SSURGO-Query Tool Application User Guide (SSURGO-QT)

Developed for NRCS CEAP-Grazing Lands

This application was developed in cooperation with Stone Environmental, Inc., under NRCS CEAP-Grazing Lands Agreements NR183A750023C002 and NR193A750007C002.

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Introduction

Welcome to the SSURGO-QueryTool application (SSURGO-QT), developed for CEAP-Grazing Lands. Intended users of this application are soil scientists or conservationists, rangeland/pastureland management specialists, agronomists, foresters, ecological site specialists, and anyone wanting to query specific soil properties or characteristics on at the MLRA (major land resource area) scale from current soil survey geographic information (SSURGO).

This online tool was designed to aid users with identification of soil/ecological site concepts, grouping landscapes for modeling purposes, to provide management-pertinent soils data for more efficient conservation planning, and to link research-scale data to soils data.

Purpose & Data Sources

This User Guide was prepared to document the 1.0 version of the SSURGO-QT application. This guide is meant to describe how the tool was developed and help users navigate the tool and its filters.

The SSURGO-QT ver. 1.0 web application makes use of the July 2020 SSURGO and 30m gSSURGO data source is available at: SSURGO-Query Tool

Supporting map layers include the Esri World Topographic Map (Sources include: Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, and the GIS User Community), Major Land Resource Areas (MLRA; Soil Survey Staff, USDA NRCS 2006).

Once you have read through this Guide, if you need more information, please send an email to: Loretta.Metz@usda.gov or wrich@stone-env.com

Background

The CEAP-Grazing Lands (CEAP-GL) team needed a spatial and tabular means of displaying soil characteristics that typically indicate potential changes in ecological sites, and to both discretize and aggregate heterogenous landscapes for modeling purposes. In the absence of an application to do this, the team partnered with Stone Environmental, Inc to provide that utility in an online, map-based application.

This query tool allows users to choose desired soil characteristics from current SSURGO and 30m gSSURGO data. CEAP-GL team members identified the most useful soil characteristics that influence vegetation and water dynamics needed for grazing land modeling and other project work. Data is displayed by MLRA, in which the user can select different soil moisture and temperature regimes, then query all soil components for specific physical and chemical characteristics (derived from specified depths or thicknesses in the profile) for all mapped components. The output soil mapunit component data will allow users to more efficiently display or create ecological site concepts, group soil components for modeling, and aid NRCS planners, ranchers and other agencies to develop conservation and monitoring plans.

Jason Nemecek, National Soil Data Application Scientist for USDA-NRCS's Soil and Plant Science Division, wrote the SQL script to extract the desired data from Soil Data Access.

Data Source Used

Detailed Soil Survey Data (SSURGO/gSSURGO)

The underlying data source for this application is derived from the July 2020 release of the USDA-NRCS SSURGO spatial and tabular data (Soil Survey Staff 2020). A custom SQL query was written to extract data fields relevant to the CEAP-GL interests for this application. The data will be refreshed annually following the official release from the USDA-NRCS, throughout the life cycle of the application. Soil properties and characteristics queried from the SSURGO dataset and displayed as filter criteria within the SSURGO-QT application are included in the list below. Note that when you download the data, there is additional tabular data provided that was not included in the filter. That additional data may be useful to the user, but the CEAP-GL team intentionally excluded it from being filterable for various reasons.

1. Soil Moisture and Temperature (class, subclass and regimes)
2. Surface Texture Characteristics
3. Surface Cover of Coarse Fragments
4. Coarse Fragments in Top Horizon
5. Soil Depth
6. Water Table
7. Hydrologic Group
8. Slope Class (percent)
9. Available Water (both capacity and storage)
10. Soil Chemistry Characteristics (Electrical Conductivity, Sodium Adsorption Ratio, Calcium Carbonate Equivalent, and Percent Gypsum, Subgroup and Great Group taxonomy for selected chemistries)
11. Restrictions (with choice of restriction kind)
12. Diagnostic Horizon or Feature
13. Ecological Site (by ID or name)
14. Soil Component (by name)

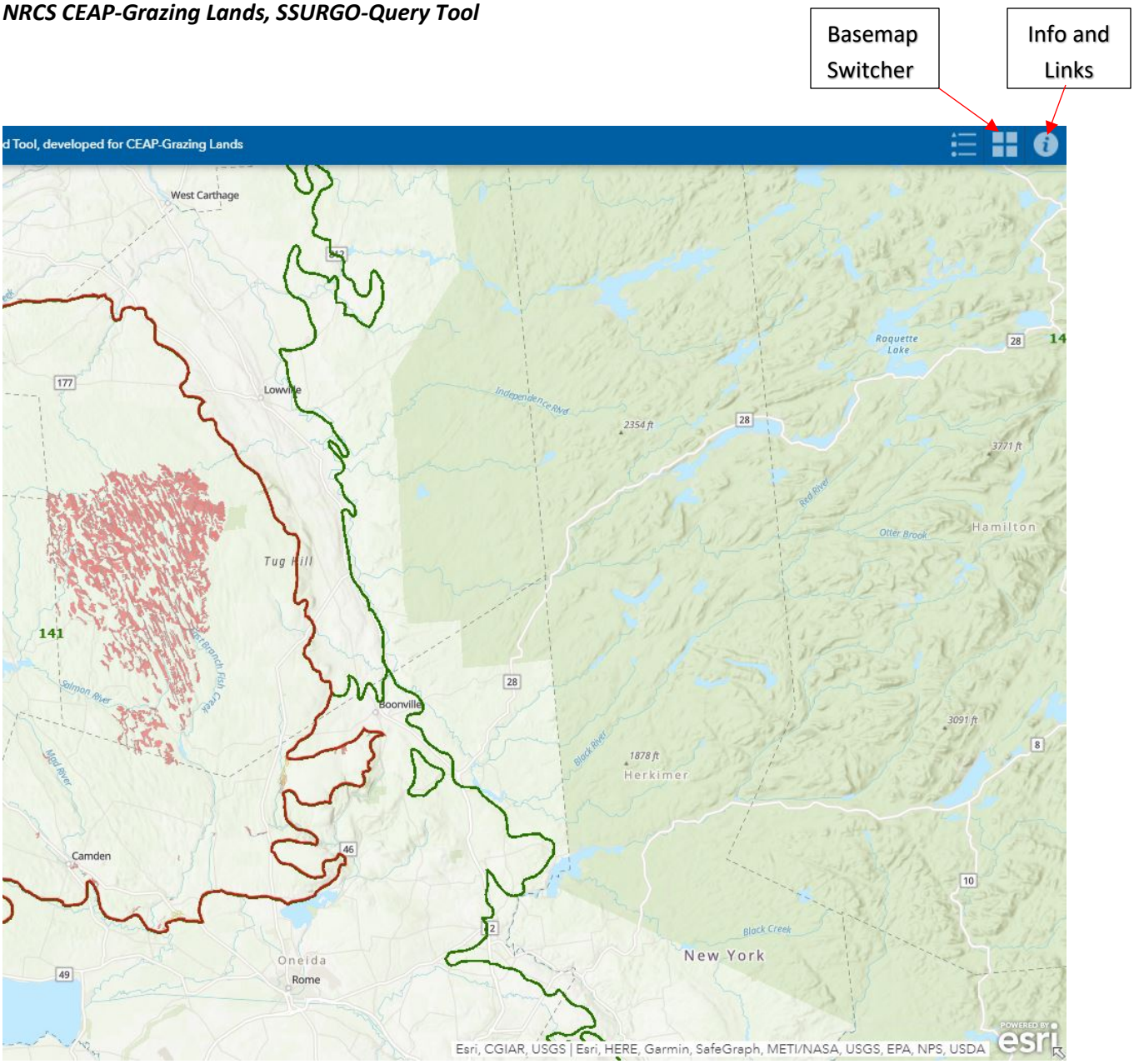
Major Land Resource Areas (MLRAs)

Major Land Resource Areas (MLRAs) as published in 2006 are provided as a reference map layer as a starting point for querying SSURGO data. The MLRA Geographic Database serves as the geospatial expression of the map products presented and described in Agricultural Handbook 296 (USDA-NRCS 2006).

Major land resource areas are geographically associated land resource units. They have unique soils, climate, water resources and land use as well as physiography, geology, and biological resources. Identification of these large areas is important in statewide agricultural planning and has value in interstate, regional, and national planning.

Base Maps

The basemap displayed in the tool is the Esri World Topographic Map, which displays a series of relevant place names, administrative boundaries, hydrologic features, road, and other standard basemap features, overlaid on a hillshade relief basemap to display relief and elevational reference. This basemap is compiled and provided directly from Esri as a hosted service, and includes data from a variety of sources. The Basemap Switcher tool is located in the upper right corner of the tool (see image below), and provides a wide array of basemaps if the user wishes to view the data with a basemap other than the World Topographic default basemap.



The Info widget (displayed in the image above) provides a brief summary of the background and purpose of the tool, as well as links to the User Guide and Questionnaire that accompany this tool. The information provided in the Info widget will also appear in the Splash Screen , which opens when you first enter the tool. Access to the User Guide and Questionnaire are provided as links within the both the Splash Screen and the Info widget.

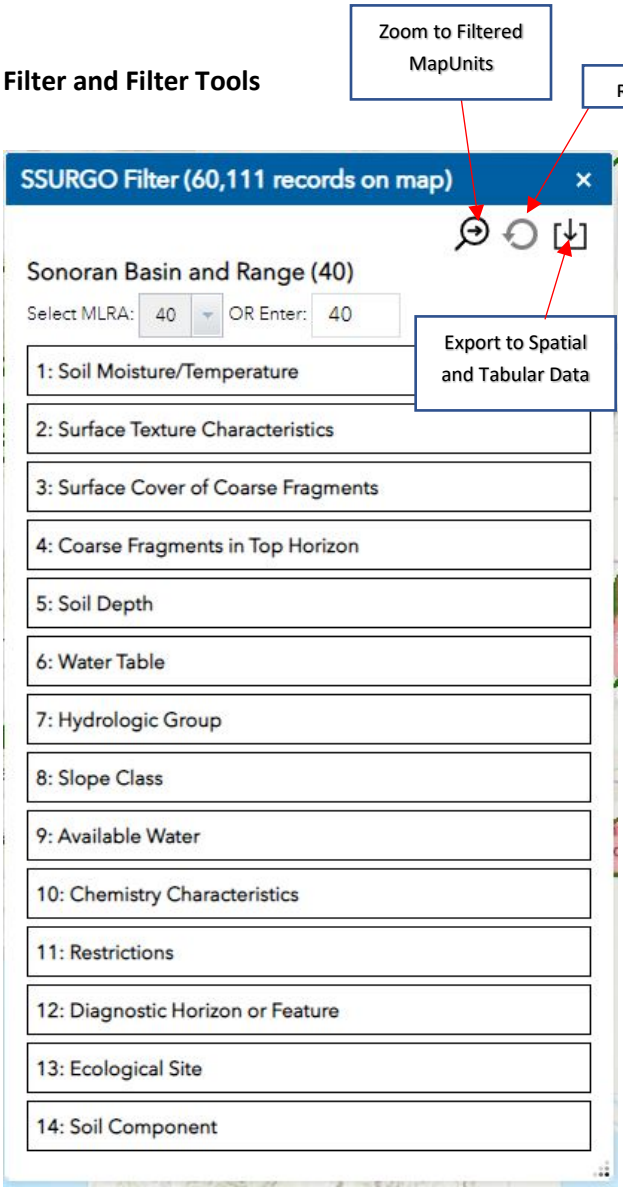
Data Quality and Considerations

A word of caution: data for minor components (typically components comprising less than 15% total acreage of a mapunit) have not consistently had 100% data quality review by NRCS, due to their lack of extensiveness and overall impact on the soil mapunit concept.

There are 31 MLRAs that have more than 1,000,000 records and therefore the data for these areas will be slow in displaying, so we remind you to please be patient. See Appendix 2 for the list of MLRAs with a large number of records.

Using the SSURGO-QT application -- *recommended browser is Chrome*

Filter and Filter Tools



This toolbar contains an assortment of tools to help the user identify areas of interest based on the soil properties included as filter choices. The primary focal point of the tool is the Filter itself. Additional tools include the Zoom to Filtered Mapunits, Reset All Filters, and Export to Spatial and Tabular functionality, which are all accessible from the Filter toolbar interface.

The Filter criteria are grouped into 14 categories, with one or more filter criteria options within each grouping. An extensive list of all the gSSURGO fields used within the filter can be found in, **Appendix 1. References and Links for Data Fields Used in Filter**, with links to associated documentation for each field.

- Expanding the specific group of interest will display the specific criteria for each grouping, which varies depending on the grouping selected (see image above).
- Clicking on the question marks on the right side of each filter criteria will display the tool-tips, including additional information and descriptions of the associated specific filter criteria.

The Export to Spatial and Tabular Data functionality will begin a download of a file geodatabase containing a feature class (similar to a shapefile) and a csv file containing only the records which are currently selected based on the Filter criteria. Note that depending on the number of records you are trying to export, this may take some time, so be please be patient when attempting to export a large set of data.

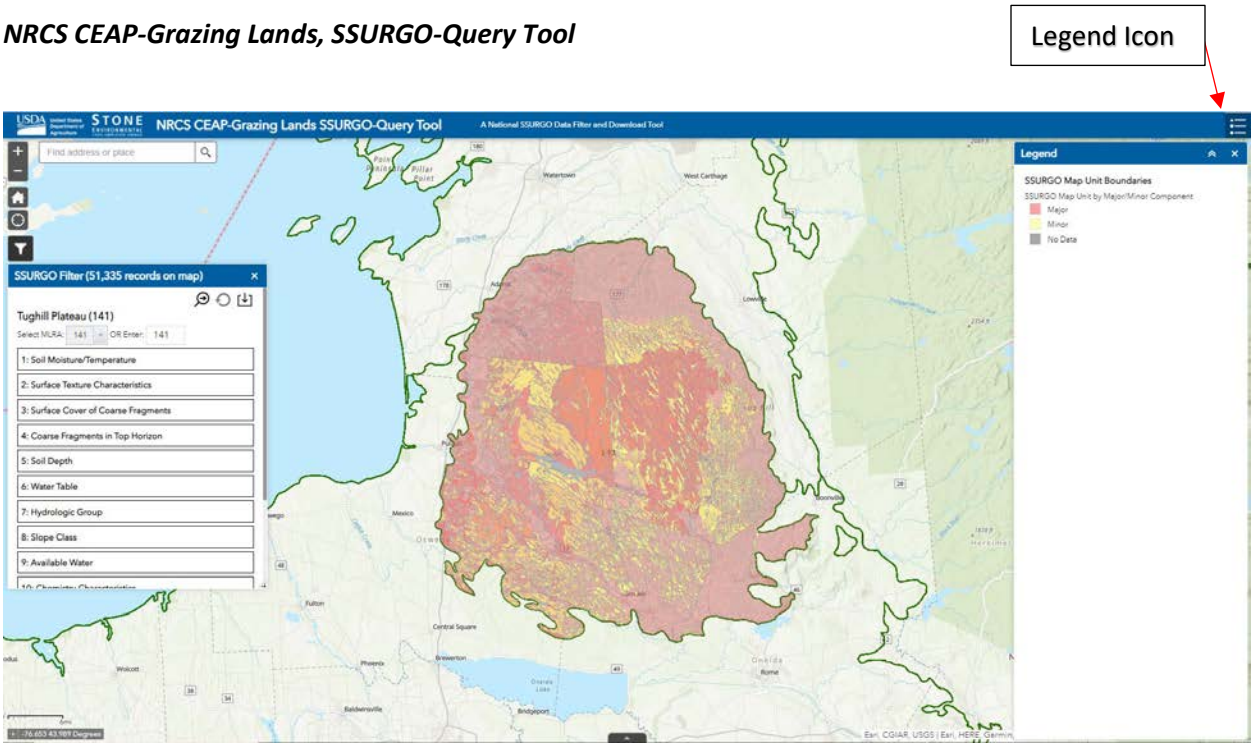
While the export is preparing for download, you will see a gray circle spinning over the export button, as displayed in the screenshot below.

Once the dataset is ready to be exported, your download will automatically begin (or will prompt you for a location to save, depending on your browser download settings). The data is exported in a zipped folder, with a default name of ''ssurgodata.zip". The contents of the zipped folder, once unzipped, contain a file geodatabase and a csv of your exported data. A file geodatabase is described by Esri as a "collection of files in a folder on disk that can store, query, and manage both spatial and nonspatial data.". While a file geodatabase was developed and is operated by Esri, it can be accessed by other GIS programs as well. The contents of the file geodatabase contain a spatial data layer (known as a feature class, and similar to a shapefile format) containing polygons representing all included map units and the associated tabular SSURGO data for each map unit. Follow these links for more information on file geodatabases and feature classes.

In addition to the geodatabase containing the spatial and tabular data, a single csv file is also exported containing just the tabular data of interest. This provides the necessary tabular without the necessity to view within a GIS platform, and can be converted/exported to other tabular (i.e. Excel, Access) formats as desired by the user.

Map and Mapunit Symbology

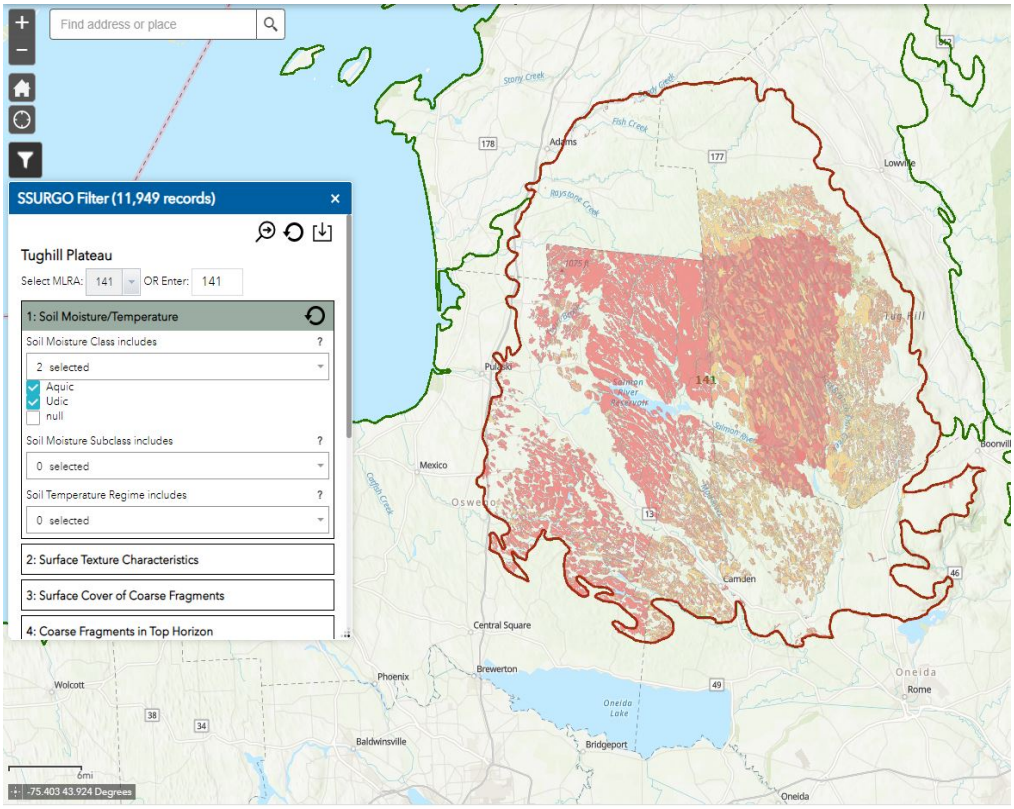
Once you have selected an MLRA of interest from the top of the Filter element, the map will zoom into the extent of the selected MLRA and the mapunit boundaries will appear. Because all components are present in this dataset, some mapunits can have more than one record associated with them. Major components are symbolized in red and minor components in yellow, each with a slight transparency to them. The transparency helps to identify mapunits which contain both a major and minor component, or multiple major/minor components on a single mapunit. A mapunit containing both major and minor components will appear as either reddish yellow or yellowish red, depending on the order of the mapunits in the data table. A mapunit containing multiple major OR minor components will appear as either a darker shade of red or yellow. Once the user has filtered the records down from initial, larger record count for an MLRA, identifying the differences between major and minor components on the map will become easier. Note that mapunits which exist but did not meet the query definition set in the initial SSURGO data extraction are included here, however because mapunits only appear on the map once a filter is selected, these map units are not currently displayed in the tool. To view the Legend for the mapunit symbology, select the 'Legend' icon in the upper left of the screen, displayed in the image below.



Steps to Take Upon Opening the Tool

- No login is required, the link to the tool will automatically open the tool.
- The Filter will be open by default, appearing on the left side of the screen
- You must first select an MLRA before proceeding to the other filters.

- Typing in the first number of the MLRA of interest will take you all MLRA's that begin with the number, which may be faster than scrolling through the list. Alternatively, if you know the alphanumeric of the MLRA of interest, you can type it into the text box next to the list.
- Once you have selected an MLRA, the map will zoom to the extent of that MLRA boundary, with the selected MLRA boundary highlighted in red.



- Before seeing the map units drawn on the map, you must first select at least one filter. Following the initial selection, the map units will then draw on the map, as displayed in the image above. Please note that depending on the number of records being drawn on the map, this could take up to a minute to draw.
- The number of records returned from the Filter is updated each time a new filter is applied, displayed at the top of the Filter window. If that number is equal to 0, then none of the rows satisfy all of the filter criteria applied, and one or more criteria needs to be removed.
    - NOTE: The record count will return before the map draws. A spinning circle in the bottom right corner of the map indicates that the mapunits are still drawing, even when the record count has been returned. You can continue with more filters while the map is drawing if you don't need to see the results of the first filter applied
- For most filters there is a "null" option which allows the user to include components for which soil characteristics or properties have no data for the selected criteria. This option is provided so the user does not lose the ability to find soil components that meet criterion existing further down in the filter. Note that the "null" option does not suggest any possible value as the data is simply missing.

- Once you have completed your query, you can export the resulting polygons, with all associated attributes, to a zipped geodatabase which can be further used within a GIS platform (eg., ArcMap on your personal computer). Also included in the export is a CSV file of your records, to facilitate usage outside of a GIS platform (i.e. Access database, Excel, etc.).
- The export can be further filtered by the spatial extent of the map. For example, if you have selected your filter criteria of interest, but only want to export records from a certain location within that MLRA, you can zoom in to the desired extent and the export functionality will honor that spatial extent with the exported data.
    - Keep in mind that the Filter list *and* spatial extent will play a role in the data that is exported. If you intend to export only the records filtered through the Filter list, be sure to zoom out to the extent of the area of interest prior to exporting.

References

Soil Survey Staff. Gridded Soil Survey Geographic (gSSURGO) Database for the United States of America and the Territories, Commonwealths, and Island Nations served by the USDA-NRCS. United States Department of Agriculture, Natural Resources Conservation Service. Available online at https://gdg.sc.egov.usda.gov/. *August 01 2020* (FY*20* official release).

U.S. Department of Agriculture, Natural Resources Conservation Service. 2006. *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin.* U.S. Department of Agriculture Handbook 296.

Additional references provided in Appendix 1.

Appendix 1. References and Links for Data Fields Used in Filter

The first column in the tables below shows the "alias" data field name that is provided in the SSURGO-QT online application. The second column shows the actual SSURGO physical column name. The third column is a brief description of the data element, and the fourth column provides a link to more information.

1. Soil Moisture/Temperature

ALIAS	SSURGO Name	Brief Description	Link for more information
MLRA	MLRA	"Major Land Resource Area" (MLRA). Geographically associated land resource units with similar physiography, geology, climate, water, soils, biological resources, and land use.	USDA Agriculture Handbook 296
MoistClass	taxmoistcl	Soil moisture class for the soil component.	USDA-NRCS Soil Survey Staff Soil Taxonomy, 2nd Edition
MoistSubClass	taxmoistscl	Soil moisture subclass regime for the soil component.	USDA-NRCS Soil Survey Staff Soil Taxonomy, 2nd Edition
TempRegime	taxtempregime	Soil temperature regime for the soil component.	USDA-NRCS Soil Survey Staff Soil Taxonomy, 2nd Edition

2. Surface Texture Characteristics

ALIAS	SSURGO Name	Brief Description	Link for more information
SurfTexture	surf_texture	Soil texture (proportion of sand, silt and clay), and texture modifier identifying proportion of fragments >2mm (gravel, cobble, etc) for the uppermost soil horizon.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
SurfText_Modifier	surf_tex_modifier	Denotes the presence and degree of a condition or component other than sand, silt, or clay in the surface horizon. It includes fragments >2mm (eg, gravelly, cobbly, extremely stony), or man-made, organic, or other unique properties.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
SurfText_Group	surf_texture_grouping	Dominant texture group in the upper part of the soil profile.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Surf_Min_Org	surface_mineral	Denotes whether the surface soil is comprised of organic (non-mineral), or mineral material.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Text_in_Lieu	tex_in_lieu	Term used when >90% of the horizon is something other than soil (e.g., peat, muck).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0

3. Surface Cover of Coarse Fragments

ALIAS	SSURGO Name	Brief Description	Link for more information
SurfFragCover_l	sum_fragcov_low2	Minimum percent of coarse fragments (>2mm in size) covering the soil surface.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
SurfFragCover_rv	sum_fragcov_rv2	Representative percent of coarse fragments (>2mm in size) covering the soil surface.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
SurfFragCover_h	sum_fragcov_high2	Maximum percent of coarse fragments (>2mm in size) covering the soil surface.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0

4. Coarse Fragments in the Top Horizon

ALIAS	SSURGO Name	Brief Description	Link for more information
Gravel_TopHzn	thoriz_gravel	Percent of gravel, by volume, in the top horizon.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Cobble_TopHzn	thoriz_cobbles	Percent of cobbles, by volume, in the top horizon.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
StoneBoul_TopHzn	thoriz_stones_and_boulders	Percent of stones and boulders, by volume, in the top horizon.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Parafrags_TopHzn	thoriz_para	Percent of pararock fragments, by volume, in the top horizon.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
ChannerFlag_TopHzn	thoriz_channers_and_flagstones	Percent of channers and flagstones, by volume, in the top horizon.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
TotalFrags_TopHzn	thoriz_total_frags	Percent of total fragments greater than 2 mm in size, by volume, in the top horizon.	

5. Soil Depth

ALIAS	SSURGO Name	Brief Description	Link for more information
ProfileDepth	profile_depth	The depth of soil to a restrictive layer, or 200cm if no restriction is encountered.	USDA-NRCS Soil Survey Staff Soil Taxonomy, 2nd Edition

6. Water Table

ALIAS	SSURGO Name	Brief Description	Link for more information
TopAnnualWaterTable	min_yr_water	Highest depth (cm) of the saturated zone in the soil component for the year. Estimates are based mainly on observations of grayish ("reduced") soil coloration.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Apr_Sept_WaterTable	avg_h20_apr2sept	Average depth (cm) to the top of the saturated zone (water table) in April through September.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Oct_Mar_WaterTable	avg_h20_oct2march	Average depth (cm) to the top of the saturated zone (water table) in October through March.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0

7. Hydrologic Group

ALIAS	SSURGO Name	Brief Description	Link for more information
HydrGroup	hydgrp	Group of soils having similar runoff potential under similar storm and cover conditions. There are 4 main classes of hydrologic soil groups determined by the water transmitting soil layer with the lowest saturated hydraulic conductivity and depth to any layer that is more or less water impermeable (such as a fragipan or duripan) or depth to a water table (if present). Where dual classes are shown, such as "A/D", the first class represents the drained condition; the second an undrained condition.	USDA-NRCS Part 630 Hydrology National Engineering Handbook, Chapter 7

8. Slope Class

ALIAS	SSURGO Name	Brief Description	Link for more information
SlopePercent	slope_r	Percent slope (representative value) for the soil component within the mapped area.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0

9. Available Water

ALIAS	SSURGO Name	Brief Description	Link for more information
ProfileAWC	awc_r	Representative amount of plant available water held in the soil profile, on a volumetric basis (cm available water/cm of soil).	NRCS Soils, Soil Health Glossary
AWS_0_20cm	aws_0_20cm	Available water storage (cm) for the upper 20cm of the soil profile. This value is aggregated for the mapunit.	Description of gSSURGO Database. "The Valu1 (Value Added Look Up) Table" section.
AWS_0_50cm	aws_20_50cm	Available water storage (cm) in the soil profile between 0 and 50cm from the top of the profile. This value is aggregated for the mapunit.	Description of gSSURGO Database. "The Valu1 (Value Added Look Up) Table" section.
AWS_0_100cm	aws_50_100cm	Available water storage (cm) in the soil profile between 0 and 100cm from the top of the profile. This value is aggregated for the mapunit.	Description of gSSURGO Database. "The Valu1 (Value Added Look Up) Table" section.
AWS_0_150cm	aws150cm	Available water storage (cm) in the soil profile between 0 and 150cm from the top of the profile. This value is aggregated for the mapunit.	Description of gSSURGO Database. "The Valu1 (Value Added Look Up) Table" section.

10. Chemistry Characteristics

ALIAS	SSURGO Name	Brief Description	Link for more information
MaxEC_0_2cm	maxec_0_2cm	Maximum electrical conductivity of an extract from saturated soil paste in the upper 2 cm of the soil profile.	Soil Survey Manual Chapter 3
MaxEC_2_13cm	maxec_2_13cm	Maximum electrical conductivity of an extract from saturated soil paste from the part of the soil profile between depths of 2 and 13 cm.	Soil Survey Manual Chapter 3
MaxEC_13_50cm	maxec_13_50cm	Maximum electrical conductivity of an extract from saturated soil paste from the part of the soil profile between depths of 13 and 50 cm.	Soil Survey Manual Chapter 3
MaxSAR_0_2cm	maxsar_0_2cm	Maximum amount of sodium (Na) relative to Calcium (Ca) and Magnesium (Mg) in a water extract from saturated soil paste in the upper 2 cm of the soil profile.	Soil Survey Manual Chapter 3
MaxSAR_2_13cm	maxsar_2_13cm	Maximum amount of sodium (Na) relative to Calcium (Ca) and Magnesium (Mg) in a water extract from saturated soil paste from the part of the soil profile between 2 and 13 cm.	Soil Survey Manual Chapter 3
MaxSAR_13_50cm	maxsar_13_50cm	Maximum amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in a water extract from saturated soil paste from the part of the soil profile between depths of 13 and 50 cm.	Soil Survey Manual Chapter 3
MaxCaCO3_0_2cm	maxcaco3_0_2cm	Maximum amount of calcium carbonate in the upper 2 cm of the soil profile, expressed as a percent by weight.	Soil Survey Manual Chapter 3
MaxCaCO3_2_13cm	maxcaco3_2_13cm	Maximum amount of calcium carbonate from the part of the soil profile between depths of 2 and 13 cm, expressed as a percent by weight.	Soil Survey Manual Chapter 3

ALIAS	SSURGO Name	Brief Description	Link for more information
MaxCaCO3_13_50cm	maxcaco3_13_50cm	Maximum amount of calcium carbonate from the part of the soil profile between depths of 13 and 50 cm, expressed as a percent by weight.	Soil Survey Manual Chapter 3
MaxGyp_0_2cm	maxgypsum_0_2cm	Maximum amount of gypsum in the upper 2 cm of the soil profile, expressed as a percent by weight.	Soil Survey Manual Chapter 3
MaxGyp_2_13cm	maxgypsum_2_13cm	Maximum amount of gypsum from the part of the soil profile between depths of 2 and 13 cm, expressed as a percent by weight.	Soil Survey Manual Chapter 3
MaxGyp_13_50cm	maxgypsum_13_50cm	Maximum amount of gypsum from the part of the soil profile between depths of 13 and 50 cm, expressed as a percent by weight.	Soil Survey Manual Chapter 3
Subgroup	subgroup	Fourth level of Soil Taxonomy. The subgroup is below greatgroup and above family.	USDA-NRCS Soil Survey Staff Soil Taxonomy, 2nd Edition
GreatGroup	greatgroup	Third level of Soil Taxonomy. The greatgroup is below the suborder and above the subgroup. Classes in this level of soil taxonomy contain soils that have the same kind of horizons in similar sequences and have similar moisture and temperature regimes.	USDA-NRCS Soil Survey Staff Soil Taxonomy, 2nd Edition

11. Restrictions

ALIAS	SSURGO Name	Brief Description	Link for more information
DensicBdrck	densic_bedrock_rest	Depth to a root restriction due to densic materials. These are noncemented, unaltered materials such as till, volcanic mudflows or mechanically compacted materials. Cracks that can be penetrated by roots are 10 cm or more apart (densic material contact).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
LithicBdrck	lithic_bedrock_rest	Depth to a root restriction due to the contact between soil and continuous, coherent hard bedrock. Cracks that can be penetrated by roots are 10 cm or more apart (lithic bedrock contact).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
ParalithicBdrck	paralithic_bedrock_rest	Depth to a root restriction due to the contact between soil and continuous, coherent soft bedrock. Roots can penetrate into cracks (paralithic bedrock contact).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
CementedHoriz	cemented_horizon_rest	Depth to cemented earthy material that does not meet the criteria for any other specifically defined types. This material does not slake in water (cemented horizon).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Duripan	duripan_rest	Depth to a root restriction due to cementation by silica and auxiliary cementing agents. Because of lateral continuity, roots can penetrate the pan only along vertical fractures with a horizontal spacing of 10 cm or more (duripan contact).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Fragipan	fragipan_rest	Depth to a root restriction from high bulk density and/or high mechanical strength compared to overlying horizons (fragipan contact).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
ManufLayer	manufactured_layer_rest	Depth to an artificial, root-limiting layer consisting of nearly continuous, human-manufactured materials whose purpose is to form an impervious barrier (e.g. geotextile liners, asphalt, concrete, rubber, and plastic); (manufactured layer).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Petrocalcic	petrocalcic_rest	Depth to a root restriction cemented or indurated by carbonates, with or without silica or other cementing agents. It cannot be penetrated with a spade or auger when dry. It is root restrictive with cracks that can be penetrated by roots greater than 10cm apart (petrocalcic horizon).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Petroferric	petroferric_rest	Depth to a root restriction due to cementation by iron. There is little to no organic matter (petroferric horizon).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
Petrogypsic	petrogypsic_rest	Depth to a root restriction that is a continuous, cemented, massive horizon that is cemented by calcium sulfate (gypsum); (petrogypsic horizon).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0
AbruptTextChng	Abrupt textural change	Root restriction characterized by an increase of 20 percent or more clay content (absolute) within a vertical distance of 7.5 cm or less. The increase in clay content can occur anywhere in the soil profile (abrupt textural change).	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0

12. Diagnostic Horizon or Feature

ALIAS	SSURGO Name	Brief Description	Link for more information
DiagFeatKind	diag_featkind	Kind of diagnostic horizon or diagnostic feature in the soil.	USDA-NRCS, Schoeneberger et al. Field Book for Describing and Sampling Soils, ver 3.0

13. Ecological Site

ALIAS	SSURGO Name	Brief Description	Link for more information
ESD_id	esd_id	Alphanumeric identifier for each ecological site description: R denotes a rangeland site and F denotes a forestland site then MLRA, LRU, site number and state are listed.	National Ecological Site Handbook
ESD_name	esd_name	Name chosen to represent the ecological site concept.	National Ecological Site Handbook

14. Soil Component*

ALIAS	SSURGO Name	Brief Description	Link for more information
CompName	compname	Name assigned to a component based on its range of properties. Components with a soil series name reflect the lowest level of soil taxonomy and data for the soil is the most detailed for the scale of mapping.	Soil Survey Manual Chapter 4

*Use the data for minor components with caution as those components don't have the same quality control as major components.

Appendix 2. List of MLRA's with Greater than 1 Million Records

The following MLRAs will be slow to load in the SSURGO-QT application, due to their large number of records. The sort order is by MLRA.

MLRA	Number of records
53B	2,467,830
54	3,041,726
55A	1,491,553
55B	2,137,863
58A	1,488,945
90A	1,203,775
98	1,970,816
102A	2,436,683
103	5,711,291
104	1,384,266
105	2,418,021
107B	1,116,633
109	1,149,147
111A	1,377,582
111B	1,525,097
112	1,045,889
116A	1,477,677
122	1,064,880
126	1,638,220
127	1,291,087
130B	1,230,897
133A	4,161,790
136	2,831,937
140	2,107,300
143	1,581,616
144A	2,551,967
144B	2,594,520
147	1,501,025
148	1,172,490
153A	1,081,101
155	1,254,420

Appendix 3. SSURGO-QT Reviewer Survey

All reviewers are asked to provide feedback to the "SSURGO-QueryTool (SSURGO-QT) Beta-Test Questionnaire", available online at this link. All comments will be reviewed by the CEAP-Grazing Lands team and Stone Environmental, Inc. They will be used to improve the SSURGO-QT application. A copy of the actual survey is provided below.

SSURGO-QueryTool (SSURGO-QT) Beta-Test Questionnaire

Thank you for offering to test the newly-developed SSURGO-QT. This was created through a partnership with the NRCS Resource Assessment Branch CEAP-Grazing Lands, Soil and Plant Sciences Division, Resource Management Systems LLC, and Stone Environmental.

The tool is intended to aid soil scientists, ecological site developers, modelers, and conservation planners with a quick geospatial soil characteristic selection filter. The soil characteristics within SSURGO-QT have been chosen because they drive plant community and ecological site concepts, either singly or in combination with additional characteristics.

The SSURGO-QT soil characteristics may also highlight soils with susceptibility to erosion or other resource concern issues (eg, runoff, flooding, floodplains, wetland soils, wind erosion, habitat potential, etc) which may aid in the conservation planning process, offer potential areas with practice limitations (eg, slopes, rockiness, chemistry), or aid in identification of focal areas for Farm Bill conservation assistance.

As you use this beta version of SSURGO-QT, we would like your feedback on ease of use, how certain characteristics are grouped or displayed, characteristics we missed, and other features that will aid in the development of soil/ecological site concepts and conservation plans. Please take a moment to answer this feedback questionnaire. Thank you!

* Required

Email address *

Your email

Functionality

Please provide feedback on the functionality of the tool and its features.

1. The tool is easy to access via the ArcGIS Online link provided. *

    Yes

    No

    Encountered trouble accessing it consistently

    Other:

2. The MLRA scale fits my need. *

    Yes

    No

    Other:

3. I would like to be able to upload a shapefile that represents my area of interest. *

    Yes

    No

4. I would like to be able to draw a polygon with my area of interest directly within the tool. *

    Yes

    No

5. The selection of MLRA was simple and straightforward. *

    Yes

    No

    Other:

6. Once I selected the MLRA, making my selections in the filter section was easy. *

    Yes

    No

    Other:

7. Exporting the tabular and spatial data was quick and easy. *

Yes

No

Other:

8. The legend was easy to locate and use *

Yes

No

Other:

9. I would like the following additions to the Legend.

Your answer

Answer the following three questions (10A-10C) based on this statement:
"I noticed there is additional soil data provided in the export that was not used in the online filter criteria."

10A. This was useful and I plan to use it to further symbolize or identify other desired soil characteristic outputs. *

Yes

No

Other:

10B. The extra soils data wasn't really that useful; the online filter provides all I need. *

Yes

No

Other:

10C. I would like the following soil component data added to the attribute table. (List the SSURGO Table and Column names from the references provided):

If you need the list of SSURGO table and column names, go here:
https://sdmdataaccess.nrcs.usda.gov/documents/TableColumnDescriptionsReport.pdf or here:
https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1241114&ext=pdf

Your answer

Soil Filter Choices

The following sections are related to each individual Filter grouping found in the application.

The Location selection requires the user to select one MLRA. In addition to MLRA, I would like the Location section to include the following choices (or abilities):

Your answer

1. Soil Moisture/Temperature

This includes choices of soil moisture and temperature regime within the selected MLRA. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

1A. Inclusion of the Soil Moisture and/or Temperature Regime allow me to identify potential Land Resource Units more effectively. *

Yes

No

Other:

2. Surface Texture Characteristics

This includes choice of surface textures, modifiers, texture groupings, in-lieu textures, mineral or organic surfaces, and so on. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

2A. The characteristics related to soil surface textures fit my needs. *

Yes

No

Other:

2B. Inclusion of the soil surface texture characteristics allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

Other:

2C. I would like the Surface Texture Characteristics section to include the following choices (or abilities):

Your answer

3. Surface Cover of Coarse Fragments

This allows the user to enter a value for the surface cover percentage of coarse fragments by soil component. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

3A. Providing a surface cover of coarse fragments selection fit my needs. *

Yes

No

3B. Inclusion of these surface coarse fragment cover values allows me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

3C. I would like the surface cover of coarse fragments section to include the following choices (or abilities):

Your answer

4. Coarse Fragments in the Top Horizon

This allows the user to select the Kind of coarse fragment, and from a range of four classes that characterize the volume of coarse fragments in the top horizon to a depth of 50cm, by soil component. The four classes, by volume, are: 0-15%; 15-35%; 35-60%, and; >60%. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

4A. Providing a profile volumetric coarse fragment content selection fit my needs. *

Yes

No

4B. Inclusion of top horizon (to 50cm depth) coarse fragment volume content allows me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

4C. I would like the coarse fragments in the top horizon section to include the following choices (or abilities):

Your answer

5. Soil Profile Depth

This allows the user to select one or more soil profile depth classes: very shallow; shallow; moderately deep; deep, or; very deep. Depth criteria for each are the same as for soil classification criteria. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

5A. The choices related to soil profile depth fit my needs. *

Yes

No

Other:

5B. Inclusion of soil profile depths allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

5C. I would like the soil profile depth section to include the following choices (or abilities):

Your answer

6. Water Table Presence/Depth

This allows the user to select one or more water table characteristics, from whole-year to seasonal water tables, as well as water table at certain depths during the selected time period. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

6A. The choices related to water table presence and depth fit my needs. *

Yes

No

6B. Inclusion of water table presence and depth allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

6C. I would like the water table presence and depth section to include the following choices (or abilities):

Your answer

7. Soil Hydrologic Group

This allows the user to select one or more soil hydrologic groups. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

7A. The choices related to soil hydrologic groups fit my needs. *

Yes

No

7B. Inclusion of soil hydrologic groups allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

7C. I would like the soil hydrologic group section to include the following choices (or abilities):

Your answer

8. Slope of Soil Component

This allows the user to select one or more soil slope classes: Nearly Level (0-6%); Gently Sloping (6-12%); Moderately Steep (12-30%); Steep (30-60%), and; Very Steep (>60%), based on soil classification slope breaks. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

8A. The choices related to soil component slope classes fit my needs. *

Yes

No

8B. Inclusion of soil component slope classes allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

8C. I would like the soil component slope class section to include the following choices (or abilities):

Your answer

9. Available Water Characteristics

This allows the user to select either the available water capacity (AWC) for a soil component, or the available water storage (AWS) in the root zone, which is an aggregated mapunit value. Both the AWC and AWS selections offer up to four classes of available water. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

9A. The choices related to soil component AWC classes fit my needs. *

Yes

No

9B. The choices related to aggregated mapunit AWS classes fit my needs. *

Yes

No

9C. Inclusion of both AWC and AWS classes allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

9D. Inclusion of both AWC and AWS classes is confusing, or unnecessary, and does not allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

9E. I would like the Available Water Characteristics section to include the following choices (or abilities):

Your answer

10. Soil Chemistry Characteristics

Soil Chemistry Characteristics allows the user to select ranges of values for calcium carbonate, gypsum, electrical conductivity, and sodium absorption by soil component. Taxonomy allows the user to select specified subgroup and great group values related to soil component chemistry (shrink/swell characteristics will be offered in Version 2). Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

10A. The choices provided for chemistry characteristics fit my needs. *

Yes

No

10B. Inclusion of these chemistry characteristics allows me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

10C. I would like the Soil Chemistry Characteristics section to include the following choices (or abilities):

Your answer

10D. The choices related to soil component subgroup taxa fit my needs. *

Yes

No

Other:

10E. The choices related to soil component great group taxa fit my needs. *

Yes

No

Other:

10F. Inclusion of both subgroup and great group allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

10G. Inclusion of both subgroup and great group is confusing, or unnecessary, and does not allow me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

10H. I would like the Taxonomy (subgroup and/or great group) selections to include the following choices (or abilities):

Your answer

11. Restrictions

This allows the user to select from two depth classes for any restrictions that are present, by soil component. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

11A. The choices and depth classes provided for restrictions fit my needs. *

Yes

No

11B. Inclusion of these restrictions allows me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

11C. I would like the Restrictions section to include the following choices (or abilities):

Your answer

12. Diagnostic Horizon or Features

This allows the user to select up to three diagnostic horizons or features that are present, by soil component. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

12A. The choices provided for diagnostic horizons and features fit my needs. *

Yes

No

12B. Inclusion of these diagnostic horizons and features allows me to identify potential ecological sites, resource concerns, or focal programmatic needs more effectively or efficiently. *

Yes

No

12C. I would like the Diagnostic Horizons & Features section to include the following choices (or abilities): *

Your answer

13. Ecological Site

This allows the user to select one or more ecological sites by Name or ID. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

13A. Providing a choice list to select ecological site(s) correlated to soil component(s) fits my needs. *

Yes

No

13B. Inclusion of correlated ecological site(s) allows me to identify the ecological site concepts, potential land resource units, develop conservation plans, identify resource concerns, or potential focal areas for programmatic assistance more effectively or efficiently. *

Yes

No

13C. I would like the ecological site section to include the following choices (or abilities):

Your answer

14. Soil Component

This allows the user to enter the soil component name. Only values present in the SSURGO data for the selected MLRA appear in the choice list, minus any previous filters the user has selected.

14A. Providing a soil component entry fits my needs. *

Yes

No

14B. Inclusion of the soil component allows me to identify the soil/ecological site concepts, potential land resource units, develop conservation plans, identify resource concerns, or potential focal areas for programmatic assistance more effectively or efficiently. *

Yes

No

14C. I would like the soil component section to include the following choices (or abilities):

Your answer

Additional Comments, Changes, Needs

Please enter comments that you feel will improve SSURGO-QT, expand its use, aid in conservation planning, or address other needs.

Your answer

Thank you for your expert review and comments!