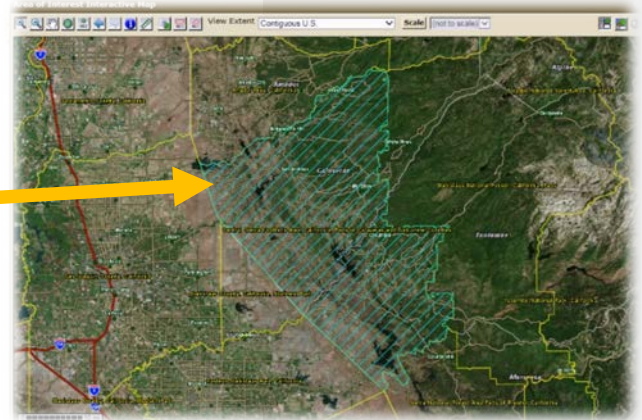
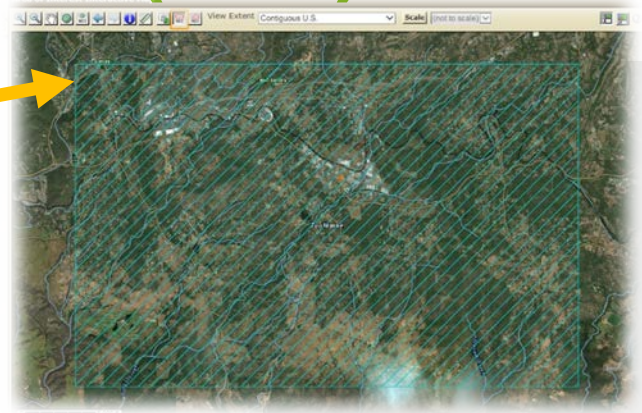


# 1. DEFINE an Area of Interest (AOI)

**Draw custom AOI**

**AOI from Soil Survey Area / County**

| Name  | Area  | Data                          | Version  |
|---|-------|-------------------------------|--|
| Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties | CA630 | Tabular and Spatial, complete | Survey Area: Version 3, Sep 17, 2018<br>Tabular: Version 3, Sep 17, 2018<br>Spatial: Version 2, Sep 14, 2018   |
| Stamplaus National Forest, California, Parts  | CA731 | Tabular and Spatial, complete | Survey Area: Version 11, Sep 12, 2018<br>Tabular: Version 11, Sep 12, 2018<br>Spatial: Version 4, Sep 12, 2018 |
| Yosemite National Park, California  | CA790 | Tabular and Spatial, complete | Survey Area: Version 10, Sep 13, 2018<br>Tabular: Version 9, Sep 13, 2018<br>Spatial: Version 7                |



There are many ways to **define your AOI** in WSS.

You can also import multipart areas from a **shapefile!**



# 1. DEFINE an Area of Interest (SoilWeb)



**1. Navigate to UC Davis CA Soil Resource Lab Google Maps App**

<https://casoilresource.lawr.ucdavis.edu/gmap/>

**2. Open the Menu to Zoom To Location**

**3. Click 'Link to WSS'**

**4. View SoilWeb AOI in Web Soil Survey**

**Alternately, you can find your AOI using the SoilWeb Google Maps App - just click "Link to WSS" in the top-right corner to import the map panel as your AOI.**





# 2. VIEW the Soil Map

Area of Interest (AOI) **Soil Map** Soil Data Explorer Download Soils Data Shopping Cart (Free)

Search **Soil Map** Scale 1:24,000 ± 1%

**1. CLICK "Soil Map" to see your AOI**

**3. Click Legend to toggle non-soil layers displayed on map (included in final report)**

**4. CLICK on links in the Map Unit Legend to view individual Map Unit Descriptions**

| Map Unit | Description   | Area (Acres) | Percentage |
|----------|---|--------------|------------|
| 3020     | Iron Mountain-Rock outcrop complex, 3 to 15 percent slopes          | 5.7          | 0.0%       |
| 3021     | Iron Mountain-Crozler-Rock outcrop complex, 15 to 30 percent slopes | 34.4         | 0.2%       |
| 6070     | Sierra-Verjeles-Aquic Haploxeralfs complex, 0 to 8 percent slopes   | 2,728.4      | 14.7%      |
| 6071     | Sierra-Flanly complex, 3 to 15 percent slopes                       | 38.2         | 2.4%       |
| 6074     | Sierra-Orose complex, 8 to 30 percent slopes                        | 4,796.7      | 5.8%       |

**2. Map is published at 1:24,000 scale (you need to specify monitor # of pixels-per-inch)**

**3. Click Legend to toggle non-soil layers displayed on map (included in final report)**

**4. CLICK on links in the Map Unit Legend to view individual Map Unit Descriptions**



# 3. EXPLORE the Data (*Map Unit Descriptions*)

**Map Unit Description** Printable Version

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**Report — Map Unit Description**

**Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties**

**6070—Sierra-Verjeles-Aquic Haploxeralfs complex, 0 to 8 percent slopes**  
**Map Unit Setting**

National map unit symbol: 2lk4t  
 Elevation: 1,160 to 2,710 feet  
 Mean annual precipitation: 30 to 41 inches  
 Mean annual air temperature: 57 to 61 degrees F  
 Frost-free period: 205 to 280 days  
 Farmland classification: Not prime farmland

**Map Unit Composition**

Sierra and similar soils: 40 percent  
 Verjeles and similar soils: 36 percent  
 Aquic haploxeralfs and similar soils: 15 percent  
 Minor components: 9 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sierra**

**Setting**


Landform: Hills  
 Landform position (two-dimensional): Backslope  
 Landform position (three-dimensional): Side slope  
 Down-slope shape: Linear  
 Across-slope shape: Linear  
 Parent material: Colluvium over residuum derived from granitoid

**Typical profile**

A - 0 to 4 inches: fine sandy loam  
 BA - 4 to 8 inches: loam  
 Bt1 - 8 to 20 inches: loam  
 Bt2 - 20 to 32 inches: clay loam  
 BCt - 32 to 59 inches: paragravelly clay loam

**Properties and qualities**

Slope: 0 to 8 percent  
 Percent of area covered with surface fragments: 0.0 percent  
 Depth to restrictive feature: More than 80 inches  
 Natural drainage class: Well drained  
 Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)



Where is the map unit used?  
What it is called?

What soils occur in the map unit?

**Major (named) components:**

- Setting (landform, parent material)
- Typical profile (horizons, depths, texture)
- Properties and restrictions
- Interpretive classes and groups

**Interpretive groups**

Land capability classification (irrigated): 5e  
 Land capability classification (nonirrigated): 5e  
 Hydrologic Soil Group: C  
 Ecological site: Thermic Granitic Foothills 27-40 PZ (F018XI205CA)  
 Hydric soil rating: No

**Minor Components**

**Hurleton, very cobbly**

Percent of map unit: 5 percent  
 Landform: Hills  
 Landform position (two-dimensional): Shoulder  
 Landform position (three-dimensional): Crest  
 Down-slope shape: Convex  
 Across-slope shape: Convex  
 Ecological site: Thermic Granitic Foothills 27-40 PZ (F018XI205CA)  
 Hydric soil rating: No

**Aqualfs**

Percent of map unit: 2 percent  
 Landform: Hills  
 Landform position (two-dimensional): Footslope  
 Landform position (three-dimensional): Base slope  
 Down-slope shape: Concave  
 Across-slope shape: Concave  
 Ecological site: Low Gradient, Concave Depressions (R018XI111CA)  
 Hydric soil rating: Yes

**Rock outcrop, mafic plutonic**

Percent of map unit: 2 percent  
 Landform: Hills  
 Hydric soil rating: No

**Minor components: emphasize landform and ecological site differences**



# 3. EXPLORE the Data (*Suitability / Limitations*)

Intro to Soils | **Suitabilities and Limitations for Use** | Soil Properties and Qualities | Ecological Site Assessment | Soil Reports

Search: Enter keywords [ ] Clear Search

**Suitabilities and Limitations Ratings**

- Building Site Development
- Construction Materials
- Disaster Recovery Planning
- California Revised Storie Index (CA)**

View Options: Map [x], Table [x], Description of Rating [x], Rating Options [x]

Advanced Options: View Description, View Rating

Map - California Revised Storie Index (CA)

Scale: 1:44,300 ± 1 %

Printable Version | Add to Shopping Cart

**Add to Shopping Cart (free!) adds current rating to your custom report**

The Revised Storie Index assesses the productivity of a soil from the following four characteristics:

- Factor A: degree of soil profile development
- Factor B: texture of the surface layer
- Factor C: steepness of slope
- Factor X: drainage class, landform, erosion class, flooding and ponding frequency and duration, soil pH, soluble salt content as measured by electrical conductivity, and sodium adsorption ratio

Revised Storie Index numerical ratings have been combined into six classes as follows:

- Grade 1: Excellent (81 to 100)
- Grade 2: Good (61 to 80)
- Grade 3: Fair (41 to 60)
- Grade 4: Poor (21 to 40)
- Grade 5: Very poor (11 to 20)
- Grade 6: Nonagricultural (10 or less)

## EXAMPLE 1. VIEWING A RATING - California (Revised) Storie Index

**View Rating** colors polygons with rating classes

**View Description** describes the factors considered in the rating

# 3. EXPLORE the Data (*Suitability / Limitations*)

Tables — California Revised Storie Index (CA) — Summary By Map Unit

| Summary by Map Unit — Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties (CA630) |  |                           |  |              |                |
|---|--|---------------------------|--|--------------|----------------|
| Summary by Map Unit — Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties (CA630) |  |                           |  |              |                |
| Map unit symbol   | Map unit name  | Rating                    | Component name (percent)                     | Acres in AOI | Percent of AOI |
| 3020  | Iron Mountain-Rock outcrop complex, 3 to 15 percent slopes                         | Grade 5 - Very Poor       | Iron Mountain (75%)                          | 5.7          | 0.0%           |
| 3021  | Iron Mountain-Crozier-Rock outcrop complex, 15 to 60 percent slopes                | Grade 6 - Nonagricultural | Iron Mountain (40%)                          | 34.4         | 0.2%           |
| 6070  | Sierra-Verjeles-Aquic Haploxeralfs complex, 0 to 8 percent slopes                  | Grade 3 - Fair            | Verjeles (36%)<br>Aquic Haploxeralfs (15%)   | 2,728.4      | 14.7%          |
| 6071  | Sierra-Flanly complex, 3 to 15 percent slopes                                      | Grade 3 - Fair            | Flanly (40%)<br>Hurleton (10%)               | 438.2        | 2.4%           |
| 6074  | Sierra-Orose complex, 8 to 30 percent slopes                                       | Grade 2 - Good            | Sierra (70%)                                 | 4,796.7      | 25.8%          |
| 6075  | Sierra-Flanly complex, 30 to 60 percent slopes                                     | Grade 3 - Fair            | Sierra (50%)<br>Flanly (30%)                 | 1,194.5      | 6.4%           |
| 6076  | Auberry-Hurleton-Rock outcrop complex, 20 to 60 percent slopes                     | Grade 3 - Fair            | Auberry (45%)                                | 902.2        | 4.8%           |
| 6202  | Musick-Ultic Haploxeralfs, moderately well drained, complex, 1 to 8 percent slopes | Grade 1 - Excellent       | Musick (60%)                                 | 202.6        | 1.1%           |
| 6205  | Musick fine sandy loam, 3 to 8 percent slopes                                      | Grade 1 - Excellent       | Musick (88%)<br>Wukusick (5%)                | 116.2        | 0.6%           |
| 6206  | Musick-Hotaw complex, 8 to 30 percent slopes                                       | Grade 2 - Good            | Musick (64%)<br>Wukusick (5%)                | 1,569.2      | 8.4%           |
| 6207  | Musick-Hotaw-Chawanakee complex, 30 to 60 percent slopes                           | Grade 3 - Fair            | Musick (55%)<br>Hotaw (20%)<br>Wukusick (5%) | 964.0        | 5.2%           |

**Storie Grade: lower grade is “better” (more suited to irrigated ag.)**

**Grades 5 and 6:**  
Very shallow soils on wide range of slopes

**Grade 3:**  
Moderately deep soils on low slopes (<15%)

**Grades 2 and 3:**  
Deep or moderately deep soils (on steeper slopes)

**Grade 1:**  
Very deep soils on low slopes

**EXAMPLE 1. VIEWING A RATING - California (Revised) Storie Index**





# 3. EXPLORE the Data (Soil Properties)

**Properties and Qualities Ratings** Open All Close All ?

**Soil Chemical Properties** ? ⌵

- Calcium Carbonate (CaCO<sub>3</sub>) ⌵
- Cation-Exchange Capacity (CEC-7) ⌵
- Effective Cation-Exchange Capacity (ECEC) ⌵
- Electrical Conductivity (EC) ⌵
- Gypsum ⌵
- pH (1 to 1 Water)** ⌵

View Description View Rating

**View Options** ? ⌵

**Advanced Options** ? ⌵

View Description View Rating

- Sodium Adsorption Ratio (SAR) ⌵
- Soil Erosion Factors ? ⌵
- Soil Health Properties ? ⌵
- Soil Physical Properties ? ⌵
- Soil Qualities and Features ? ⌵
- Water Features ? ⌵

Using Advanced Options, you can change the way ratings are generated for Map Units that have *several soil components*

**Advanced Options** ? ⌵

Aggregation Method ? ⌵

- Dominant Condition**
- Dominant Component
- Weighted Average
- Minimum or Maximum

Component Percent Cutoff

Tie-break Rule

Lower

Higher

Interpret Nulls as Zero

Yes

No

Layer Options (Horizon Aggregation Method)

Surface Layer (Not applicable)

Depth Range (Weighted Average)

Top Depth

Bottom Depth

Inches

Centimeters

All Layers (Weighted Average)

View Description View Rating

## COMPONENT AGGREGATION METHODS

- Dominant Condition: apply rating to all components; add percentages in each rating class; returns rating for **most prevalent rating class**
- Dominant Component: returns rating of **component with highest percentage**
- Weighted-average: apply rating to all components; returns the **component-percentage-weighted-average rating**
- Minimum or Maximum: apply rating to all components; returns the **most/least limiting/suitable rating**

### EXAMPLE 2. ADVANCED COMPONENT AGGREGATION



# 3. EXPLORE the Data (Soil Properties)



**Properties and Qualities Ratings**

Open All Close All

**Soil Chemical Properties**

- Calcium Carbonate (CaCO<sub>3</sub>)
- Cation-Exchange Capacity (CEC-7)
- Effective Cation-Exchange Capacity (ECEC)
- Electrical Conductivity (EC)
- Gypsum
- pH (1 to 1 Water)**

View Description View Rating

**View Options**

**Advanced Options**

View Description View Rating

- Sodium Adsorption Ratio (SAR)
- Soil Erosion Factors
- Soil Health Properties
- Soil Physical Properties
- Soil Qualities and Features
- Water Features

Also, in Advanced Options you can set rules for excluding data/components, as well as averaging horizon data (across depth) within components

**Advanced Options**

Aggregation Method: Dominant Component

Component Percent Cutoff: [ ]

Tie-break Rule:  Lower  Higher

Interpret Nulls as Zero:  Yes  No

Layer Options (Horizon Aggregation Method):  Surface Layer (Not applicable)  Depth Range (Weighted Average)

Top Depth: [ ]  
Bottom Depth: [ ]

Inches  Centimeters

All Layers (Weighted Average)

View Description View Rating

## ADVANCED OPTIONS

- Component Percent Cutoff: ignore all components with percentage less than this number
- Tie-break Rule: In case of a tie when determining dominance, return the lower or higher rating?
- Interpret Nulls as Zero: Fill in empty values with zero? (be careful)

## HORIZON AGGREGATION

- Surface layer: only use surface horizon?
- All Layers: rate by depth-weighted-average of all layers in each component
- Depth range: Calculate depth-weighted average of the layers in range specified

**EXAMPLE 2 (continued). ADVANCED HORIZON AGGREGATION**





# 3. EXPLORE the Data (Soil Properties)

**pH (1 to 1 Water)**

View Description View Rating ?

View Options ?

Advanced Options ?

Aggregation Method: Minimum or Maximum

Component Percent Cutoff: 15

Tie-break Rule:  Lower  Higher

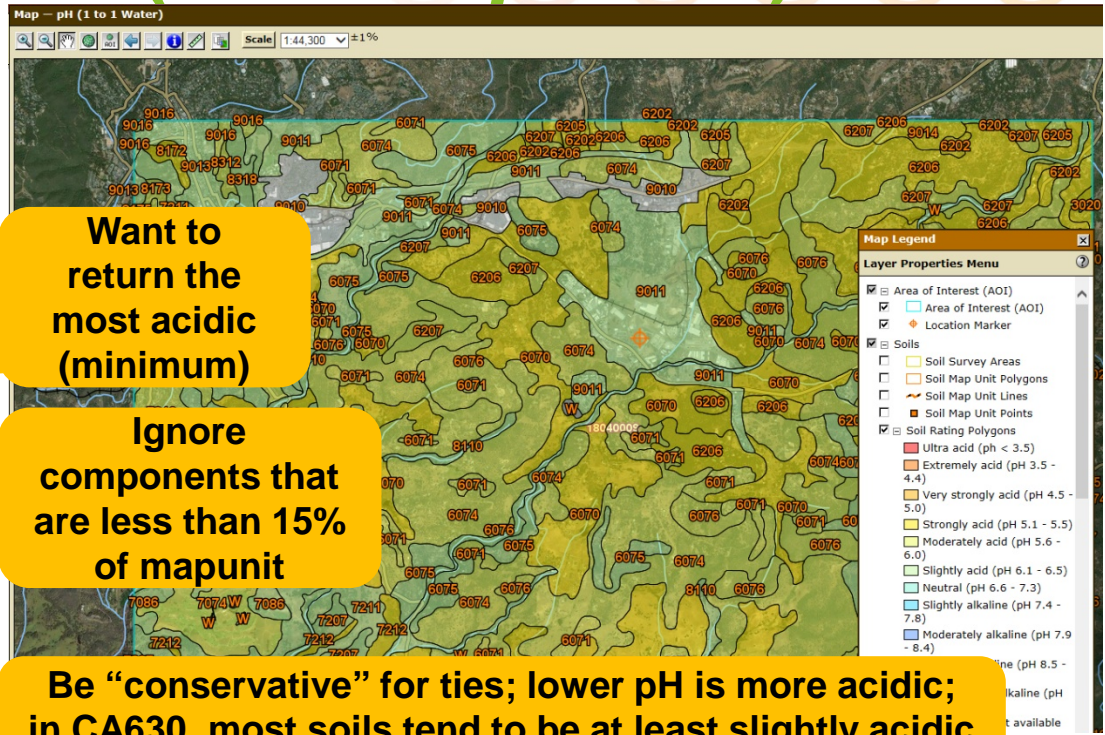
Interpret Nulls as Zero:  Yes  No

Layer Options (Horizon Aggregation Method):  Surface Layer (Not applicable)  Depth Range (Weighted Average)

Top Depth: 0  
Bottom Depth: 10

Inches  Centimeters

All Layers (Weighted Average)



Want to return the most acidic (minimum)

Ignore components that are less than 15% of mapunit

Be "conservative" for ties; lower pH is more acidic; in CA630, most soils tend to be at least slightly acidic and the lower values will generally be "more limiting"

Calculate the depth weighted-average pH for each component for soil layers within 0-10cm depth interval

**EXAMPLE 2 (continued). pH 1:1 water 0-10cm rating**

**GOAL:** Show the "most limiting" soil pH in upper 10 cm (4 inches)



# 3. EXPLORE the Data (Soil Data Explorer)

The interface features a top navigation bar with five tabs: **Intro to Soils**, **Suitabilities and Limitations for Use**, **Soil Properties and Qualities**, **Ecological Site Assessment**, and **Soil Reports**. Below the navigation bar are three main content panels:

- Table of Contents:** A tree view of topics including All Uses, Introduction to Soils, Cropland, Forestland, Pastureland and Hayland, Horticulture, and Nutrient Management.
- Ecological Sites:** A panel for viewing ecological site information, including options for site maps and site types (e.g., Rangeland).
- Soil Reports:** A list of report categories such as AOI Inventory, Disaster Recovery Planning, Land Classifications, and Soil Chemical Properties.

In addition to suitability/limitation/property ratings, the Soil Data Explorer tab allows you to review basic soil science definitions and Ecological Site information.

Also, you can generate independent Soil Reports to summarize various classifications, interpretations and soil properties in a tabular format.





# 4. CHECK OUT (make custom resource report)

**Report Properties**

**Title**  
 Title: Custom Soil Resource Report for Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties

**Subtitle**  
 Area of Interest Name: (none defined)  
 Custom Subtitle:  
  
 None

**Map Options**  
 Map Scale:   
 Printed Sheet Size:   
 Show UTM Coordinate Ticks:

**Table of Contents**

- Custom Soil Resource Report for Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties: Sonora, CA Area
  - Cover
  - Preface
  - Contents
  - How Soil Surveys Are Made
  - Soil Map
    - Soil Map
    - Map Unit Legend
    - Map Unit Description
  - Soil Data Explorer
  - All Uses
    - Suitabilities and Limitations for Use
      - Land Classifications
        - California Revised Storie Index (CA): Sonora, CA Area
    - Soil Properties and Qualities
      - Soil Chemical Properties
        - pH (1 to 1 Water): Sonora, CA Area
  - Soil Reports
    - Land Management
      - Damage by Fire and Seedling Mortality on Forestland: Sonora, CA

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

## Custom Soil Resource Report for Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties

Sonora, CA Area

**3. Check Out (top right corner of WSS window)!**

**4. View or print PDF output**

**1. Set report subtitle and output size**

**2. Check Table of Contents (note items added under Soil Data Explorer section)**



# Optional: Skipping the AOI



Area of Interest (AOI) | Soil Map | Soil Data Explorer | **Download Soils Data** | Shopping Cart (Free)

Download Soils Data for...  
Your AOI (SSURGO)  
**Soil Survey Area (SSURGO)**

**General Information**  
 Link: [Description of Soil Survey Geographic \(SSURGO\) Database](#)  
 Download Contents: Tabular data, spatial data (if available), template database (if selected), and FGDC metadata  
 Spatial Data Format: ESRI Shapefile, Geographic WGS84

**Options**  
 State:   
 County (optional):   
 Only show Soil Survey Areas updated since...     
 Sort by...   
 Include Template Database

**Soil Survey Area (SSURGO) Download Links**

| Name  | Area Symbol | Data Availability             | Version  | Template Database                     | Download Size | Download Link   |
|---|-------------|-------------------------------|--|---------------------------------------|---------------|---|
| Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties | CA630       | Tabular and Spatial, complete | Survey Area: Version 3, Sep 17, 2018<br>Tabular: Version 3, Sep 17, 2018<br>Spatial: Version 2, Sep 14, 2018   | soildb_US_2003 Access 2003 Version 36 | 30.0 MB       | <a href="#">wss_SSA_CA630_soildb_US_2003_[2018-09-17].zip</a> |
| Stanislaus National Forest, California, Parts                                       | CA731       | Tabular and Spatial, complete | Survey Area: Version 11, Sep 12, 2018<br>Tabular: Version 11, Sep 12, 2018<br>Spatial: Version 4, Sep 12, 2018 | soildb_US_2003 Access 2003 Version 36 | 36.0 MB       | <a href="#">wss_SSA_CA731_soildb_US_2003_[2018-09-12].zip</a> |
| Yosemite National Park, California  | CA790       | Tabular and Spatial, complete | Survey Area: Version 10, Sep 13, 2018<br>Tabular: Version 9, Sep 13, 2018                                      | soildb_US_2003 Access 2003 Version 36 | 18.5 MB       | <a href="#">wss_SSA_CA790_soildb_US_2003_[2018-09-13].zip</a> |

**For GIS/external use -- directly download SSURGO data in .ZIP format via 'Download Soils Data' tab**

- No need to specify AOI
- Search soil surveys by State/County
- Tabular data delivered as MS Access database
- Spatial layers delivered as shapefile

