National Soil Information System Editing Datamapunits

Purpose

Guidance for populating soil properties in the National Soil Information System (NASIS), as well as what properties need to be populated, are provided in the National Soil Survey Handbook (NSSH) and National Bulletin 430-5-7 (August 25, 2005). This technical note provides the Great Plains Soil Survey Region 5 (MO5) guidance to supplement the national and state guidance for properties not clearly specified nationally or properties not required nationally that the MO5 wants populated or believes should not be populated. **All other properties should be populated in accordance with national or state policy**.

Discussion

Some of the guidance in the NSSH is non-specific because the property varies widely across the nation or is more important in one part of the nation than others. Missouri, Colorado, and Oklahoma have provided statewide comprehensive guidance to soil scientists in those states. National Soil Survey Center (NSSC) Technical Note 4 also provides background information on developing map units and populating map unit and component information. The guidance in this technical note will be applicable to datamapunits (DMUs) that are being revised. Always open a new row and create a new line in the Datamapunit table. Existing components can be pasted into the Component child table by using the copy tree and paste with insert command of NASIS and then edited using the checklist in attachment 1. The new DMU will be given a new DMU description using a format similar to the following: MLRA 106 Alpha sicl, 0-2%, Occasional fl, WAW. Always start the new DMU description with the MLRA number. A map unit symbol can be added as a part of the name but keep in mind that many DMUs may be correlated to map units in several survey areas in multiple states and that a map unit symbol will only have meaning to one state or survey area. Make sure the name is unique; use the date in the name if necessary.

Minor components should also be populated in accordance with the NSSH, as well as state and MO5 guidance. Not all states in MO5 are exporting minor components to the Soil Data Warehouse (SDW); however, for all revised DMUs, minor components should be fully populated even if not exported.

Notes:

A **DMU text** note should be created to document the intent of the DMU and where it may be used.

Example:

This datamapunit is being created on 2/23/07 to be used for the map unit Pawnee clay loam, 3 to 7 percent slopes, as it occurs in 14 counties in MLRA 106. In those 14 counties there are currently 10 datamapunits correlated to this map unit. This datamapunit was created by editing a copy of DMUID 498983 which had previously been edited and had most properties populated and passed validations. All data elements including MAP, MAAT, and FFD are being reviewed in the context of using the datamapunit across the Kansas Nebraska state line. A major editing emphasis is being placed on the composition of minor components and their percentages. Minor components are being reviewed and edited and will pass all validations and requirements of National Bulletin 430-5-7. WAW.

Review **all** existing DMU, component, and horizon text notes and evaluate how appropriate they are to the new DMU and the area of interest. Delete any that are not appropriate.

Add new notes about changes in soil properties and interpretations. Create a summary note that informs the user about the impacts of changes made to the DMU. List the significant items, not every detail.

Example:

Many of the interpretation ratings for the Washington County, Kansas DMU changed because of changes in saturated hydraulic conductivity (Ksat). This DMU had higher values, especially for the Bt, compared to all the other DMUs.

The other main item that affected interpretations was horizon depths. Many of the interpretations look for the thickest horizon. Some DMUs may have had the A horizon or possibly the C horizon (Adams County, Nebraska) as the thickest horizon within 100 cm. Pedon data was used to populate horizon depths, so the new DMU is more accurate with Bt being the thickest horizon and controlling interpretations.

Datamapunit Yields

The MO5 suggests that yields in the **datamapunit crop yield** table be deleted. The exception to this would be for areas where state or local agencies use DMU yields in regulatory programs (i.e., coal mine reclamation). It is difficult to maintain and coordinate yield data at any level, and MO5 suggests that this be done in the **component crop yield** table. If populated, yields should only be for the major crops in the area and should be coordinated with agronomists and rangeland management specialists. Minor components should have all yields deleted.

Component

National Bulletin 430-5-7 (August 25, 2005) lists the horizon soil properties required of all major and minor soil components. If the NASIS column in the attachment of this bulletin is listed, it is required to be populated. The Data Population Notes column is out of date. The NSSH and many state guides supply guidance on values and parameters for those required fields. This guidance from MO5 for component data will only outline a few additional required fields and list a few commonly observed population problems.

Component Percent (Component Table)

In most cases, the DMU being revised will have had field work done. This field work and the previously published data should allow for confident population of low, representative, and high values for component percent. Many minor components will have 0 for low since they are not present in all areas and delineations. Not all minor components observed in the field need to be added as a fully populated component. Populate the major dissimilar components. Minor components that are of limited extent can be documented as a DMU text note. If a minor component only occurs in one non-MLRA soil survey area (SSA) or over one geological formation and the DMU is being used in several non-MLRA areas or geologies, make this information a part of the text note.

Runoff (Component Table)

Amendment 12 (May 2007) of the NSSH removes surface index runoff as a supported interpretation. It does not, however, remove it from the NASIS database structure. When revising a DMU, runoff can be deleted if it is not important to the survey area. If it is not deleted, it should be checked for accuracy using the Soil Survey Manual (SSM) or the NASIS report UTIL-Comparison of Runoff, stored vs. calculated (marked not ready for use). If data is exported to the public, even if no longer supported nationally, it should be correct.

Drainage Class (Component Table)

This is a soil interpretation that nationally is defined with some ambiguity. Missouri and Oklahoma have published recent guidance for populating drainage in their states based on soil properties and depth to redoximorphic features. Kansas guidance was published in 1990 but the terminology is now out of date. Nebraska also has older guidance. Project leaders with responsibilities in multiple states should draft guidance for this interpretation that all states in their area will accept.

Component Moisture Class and Moisture Subclass

The moisture subclass is in the component table and the moisture class is in the component moisture class table. Class and subclass are used in some NASIS forestry interpretations and some generated Taxonomic Unit Description (TUD) reports. With this technical note, MO5 will require these fields to be populated for any updated component. The NSSC Technical Note 9 has further information on this property.

Wildlife Interpretations (Component Table)

Currently, there are no national guides for populating, checking, or developing these interpretations. Everything that is currently in these columns originated in and is a legacy of the State Soil Survey Database (SSSD). These values should be removed since they have not been checked and there is nothing to check them against. If they are not removed they are exported to the Soil Data Mart (SDM) and are available to the public.

Component Elevation, Mean Annual Air Temperature, Mean Annual Precipitation, and Frost Free Days (Component Table)

Values for these properties should reflect the range of where the DMU will be used. All components including minor components within the DMU will have the same range.

Component Albedo Dry

If the component pedon is populated and one pedon is selected as representative, this value can be calculated. If not calculated, use national guidance from the NSSH.

Component Hydrologic Group

There is a calculation that has been approved for use. It is based on the criteria in the National Engineering Handbook Part 630 Hydrology, Chapter 7. The horizon table and component restriction tables must be fully populated before this calculation can be valid.

Component Crop Yield

If this table is populated, use a maximum of three prominent crops in the area. If the DMU extends across state boundaries, then the yields must be coordinated and acceptable in all states. If the DMU yield table is populated (see above), then the yields in the two tables should be coordinated. Do not populate yields for minor components.

Component Existing Plants

The local rangeland management specialist should assist with revising this table. If there is an existing Ecological Site Description for this component in the Ecological Site Information System (ESIS), make sure that the two are coordinated. Only the major plants from ESIS need to be in NASIS, but the relative abundance percentages should agree. Production values should also be coordinated between the two databases. Minor components should **not** have this table populated.

Component Potential Windbreak

This table is similar to existing plants table. Species and heights need to be coordinated with all states using the DMU. Minor components should **not** have this table populated.

Component Trees to Manage

This table is similar to existing plants table. Suitable species need to be coordinated with all states if the component is suitable for planting trees. Again, minor components should **not** have this table populated.

Component Month Flooding and Ponding Frequency

Flooding and ponding are defined in the NSSH on an **annual** basis. The national guidance requires that all 12 months be listed in the **component month** table.

Table 1 is an example of the correct population of **component month** for a component that is a series, taxadjunct, family, or taxon above family that is occasionally flooded. Table 2 is also for a map unit that is occasionally flooded; the author is trying to illustrate that the flooding is only during the growing season. There may be some difference in some interpretations between these two methods of populating flooding. Some interpretations may show more limitations with Table 1 because they count the number of months of flooding or ponding and weight the limitation based on that number. This may be important in some agronomic considerations, but for urban interpretations, floods in January are just as damaging as those in May. Because of this, Table 1 is the only acceptable method of population in MO5. In all areas of MO5, flooding conditions can and do occur in all 12 months. However, the probability that they will occur in December, January, and February is much less than floods in the growing season. Current NSSH guidance and policy is that flooding is on an annual basis and the Natural Resources Conservation Service (NRCS) does not present probability of flooding in the data.

Table 1. Preferred population for flooding, ponding is similar

Month	Flooding Frequency	Flooding Duration
Jan	Occasional	Brief
Feb	Occasional	Brief
Mar	Occasional	Brief
Apr	Occasional	Brief
May	Occasional	Brief
Jun	Occasional	Brief
Jul	Occasional	Brief
Aug	Occasional	Brief
Sep	Occasional	Brief
Oct	Occasional	Brief
Nov	Occasional	Brief
Dec	Occasional	Brief

Table 2. No longer acceptable in MO5 as of January 2011

Month	Flooding Frequency	Flooding Duration
Jan		
Feb		
Mar		
Apr	Occasional	Brief
May	Occasional	Brief
Jun	Occasional	Brief
Jul	Occasional	Brief
Aug	Occasional	Brief
Sep	Occasional	Brief
Oct	Occasional	Brief
Nov		
Dec		

Table 3 is an example of an unacceptable method of populating flooding or ponding. This is an attempt to indicate the probability of flooding in some months by using the frequency terminology. The MO5 will not accept this type of data population in new or revised DMUs. While the probability of flooding occurrence in the non-growing season is low in most areas of MO5, the national standard for populating flooding is **annual** occurrence **not** monthly probability.

Table 3. Not acceptable

Month	Flooding Frequency	Flooding Duration
Jan	Rare	Brief
Feb	Rare	Brief
Mar	Rare	Brief
Apr	Occasional	Brief
May	Occasional	Brief
Jun	Occasional	Brief
Jul	Occasional	Brief
Aug	Occasional	Brief
Sep	Occasional	Brief
Oct	Occasional	Brief
Nov	Rare	Brief
Dec	Rare	Brief

For components that are miscellaneous areas if there is no flooding hazard; i.e., Rock outcrop in upland units, the **Component Month** table should not be populated. This means no rows for months should be opened. If the miscellaneous area does have a flooding hazard such as “Riverwash” then the **Component Month** table should be populated as Table 1 with the appropriate frequency class and duration.

Component Month Flooding and Ponding Duration

Flooding duration can range from extremely brief to very long. Ponding duration can range from very brief to very long. For most of the national interpretations there is no or very little penalty for durations less than brief. Two DMUs with the same flooding frequency may have different limitation ratings because one is populated brief and the other is populated very brief duration. There are also situations where a soil populated with occasional, brief flooding will have greater limitations than one populated frequent, very brief. Critical review and coordination of this property is imperative when revising DMUs. If durations less than brief are used, the MO5 quality assurance staff will require supporting documentation and coordination with similar map units.

Ponding Depth

If ponding is more frequent than NONE then ponding depth RV, high and low must be populated.

Component Soil Moisture

Some states in MO5 are requiring an entry for all months from 0 to 200 cm. The MO5 only requires entries for soils with “wet” layers in the months when the saturation occurs. This table is to be populated using NSSC Technical Note 1 as a guide. Entries should reflect the monthly dominant condition in “normal years” as defined in Soil Taxonomy.

For soils that have a ”perched” water table as opposed to “apparent,” a moist layer must be populated below the “wet” layer. This is critical for making the WMS - Excavated Ponds (Aquifer-fed) interpretation work correctly for soils with a “perched” water table.

Some interesting situations occur with soils that pond and have saturation only when they pond. If the soil is rarely ponded, by definition the ponding only occurs under unusual circumstances (non-normal years). If the saturation only occurs when ponding occurs, then a “wet” layer should not be populated for this soil. If this soil has saturation in normal years even when not ponded, then a “wet” layer should be populated in the months that it occurs. Remember flooding and ponding are annual and all months are populated the same. Soil moisture is populated by month to reflect the dominant condition for that month in normal years.

Component Restrictions

This property at the national level is currently only required for components with bedrock layers. However, some states in MO5 are requiring this field be populated with any of the following restrictive features: abrupt textural change, bedrock (lithic), bedrock (paralithic), cemented horizon, densic material, duripan, fragipan, natric, or strongly contrasting textural stratification. Along with kind of restriction, top depth, bottom depth and thickness, it is also important to populate the hardness class.

Component Diagnostic Features

This property is not currently required nationally. However, it is a property that should be populated while revising a DMU. The low, representative, and high values should be populated for diagnostic features for all major components in the DMU. The pedons in **component pedon** should reasonably support these ranges.

Component Text

Review all existing notes and delete those that are no longer appropriate. For example, editing a DMU copied from Scott County, Kansas, the original DMU had the following component text notes:

8/9/00 LK Runoff values were posted in the component section for all DMUs. Ratings are based on the runoff classes table in 430-NSSH Part 618-50.

8/10/00 LK Added parent material properties as listed in the Series OSDs and the County Soil Survey.

8/18/00 LK Posted geomorphic features for the Keith DMUs.

None of these notes are relevant to this new DMU or the components and should therefore be deleted. They are not being removed from the original DMU for which they were made and still are appropriate for that DMU.

Component Pedon

Pedons listed in the **component pedon** table should be from the area and map unit where the DMU is being used and fit within the concept of the map unit; i.e., have textures, depths, slopes, and diagnostic features within the range of the DMU. A pedon of Alpha silty clay loam on 6 percent slope should not be listed in the DMU for Alpha silt loam, 0 to 1 percent slope. It may fit within the range of the Alpha series, but it is outside the range of the DMU. If the original DMU had component pedons populated, review them and make sure they are appropriate for the edited and revised DMU. Delete those that no longer are appropriate and do not support the DMU as revised. Pedons of included minor components (suggested but not required) should be populated in the component pedon table for the minor component, not as part of the major component pedon table. Component pedons listed should be from the area and map unit where the DMU is being used.

In the initiative to consolidate, DMUs list the county modal pedons in the component pedon table of the new DMU.

Horizon

National Bulletin 430-5-7 (August 25, 2005) lists the horizon soil properties required of all major and minor soil components. The NSSH and many state guides supply guidance on values and parameters for those required fields. This guidance from MO5 for horizon data will only outline a few additional required fields and list a few commonly observed population problems.

For R and Cr horizons, only a few fields need to be populated: Horizon designation, top and bottom depth, Ksat, and Horizon texture using the In lieu of term bedrock. Many old DMUs have one of the obsolete terms: weathered or unweathered bedrock. These need to be corrected when updating the DMU.

The Missouri State Office staff has put together an excellent checklist for horizon properties in the order that properties should be populated. A copy can be downloaded from the MO5 site**.** Other MO offices also have checklists.

Horizon Designation

All new and revised DMUs will have horizon designations calculated. This will require population of the horizon_desgn_master and associated columns.

Horizon Total Fragment Volume

Entries here are intended to represent the low, RV, and high values of the range of total fragment volume for the horizon. The volume ranges for the individual size fractions are entered in the Horizon Fragment table. The representative value should equal the total of the individual size fractions in the Horizon Fragment table. The low values in this table are **not** equal to the sum of all the low values in the Horizon Fragment table, likewise for the high values.

Horizon Total Clay

Round clay percentages to nearest whole number. Populating with values like 35.4 percent clay gives the appearance of greater precision than is true.

Horizon Sand and Silt

Like clay, these values should be rounded to whole numbers. The SDM, SSURGO, Soil Data Viewer (SDV), and Web Soil Survey (WSS) physical properties reports all report total sand silt and clay as the high and low. Enter the high and low and representative value for total sand and total silt so that the physical properties report shows values instead of dashes. At this time, high and low for the sand fractions is optional; however, if these are populated, the calculations for percent passing sieves will be improved.

Horizon Organic Matter

As per NSSH Section 618.40 guidance, use whole numbers for entries that are 1 and above.

Horizon Sum of Bases

With the initiative to consolidate DMUs, this will be a required field in MO5 as it was in National Bulletin 430-5-7 (August 25, 2005).

Horizon Ksat

National and MO5 guidance is to enter Ksat values in µm/sec. Any values between 0.0 and 705 can be entered into the data fields. In the past, permeability class range values were used for soil survey. The units of measurement were in inches per hour, which can be converted to µm/sec. The NSSC Technical Note 6 presents an excellent discussion and history of the permeability, hydraulic conductivity debate. Table 4 shows the permeability class terms, along with the corresponding units of measurement in inches per hour and µm/sec. Nearly all water movement data entries currently in NASIS in MO5 have the µm/sec values that are associated with the permeability class terms. Currently, the term permeability and its associated class terms and ranges are criteria in assigning T-factor and calculating K factor. The class terms and ranges are used as criteria in determining hydric soils and prime farmland. Many state and local ordinances for on-site waste disposal (septic tank) use permeability and its associated class breaks. Although permeability and Ksat can use the same units of measurement for the class terms, the number of class terms and the associated breaks between class terms is not identical. Consequently, there is no direct one-to-one relationship between the permeability terms and ranges with saturated hydraulic conductivity terms and ranges. Table 5 shows the comparison between Ksat class terms and class breaks with permeability class terms and breaks.

Given the fact that permeability class terms and their associated class break ranges are currently used as criteria for significant soil properties/criteria/interpretations, it is MO5 guidance to continue to use the class range breaks associated with the permeability class terms. Use Table 4 below when populating Ksat in NASIS.

Table 4. Use these values highlighted in yellow to populate NASIS. Rv may be adjusted with adequate documentation.

Permeability Class Terms (8)	**Inches/Hour**	**µm/sec** **L (RV) H**
very rapid	20.0-100.0	141.14 (423) 705
rapid	6.0-20.0	42.34 (92) 141.14
moderately rapid	2.0-6.0	14.11 (28) 42.34
moderate	0.6-2.0	4.23 (9) 14.11
moderately slow	0.2-0.6	1.41 (2.7) 4.23
slow	0.06-0.2	0.42 (.91) 1.41
very slow	0.0015-0.06	0.01 (.22) 0.42
impermeable	0.00-0.0015	0.0 (.005) 0.01

Table 5. Saturated Hydraulic Conductivity – Permeability

K_{sat} Class			Permeability Class		
705.00	Very High	99.90	705.00	Very Rapid	99.90
			141.14	Rapid	20.00
100.00	High	14.17			
			42.34	Moderately Rapid	6.00
			14.11	Moderate	2.00
10.00	Moderately High	1.42			
			4.23	Moderately Slow	0.60
			1.41	Slow	0.20
1.00	Moderately Low	0.14			
			0.42	Very Slow	0.06
0.10	Low	0.01			
0.01	Very Low	0.001	0.01	Impermeable	0.002
0.00 µm/sec		0.00 in/hr	0.00 µm/sec		0.00 in/hr

µm/sec x 0.1417 = in/hr ***in/hr x 7.0572 = µm/sec***