

# An iPhone Application for on Demand Access to Digital Soil Survey Information

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## SoilWeb for the iPhone By CA Soil Resource Lab

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Open iTunes to buy and download apps.



### Description

GPS based, real-time access to USDA-NRCS soil survey data, formatted for the iPhone. This application retrieves graphical summaries of soil types associated with the iPhone's current geographic location, based on a user defined horizontal precision. Sketches of soil profiles are linked to their official soil series description (OSD) page.

[CA Soil Resource Lab Web Site](#) > [SoilWeb for the iPhone Support](#) >

[...More](#)

### What's New in Version 1.2

New interface, online help, and calibrated GPS accuracy threshold.



## SoilWeb Application and API

- CA Soil Resource Lab
- project motivation
- application demo
- SoilWeb API

## Future Directions

- closer ties with agencies?
- new applications (ESD, PLANTS, etc.)

“How can we make soil survey more accessible, interpretable, and appreciated?”

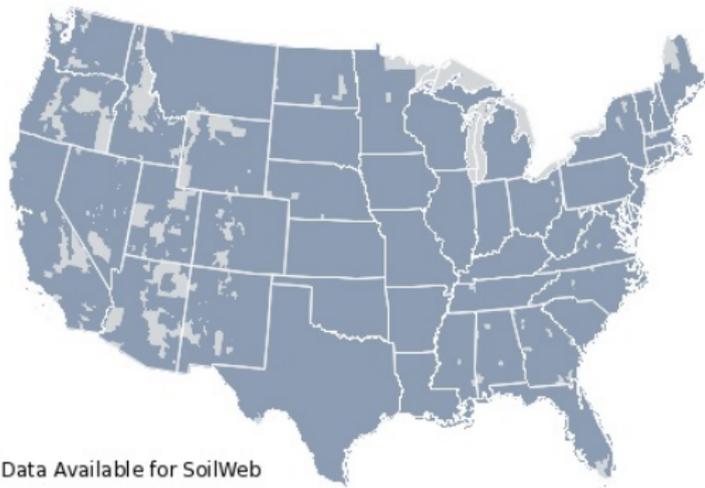
Our online soil survey can be used to access NRCS-NCSS 1:24,000 scale detailed soil survey data (SSURGO) in many parts of the lower 48 states. Where this data is not yet available, 1:250,000 scale generalized soils data (STATSGO) can be accessed instead (AZ, CA, NV only). An interactive map interface allows for panning and zooming, with highways, streets, and aerial photos to assist navigation (Figure 1). Soil polygons become visible near a scale of 1:30,000. Alternatively, a GPS point, CA Zip code, or a street address can be used to zoom in on a specific location. General usage notes and information on how our online soil survey work can be found [here](#). Statistics on who is using our online soil survey can be found [here](#). Technical details on SoilWeb can be found in this [publication](#).



SSURGO Map  
Units



STATSGO Map Units



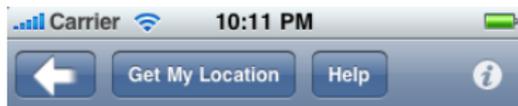
Select an Interface to SoilWeb

# Project Motivation



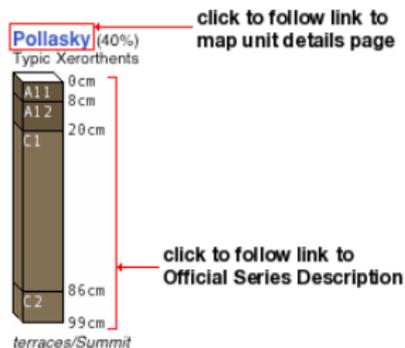
- paper surveys → invaluable resource, widely used... but now out of print
- digital surveys → excellent for analysis... but requires GIS / DB skills
- online interfaces → fill an important gap... but could be better
- GPS enabled mobile phone → **bring digital soils information to the field**

# General Usage: Getting Started



## Instructions:

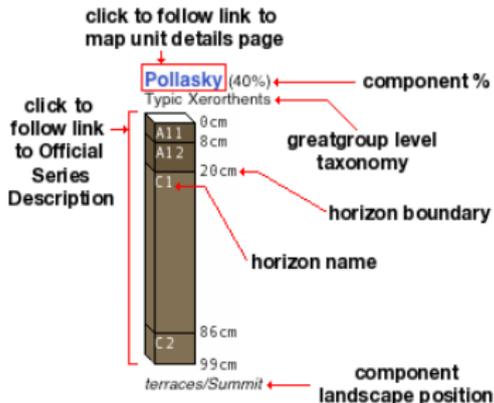
1. click "get my location" to enable GPS
2. if sufficient accuracy is not attained by the GPS, adjust accuracy threshold slider on back page
3. once soils information is returned, click one of the two links associated with soil profile images
4. click the "back arrow" button to return to this screen at any time



Accuracy Thresh: 146 m

GPS stopped

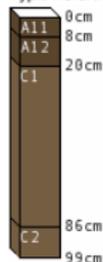
## Application starts with online help



# General Usage: Soils Data Requested and Returned

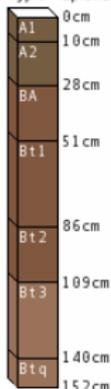


**Pollasky (40%)**  
Typic Xerothents



*Pollasky-Montpellier complex, 9 to 15 percent slopes erosion remnants terraces / Summit*

**Montpellier (40%)**  
Typic Haploxeralfs



*Pollasky-Montpellier complex, 9 to 15 percent slopes terraces / Summit erosion remnants / Backslope*

## From Coordinates to Soils Information

- 1 coordinates sent to CA Soil Resource Server
- 2 spatial intersection performed on SSURGO
- 3 if soils data are present at queried location, return graphical summary
- 4 else, return error message + link to details
- 5 status display + phone vibration notifies successful request
- 6 results are clickable

# General Usage: Digging Deeper

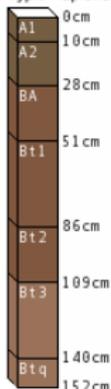


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Typic Xerothents



*Pollasky-Montpellier complex, 9 to 15 percent slopes erosion remnants terraces / Summit*

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*Pollasky-Montpellier complex, 9 to 15 percent slopes terraces / Summit erosion remnants / Backslope*

## User Interaction

- clicks on profile re-direct to associated OSD
- clicks on soil series name re-direct to CA Soil Resource website
- text and content automatically re-sized for iPhone screen geometry
- pages are scrollable with hand gestures

# General Usage: Digging Deeper



LOCATION POLLASKY

CA

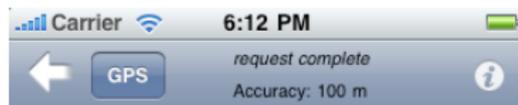
Established Series  
GLH/RCH  
05/2006

## POLLASKY SERIES

The Pollasky series consists of moderately deep, well drained, moderately coarse textured Regosols formed in the residuum from softly to moderately consolidated arkosic sediments. They occur on undulating to steep dissected terraces under annual grasses and forbs. They have brown, slightly acid sandy loam A horizons and pale brown to yellowish brown, slightly acid to neutral, sandy loam C horizons abruptly overlying consolidated granitic

Accuracy: 100 m

request complete



### Soil Taxonomy

Order:	<i>Entisols</i>	
Suborder:	<i>Orthents</i> [ <a href="#">Map of Suborders</a> ]	
Greatgroup:	<i>Xerorthents</i>	
Subgroup:	<i>Typic Xerorthents</i>	
Family:	<i>Coarse-loamy, mixed, nonacid, Xerorthents</i>	
Soil Series:	<i>Pollasky</i> ( <a href="#">Link to OSD</a> ) (L	
Phase:	<i>Pollasky-Montpellier complex, 9 slopes</i>	
Data:	<a href="#">[Lab Data]</a>	<a href="#">[Nitrate Groundwater P</a>
Raw Data	<a href="#">Component</a>	<a href="#">All Horizons</a>

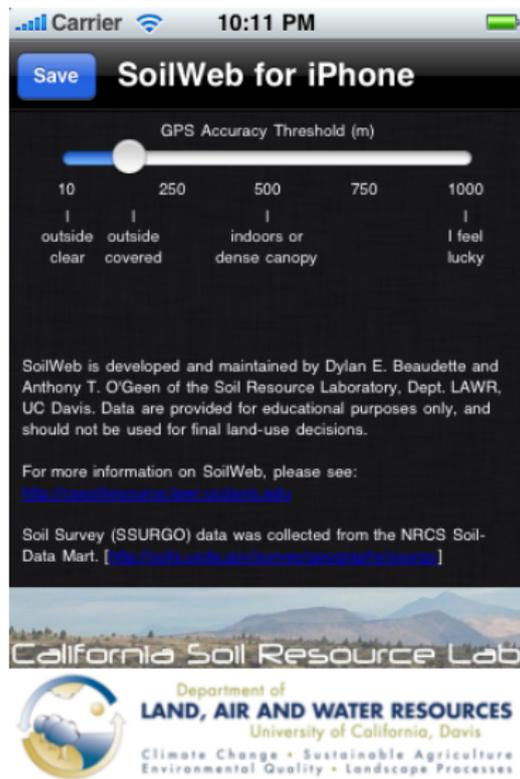
### Land Classification

<a href="#">Storie Index</a>	5:
<a href="#">Land Capability Class [non-irrigated]</a>	4-
<a href="#">Land Capability Class [irrigated]</a>	4-
<a href="#">Ecological Site Description</a>	G

### Soil Suitability Ratings

<a href="#">Waste Related</a>	Ei
<a href="#">Urban/Recreational</a>	

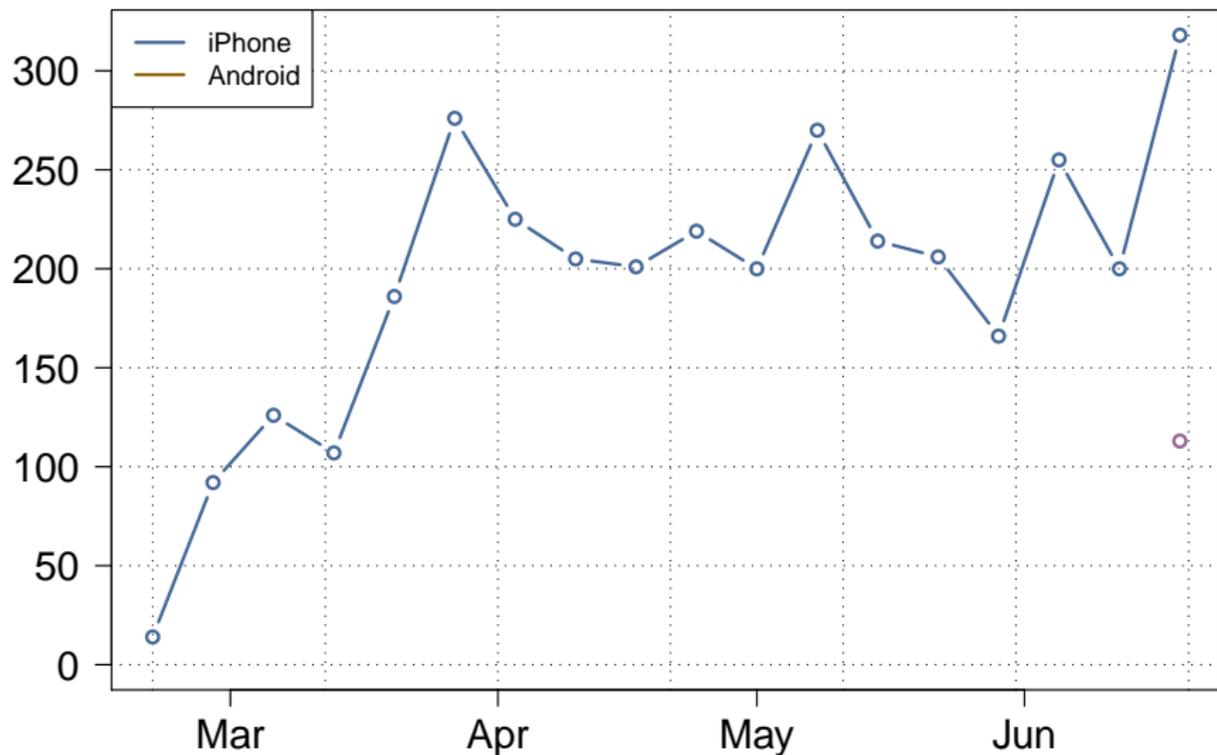
# General Usage: Application Settings



## GPS Accuracy Threshold / App Credits

- threshold determines acceptable level of accuracy
- trade-off between accuracy / time required for fix
- scale is calibrated with common usage patterns
- threshold is saved for next time application is used
- links in credits are clickable

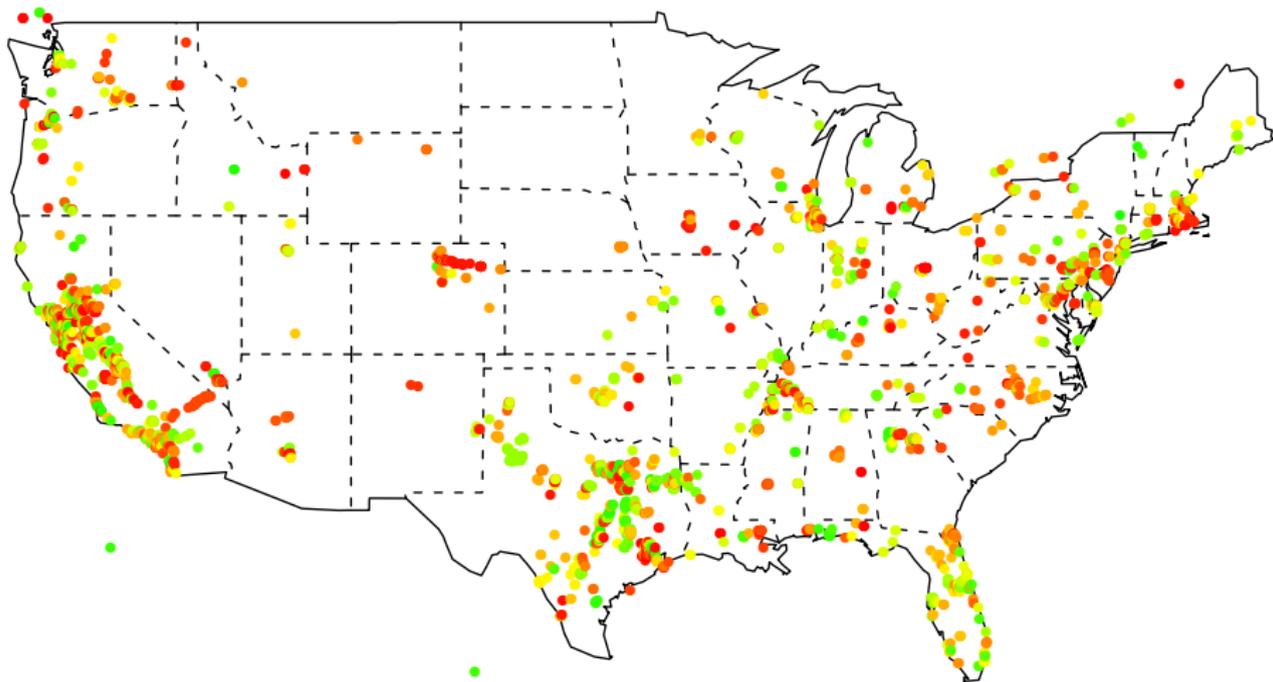
# SoilWeb App Popularity: Unique Queries per Week



700+ iPhone users [March-June] / 84 Android users [last 2 weeks]

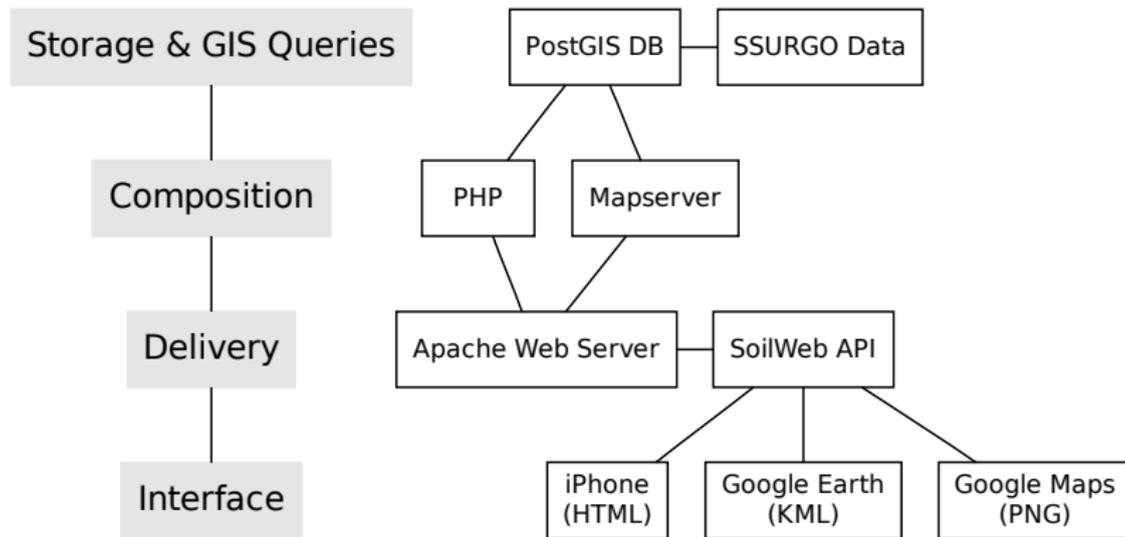
# SoilWeb App Usage Patterns (a map for that)

(possibly no people/soil/iPhones in SD & ND)



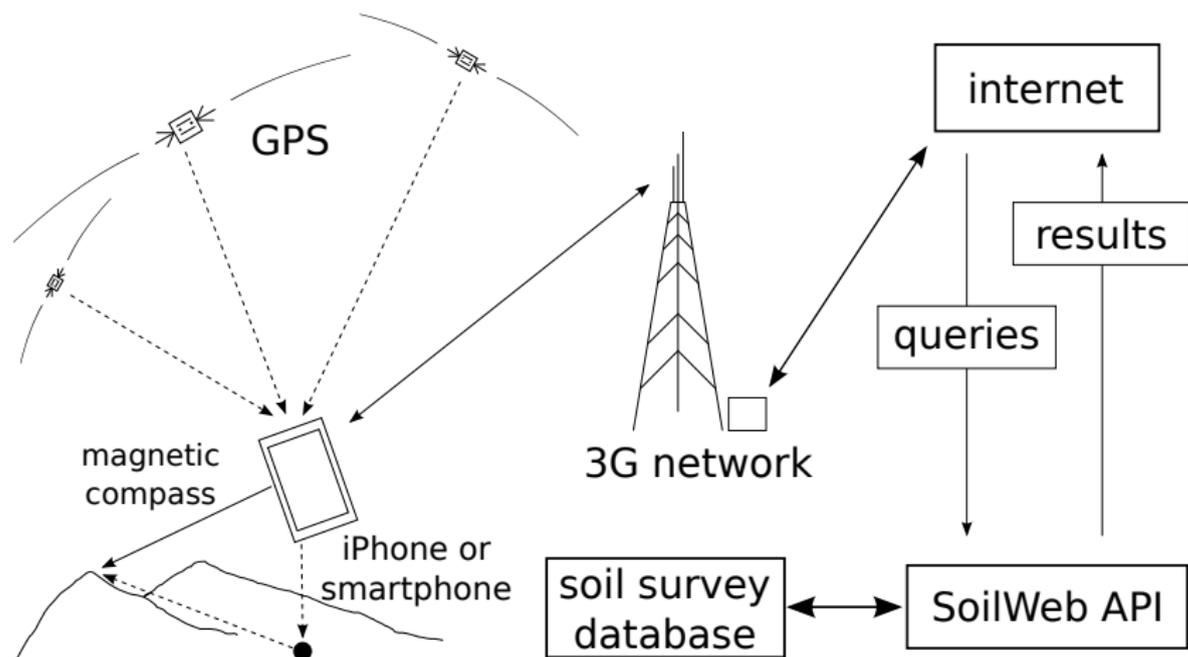
green symbols are "older"; red more recent

# SoilWeb API: Implementation



- an “Application Programming Interface” for soils information
- simple URL-based query mechanism
- results returned as HTML, PNG, XML, KML, etc.

# SoilWeb API: Generalized for GPS-enabled Smartphones



# SoilWeb API: Examples

## WMS/WFS/KML Queries: images, geometry, KML returned for BBOX

- → <http://casoilresource.lawr.ucdavis.edu/cgi-bin/mapserv?> ...
- supports custom web-based or GIS applications
- supports Google Maps interface to STATSGO/SSURGO
- supports Google Earth interface to STATSGO/SSURGO

## Text Queries: HTML, XML, etc. returned for coordinate or BBOX

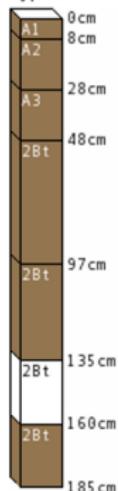
- → [http://\[...\].soils.php?what=mapunit&lon=-122&lat=37](http://[...].soils.php?what=mapunit&lon=-122&lat=37)
- → [http://\[...\].soils.php?what=mapunit&bbox=-120,37,-119.99,37.01](http://[...].soils.php?what=mapunit&bbox=-120,37,-119.99,37.01)
- → [http://\[...\].soils.php?what=soil\\_series\\_query&q\\_string=yolo](http://[...].soils.php?what=soil_series_query&q_string=yolo)
- supports dynamic legends for Google Maps application

## Specialized Queries: soil profile images returned for coordinate or BBOX

- → [http://\[...\].list\\_components.php?mukey=461573](http://[...].list_components.php?mukey=461573)
- → [http://\[...\].list\\_components.php?lon=-122&lat=37](http://[...].list_components.php?lon=-122&lat=37)
- supports iPhone and Android mobile interfaces to SSURGO

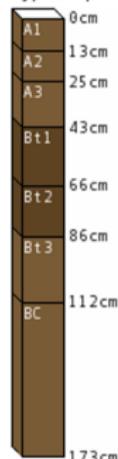
# SoilWeb API: Soil Profile Visualization

**Hillgate (90%)**  
Typic Palexeralfs



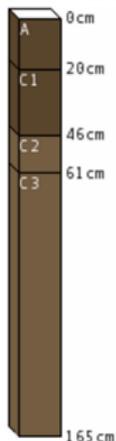
*Hillgate loam, 1 to 5 percent slopes terraces / Toeslope*

**Arbuckle (5%)**  
Typic Haploxeralfs



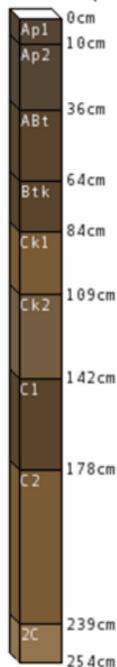
*Hillgate loam, 1 to 5 percent slopes terraces*

**Arand (2%)**  
Mollic Xerofluvents



*Hillgate loam, 1 to 5 percent slopes flood plains*

**Westfan (2%)**  
Pachic Haploxeralfs



*Hillgate loam, 1 to 5 percent slopes fans*

# SoilWeb API: Rapid Development of New Applications

Back Get My Location Help ready 10:23 PM

**Instructions:**

1. click "get my location" to enable GPS
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click to follow link to map unit details page

Pollasky (40%)  
Typic Xeroorthents

click to follow link to Official Series Description

Back Get My Location Help ready 10:24 PM

**Redding (85%)**  
Abruptic Durixeralfs

Redding gravelly loam, 2 to 8 percent slopes erosion remnants / Backslope terraces

Back Get My Location Help ready 10:25 PM

LOCATION REDDING CA

Established Series  
Rev. SBJ/DJL/DJE/MAV/AJT/SBS  
05/2006

## REDDING SERIES

The Redding series consists of moderately deep to duripan, well or moderately well drained soils that formed in alluvium derived from mixed sources. They are on nearly level or dissected and undulating to hilly high terraces. Slopes are 0 to 30 percent. The average annual precipitation is about 22 inches and the average annual temperature is about 61 degrees F.

**TAXONOMIC CLASS:** Fine, mixed, active, thermic Abruptic Durixeralfs

Preliminary version of SoilWeb for the Android developed in ~ 3 days.

# Future Directions

## Interface to WSS / NASIS / USDA Web Services

- results based on most up-to-date soils information
- \* open, documented API required [existing SOAP interface]
- \* spatial query support required [existing WFS interface]
- → faster + better up-time would be nice
- → simple URL-based interface would be nice

## New Applications

- PLANTS database application → HTTP API close to functional
- ESD application → more complete HTTP API needed
- Keys to Soil Taxonomy → XML version of 'keys needed
- national park specific applications: soils, geology, plants, ESD, trails, etc.
- integration of GPS + magnetic compass

## *Eschscholzia californica* Cham. California poppy

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Symbol: ESCA2  
Group: Dicot  
Family: Papaveraceae  
Duration: Annual  
Perennial  
Growth Habit: Forb/herb  
Native Status: L48 N  
HI I  
CAN I

Click on the image below to enlarge it and download a high-resolution JPEG file.



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Brother Alfred Brousseau. Courtesy of St. Mary's College of California. ©St. Mary's College of California. [Usage Requirements](#). Any use of copyrighted images requires notification of the copyright holder.



## **Ecological Site Information System (ESIS)**

ESIS is the NRCS repository for ecological site descriptions and for information associated with the collection of forestland and rangeland plot data. ESIS is organized into two applications and associated databases; the Ecological Site Description (ESD) application and the Ecological Site Inventory (ESI) application. This section, plus the access tab on the right, provides quick access to technical resources and technical guidance for developing and understanding ecological sites.

[...More Info](#)



## **Ecological Site Description (ESD)**

The ESD application is used to enter, edit and store ecological site information. Only approved ecological sites for forestland and rangeland are available to the public. Open this section to access approved and non-approved ESD's. Entry/Edit privileges are required to access non-approved sites. Click on MLRA/state of interest, and available ESDs within that MLRA/LRU for the state will be displayed.

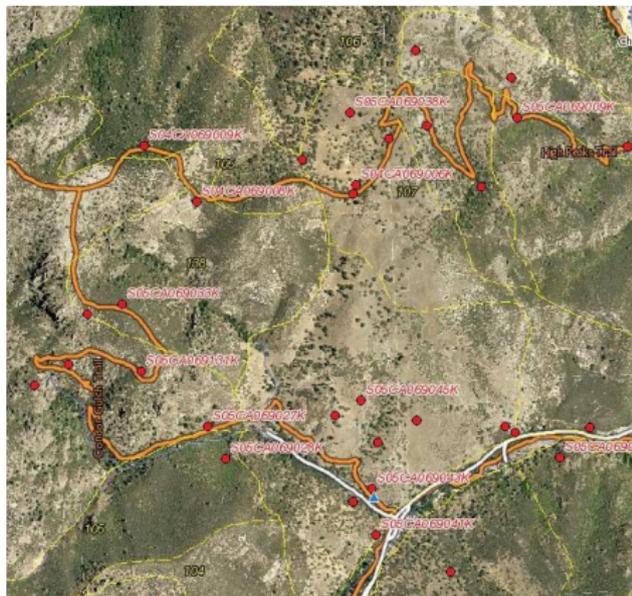
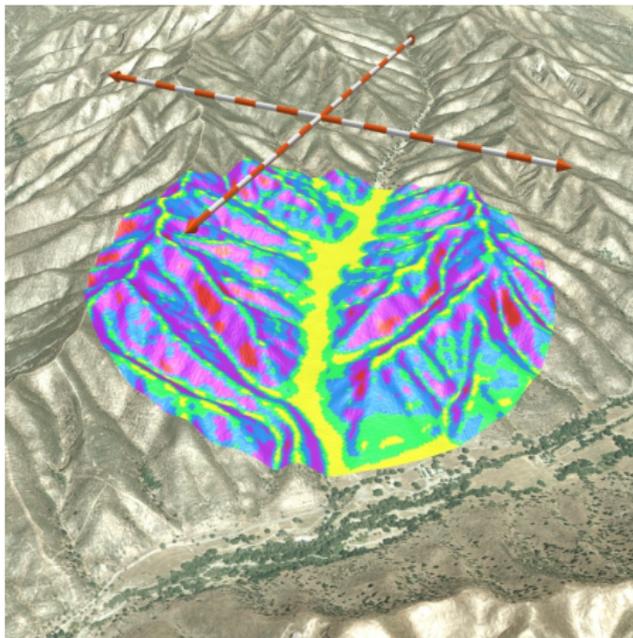
[...More Info](#)



## **Forage Suitability Group Descriptions (FSGD)**

Forage suitability group descriptions (FSGDs) are interpretive reports which provide a soil and plant science basis for conservation planning where forage crops are grown. FSGDs identify adapted forage species, yearly forage production estimates, and distribution of production during the growing season. Open this section to access approved and non-approved FSGD's. Click on MLRA/state of interest, and available FSGD's within that MLRA/LRU for the state will be displayed.

# Future Directions: Block Diagrams / National Parks





# Where to get the Application

<http://casoilresource.lawr.ucdavis.edu/>

## SoilWeb for the iPhone By CA Soil Resource Lab

[View More By This Developer](#)

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### Description

GPS based, real-time access to USDA-NRCS soil survey data, formatted for the iPhone. This application retrieves graphical summaries of soil types associated with the iPhone's current geographic location, based on a user defined horizontal precision. Sketches of soil profiles are linked to their official soil series description (OSD) page.

[CA Soil Resource Lab Web Site](#) ▶ [SoilWeb for the iPhone Support](#) ▶

...More

### What's New in Version 1.2

New interface, online help, and calibrated GPS accuracy threshold.



### Dylan Beaudette

dylan.beaudette@gmail.com

[Edit profile](#) >

### All Android Market listings



[SoilWeb](#) v1.0

Applications: Reference

(0) ☆☆☆☆☆

0 total

0 active installs (0%)

Free

[Errors](#)

✔ Published