Description of the Soils Lite Database

A report to the Kansas Water Office and the State GIS Policy Board

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Background

Existing databases intended for use with SSURGO or 1:24k detailed soil coverages have multiple tables that must be linked in order to provide the information necessary for a variety of GIS projects. In addition, non-soil scientists often make incorrect assumptions about the use of soil property information as it appears in these databases. The purpose of this project was to develop a simple, easy-to-use, database for SSURGO and the 1:24k detailed soil coverages that included only the most commonly used soil properties. The new database christened Soils Lite is a subset of the now available SSURGO database. Integral parts of the project included the selection of attributes to include in the database; documentation of the attribute selection, data extraction, and database development processes; and the processing of the attributes for all map units within the state.

The Soils Light database is not intended to replace or supercede the existing SSURGO database. It is meant to be a tool to facilitate greater access to digital soils information from SSURGO. As such it is meant to compliment the existing database and provide a means to make updates and additions available to GIS users in a user-friendly manner. It was also intended to provide detailed information regarding the sources of the data and suggestions for its use. The SSURGO and 1:24k detailed soils databases are important assets to GIS users throughout the state of Kansas. Unfortunately, many users of spatial soil data are not well versed in soil science or the interpretation of data in soil databases. The Soils Lite database and associated documentation will help relieve some of the frustration with access, interpretation, and utilization of current database information. Kansas is not alone in developing this type of database to simplify the use digital soils data for its GIS community. Other states and agencies have undertaken similar projects for their respective geographic areas.

Project Description

The first step in the Soils Lite project was to identify a set of attributes to be included in the database. The initial set of variables was compiled from suggestions by end user agencies (Table 1) and included a variety of soil properties. The final list of attributes included all of those found in Table 1 plus some additional attributes. The additional attributes were added based on suggestions by NRCS personnel, potential end-users of the database, and to facilitate the use of existing models such as the Soil Rating for Plant Growth (SRPG).

Table 1. Initial set of requested attributes for Soils Lite.

Variables	Description
Mapunit Identification Symbol	Mapunit symbol plus the FIPS code for the county
Mapunit Symbol	Letter symbol used in county soil surveys
Mapunit type	Consociations, complexes, associations, undifferentiated groups
Taxonomic Classification	Family level classification of the dominant soil series in the map unit. Example: Carwile Series is a fine, mixed, thermic Typic Argiaquoll
Soil Textural Class	The soil textural class is the USDA texture as described in the Soil Survey Manual (1993). 136-140. Most map units have multiple surface and subsurface textures. In addition, many map units have multiple dominant series. Textures will be converted to ranks (1=finest to 21

	coarsest) so that area weighted averages can be calculated. Two textures will be recorded. The surface texture and the texture of the finest layer.
Slope Class	Slope class is expressed as a range such as 0-3%. Slopeh and slopel in the SSURGO database.
K factors	Factors used in the USLE to describe the relative erodibility of the soil by water.
T factors	Factors is the soil loss tolerance for erosion.
Wind Erodibility Group	Classes from 1-8 that indicate the relative erodibility of the topsoil to wind erosion.
Wind Erodibility Index	Theoretical annual loss of soil by wind erosion per year in tons per acre
Prime Farm Land Classification	Soils that are well suited to agricultural crop production due to their physical and chemical characteristics
Natural Drainage Class	An indicator of the frequency and duration of wet periods for soils under the conditions in which the soil formed.
Soil Hydrologic Group	Based on hydraulic conductivity and free water occurrence in the soil profile. Commonly used in the NRCS runoff equation to determine a runoff curve number.
Hydric Soil Rating	An indicator that a soil is saturated for a long enough period during the growing season for the soil to become anaerobic. Used as a criteria for wetlands identification.
Available Water Capacity	Volume of water that can be made available to plants from a soil.
Bulk Density	Weight per unit volume of soil.
Cation Exchange Capacity	A measure of the soil's ability to exchange nutrient cations with plants
Calcium Carbonate Content	Expressed as a percent $CaCO_3$ in the soil.
Clay Content	Expressed as a percent of the material smaller than 2 microns in diameter
Coarse Fragments	Percent fragments larger than 2 mm expressed as a percent.
Gypsum Content	Percent sulfates in a layer expressed as gypsum
Shrink-swell Potential	Interpretive value indicating potential to change volume as a function of changes in moisture content.
Organic Matter	Percent organic matter by weight.
Sodium Absorption Ratio	A comparison of soluble sodium versus soluble calcium and magnesium in the soil.
pH	Soil acidity/alkalinity
Water Table Depth	Depth to free water
Saturated Hydraulic Conductivity (K_{sat})	Permeability of the soil in inches per hour.
Annual Flooding Frequency	How often the soil is likely to be inundated during the year.
Annual Flooding Duration Class	Length of time during the year when ponded water is likely to occur.
Growing Season Flooding Frequency	How often the soil is likely to be inundated during the growing season.
Growing Season Flooding Duration	Length of time during the growing season when ponded water is likely to occur.
Depth to Bedrock	Depth to bedrock in inches. Only useful incases where the bedrock is within 60 inches of the soil surface.
AASHTO Group Index	Based on the plasticity index and the liquid limit of the soil
AASHTO Group Classification	Classification of soil material for highway and airstrip construction.

Acquisition and Manipulation of the Data

SSURGO database tables were obtained directly from NRCS via their ftp website. Tables for the 1:24k detailed soils coverages were obtained from DASC in *.dbf format. Seventy-one counties are currently SSURGO certified and the remaining 24 counties in Kansas are only available as 1:24k detailed soil coverages. The SSURGO tables and associated coverages appear to be relatively clean and multiple counties can be joined together in ARC/INFO easily. The 1:24k detailed soil tables are complete as obtained from DASC/NRCS but they do include some errors and should therefore be used with caution.

The tables necessary to compile soil attributes listed below were derived from the SSURGO/1:24k comp, layer, taxclass, and mapunit tables for each county. The tables were converted to Microsoft Access tables and a set of queries were used to calculate each parameter. Descriptions of each variable and the formulas used to create them are included below in tables 2 and 3 respectively. Table 4 contains information about the original database tables and variable headings from which the Soils Lite tables were derived. Table 5 is a ranking scheme for soil texture used to calculate area and depth-weighted averages for descriptive textural classes. Table 6 contains a similar ranking scheme used for flooding frequency and duration. Table 7 contains information about types of water tables and abbreviations for water table kinds used in the database. Table 8 contains descriptive information about soil hydrologic groups and a ranking scheme used for them. Table 9 contains descriptive information about soil natural drainage classes and a ranking scheme used for them. Table 10 contains a ranking scheme used for hydric soils. Table 11 contains a ranking scheme used for low, moderate, high, and very high classes used for corrosion for steel and concrete as well as shrink-swell potential.

Table 2. Soil Properties Included in the Soilslite database Documented: June 5, 2000 – by K. Apolzer ** Many definitions were taken directly from the: USDA-NRCS, SSURGO: Data Use Information report, January 1995 Online at:
http://www.ncg.nrcs.usda.gov/pdf/ssurgo_db.pdf (Appendix A, pages 37-50)

Field Name	Definition
MUID	Map Unit Identification Symbol: A symbol created by concatenation of the soil survey area symbol (ssaid) and map unit symbol (musym). It uniquely identifies a map unit within a state. For example, ssaid 061 and musym 1 is stored as muid 061001 *Procedures: unaltered*
MUSYM	Map Unit Symbol: The symbol used to identify the soil map unit component on the soil map *Procedures: unaltered*
MUNAME	Map Unit Name: Correlated name of the map unit (recommended name or field name for surveys in progress) *Procedures: unaltered*

MUKIND	Map Unit Kind: Code identifying the kind of map unit: Consociation (C); Association (A); Undifferentiated Group (U); Complex (X) *Procedures: unaltered*
PRIMEFMLD	Prime Farmland Classification: The prime farmland classification of the map unit. State codes have been developed for some states. *Procedures: unaltered*
CLASSCODE	Taxonomic Classification: Code for the taxonomic classification for the tax class code of the soil. *Procedures: unaltered*
CLASS	Taxonomic Classification: The taxonomic classification (name) of the soil *Procedures: unaltered*
SUBORDER	Sub Order: Code for the taxonomic SUBORDER category of the record *Procedures: unaltered*
GRTGROUP	Great Group: Code for the taxonomic GREAT GROUP category *Procedures: unaltered*
SUBGROUP	Subgroup: Code for the taxonomic SUBGROUP category of the record *Procedures: unaltered*
PARTSIZE	Particle Size: Code for the PARTICLE-SIZE class of the Family category of taxonomic classification *Procedures: unaltered*
MINERALOGY	Mineralogy: Code for the MINERALOGY class of the Family category of taxonomic classification *Procedures: unaltered*
SOILTEMP	Soil Temperature: Code for the SOIL TEMPERATURE class of the Family category of taxonomic classification *Procedures: unaltered*
OTHERFAM	Other Family: This field consists of OTHER FAMILY codes for soil depth class, slope class, consistence class, classes of coatings and classes of cracks of the Family category of taxonomic classification *Procedures: unaltered*
COMPKIND	Kind of Component: Code identifying the kind of component of the map unit. Example: Series (S); Family (F); Variant (V); Taxadjunct (T); Taxon above family (G); Miscellaneous area (M) *Procedures: unaltered*
AASHTO_A	AASHTO Group: AASHTO (American Assoc. of State Highway Classification and Transportation Officials) group classification. A code for AASHTO group classification for a soil *Procedures: selected A_horizon value only, from original table, for each soil component*

AASHIND_A	AASHTO Group: Index AASHTO (American Assoc. of State Highway and Transportation Officials) group index. A modification to AASHTO group classification of a soil. *Procedures: selected A_horizon value only, from original table, for each soil component*
GYPSUM	Gypsum: 1 (present in the soil component) or 0 (not present in the soil component) value for sulfates reported as gypsum ($CaSO_4$) in the soil layer or horizon *Procedures: non-zero numeric values were replaced with the number 1 to represent the presence of gypsum*
$CaCO_3$	Carbonate as $CaCO_3$: 1 (present in the soil component) or 0 (not present in the soil component) value for calcium carbonate ($CaCO_3$) in the soil layer or horizon *Procedures: non-zero numeric values were replaced with the number 1 to represent the presence of* $CaCO_3$
SAR	Sodium Absorption Ratio: 1 (present in the soil component) or 0 (not present in the soil component) value for the Sodium Absorption Ratio (SAR) for the soil layer or horizon *Procedures: non-zero numeric values were replaced with the number 1 to indicate the presence of significant sodium levels*
SALINITY	Salinity: 1 (present in the soil component) or 0 (not present in the soil component) value for soil salinity of the soil layer or horizon *Procedures: non-zero numeric values were replaced with the number 1 to represent the presence of Salinity*
WTKIND	Water Table Kind: The type of water table (See Attachment A, Table 3) *Procedures: selected A_horizon description, from original table, for each soil map unit*
WTDEP	Water Table Depth: Average depth to the seasonally high water table during specific months. *Procedures: property value calculated by averaging the low and high values of the property then calculating the area-weighted average to determine the soil map unit value*
PNDDEP	Ponding Depth: Average depth of surface water ponding on the soil *Procedures: property value calculated by averaging the low and high values of the property then calculating the area-weighted average to determine the soil map unit value*
ANFLOOD	Annual Flooding Frequency: The frequency of annual flooding (flooding likely to occur during the year) that is likely to occur, expressed as a ranked numeric value (See Attachment A, Table 2a) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
ANFLODUR	Flood Duration Class: The duration of annual flooding in a normal year, expressed as a ranked numeric value (See Attachment A, Table 2b) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*

GSFLOOD	Growing Season Flooding Frequency: The frequency of flooding during the growing season (season for the common field crops in the area), expressed as a ranked numeric value (See Attachment A, Table 2a) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
GSFLODUR	Growing Season Duration: The duration of flooding during the growing season (season for common field crops in the area), expressed as a ranked numeric value (See Attachment A, Table 2b) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
PNDDUR	Ponding Duration: The duration of surface water ponding, expressed as a ranked numeric value (See Attachment A, Table 2b) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
HYDGRP	Hydrologic Group: The hydrologic group for the soil, expressed as a ranked numeric value (See Attachment A, Table 4) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
DRAINAGE	Soil Drainage Class: Code identifying the natural drainage condition of the soil and refers to the frequency and duration of periods when the soil is free of saturation, expressed as a ranked numeric value (See Attachment A, Table 5) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
HYDRIC	Hydric Soil Rating: A numeric value (2= undetermined, 1= yes, a hydric soil, 0= no, not a hydric soil) identifying hydric soils (See Attachment A, Table 6) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
CORCON	Corrosion-Concrete: A numeric ranking of the susceptibility of concrete to corrosion when in contact with the soil (See Attachment A, Table 7) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
CORSTEEL	Corrosion-Uncoated Steel: A numeric ranking of the susceptibility of uncoated steel to corrosion when in contact with the soil (See Attachment A, Table 7) *Procedures: an area-weighted average calculated on ranked numeric value to determine the soil map unit value*
SLOPE	Soil Slope: The average value for the slope of the soil map unit *Procedures: property value calculated by averaging the low and high values of the property then calculating the area-weighted average to determine the soil map unit value*

ROCKDEP — Depth to Bedrock: The average value for the depth to bedrock of the soil map unit, expressed in inches (blank cells represent no bedrock encountered before 60 inches in depth)
Procedures: property value calculated by averaging the low and high values of the property then calculating the area-weighted average to determine the soil map unit value

SURFTEX — Surface Soil Texture: Code for the USDA of the soil map unit, expressed as a ranked numeric value (See Attachment A, Table 1)
Procedure: an area-weighted average calculated using the assigned value for each soil component to determine soil map unit value

TFACT — T Factor: Soil loss tolerance factor. The maximum rate of soil erosion that will permit a high level of crop production
Procedure: an area-weighted average calculated using the assigned value for each soil component to determine soil map unit value

WEG — Wind Erodibility Group: The wind erodibility group (WEG) value assigned to the soil map unit. Values can potentially range from 1-8.
Procedure: an area-weighted average calculated using the assigned value for each soil component to determine soil map unit value

WEI — Wind Erodibility Index: The wind erodibility index value assigned to the soil map unit
Procedure: an area-weighted average calculated using the assigned value for each soil component to determine soil map unit value

Texture_A — Soil Texture Class, A Horizon: Code for the USDA texture for the surface layer or horizon of the soil, expressed as a ranked numeric value (See Attachment A, Table 1)
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

TEXTFINE — Finest Texture of Soil Component: Lowest textural rank for any horizon for each soil map unit component (See Attachment A, Table 1). Particles larger than coarse sand (i.e. pebbles, gravel, cobbles, stones, channers, , flagstones, and boulders were ignored in the ranking scheme).

Procedure: an area-weighted average calculated using the lowest textural value of each soil component to determine soil map unit value

KFACT_A — Soil Erodibility Factor, A Horizon: Surface layer or horizon erodibility factor value, that is adjusted for the effect of rock fragments, of the soil map unit
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

KFACT_MAX — Soil Erodibility Factor, Maximum Value: Max profile erodibility factor that is adjusted for the effect of rock fragments, of the soil map unit
Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value

KFACT — Soil Erodibility Factor: Depth weighted average of the erodibility factor value that is adjusted for the effect of rock fragments, of the soil map unit
Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value

KFFACT_A — Soil Erodibility Factor, A Horizon: Surface layer or A horizon erodibility factor value, which quantifies the susceptibility of soil particles to detachment and movement by water, of the soil map unit
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

KFFACT_MAX — Soil Erodibility Factor, Maximum Value: Maximum profile erodibility factor value, which quantifies the susceptibility of soil particles to detachment and movement by water, of the soil map unit
Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value

KFFACT — Soil Erodibility Factor, Depth weighted average of the erodibility factor value, which quantifies the susceptibility of soil particles to detachment and movement by water, of the soil map unit
Procedure: calculated the depth-weighted average of each soil component then calculating an area-weighted average to determine each soil map unit value

NO10_A — Weight Percent passing a #10 sieve, A Horizon: The value for the surface soil layer or horizon, in percent by weight of the soil material that is less than three inches in diameter but that will pass through a #10 sieve
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

NO10_MAX — Weight Percent passing a #10 sieve, Maximum Value: The maximum profile value, in percent by weight of the rock fragments less than 3 inches in diameter that will pass through a #10 sieve
Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value

NO10 — Weight Percent passing a #10 sieve: Depth weighted average value, in percent by weight of the rock fragments less than 3 inches in diameter that will pass through a #10 sieve
Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value

CLAY_A — Clay, A Horizon: Surface layer or A horizon clay content value of the soil map unit, expressed as a percentage of the material less than 2 mm in size
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

CLAY_MAX — Clay, Maximum Value: Maximum profile clay content value of the soil map unit, expressed as a percentage of the material less than 2 mm in size
Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value

CLAY	Clay: Depth weighted average clay content value of the soil map unit, expressed as a percentage of the material less than 2 mm in size *Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value*
LL_A	Liquid Limit, A Horizon: Surface layer or A horizon liquid limit value of the soil map unit, expressed as percent moisture by weight *Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value*
LL_MAX	Liquid Limit, Maximum Value: Maximum profile liquid limit value of the soil map unit, expressed as percent moisture by weight *Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value*
LL	Liquid Limit: Depth weighted average of the liquid limit value of the soil map unit, expressed as percent moisture by weight *Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value*
PI_A	Plasticity Index, A Horizon: Surface layer or A horizon plasticity index value for the soil map unit, expressed as percent of moisture by weight *Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value*
PI_MAX	Plasticity Index, Maximum Value: Maximum profile plasticity index value of the soil map unit, expressed as percent of moisture by weight *Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value*
PI	Plasticity Index: Depth weighted average plasticity index value of the soil map unit, expressed as percent of moisture by weight *Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value*
AWC_A	Available Water Capacity, A Horizon: Surface layer or A horizon available water capacity value for the soil map unit, expressed as inches/inch *Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value*
AWC_MAX	Available Water Capacity, Maximum Value: Maximum profile available water capacity value of the soil map unit, expressed as inches/inch *Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value*

AWC	Available Water Capacity: Depth weighted average available water capacity value of the soil map unit, expressed as inches/inch *Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value*
BD_A	Bulk Density, A Horizon: Surface layer or A horizon moist bulk density value of the soil map unit, expressed as grams per cubic centimeter *Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value*
BD_MAX	Bulk Density, Maximum Value: Maximum profile moist bulk density value of the soil map unit, expressed as grams per cubic centimeter *Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value*
BD	Bulk Density: Depth weighted average of the moist bulk density value of the soil map unit, expressed as grams per cubic centimeter *Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value*
OM_A	Organic Matter, A Horizon: Surface layer or A horizon organic matter content value of the soil map unit, expressed in percent by weight *Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value*
OM_MAX	Organic Matter, Maximum Value: Maximum profile organic matter content value of the soil map unit, expressed in percent by weight *Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value*
OM	Organic Matter: Depth weighted average organic matter content value of the soil map unit, expressed in percent by weight *Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value*
PH_A	Soil Reaction (pH), A Horizon: Surface layer or A horizon soil reaction (pH) value of the soil map unit *Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value*
PH_MAX	Soil Reaction (pH), Maximum Value: Maximum profile soil reaction (pH) value of the soil map unit *Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value*
PH	Soil Reaction (pH): Depth weighted average soil reaction (pH) value of the soil map unit

Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value

CEC_A

Cation Exchange Capacity, A Horizon: Surface layer or A horizon cation exchange capacity value of the soil map unit
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

CEC_MAX

Cation Exchange Capacity, Maximum Value: Maximum profile cation exchange capacity value of the soil map unit
Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value

CEC

Cation Exchange Capacity: Depth weighted average cation exchange capacity value of the soil map unit
Procedure: property value calculated by averaging the low and high values of the property then calculating the depth weighted average of each soil component then calculating an area weighted average to determine each soil map unit value

SHRNKSW_A

Shrink-Swell Potential, A Horizon: Surface soil layer or A horizon shrink/swell potential upon wetting and drying, expressed as a ranked numeric value (Table 7)
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

SHRKSW_MAX

Shrink-Swell Potential, Maximum Value: Maximum profile shrink/swell potential upon wetting and drying expressed as a ranked numeric value (See Attachment A, Table 7)
Procedures: an area-weighted average calculated on maximum ranked numeric value for each soil component to determine soil map unit value

PERM_A

Permeability Rate, A Horizon: Surface layer or A horizon permeability rate of the soil map unit, expressed in inches/hour
Procedure: an area-weighted average calculated using the A horizon value for each soil component to determine soil map unit value

PERM_MIN

Permeability Rate, Minimum Value: Minimum profile permeability rate of the soil map unit, expressed in inches/hour
Procedures: an area-weighted average calculated on minimum ranked numeric value for each soil component to determine soil map unit value

PERM

Permeability Rate: Depth weighted average permeability rate of the soil map unit, expressed in inches/hour
Procedure: property value calculated by averaging the low and high values of the property then calculating the geomean of each soil component then calculating an area weighted average to determine each soil map unit value

Table 3. Formulas used to create selected variables in the Soils Lite database.

1) **Property Average**: *property_ave* = (*property*l + *property*h)/2

Properties Included:

layer table

no10h/no10l	*bdh/bdl*
omh/oml	*phh/phl*
cech/cecl	*clayh/clayl*
lll/llh	*pil/pih*
awch/awcl	

comp table

slopeh/slopel	*pndeph/pndepl*
rockdeph/rockdepl	*wtdeph/wtdepl*

2) **Depth Weighted Average**:

Grouped by MUID + Seqnum

property_dwa =*Sum* ((layerh-layerl)/layer_total_thickness)* *property* [or *property_ave*]

Properties Included:

layer table

kfact	*kffact*

layer table (w/ averages)

No10_ave	*Clay_ave*	*AWC_ave*	*BD_ave*
LL_ave	PI_ave	*OM_ave*	*PH_ave*
CEC_ave			

3. **Area Weighted Average**:

Grouped by MUID

Property = *Sum*(*property*1 * comp percent)+(*property*2 * comp percent)...etc

Table 4. Properties included in the Soils Lite database and the SSURGO/1:24k detailed soils database tables from which they were derived.

layer table

tfact	*weg*	*Clay_Max*	*LL_A*
wei	*texture*	*PI_Max*	*AWC_A*
textfine	*kfact_A*	*AWC_Max*	*BD_A*
kfact_Max	*kffact_A*	*BD_Max*	*OM_A*
kffact_Max	*No10_A*	*OM_Max*	*PH_A*
No10_Max	*Clay_A*	*PH_Max*	*CEC_A*
CEC_Max			

layer table (w/depth weighted averages)

Kfact	*AWC_dwa*
BD_dwa	*OM_dwa*
PH_dwa	*CEC_dwa*
Kffact	*No10_dwa*
Clay_dwa	LL_dwa
PI_dwa	

comp table

surftex	*pnddur*
hydgrp	*drainage*
hydric	*corcon*
corsteel	*anflood*
anflodur	*gsflood*
gsflodur	

comp table (w/ averages)

Slope_ave	*PndDep_ave*
RockDep_ave	*WTDep_ave*

Table 5. Soil Textural ranking scheme.

Texture Name	Texture Abbreviation	New Ranking
Coarse Sand	CoS	21
Sand	S	20
Fine Sand	FS	19
Very Fine Sand	VFS	18
Loamy Coarse Sand	LCoS	17
Loamy Sand	LS	16
Loamy Fine Sand	LFS	15
Loamy Very Fine Sand	LVFS	14
Coarse Sandy Loam	CoSL	13
Sandy Loam	SL	12
Fine Sandy Loam	FSL	11
Very Fine Sandy Loam	VFSL	10
Loam	L	9
Silt Loam	SiL	8
Silt	Si	7
Sandy Clay Loam	SCL	6
Clay Loam	CL	5
Silty Clay Loam	SiCL	4
Sandy Clay	SC	3
Silty Clay	SiC	2
Clay	C	1
Un/Weathered Bedrock	UWB/WB	Blank
	VAR	Blank

Table 6. Flooding Frequency and Duration

Classes	Criteria	New Ranking
Table 2a: Frequency		
None (N)	No reasonable possibility	1
Rare (R)	1-5 times in 100 years	2
Occasional (O)	5-50 times in 100 years	3
Frequent (F)	> or = to 50 times in 100 years	4
Common (C)	Occasional and frequent can be grouped for certain purposes and called common.	Blank because there are no soils with a common class in Kansas
Table 2b: Duration		
Blank	Blank	0
Extremely Brief (BE)	<4 hours (flooding only)	1
Very Brief (BV)	4-48 hours	2
Brief (B)	2-7 days	3
Long (L)	7 days- 1 month	4
Very Long (LV)	> or = to 1 month	5

Table 7. Water Table Kind.

Kind	Original Abbreviation	New Abbreviation
Apparent	APPAR	N/A
Artesian	ARTES	N/A
Perched	PERCH	N/A
No Water Table		None

Table 8. Hydrologic Soil Group.

Group	Criteria (guidelines only)	New Ranking
A	Saturated hydraulic conductivity is very high or in the upper half of high and internal free water occurrences is very deep.	4
B	Saturated hydraulic conductivity is in the lower half of high or in the upper half of moderately high and free water occurrence is deep or very deep.	3
C	Saturated hydraulic conductivity is in the lower half of moderately high or in the upper half of moderately low and internal free water occurrence is deeper than shallow.	2
D	Saturated hydraulic conductivity is below the upper half of moderately low, and/or internal free water occurrence is shallow or very shallow and transitory through permanent.	1

Table 9 Soil Natural Drainage Class.

Class	Description	New Ranking
E	Excessively drained.	7
SE	Somewhat excessively drained	6
W	Well drained	5
MW	Moderately well drained	4
SP	Somewhat poorly drained	3
P	Poorly drained	2
VP	Very poorly drained	1

Table 10. Hydric Soil Rating

Identifier	New Ranking
U (undetermined)	2
Y (yes)	1
N (no)	0

Table 11. Corrosion- Concrete, Corrosion- Uncoated Steel, Shrink-Swell Potential

Class	New Ranking
Low	1
Moderate	2
High	3
Very High	4

Database Manipulation Procedures

The following sections describe the specific database manipulation procedures used to create the final Soils Lite tables. There are two sets of procedures. The first is for use only with SSURGO certified coverages and databases. The second set of procedures is for use with the 1:24k detailed soil coverages which have not been edited and given final approval by NRCS. There are also procedures included for joining the Soils Lite tables to the soil polygon coverages using ARCVIEW and ARC/INFO software. The final piece of documentation is a description of the Microsoft Access database tables, queries, and macros used to generate the Soils Lite database.

Soils Light - SSURGO Procedures

Documented: June 5, 2000 – by K. Apolzer

Soils Light – SSURGO procedures are used to generate Soils Light attribute tables from Soil Survey Geographic Database (SSURGO) data tables. Tables are stored according to county. Tables downloaded and modified include comp, layers, taxclass, and mapunit. A Soils Light table is in *.dbf format and consists of a flat table containing selected soil and soil-related property data of a county.

If **SSURGO** then:

1. **a) Download SSURGO data:**
   http://www.ftw.nrcs.usda.gov/ssur_data.html
   Click on "Download SSURGO Data"
   Enter username and password (create your own account if you don't already have one)
   Find the county you need and click on "Download"
   Click on "tab.zip"
   Select "Save to disk"
   Save to appropriate directory!

   b) To unzip:
   Double click on file (this will open PKZip)
   Extract files (select files: *comp, layer, mapunit and taxclass*)
   Make sure you are saving to the correct directory, Browse if necessary

1. **Open Excel**

   a. **Open Layer:**

IMPORTANT!!- create musym: copy muid and rename musym, do a Find & Replace to remove ssaid# (FIP#)[(example: muid= 151009AD, copy to musym= 151009AD, find 151, replace with (leave blank), musym should now look like this: musym = 009AD)]

i) Delete "filler"row (the second row of the table)
ii) Remove field name extensions (ie. :c, :f, :i), [use Find & Replace]
iii) Sort by perml: replace 0 with 0.00009 **(always make sure Header row is selected)**
iv) Resort by musym, seqnum, layernum
v) Replace Texture with ranking scheme [use Find & Replace]
    - particles larger than 2 mm are ignored
    - make sure only 1 value is entered in the A Horizon row
    - disregard subsurface soil horizons
vi) Create TextFine: finest texture rating for each map unit component
    - enter finest texture rating for each soil component profile
vii) WEG: remove "L" [use Find & Replace]
    - *values range from 1 to 8 and are integers, however, some classes have a character modifier, such as 4L. For these classes the character modifiers were dropped to facilitate calculation of depth-weighted and area-weighted averages. If users intend to use this coverage for modeling wind erosion it's suggested that the original data be referenced.
viii) Place 1 (non-zero numeric values) (represents presence of) or 0 (represents absence of) in the A Horizon row for fields: Gypsum, CACO3, SAR, Salinity
ix) Replace ShrinkSw with ranking scheme [use Find & Replace]
x) Create PERM_A
    - calculate the geometric mean for each soil layer (GEOMEAN)
xi) SAVE as: FIPlayer.xls

b. Open Comp:

IMPORTANT!!- create musym: copy muid and rename musym, do a Find & Replace to remove ssaid# (FIP#)[(example: muid= 151009AD, copy to musym= 151009AD, find 151, replace with (leave blank), musym should now look like this: musym = 009AD)]

i) Delete "filler" row (the second row of the table)
ii) Remove field name extensions (ie. :c, :f, :i), [use Find & Replace]
iii) Replace the following with appropriate ranking: Surftex, Anflood, GSFlood, AnFlodur, GSFlodur, Pnddur, WTKind (blanks = NONE), Hydgrp, Hydric, Drainage, Corcon, Corsteel, [use Find & Replace]
    - pay attention to field names, if altered, restore to original name
iv) SAVE as: FIPcomp.xls

c. Open Mapunit:

i) Delete "filler" row (the second row in the table)
ii) Remove field name extensions (ie. :c, :f, :i), [use Find & Replace]
iii) SAVE as: FIPmapunit.xls

d. Open Taxclass:

i) Delete "filler" row (the second row in the table)
ii) Remove field name extensions (ie. :c, :f, :i), [use Find & Replace]
iii) Delete the "1" in the MINERLOGY1 field name (if there)
v) SAVE as: FIPtaxclass.xls

2. Import into Access
-file, get external data, import:
-double click on *.xls file
-check box First Row Headings
-select no primary key
-name table

a. Layer:
i) Name Imported Table **LAYER**
ii) **Open layer in design, check Texture field, if text data type change to number data type**

b. Comp:
i) Name Table **COMP**

c. Mapunit:
i) Name Table **MAPUNIT**

d. Taxclass:
i) Name Table **TAXCLASS**

3. Run Macro: SSURGO Process Data

4. Export Final SSURGO Table as an Excel file
-right click on table **[Final Table- SSURGO]**
-select export as
-check to external database
-select file type (*.xls)
-name file (FIPfinal.xls)

5. Open FIPfinal.xls in Excel
a. Select all

b. Replace all blanks with –9999 [use Find & Replace]
c. Format cells accordingly
    - PrimeLand= number, 0 decimals, Clay= number, 2 decimals, Perm_A= number, 5 decimals,
      MUName =general)

d. SAVE AS: FIPTable.dbf (remember to change the data type to Dbase 4)

Soils Light - 24K Procedures

Soils Light – 24K procedures are used to generate Soils Light attribute tables from National Map Unit Interpretation Record Database (MUIR) 24K data tables. Tables are stored according to county. Tables downloaded and modified include comp, layers, taxclass, and mapunit. A Soils Light table is in *.dbf format and consists of a flat table containing selected soil and soil-related property data of a county.

If **24K** then:

6. **a) Download MUIR Data:**
   http://www.statlab.iastate.edu/soils/muir/download.html
   Click "Download data for soil survey area"
   Enter MUIR state and survey area id
   Select tables: *comp, layer, mapunit and taxclass*
   Select "yes" to include header rows in tables
   Click on Process button

   Select "zip files"
   Select "DOS and MS Windows"
   Click on Download button

   Click on file to download
   Select "Save to disk"
   Save to appropriate directory!

   b) To unzip:
   Double click on file (this will open PKZip)
   Extract files
   Make sure you are saving to the correct directory, Browse if necessary

7. **Open Excel:**

a. **Open Layer**:

IMPORTANT!!- **check ssiad**: if 1digit (example: ssaid= 1) then do a Find &Replace (example:
replace ssaid= 1 with ssaid= '001)

: if 2digits (example: ssaid= 79) then do a Find &Replace (example:
replace ssaid= 79 with ssaid= '079)

: if 3digits (example: ssaid = 185) then leave as is

i) Sort by perml: replace 0 with 0.00009 **(always make sure Header row is selected)**
ii) Resort by musym, seqnum, layernum
iii) Replace Texture with ranking scheme [use Find & Replace]
  - particles larger than 2 mm are ignored
  - make sure only 1 value is entered in the A Horizon row
  - disregard subsurface soil horizons
iv) Create TextFine: finest texture rating for each map unit component
  - enter finest texture rating for each soil component profile
v) WEG: remove "L" [use Find & Replace]
  - *values range from 1 to 8 and are integers, however, some classes have a character modifier, such as 4L. For these classes the character modifiers were dropped to facilitate calculation of depth-weighted and area-weighted averages. If users intend to use this coverage for modeling wind erosion it's suggested that the original data be referenced.
vi) Place 1 (non-zero numeric values) (represents presence of) or 0 (represents absence of) in the A Horizon row for fields: Gypsum, CACO3, SAR, Salinity
vii) Replace ShrinkSw with ranking scheme [use Find & Replace]
viii) Create PERM_A
  - calculate the geometric mean for each soil layer (GEOMEAN)
ix) SAVE as: FIPlayer.xls

b. **Open Comp**:

IMPORTANT!!- **check ssiad**: if 1 digit (example: ssaid= 1) then do a Find &Replace (example:

replace ssaid= with ssaid= '001)

: if 2digits (example: ssaid= 79) then do a Find &Replace
(example:

replace ssaid= 79 with ssaid= '079)

: if 3digits (example: ssaid = 185) then Find & Replace ssaid = '185 (to
make it a text data type field)

i) Replace the following with appropriate ranking scheme: Surftex, Anflood, GSFlood, AnFlodur, GSFlodur, Pnddur, WTKind (blanks = NONE), Hydgrp, Hydric, Drainage, Corcon, Corsteel, [use Find & Replace]

- pay attention to field names, if altered, restore to original name

ii) If GSFlood and/or GSFlodur are not present, add them by inserting a column and name field accordingly
vi) SAVE as: FIPcomp.xls

c. **Open Mapunit**:

IMPORTANT!!- check ssiad: if 1 digit (example: ssaid= 1) then do a Find &Replace (example:

replace ssaid= with ssaid= '001)

: if 2digits (example: ssaid= 79) then do a Find &Replace (example:

replace ssaid= 79 with ssaid= '079)

: if 3digits (example: ssaid = 185) then Find & Replace ssaid = '185 (to make it a text data type field)

i) SAVE as: FIPmapunit.xls

d. **Taxclass**:

i) SAVE as: FIPtaxclass.xls

8. Import into Access:
-file, get external data, import:
-double click on *.xls file
-select worksheet
-check box First Row Headings
-select no primary key
-name table

a. Layer:
i) Name Imported Table **LAYER_24**
ii) **Open table in design, check texture, should be number data type, change if set at text data type**

b. Comp:
i) Name Table **COMP_24**

c. Mapunit:
i) Name Table **MAPUNIT_24**

d. Taxclass:
i) Name Table **TAXCLASS_24**

9. Run Macro: 24K Process Data

10. Export Final 24K Table as an Excel file
-right click on table **[Final Table- 24K]**

-select export as
-check to external database
-select file type (*.xls)
-name file (FIPfinal.xls)

11. Open FIPfinal.xls in Excel

a. Select all
b. Replace all blanks with –9999 [Find & Replace]
c. Format cells accordingly (ie, PrimeLand= number, 0 decimals, Clay= number, 2 decimals, Perm_A= number, 5 decimals, MUName =general)
d. SAVE AS: FIPTable.dbf (remember to change the data type to Dbase 4)

To join a Soils Light SSURGO table to a SSURGO coverage

ArcView Procedures

1) Add coverage as a theme in the View Module
2) Add *.dbf table in the Table Module
3) Open both the *.dbf table and coverage attribute table
4) Select the MUSYM field in the *.dbf table (should be highlighted)
5) Select the MUSYM field in the coverage attribute table (should also be highlighted)
6) Hit the Join button on the tool bar (or select Join under the Table pull-down menu) (or Ctrl+J)

Arc/Info Procedures (All commands initiated at the arc prompt)

1) Use the DBASEINFO command to convert your Soils Light *.dbf table into an info table
2) Use the JOINITEM command to join the Soils Light info table to the SSURGO coverage, the relate item is **MUSYM** (only relatable attribute included in the SSURGO coverages)
3) BUILD your new coverage (poly) that has the Soils Light attributes

Note: Table has to be joined to the coverage, county-by-county, first before counties can be appended together. MUID will be the unique identifier of soil map units between counties. MUSYMs may be duplicated. If this is the case the MUSYM attribute will be eliminated.

To join a Soils Light 24k table to a 24K county coverage.

Note: 24k coverages are tiled by 7.5 minute topographic quadrangles. The needed soil quadrangles for a county should first be appended and clipped to the appropriate county boundaries before the soils light table is joined to the coverage.

ArcView Procedures

7) Add coverage as a theme in the View Module
8) Add *.dbf table in the Table Module
9) Open both the *.dbf table and coverage attribute table
10) Select the MUID field in the *.dbf table (should be highlighted)
11) Select the MUID field in the coverage attribute table (should also be highlighted)
12) Hit the Join button on the tool bar (or select Join under the Table pull-down menu) (or Ctrl+J)

Arc/Info Procedures (All commands initiated at the arc prompt)

1) Use the DBASEINFO command to convert your Soils Light *.dbf table into info table

2) Use the JOINITEM command to join the Soils Light info table to the 24k coverage, relate item is **MUID** (MUID has to be used in place of MUSYM because of possible duplicates between counties)
3) BUILD your new coverage (poly) that has the Soils Light attributes

Note: For soil quads that have map units that cross county boundaries it is necessary to use the Soils Light tables from all adjacent counties to ensure that these map units will be properly attributed.

Soils Light - Access Data Base

A list and brief description of the tables, queries, and macros that are in the Soils Light database.

Tables:

Layer_24	- original 24k table, imported from FIPlayer.xls file
Comp_24	- original 24k table, imported from FIPcomp.xls file
Mapunit_24	- original 24k table, imported from FIPmapunit.xls file
Taxclass_24	- original 24k table, imported from FIPtaxclass.xls file
Layer	- original SSURGO table, imported from FIPlayer.xls file **OR** table created from concat query run on layer_24
Comp	- original SSURGO table, imported from FIPcomp.xls file **OR** table created from concat query run on comp_24
Mapunit	- original SSURGO table, imported from FIPmapunit.xls file **OR** table created from concat query run on mapunit_24
Taxclass	- original SSURGO table, imported from FIPtaxclass.xls file **OR** table created from concat query run on taxclass_24
Layer Total Thick	-only total layer thickness fro each mapunit + seqnum
Layer Thick_Averages	-only individual layer thickness and average of properties that have high & low values
Layer Max/Min	-only max property values for each mapunit+seqnum, and min value for perm
Layer A_horizon	-only property values in the A horizon for each mapunit + seqnum
Layer DWA	-calculated dwa for each mapunit + seqnum
Layer Final	-combines layer tables, contains a_horizon, max/min, and dwa of properties
Comp + Layer	-calculated comp%, averages and appends layer table to the comp table
Comp/Layer Final	-selects only required fields for final table
Final Table-24K	-final table, includes fields from layer, comp, mapunit and taxclass tables
Final Table-SSURGO	-final table, includes fields from layer, comp, mapunit and taxclass tables

Queries:

Layer_24k_concat: *Make Table: LAYER* -creates muid by combining ssaid and musym fields

SQL View:
SELECT Left([LAYER_24]![ssaid],3) & Right([LAYER_24]![musym],4) AS muid, LAYER_24.state, LAYER_24.ssaid, LAYER_24.musym, LAYER_24.seqnum, LAYER_24.layernum, LAYER_24.s5id, LAYER_24.layerid, LAYER_24.laydepl, LAYER_24.laydeph, LAYER_24.texture, LAYER_24.textfine, LAYER_24.kfact, LAYER_24.kffact, LAYER_24.tfact, LAYER_24.weg, LAYER_24.inch10l, LAYER_24.inch10h, LAYER_24.inch3l, LAYER_24.inch3h, LAYER_24.no4l, LAYER_24.no4h, LAYER_24.no10l, LAYER_24.no10h, LAYER_24.no40l, LAYER_24.no40h, LAYER_24.no200l, LAYER_24.no200h, LAYER_24.clayl, LAYER_24.clayh, LAYER_24.lll, LAYER_24.llh, LAYER_24.pil, LAYER_24.pih, LAYER_24.unified, LAYER_24.aashto, LAYER_24.aashind, LAYER_24.awcl, LAYER_24.awch, LAYER_24.bdl, LAYER_24.bdh, LAYER_24.oml, LAYER_24.omh, LAYER_24.phl, LAYER_24.phh, LAYER_24.salinl, LAYER_24.salinh, LAYER_24.sarl, LAYER_24.sarh, LAYER_24.cecl, LAYER_24.cech, LAYER_24.caco3l, LAYER_24.caco3h, LAYER_24.gypsuml, LAYER_24.gypsumh,

LAYER_24.perml, LAYER_24.permh, LAYER_24.perma, LAYER_24.permgeo, LAYER_24.shrinksw, LAYER_24.wei INTO LAYER
FROM LAYER_24;

Comp_24k_concat: *Make Table: COMP* -creates muid by combining ssaid and musym fields

SQL View:
SELECT Left([COMP_24]![ssaid],3) & Right([COMP_24]![musym],4) AS muid, COMP_24.state, COMP_24.ssaid, COMP_24.musym, COMP_24.seqnum, COMP_24.compname, COMP_24.s5id, COMP_24.comppct, COMP_24.slopel, COMP_24.slopeh, COMP_24.surftex, COMP_24.otherph, COMP_24.compkind, COMP_24.compacre, COMP_24.clascode, COMP_24.anflood, COMP_24.anflodur, COMP_24.anflobeg, COMP_24.anfloend, COMP_24.gsflood, COMP_24.gsflodur, COMP_24.wtdepl, COMP_24.wtdeph, COMP_24.wtkind, COMP_24.wtbeg, COMP_24.wtend, COMP_24.pnddepl, COMP_24.pnddeph, COMP_24.pnddur, COMP_24.pndbeg, COMP_24.pndend, COMP_24.rockdepl, COMP_24.rockdeph, COMP_24.rockhard, COMP_24.pandepl, COMP_24.pandeph, COMP_24.panhard, COMP_24.subinitl, COMP_24.subinith, COMP_24.subtotl, COMP_24.subtoth, COMP_24.hydgrp, COMP_24.frostact, COMP_24.drainage, COMP_24.hydric, COMP_24.corcon, COMP_24.corsteel, COMP_24.clnirr, COMP_24.clirr, COMP_24.sclnirr, COMP_24.sclirr INTO [COMP]
FROM COMP_24;

Mapunit_24k_concat: *Make Table: Mapunit* - creates muid by combinig ssaid and musym fields

SQL View:
SELECT Left([mapunit_24]![ssaid],3) & Right([mapunit_24]![musym],4) AS muid, mapunit_24.state AS state, mapunit_24.ssaid AS ssaid, mapunit_24.musym AS musym, mapunit_24.muname AS MUName, mapunit_24.mukind AS MUKind, mapunit_24.mlra AS mlra, mapunit_24.primfml AS Primfml, mapunit_24.muacres AS muares INTO MAPUNIT
FROM mapunit_24;

Taxclass_grp: *Make Table: TaxClass* -deletes duplicates of clascode

SQL View:
SELECT TAXCLASS_24.clascode, First(TAXCLASS_24.class) AS class, First(TAXCLASS_24.soilordr) AS soilordr, First(TAXCLASS_24.suborder) AS suborder, First(TAXCLASS_24.grtgroup) AS grtgroup, First(TAXCLASS_24.subgroup) AS subgroup, First(TAXCLASS_24.partsize) AS partsize, First(TAXCLASS_24.minalogy) AS minalogy, TAXCLASS_24.reaction AS reaction, First(TAXCLASS_24.soiltemp) AS soiltemp, First(TAXCLASS_24.otherfam) AS otherfam INTO TaxClass
FROM TAXCLASS_24
GROUP BY TAXCLASS_24.clascode, TAXCLASS_24.reaction;

Layer_totalthick: *Make Table: Layer Total Thick* -calculates total layer thickness for each mapunit

SQL View:
ELECT LAYER.muid, LAYER.seqnum, Max([LAYER]![laydeph])-Min([LAYER]![laydepl]) AS [total thick] INTO [Layer Total Thick]
FROM LAYER
GROUP BY LAYER.muid, LAYER.seqnum;

Layer_max/min_maketable: *Make Table: Layer Max/Min* - selects the Max (Min for perml) for each mapunit

SQL View:
SELECT LAYER.muid, LAYER.seqnum, Max(LAYER.kfact) AS KFact_Max, Max(LAYER.kffact) AS KFFact_Max, Max(LAYER.no10h) AS No10_Max, Max(LAYER.clayh) AS Clay_Max, Max(LAYER.llh) AS LL_Max, Max(LAYER.pih) AS PI_Max, Max(LAYER.awch) AS AWC_Max, Max(LAYER.bdh) AS BD_Max, Max(LAYER.omh) AS OM_Max, Max(LAYER.phh) AS PH_Max, Max(LAYER.cech) AS CEC_Max, Min(LAYER.perml) AS Perm_Min, Max(LAYER.shrinksw) AS ShrkSw_Max INTO [Layer Max/Min]

```
FROM LAYER
GROUP BY LAYER.muid, LAYER.seqnum;
```

Layer_thick_ave_maketable: *Make Table: Layer Thick_Averages* - calculates individual layer thickness and the average for properties that have a high and low value

SQL View:

```
SELECT LAYER.muid, LAYER.seqnum, ([LAYER]![laydeph]-[LAYER]![laydepl]) AS [layer thick],
([LAYER]![no10h]+[LAYER]![no10l])/2 AS No10_ave, ([LAYER]![clayh]+[LAYER]![clayl])/2 AS Clay_ave,
([LAYER]![llh]+[LAYER]![lll])/2 AS LL_ave, ([LAYER]![pih]+[LAYER]![pil])/2 AS PI_ave,
([LAYER]![awch]+[LAYER]![awcl])/2 AS AWC_ave, ([LAYER]![bdh]+[LAYER]![bdl])/2 AS BD_ave,
([LAYER]![omh]+[LAYER]![oml])/2 AS OM_ave, ([LAYER]![phh]+[LAYER]![phl])/2 AS PH_ave,
([LAYER]![cech]+[LAYER]![cecl])/2 AS CEC_ave, LAYER.kfact, LAYER.kffact INTO [Layer Thick_Averages]
FROM LAYER;
```

Layer_ahorizon(1) _maketable: *Make Table: Layer_Ahorizon(1)* - selects properties that have a value in the Ahorizon for each mapunit in the Layer Table

SQL View:

```
SELECT LAYER.muid, LAYER.seqnum, First(LAYER.texture) AS Texture_A, First(LAYER.textfine) AS
TextFine, First(LAYER.kfact) AS KFact_A, First(LAYER.tfact) AS TFact, First(LAYER.weg) AS WEG,
First(LAYER.aashto) AS AASHTO_A, First(LAYER.aashind) AS AASHIND_A, First(LAYER.salinh) AS
Salinity, First(LAYER.sarh) AS SAR, First(LAYER.caco3h) AS CaCo3, First(LAYER.gypsumh) AS Gypsum,
First(LAYER.perma) AS Perm_A, First(LAYER.shrinksw) AS ShrnkSw_A, First(LAYER.wei) AS WEI,
First(LAYER.musym) AS musym, First(LAYER.kffact) AS KFFact_A, First(LAYER.permgeo) AS Perm_geo
INTO [Layer A_horizon(1)]
FROM LAYER
GROUP BY LAYER.muid, LAYER.seqnum;
```

Layer_ahorizon(2) _maketable: *Make Table: Layer_Ahorizon(2)* - selects properties that have a value in the Ahorizon for each mapunit in the Layer_Thick Table

SQL View:

```
SELECT [Layer Thick_Averages].muid, [Layer Thick_Averages].seqnum, First([Layer
Thick_Averages].No10_ave) AS No10_A, First([Layer Thick_Averages].Clay_ave) AS Clay_A, First([Layer
Thick_Averages].LL_ave) AS LL_A, First([Layer Thick_Averages].PI_ave) AS PI_A, First([Layer
Thick_Averages].AWC_ave) AS AWC_A, First([Layer Thick_Averages].BD_ave) AS BD_A, First([Layer
Thick_Averages].OM_ave) AS OM_A, First([Layer Thick_Averages].PH_ave) AS PH_A, First([Layer
Thick_Averages].CEC_ave) AS CEC_A INTO [Layer A_Horizon(2)]
FROM [Layer Thick_Averages]
GROUP BY [Layer Thick_Averages].muid, [Layer Thick_Averages].seqnum;
```

Layer_ahorizon _maketable: *Make Table: Layer_Ahorizon* – joins *Layer_Ahorizon(1) and Layer_Ahorizon(2) tables together, relate item is the MUID*

SQL View:

```
SELECT [Layer A_horizon(1)].muid, [Layer A_horizon(1)].seqnum, [Layer A_horizon(1)].Texture_A, [Layer
A_horizon(1)].TextFine, [Layer A_horizon(1)].KFact_A, [Layer A_horizon(1)].TFact, [Layer A_horizon(1)].WEG,
[Layer A_horizon(1)].AASHTO_A, [Layer A_horizon(1)].AASHIND_A, [Layer A_horizon(1)].Salinity, [Layer
A_horizon(1)].SAR, [Layer A_horizon(1)].CaCo3, [Layer A_horizon(1)].Gypsum, [Layer A_horizon(1)].Perm_A,
[Layer A_horizon(1)].ShrnkSw_A, [Layer A_horizon(1)].WEI, [Layer A_horizon(1)].musym, [Layer
A_horizon(1)].KFFact_A, [Layer A_horizon(1)].Perm_geo, [Layer A_Horizon(2)].No10_A, [Layer
A_Horizon(2)].Clay_A, [Layer A_Horizon(2)].LL_A, [Layer A_Horizon(2)].PI_A, [Layer A_Horizon(2)].AWC_A,
[Layer A_Horizon(2)].BD_A, [Layer A_Horizon(2)].OM_A, [Layer A_Horizon(2)].PH_A, [Layer
A_Horizon(2)].CEC_A INTO [Layer A_Horizon]
FROM [Layer A_horizon(1)] INNER JOIN [Layer A_Horizon(2)] ON ([Layer A_horizon(1)].seqnum = [Layer
A_Horizon(2)].seqnum) AND ([Layer A_horizon(1)].muid = [Layer A_Horizon(2)].muid);
```

Layer_dwa_maketable: *Make Table: Layer DWA* -calculates depth weighted average of property for individual mapunit [(layer thick/total thick)* property value]

SQL View:
SELECT [Layer Thick_Averages].muid, [Layer Thick_Averages].seqnum, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![kfact]) AS KFact_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![kffact]) AS KFFact_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![No10_ave]) AS No10_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![Clay_ave]) AS Clay_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![LL_ave]) AS LL_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![PI_ave]) AS PI_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![AWC_ave]) AS AWC_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![BD_ave]) AS BD_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![OM_ave]) AS OM_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![PH_ave]) AS PH_dwa, Sum(([Layer Thick_Averages]![layer thick]/[Layer Total Thick]![total thick])*[Layer Thick_Averages]![CEC_ave]) AS CEC_dwa INTO [Layer DWA]
FROM [Layer Thick_Averages] INNER JOIN [Layer Total Thick] ON ([Layer Thick_Averages].seqnum = [Layer Total Thick].seqnum) AND ([Layer Thick_Averages].muid = [Layer Total Thick].muid)
GROUP BY [Layer Thick_Averages].muid, [Layer Thick_Averages].seqnum;

Layer_final_maketable: *Make Table: Layer Final* -combines tables Layer Min/Max, Layer Thick_Averages and Layer Ahorizon, uses muid and seqnum as relate item

SQL View:
SELECT [Layer A_horizon].muid, [Layer A_horizon].seqnum, [Layer A_horizon].musym, [Layer A_horizon].Gypsum, [Layer A_horizon].CaCo3, [Layer A_horizon].SAR, [Layer A_horizon].Salinity, [Layer A_horizon].TFact, [Layer A_horizon].WEG, [Layer A_horizon].WEI, [Layer A_horizon].Texture_A, [Layer A_horizon].TextFine, [Layer A_horizon].KFact_A, [Layer Max/Min].KFact_Max, [Layer DWA].KFact_dwa, [Layer A_horizon].KFFact_A, [Layer Max/Min].KFFact_Max, [Layer DWA].KFFact_dwa, [Layer A_horizon].No10_A, [Layer Max/Min].No10_Max, [Layer DWA].No10_dwa, [Layer A_horizon].Clay_A, [Layer Max/Min].Clay_Max, [Layer DWA].Clay_dwa, [Layer A_horizon].LL_A, [Layer Max/Min].LL_Max, [Layer DWA].LL_dwa, [Layer A_horizon].PI_A, [Layer Max/Min].PI_Max, [Layer DWA].PI_dwa, [Layer A_horizon].AWC_A, [Layer Max/Min].AWC_Max, [Layer DWA].AWC_dwa, [Layer A_horizon].BD_A, [Layer Max/Min].BD_Max, [Layer DWA].BD_dwa, [Layer A_horizon].OM_A, [Layer Max/Min].OM_Max, [Layer DWA].OM_dwa, [Layer A_horizon].PH_A, [Layer Max/Min].PH_Max, [Layer DWA].PH_dwa, [Layer A_horizon].CEC_A, [Layer Max/Min].CEC_Max, [Layer DWA].CEC_dwa, [Layer A_horizon].ShrnkSw_A, [Layer Max/Min].ShrkSw_Max, [Layer A_horizon].Perm_A, [Layer Max/Min].Perm_Min, [Layer A_horizon].Perm_geo, [Layer A_horizon].AASHTO_A, [Layer A_horizon].AASHIND_A INTO [Layer Final]
FROM ([Layer A_horizon] INNER JOIN [Layer DWA] ON ([Layer A_horizon].muid = [Layer DWA].muid) AND ([Layer A_horizon].seqnum = [Layer DWA].seqnum)) INNER JOIN [Layer Max/Min] ON ([Layer DWA].muid = [Layer Max/Min].muid) AND ([Layer DWA].seqnum = [Layer Max/Min].seqnum);

Comp_layer_maketable: *Make Table: Comp + Layer*- calculates average for properties with a high and low value for fields in the comp table, calculates comppct/100, appends layers properties to comp table, uses muid and seqnum as relate item

SQL View:
SELECT COMP.muid, COMP.seqnum, ([COMP]![comppct])/100 AS [Comp%], ([COMP]![slopeh]+[COMP]![slopel])/2 AS Slope_ave, ([COMP]![wtdeph]+[COMP]![wtdepl])/2 AS WTDep_ave, ([COMP]![pnddeph]+[COMP]![pnddepl])/2 AS PndDep_ave, ([COMP]![rockdeph]+[COMP]![rockdepl])/2 AS RockDep_ave, COMP.surftex, COMP.compkind, COMP.clascode, COMP.anflood, COMP.anflodur, COMP.gsflood, COMP.gsflodur, COMP.wtkind, COMP.pnddur, COMP.hydgrp, COMP.drainage, COMP.hydric, COMP.corcon, COMP.corsteel, [Layer Final].Gypsum, [Layer Final].CaCo3, [Layer Final].SAR, [Layer

Final].Salinity, [Layer Final].TFact, [Layer Final].WEG, [Layer Final].WEI, [Layer Final].Texture_A, [Layer Final].TextFine, [Layer Final].KFact_A, [Layer Final].KFact_Max, [Layer Final].KFact_dwa, [Layer Final].KFFact_A, [Layer Final].KFFact_Max, [Layer Final].KFFact_dwa, [Layer Final].No10_A, [Layer Final].No10_Max, [Layer Final].No10_dwa, [Layer Final].Clay_A, [Layer Final].Clay_Max, [Layer Final].Clay_dwa, [Layer Final].LL_A, [Layer Final].LL_Max, [Layer Final].LL_dwa, [Layer Final].PI_A, [Layer Final].PI_Max, [Layer Final].PI_dwa, [Layer Final].AWC_A, [Layer Final].AWC_Max, [Layer Final].AWC_dwa, [Layer Final].BD_A, [Layer Final].BD_Max, [Layer Final].BD_dwa, [Layer Final].OM_A, [Layer Final].OM_Max, [Layer Final].OM_dwa, [Layer Final].PH_A, [Layer Final].PH_Max, [Layer Final].PH_dwa, [Layer Final].CEC_A, [Layer Final].CEC_Max, [Layer Final].CEC_dwa, [Layer Final].ShrnkSw_A, [Layer Final].ShrkSw_Max, [Layer Final].Perm_A, [Layer Final].Perm_Min, [Layer Final].Perm_geo, [Layer Final].AASHTO_A, [Layer Final].AASHIND_A, [Layer Final].musym INTO [Comp + Layer]
FROM [COMP] INNER JOIN [Layer Final] ON (COMP.muid = [Layer Final].muid) AND (COMP.seqnum = [Layer Final].seqnum);

Comp/layer_final_maketable: *Make Table: Comp/Layer Final* - calculates area weighted average for all properties (excluding properties that only require first value to be included, ex. ASSHTO_A)

SQL View:
SELECT [Comp + Layer].muid, First([Comp + Layer].compkind) AS CompKind, First([Comp + Layer].clascode) AS clascode, First([Comp + Layer].AASHTO_A) AS AASHTO_A, First([Comp + Layer].AASHIND_A) AS AASHIND_A, First([Comp + Layer].wtkind) AS WTKind, First([Comp + Layer].Gypsum) AS Gypsum, First([Comp + Layer].CaCo3) AS CaCo3, First([Comp + Layer].SAR) AS SAR, First([Comp + Layer].Salinity) AS Salinity, Sum(([Comp + Layer]![Slope_ave]*[Comp + Layer]![Comp%])) AS Slope, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![WTDep_ave])) AS WTDep, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PndDep_ave])) AS PndDep, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![RockDep_ave])) AS RockDep, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![surftex])) AS SurfTex, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![anflood])) AS AnFlood, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![anflodur])) AS AnFloDur, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![gsflood])) AS GSFlood, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![gsflodur])) AS GSFloDur, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![pnddur])) AS PndDur, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![hydgrp])) AS HydGrp, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![drainage])) AS Drainage, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![hydric])) AS Hydric, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![corcon])) AS CorCon, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![corsteel])) AS CorSteel, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![TFact])) AS TFact, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![WEG])) AS WEG, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![WEI])) AS WEI, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Texture_A])) AS Texture_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![TextFine])) AS TextFine, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![KFact_A])) AS KFact_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![KFact_Max])) AS KFact_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![KFact_dwa])) AS KFact, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![KFFact_A])) AS KFFact_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![KFFact_Max])) AS KFFact_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![KFFact_dwa])) AS KFFact, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![No10_A])) AS No10_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![No10_Max])) AS No10_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![No10_dwa])) AS No10, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Clay_A])) AS Clay_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Clay_Max])) AS Clay_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Clay_dwa])) AS Clay, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![LL_A])) AS LL_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![LL_Max])) AS LL_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![LL_dwa])) AS LL, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PI_A])) AS PI_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PI_Max])) AS PI_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PI_dwa])) AS PI, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![AWC_A])) AS AWC_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![AWC_Max])) AS AWC_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![AWC_dwa])) AS AWC, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![BD_A])) AS BD_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![BD_Max])) AS BD_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![BD_dwa])) AS BD, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![OM_A])) AS OM_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![OM_Max])) AS OM_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![OM_dwa])) AS OM,

Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PH_A])) AS PH_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PH_Max])) AS PH_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![PH_dwa])) AS PH, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![CEC_A])) AS CEC_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![CEC_Max])) AS CEC_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![CEC_dwa])) AS CEC, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![ShrnkSw_A])) AS ShrnkSw_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![ShrkSw_Max])) AS ShrkSw_Max, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Perm_A])) AS Perm_A, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Perm_Min])) AS Perm_Min, Sum(([Comp + Layer]![Comp%]*[Comp + Layer]![Perm_geo])) AS Perm, First([Comp + Layer].musym) AS musym INTO [Comp/Layer Final]
FROM [Comp + Layer]
GROUP BY [Comp + Layer].muid;

Final_table_24k_maketable: *Make Table: Final Table- 24K* -appends all fields together from comp/layer, mapunit, taxclass tables, uses muid as realte item

SQL View:
SELECT MAPUNIT.muid, MAPUNIT.musym AS musym, MAPUNIT.muname AS MUName, MAPUNIT.mukind AS MUKind, MAPUNIT.primfml AS PrimeFMLD, [Comp/Layer Final].clascode AS ClassCode, TaxClass.class AS Class, TaxClass.suborder AS SubOrder, TaxClass.grtgroup AS GrtGroup, TaxClass.subgroup AS SubGroup, TaxClass.partsize AS PartSize, TaxClass.minalogy AS Mineralogy, TaxClass.soiltemp AS SoilTemp, TaxClass.otherfam AS OtherFam, [Comp/Layer Final].CompKind, [Comp/Layer Final].AASHTO_A, [Comp/Layer Final].AASHIND_A, [Comp/Layer Final].Gypsum, [Comp/Layer Final].CaCo3, [Comp/Layer Final].SAR, [Comp/Layer Final].Salinity, [Comp/Layer Final].WTKind, [Comp/Layer Final].WTDep, [Comp/Layer Final].PndDep, [Comp/Layer Final].AnFlood, [Comp/Layer Final].AnFloDur, [Comp/Layer Final].GSFlood, [Comp/Layer Final].GSFloDur, [Comp/Layer Final].PndDur, [Comp/Layer Final].HydGrp, [Comp/Layer Final].Drainage, [Comp/Layer Final].Hydric, [Comp/Layer Final].CorCon, [Comp/Layer Final].CorSteel, [Comp/Layer Final].Slope, [Comp/Layer Final].RockDep, [Comp/Layer Final].SurfTex, [Comp/Layer Final].TFact, [Comp/Layer Final].WEG, [Comp/Layer Final].WEI, [Comp/Layer Final].Texture_A, [Comp/Layer Final].TextFine, [Comp/Layer Final].KFact_A, [Comp/Layer Final].KFact_Max, [Comp/Layer Final].KFact, [Comp/Layer Final].KFFact_A, [Comp/Layer Final].KFFact_Max, [Comp/Layer Final].KFFact, [Comp/Layer Final].No10_A, [Comp/Layer Final].No10_Max, [Comp/Layer Final].No10, [Comp/Layer Final].Clay_A, [Comp/Layer Final].Clay_Max, [Comp/Layer Final].Clay, [Comp/Layer Final].LL_A, [Comp/Layer Final].LL_Max, [Comp/Layer Final].LL, [Comp/Layer Final].PI_A, [Comp/Layer Final].PI_Max, [Comp/Layer Final].PI, [Comp/Layer Final].AWC_A, [Comp/Layer Final].AWC_Max, [Comp/Layer Final].AWC, [Comp/Layer Final].BD_A, [Comp/Layer Final].BD_Max, [Comp/Layer Final].BD, [Comp/Layer Final].OM_A, [Comp/Layer Final].OM_Max, [Comp/Layer Final].OM, [Comp/Layer Final].PH_A, [Comp/Layer Final].PH_Max, [Comp/Layer Final].PH, [Comp/Layer Final].CEC_A, [Comp/Layer Final].CEC_Max, [Comp/Layer Final].CEC, [Comp/Layer Final].ShrnkSw_A, [Comp/Layer Final].ShrkSw_Max, [Comp/Layer Final].Perm_A, [Comp/Layer Final].Perm_Min, [Comp/Layer Final].Perm INTO [Final Table -24K]
FROM ([Comp/Layer Final] LEFT JOIN TaxClass ON [Comp/Layer Final].clascode = TaxClass.clascode) RIGHT JOIN MAPUNIT ON [Comp/Layer Final].muid = MAPUNIT.muid;

Final_table_ssurgo_maketable: *Make Table: Final Table- SSURGO* - appends all fields together from comp/layer, mapunit, taxclass tables, uses muid as relate item

SQL View:
SELECT MAPUNIT.muid AS muid, MAPUNIT.musym, MAPUNIT.muname AS MUName, MAPUNIT.mukind AS MUKind, MAPUNIT.primfml AS PrimeFMLD, [Comp/Layer Final].clascode AS ClassCode, TaxClass.class AS Class, TaxClass.suborder AS SubOrder, TaxClass.grtgroup AS GrtGroup, TaxClass.subgroup AS SubGroup, TaxClass.partsize AS PartSize, TaxClass.minalogy AS Mineralogy, TaxClass.soiltemp AS SoilTemp, TaxClass.otherfam AS OtherFam, [Comp/Layer Final].CompKind, [Comp/Layer Final].AASHTO_A, [Comp/Layer Final].AASHIND_A, [Comp/Layer Final].Gypsum, [Comp/Layer Final].CaCo3, [Comp/Layer Final].SAR, [Comp/Layer Final].Salinity, [Comp/Layer Final].WTKind, [Comp/Layer Final].WTDep, [Comp/Layer Final].PndDep, [Comp/Layer Final].AnFlood, [Comp/Layer Final].AnFloDur, [Comp/Layer Final].GSFlood, [Comp/Layer Final].GSFloDur, [Comp/Layer Final].PndDur, [Comp/Layer Final].HydGrp, [Comp/Layer

Final].Drainage, [Comp/Layer Final].Hydric, [Comp/Layer Final].CorCon, [Comp/Layer Final].CorSteel, [Comp/Layer Final].Slope, [Comp/Layer Final].RockDep, [Comp/Layer Final].SurfTex, [Comp/Layer Final].TFact, [Comp/Layer Final].WEG, [Comp/Layer Final].WEI, [Comp/Layer Final].Texture_A, [Comp/Layer Final].TextFine, [Comp/Layer Final].KFact_A, [Comp/Layer Final].KFact_Max, [Comp/Layer Final].KFact, [Comp/Layer Final].KFFact_A, [Comp/Layer Final].KFFact_Max, [Comp/Layer Final].KFFact, [Comp/Layer Final].No10_A, [Comp/Layer Final].No10_Max, [Comp/Layer Final].No10, [Comp/Layer Final].Clay_A, [Comp/Layer Final].Clay_Max, [Comp/Layer Final].Clay, [Comp/Layer Final].LL_A, [Comp/Layer Final].LL_Max, [Comp/Layer Final].LL, [Comp/Layer Final].PI_A, [Comp/Layer Final].PI_Max, [Comp/Layer Final].PI, [Comp/Layer Final].AWC_A, [Comp/Layer Final].AWC_Max, [Comp/Layer Final].AWC, [Comp/Layer Final].BD_A, [Comp/Layer Final].BD_Max, [Comp/Layer Final].BD, [Comp/Layer Final].OM_A, [Comp/Layer Final].OM_Max, [Comp/Layer Final].OM, [Comp/Layer Final].PH_A, [Comp/Layer Final].PH_Max, [Comp/Layer Final].PH, [Comp/Layer Final].CEC_A, [Comp/Layer Final].CEC_Max, [Comp/Layer Final].CEC, [Comp/Layer Final].ShrnkSw_A, [Comp/Layer Final].ShrkSw_Max, [Comp/Layer Final].Perm_A, [Comp/Layer Final].Perm_Min, [Comp/Layer Final].Perm INTO [Final Table -SSURGO]
FROM ([Comp/Layer Final] LEFT JOIN TaxClass ON [Comp/Layer Final].clascode = TaxClass.clascode) RIGHT JOIN MAPUNIT ON [Comp/Layer Final].musym = MAPUNIT.musym;

Macros:

SSURGO Process Data -processes data for SSURGO tables, creates Final SSURGO Table

Detailed Description:
Runs Queries in appropriate order to compile the Final SSURGO Table

24K Process Data -processes data for 24K tables, creates Final 24K Table

Detailed Description:
Runs Queries in appropriate order to compile the Final 24K Table