



United States Department of Agriculture



Urban Soils Focus Team

**Natural  
Resources  
Conservation  
Service**



# Soil Survey in Greater Los Angeles

June 26, 2020 | Randy Riddle, MLRA Soil Survey Office Leader

USDA is an equal opportunity provider, employer, and lender

Natural  
Resources  
Conservation  
Service

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



# Overview

- National Cooperative Soil Survey
- Soil Surveys in Los Angeles County
- Finding Soil Survey Data
- Soils in Greater Los Angeles
- Comparison of Urban Soil Patterns
- NRCS Urban Soils Resources
- Important Links



Above: Soil survey observation in West Los Angeles, CA.

Natural  
Resources  
Conservation  
Service

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



# National Cooperative Soil Survey (NCSS)

## What is NCSS?

- a nationwide partnership of Federal, regional, State, and local agencies and private entities and institutions. This partnership works to cooperatively investigate, inventory, document, classify, interpret, disseminate, and publish information about soils.
- NRCS is the lead federal agency.



NRCS soil scientist describing Montebello soils formed in human-transported materials in Azusa, CA.

Natural  
Resources  
Conservation  
Service

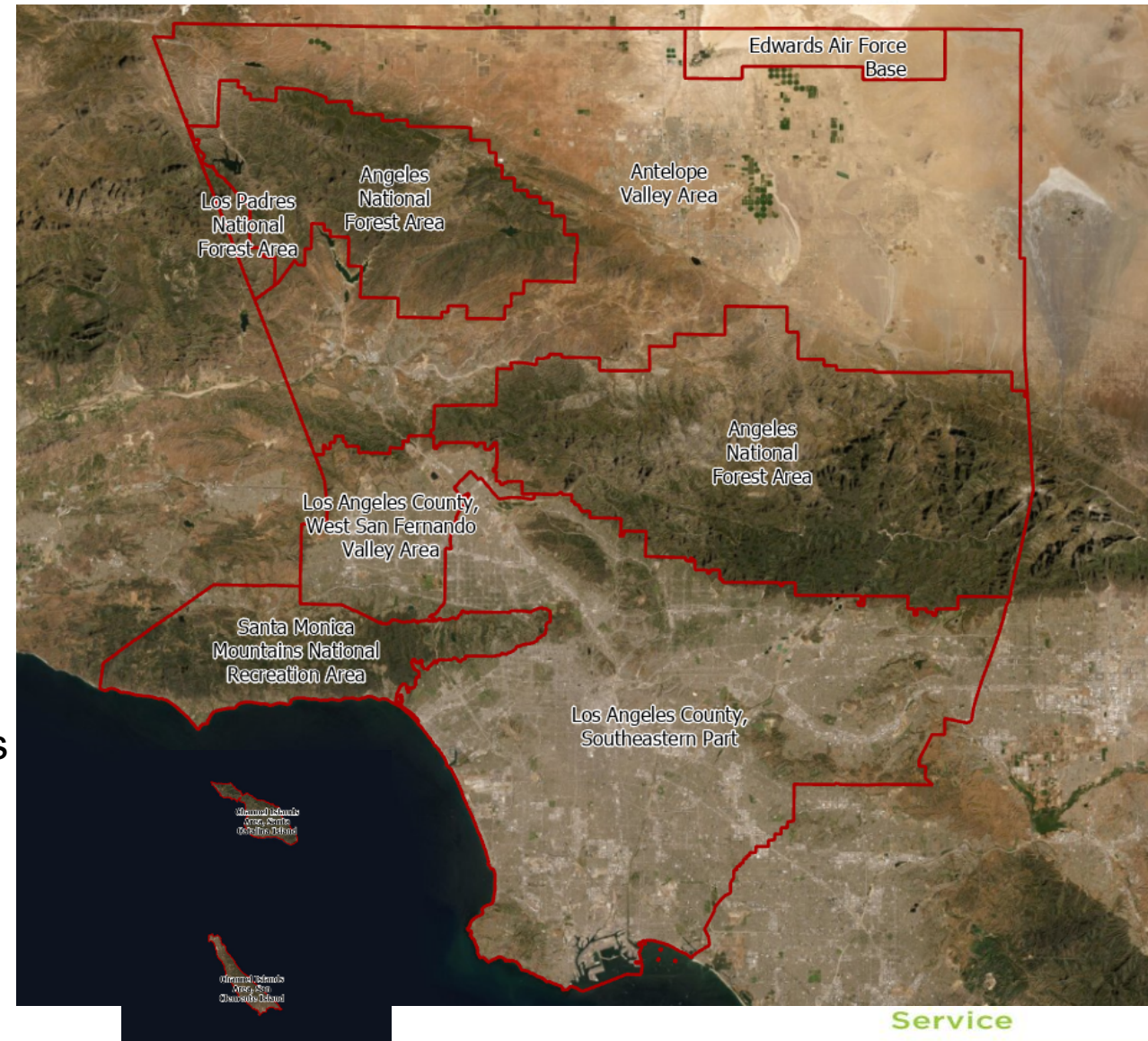
[nrcs.usda.gov/](https://nrcs.usda.gov/)





## Soil Surveys in Los Angeles County

- Los Angeles County, Southeastern Part (2016) ~ 681,695 acres
- Channel Islands Area (2008) ~ 81,226 acres
- Edwards Air Force Base (1997) ~ 47,413 acres
- Santa Monica Mountains National Recreation Area (2001) ~ 139,961 acres
- Angeles National Forest Area (1981) ~ 679,833 acres
- Los Padres National Forest Area (1981) ~ 13,211 acres
- Los Angeles County, W. San Fernando Valley Area (1975) ~ 104,896 acres
- Antelope Valley Area (1968) ~ 870,089 acres



Above: Soil survey area boundaries in Los Angeles County, CA.

Service

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

# Soil Survey Website

- URL: [soils.usda.gov](https://soils.usda.gov)
- Quick links to popular resources
  - **Web Soil Survey**
  - **SoilWeb**
  - Soil Classification (Taxonomy, OSDs)
  - Soil Lab Data
  - Focus Team – Urban Soils Team
  - Technical Resources
  - Tools
  - Fact Sheets
  - Manuscripts

Right: Soil & Plant Science  
Division Homepage

The screenshot shows the USDA Natural Resources Conservation Service Soils website. The header includes the USDA logo, the text 'Natural Resources Conservation Service Soils', and the 'United States Department of Agriculture'. Navigation links include 'About Us', 'Soil Survey Releases', 'National Centers', and 'State Websites'. A search bar is present on the right. Below the header, there are tabs for 'Topics', 'Soil Survey', 'Soil Health', and 'Contact Us'. The main content area features a large map of the United States titled 'Available Water Storage in Upper 150cm'. To the left of the map is a text box about 'gNATSGO Now Available!'. To the right is a 'Popular Topics' sidebar with links to 'Nat'l Cooperative Soil Survey', 'Soil Surveys by State', 'Soil Education', 'Soil Classification', and 'Focus Teams'. Below the map is a section titled 'Customizable Full Coverage Grids of Soil Properties and Interpretations'. The bottom section is divided into three columns: 'Soil Survey Releases' with a list of surveys from December to August, 'Helping People Understand Soils and Plants' with links to 'Web Soil Survey', 'Official Soil Series Descriptions (OSD)', 'Soil Data Access (SQL Library)', 'Soil Data Viewer', 'Soil Lab Data', and 'SoilWeb: An Online Soil Survey Browser'; and a large video player titled 'Step-by-Step How to Get Assistance' with the subtitle 'How to receive conservation assistance from NRCS'. To the right of the video player are three smaller sections: 'NCSS Training', 'PLANTS Database', and 'Ecosystem Dynamics Interpretive Tool (EDIT)'. The footer includes the 'Natural Resources Conservation Service' logo and the URL 'nrcs.usda.gov/'.





# Historical Approaches to Urban Mapping

- Early soil surveys avoided urban areas
  - Large delineations surrounding cities
  - Mostly unmapped
  - Higher cost per acre
- Some progress
  - Urban land components in complex with natural soils
  - Mapping through developed area
  - Vague Udorthents/Xerorthents/Ustorthents components
- Modern methods
  - HAHT components to series level
  - Anthropogenic landforms
  - Degree and extent of soil alteration
- Future
  - Sealed soils
  - Improved taxonomic criteria
  - Expanded use of proximal sensors
  - Consideration for trace elements and contaminants?



Soil Survey staff in Chicago, Illinois.





# Landform Mapping in the Urban Environment – Los Angeles example

- Soil lines closely follow natural landforms
- Anthropogenic boundary used for altered landforms that overtake natural landscape
- Only large impervious areas were individually delineated due to runoff potential
- Land-use criteria used as last option
- 1:24,000 scale



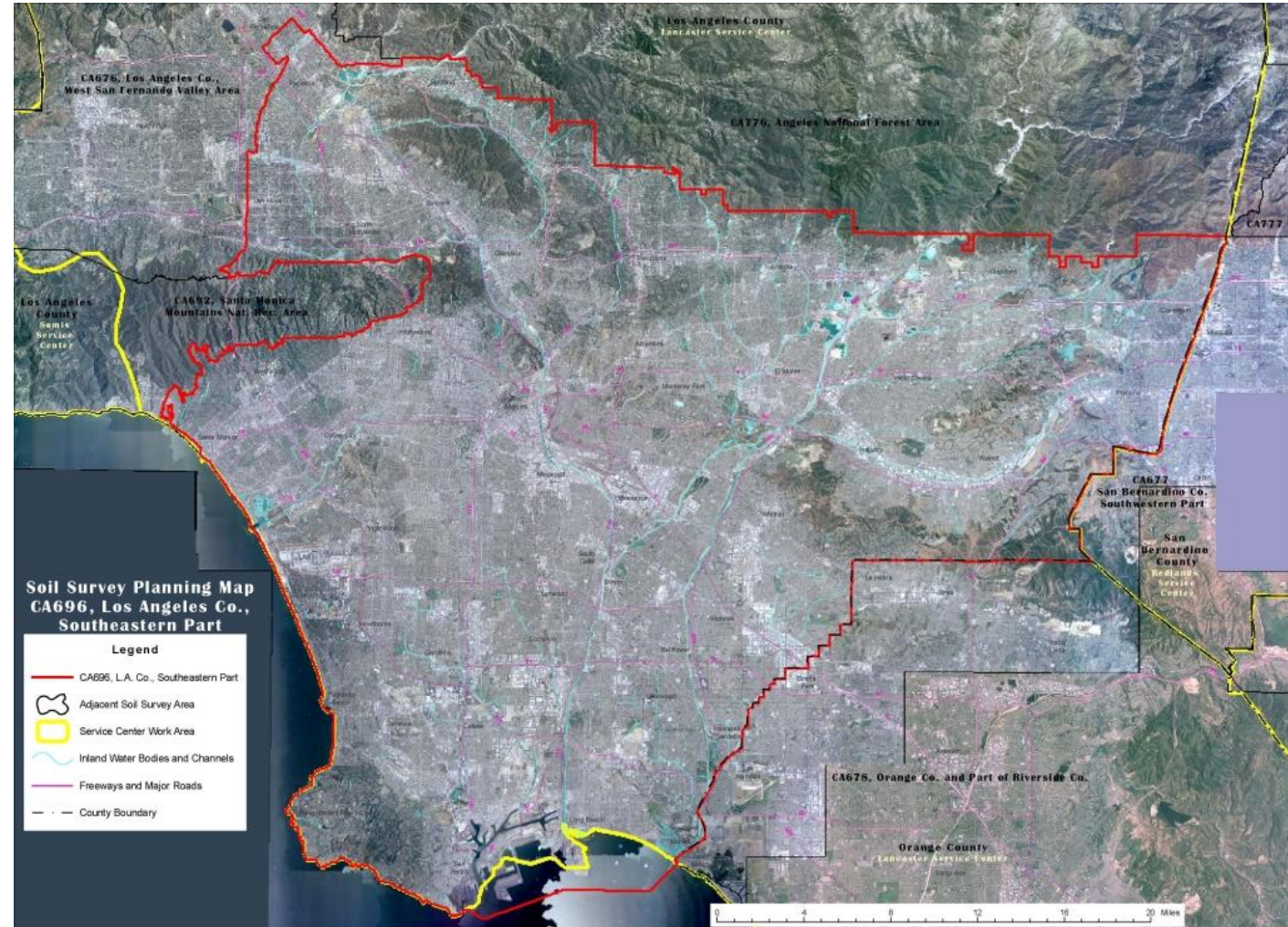
Above: Snapshot of soil linework for Soil Survey of Los Angeles County, California, Southeastern Part near downtown Los Angeles.





# Los Angeles County, SE Part Data

- 158 soil-landscape mapping units
- 185 soil components (soil types)
  - Taxonomic units
- 27 HAHT (anthropogenic) soils
  - 15 major components
  - named in map unit
- 20 soil series established
  - 5 HAHT Soil Series
- Soils were either natural, partially, or completely altered



Soil Survey Boundary of Los Angeles County, SE Part (CA696)





# Comparison of Urban Soil Patterns



## New York City - Citywide Totals

<u>Soil Type</u>	<u>% of land area</u>
Urban land (sealed soils)	62.7
*HAHT (fill) Soils	27.6
“Native” Soils	8.6
Other Misc. Areas	1.1

**\*59% spolic, 22% artifactic, 11% dredgic, 6% methanogenic, 2% combustic & ashifactic, HAHT material classes**



## Los Angeles County, SE Part - Citywide Total

<u>Soil Type</u>	<u>% of land area</u>
Urban land (sealed soils)	43
HAHT (fill) Soils	11
Surface amended soils (< 50cm alteration)	32
**“Native” Soils	12
Other Misc. Areas	2

**\*\*on natural hillsides (undeveloped areas)**



# Human Altered & Human Transported Materials (HAHT)

## Examples of HAHT soil profiles – a diversity of urban soils



**Laguardia Series**  
New York City



**Ladyliberty Series**  
New York City



**Dapplegray Series**  
Echo Park area, Los Angeles



**Arbolado Series**  
Hacienda Heights, CA





# Common Soils in Greater Los Angeles



## Windfetch Series

Thin layer of HTM over intact subsoil



## Palmview Series

Thin surface HTM over intact subsoil



## Montebello Series

Thick HTM over intact subsoil below 1 meter



## Centinela Series

Thin surface HTM over shrink-swell clays





# NRCS Urban Soils Resources

- Urban Soils Focus Team Website
  - Urban Soil Survey Story Map
  - Urban Soils Fact Sheet
  - Soil Survey Manual, Ch. 11 link
  - ArcGIS online integrated map
    - HAHT soil series extent map
    - Urban soil survey inventory map
- Soil Quality – Urban Technical Notes
  - Tech Note 1 – Erosion & Sedimentation from Construction
  - Tech Note 2 – Urban Soil Compaction
  - Tech Note 3 – Heavy Metal Soil Contamination
  - Tech Note 4 – Urban Soils in Agriculture
- Supplement Manuscripts
  - Los Angeles County, California, Southeastern Part
  - Santa Clara County, California, Western Part



**Supplement to the  
Soil Survey of  
Los Angeles County,  
California,  
Southeastern Part**

## Urban Soils Team

### Overview

The Urban Soils Team was created to address topics relevant to soils in the urban environment. Team members are experienced urban soil mappers and bring together a diverse perspective of urban soil issues from cities with various mapping needs and historical backgrounds.



### CHARGES

- Coordinate urban activities across division (procedures, equipment, safety)
- Identify training needs
- Identify needs to update standards – propose solutions
- Identify needs to update taxonomy – propose solutions
- Assemble existing data
- Identify gaps
- Work with BOA and MGT to provide guidance on priority areas

### RESOURCES

- Urban Soil Survey Story Map [↗](#)
- Urban Soils Fact Sheet (PDF; 2.28 MB)
- Soil Survey Manual – Chapter 11. Human-Altered and Human-Transported Materials

### PROJECTS

Current Projects List:



**Natural  
Resources  
Conservation  
Service**

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

**Website: [soils.usda.gov](https://soils.usda.gov)**

# Important Links & Definitions

- Soil Survey Website: **soils.usda.gov**
- Web Soil Survey: *websoilsurvey.nrcs.usda.gov*
- SoilWeb: *casoilresource.lawr.ucdavis.edu/gmap*
- Geospatial Data Gateway: *datagateway.nrcs.usda.gov*
- Urban Soils Focus Team:  
*<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/focusteam/?cid=nrcseprd1319413>*
- Soil Health: Soil Quality – Urban Technical Notes:  
*[https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/health/resource/?cid=nrcs142p2\\_053878#utn](https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/health/resource/?cid=nrcs142p2_053878#utn)*
- Datasets:
  - SSURGO: Soil Survey Geographic Database (by soils survey area)
  - gSSURGO: combined SSURGO statewide coverage or continental U.S.A. (CONUS)
  - gNATSGO: rasterized version of gSSURGO (statewide or CONUS)







Thank you for your  
attention...  
[randy.riddle@usda.gov](mailto:randy.riddle@usda.gov)

