

USDA NRCS SSURGO Query Tool

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Services / Expertise

Geospatial Application Development
Data Management & Visualization
Natural Resource Decision Support Tools
Interactive Web Mapping
Spatial Database Design & Optimization
Cloud-Based GIS Hosting (ArcGIS Enterprise)
Scientific Data Integration & Analysis
Conservation Planning & Modeling Support

Technology

Esri ArcGIS (Enterprise, ArcGIS JavaScript SDK)
PostgreSQL / PostGIS
Amazon Web Services (AWS)
Python, HTML, CSS, React

Market

Federal Government
Academic & Research Partnerships

Project Location

National (United States)
Hosted for USDA NRCS CEAP-Grazing Lands Program

Project Duration

2020–Present

Project Owner

University of Arizona

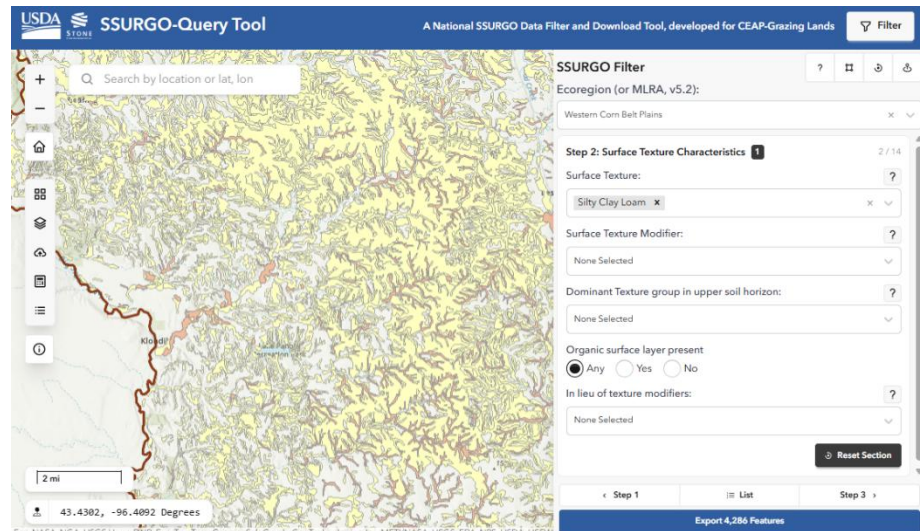
USDA Natural Resources Conservation Service (NRCS), Conservation Effects Assessment Project – Grazing Lands (CEAP-GL)

Project Team

Barbara Patterson, Project Manager
Nick Floersch
Mary Haley

Application Link

<http://www.ssurgoqt.com>



Using SSURGOQT.com to filter out the Soil Moisture Class and Surface Texture Characteristics for a MLRA.

THE USDA Natural Resources Conservation Service (NRCS) Conservation Effects Assessment Project (CEAP) evaluates the outcomes of conservation practices on working lands across the United States, including grazing lands, croplands, and wetlands. To support this work, the CEAP-Grazing Lands (CEAP-GL) team relies on the Soil Survey Geographic (SSURGO) database, a comprehensive national inventory of soils data. While SSURGO provides the information needed to support grazing lands research, ecological site development, conservation planning, and modeling efforts, its size and complexity can make it difficult to efficiently explore and identify soils relevant to specific project areas. The CEAP-GL team sought a faster, more intuitive way to search, visualize, and apply soil information across diverse landscapes nationwide.

In 2020, Stone partnered with the CEAP-GL team to develop the SSURGO Query Tool (SSURGO-QT), a web-based, map-driven application that enables users to query and visualize soil properties and characteristics at the Major Land Resource Area (MLRA) scale. The tool was designed for a broad range of users, including soil scientists, conservation planners, rangeland and pastureland specialists, agronomists, foresters, and ecological site specialists, allowing them to quickly identify and evaluate soils relevant to their work.

Working closely with Stone, the CEAP-GL team identified the soil characteristics most useful for grazing lands modeling and related conservation assessment activities. These characteristics became the foundation of the tool's query framework. Users can select from 14 soil and site physical and chemical property categories encompassing 51 nested soil properties to query all mapped soil components within a selected MLRA.



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Data is displayed at the soil map unit component level within the user-selected MLRA, providing both spatial visualization and tabular access to the underlying data. Soil map unit components are digitized by NRCS at either 1:12,000 or 1:24,000 scale, depending on the objectives and order of each soil survey. As users zoom beyond these mapping scales, ground-truthing of soil conditions is strongly recommended.

The resulting data supports several practical applications, including grouping soil components for modeling, helping NRCS planners, ranchers, and partner agencies develop conservation and monitoring plans, and supporting the development and visualization of ecological site concepts. The tool also provides a spatial and tabular framework for identifying soil characteristics that may indicate potential changes in ecological sites and for discretizing or aggregating heterogeneous landscapes for modeling purposes.

SSURGO-QT draws from the most current NRCS Soil Survey Geographic (SSURGO) database, including both SSURGO and 30-meter gSSURGO datasets. Annual updates provide refreshed soil spatial and tabular data shortly after NRCS completes its yearly data releases. Supporting map layers include Major Land Resource Areas and several Esri basemap products, providing users with additional geographic context for analysis and decision-making.

Stone developed the application using ArcGIS Web App Builder, the ArcGIS JavaScript API, ArcGIS Enterprise, Amazon Web Services (AWS), and PostgreSQL Enterprise Geodatabases. The platform was designed to efficiently query and display a national-scale soils inventory through an interactive map-based interface, enabling users to rapidly filter and visualize complex spatial and tabular soil information that would otherwise require extensive manual processing.

