Datamapunit Development and Quality Control Checklist for Mineral Soils

DMU Description_____

DMU Record No._____

Component Name _____Component Record No._____

Refer to the National Soil Survey Handbook (NSSH), National Soil Information System (NASIS) documentation, Soil Survey Manual (SSM), National Soil Survey Technical Notes, and Great Plains Soil Survey Region 5 (MO5) Technical Notes for definitions and allowable values for all columns and properties. Changes and comments that are different from the national list are shown in RED.

☑	Table	Column	Comments
	Datamapunit	Open New Row	Create a new datamapunit (DMU). This will: eliminate the need to edit old notes, eliminate any legacy yields, and eliminate legacy Highly Erodible Land (HEL) classes that do not pertain to the DMU. Enter a new DMU description, text notes, and certification status. Existing components can be copied using the copy tree command and pasting into this new DMU.
	Datamapunit	DMU Description	Make sure this is unique. The preferred method for the Soil Data Join Recorrelation (SDJR) Initiative is to use the MLRA and map unit name (e.g., MLRA 133B – Bowie fine sandy loam, 0 to 1 percent slopes). See MO5 Tech Note 8 Attachment 2.
	Datamapunit	Order of Mapping	The order of survey for which the DMU was developed.
	Datamapunit Text	Author, Kind, Text Required, Category (optional)	Enter notes relevant to what you are doing, as suggested in MO5 Tech Note 8 Attachment 2.
	Datamapunit Certification History	Certification Date, Kind, Status, Text	This is a new DMU. The certification and review process begins anew. Quality Criteria (QC) and Quality Assurance (QA) are certified using this table.
	Component		Use the copy tree command to copy the component that is your best fit and starting point. Paste inserting a new row.
	Component	Component Name	Refer to NSSH, Part 617, Policy and Responsibilities and Part 627, Map Unit Components. For miscellaneous areas, refer to NSSH Exhibit 627-1.
	Component	Component Percent	All components will add up to 100 percent.
	Component	Local Phase	Refer to NSSH, Part 627, Map Unit Components. Used to distinguish various component phase criteria, such as drained and undrained phases, which will have significantly different properties.
	Component	SIR Phase - Obsolete	Delete. This does not apply to the new component record.
	Component	Taxon Kind	When combining map units and consolidating DMUs, if the component is a series listed as a taxadjunct in one or more counties, enter the component name here and make a text note that in Alpha and Beta Counties this component was a taxadjunct because . . . or, if warranted, add as a separate component.
	Component	Major Component Flag	Identify those components that are identified in the map unit name.

☑	Table	Column	Comments
	Component	Elevation	Elevation in meters for the map unit as it occurs in the MLRA. As part of the evaluation, this and the next three columns should be determined before the rest of the columns are populated.
	Component	MAAT	Refer to NSSH, Part 618, Climatic Setting. Values for these properties should have been decided as part of the review of distribution and extent of soils within the MLRA.
	Component	MAP	Refer to NSSH, Part 618, Climatic Setting. Values for these properties should have been decided as part of the review process.
	Component	Frost Free Days	Refer to NSSH, Part 618, Climatic Setting. Values for these properties should have been decided as part of the review process. Entries are rounded to the nearest 5 days.
	Component	Slope Gradient	Refer to NSSH, Part 618, Slope Gradient. Give low, RV, and high values. (Use whole numbers when slope is greater than 1.)
	Component	USLE Slope Length (L, RV, H)	Refer to NSSH, Part 618, Slope Length. This is the USLE slope length value (not landform slope length). A calculation is available for a national RV default value. This field is used by many external national customers for running the USLE model. Enter using values that all parties agree to, or the guide posted on MO5 SharePoint site.
	Component	Local Runoff Class	This is an optional field that can be populated if local written criteria are available.
	Component	Erosion Class	Refer to NSSH, Part 618, Erosion Class. This class should correspond to the map unit name. See NASIS Help System and SSM for definitions.
	Component_ erosion_ accelerated	Kind	Refer to NSSH, Part 618, Erosion Accelerated, Kind. Used if erosion is noted in the map unit name.
	Component_ erosion_ accelerated	Representative?	Refer to NSSH, Part 618, Erosion Accelerated, Kind.
	Component	Cover Kind 1	The most common use of the map unit which corresponds to the interpretative focus. ALL horizon properties (e.g., organic matter and structure) will be based on this land use. See NASIS Help System for population details. Make sure the surface horizon nomenclature matches what is entered here (e.g., Ap for crop cover or A for other cover).
	Component	Cover Kind 2	The most common use of the map unit. See NASIS Help System for population details.
	Component	Drainage Class	Refer to NSSH, Part 618, Drainage Class. The MLRA Soil Survey Office (SSO) is responsible for identifying the modeled depth to water table or redoximorphic features and coordinating the appropriate class for the given depth. Review this with what is listed in the Official Series Description (OSD).
	Component	Non-irrigated Land Capability Class	Refer to NSSH, Part 622, Land Capability Classification. Populated for components.
	Component	Non-irrigated Land Capability Subclass	Refer to NSSH, Part 622, Land Capability Classification. Populated for components.

☑	Table	Column	Comments
	Component	Irrigated Land Capability Class	Refer to NSSH, Part 622, Land Capability Classification. Populated for components suited to irrigation; otherwise, NULL.
	Component	Irrigated Land Capability Subclass	Refer to NSSH, Part 622, Land Capability Classification. Populated for components suited to irrigation; otherwise, NULL.
	Component	Order	Bring all taxonomy fields to current edition after review.
	Component	Suborder	
	Component	Great Group	
	Component	Subgroup	
	Component	Particle Size	Populate as “not used” if it is not needed.
	Component	Particle Size Modifier	Populate as “not used” if it is not needed.
	Component	CEC Activity Class	Populate as “not used” if it is not needed.
	Component	Reaction	Populate as “not used” if it is not needed.
	Component	Temperature Class	This is the field used in the calculation of Taxonomic Class. Populate as “not used” if it is not needed.
	Component	Moisture Subclass	Used in some forestry interpretations. See NSSC Soil Survey Technical Note 9.
	Component	Temperature Regime	Populate for all named components.
	Component	Keys to Taxonomy Edition	Bring all taxonomy fields to current edition. If Soil Taxonomy has changed and the series needs to be reclassified and there isn't sufficient supporting documentation, this is not an SDJR project.
	Component Taxonomic Family Mineralogy	Mineralogy	Populate as “not used” if it is not needed.
	Component Tax Moisture Class	Moisture Class	Every named soil should have a moisture class populated.
	Comp Tax Family Other	Family Other	Populate as “not used” if it is not needed.
	Component	Taxonomic Classification	CALCULATE. Review this with the OSD classification.
	Component Parent Material	Kind, Origin	If the OSD is described as multiple parent materials, e.g., loess over till, then also populate top depth, bottom depth, and vertical order. If needed or known, populate textural or general modifiers.
	Component Parent Material Group	Parent Material Group Name	CALCULATE. This can also be manually altered to improve the description.
	Component Parent Material Group	Representative	Make sure there is a check in the Representative box.
	Component Geomorphic Description	Feature Type	Populate Landscape and Landform with approved Feature Name, Feature ID, Exists on Feature ID, and mark Representative. Review this with what is listed in the OSD.

☑	Table	Column	Comments
	Component 3D Surface Morphometry	Hills, Terraces Mountains, Flats	MO5 does not have Flats or Mountains. Flats are areas with deranged, non-integrated, or incipient drainage networks (see Field Book for Describing and Sampling Soils Version 2.0 pp. 3-41). Most areas of plains have an integrated drainage network even though it is not deeply incised. These areas can have the 3D terminology for Hills populated. Populate only for landform; do not populate for landscape. **Typically** in a map unit all components would have the same 3D morphometry but each component would be on different geomorphic positions (Component 2D).
	Component 2D Surface Morphometry	Hillslope Profile	Used only for landforms that have a hillslope profile (not for stream terraces, flood plains, mountain slopes, canyon slopes, etc.). All other landforms will have the most common for the map unit. Populate only for landform; do not populate for landscape.
	Component Slope Shape Morphometry	Across	Typical for the map unit as it occurs throughout the MLRA. This feature is used in some interpretations to determine if there is runoff or run-on and possible sequestration.
	Component Slope Shape Morphometry	Up/Down	Typical for the map unit as it occurs throughout the MLRA. This feature is used in some interpretations as above.
	Component Slope Shape Morphometry	Kind	Not common in MO5, refer to NASIS Help System for definitions. Leave NULL if not representative for the map unit in general.
	Component Month	12 Months Flooding and Ponding Frequency and Duration	Refer to NSSH, Part 618, Flooding Frequency Class, Duration Class, and Month. Identify the most common months in which single annual flooding frequency occurs. Multiple frequencies/durations will not be used. See further explanation in MO5 Tech Note 8 Attachment 2.
	Component Month	12 Months Ponding Frequency, Duration and Depth L, RV, H	Refer to NSSH, Part 618, Ponding Depth, Duration Class, Frequency Class, and Month. Identify the most common months in which single annual ponding frequency occurs. Multiple frequencies/durations will not be used.
	Component Soil Moisture	Moisture status	Refer to NSSH, Part 618, Soil Moisture Status. Wet layers are required for components with a water table. Moist layers are required in some instances. If the water table is "perched," there must be a wet layer above a moist layer. If there is an apparent water table, all layers must be populated as "wet" to the last layer. If there is supposed to be a water table and there is nothing mentioned in the OSD, add it to the OSD. See further explanation in MO5 Tech Note 8 Attachment 2, and NSSC Tech Note 1.
	Component Surface Fragments	Cover %, Spacing, Kind, Size L, RV, H, shape, roundness, hardness	Refer to NSSH, Part 618, Surface Fragments. Indicates fragments ON THE SURFACE, not fragments mixed in the surface horizon. Populate for all components having surface fragments, regardless of whether a fragment phase is named.
	Component Restrictions	Kind, Hardness, Top Depth L, RV, H, Bottom Depth, Thickness (L, RV, H)	Refer to NSSH, Part 618, Restriction Kind, Depth, Thickness, and Hardness. Make sure restriction depths agree with the horizon depths, e.g., an R horizon at a depth of 35 cm will have bedrock, lithic, top depth RV at 35 cm. Hardness must agree with Kind, e.g., Paralithic cannot be strongly cemented.

☑	Table	Column	Comments
	Component Diagnostic Features	Kind, Top Depth, Bottom Depth, Thickness (L, RV, H)	Refer to NSSH, Part 618, Diagnostic Horizon Feature sections. Consider the aggregated bases for this component as it occurs in this map unit across the MLRA. This is not a table for point data. With a thorough understanding of this component in this map unit, you should be able to give ranges in depths and thicknesses.
	Component Pedon	User Pedon ID, Representative	At a minimum, all county modal pedons must be identified. Must have one component pedon marked as RV with **dry** colors in the surface layer to calculate albedo. See Tech Note 8 Attachment 2, and MO5 guidance and conventions for entering Taxonomic Unit Descriptions.
	Component	Albedo Dry RV	Refer to NSSH, Part 618, Albedo, Dry. CALCULATE once the representative pedon is identified in the Component Pedon table.
	Component	Aspect, Clockwise, L, RV, H Counterclockwise L, RV, H	Refer to NSSH, Part 618, Slope Aspect. For the map unit as it occurs in the MLRA.
	Component	Hydric Rating	Make an entry based on available information. This will be validated later.
	Component	Hydric Condition	Populate if hydric rating is YES. Work with state soil scientists (SSS) and resources staffs for this across the MLRA.
	Component Hydric Criteria	Hydric Criterion	Will be validated later. May need revision.
	Horizon	Top Depth (L, RV, H)	These depths should be based on the review of modal pedons, lab data, etc. Done as part of the evaluation of the map unit as it occurs in the MLRA.
	Horizon	Bottom Depth	
	Horizon	Thickness (L, RV, H)	CALCULATE.
	Horizon	Master	H1, H2, etc., should be modified to match the modal pedon description but may be aggregated where differences are very minor.
	Horizon Designation Suffix	Suffix	
	Horizon	Prime	
	Horizon	Sub (vertical subdivision)	
	Horizon	Discontinuity	
	Horizon	Designation	CALCULATE.
	Horizon	Particle Size Separates	Populate if organic matter content is less than 35 percent. If layer contains andic soil material, populate if organic matter content is less than 50 percent. Leave as NULL if organic matter content is high.
	Horizon	Total Sand Low, High, RV	Total sand should be WHOLE numbers after analysis of lab and pedon data. Review values with the OSD. If nothing is listed in the OSD, add values to range of characteristics.

☑	Table	Column	Comments
	Horizon	Sand Fractions Low, High, RV	Populated based on analysis of pedon and lab data.
	Horizon	Total Clay Low, High, RV	Use whole numbers. Review values with the OSD. If nothing is listed in the OSD, add values to range of characteristics.
	Horizon	Total Silt Low, RV, High	Manually populate using whole numbers.
	Horizon	Silt Fractions RV	Manually populate. Use lab data for similar soils that formed in similar parent materials.
	Horizon	$CaCO_3$ Clay Low, High, RV	Use lab data for similar soils that formed in similar parent materials to corroborate values. Round to the nearest whole number, the same as other separates.
	Horizon Texture	Texture or In Lieu Term	Refer to NSSH, Part 618, Texture Class, Texture Modifier, and Terms Used in Lieu of Texture. A child table to Horizon Texture Group. Remove and update any obsolete terms. The entries uwb (uweathered bedrock) and wb (weathered bedrock) are obsolete and should be changed to br (bedrock). VAR is also obsolete and should be corrected. Review with textures listed in the OSD.
	Horizon Texture Modifier	Horizon Texture Modifier	A child table to Horizon Texture.
	Horizon Texture Group	Tex Mod & Class	CALCULATE.
	Horizon Texture Group	Representative	Check one and only one texture.
	Horizon Fragments	Volume % Low, High, RV	Refer to NSSH, Part 618, Fragments in the Soil. Make sure this agrees with the any modifier that was entered in the Horizon Texture Modifier table. Review values with the OSD. Add values to the OSD if there are fragments in the horizon.
	Horizon Fragments	Kind	Refer to NSSH, Part 618, Fragments in the Soil. Required if there are fragments.
	Horizon Fragments	Size	Refer to NSSH, Part 618, Fragments in the Soil. Enter for 2-5, 5-20, 20-75, 75-250, 250-600 mm for nonflat shape. See SSM for flat sizes.
	Horizon Fragments	Shape	Refer to NSSH, Part 618, Fragments in the Soil. Required if there are fragments.
	Horizon Fragments	Roundness	Refer to NSSH, Part 618, Fragments in the Soil. Required if there are fragments.
	Horizon Fragments	Hardness	Refer to NSSH, Part 618, Fragments in the Soil. Required if there are fragments.
	Horizon	Total Fragment Volume RV	CALCULATE. Required.
	Horizon	Total Fragment Volume Low, High	A manual entry. The RV is calculated based on how the RVs in the fragment table were populated. The low and high require additional professional judgment.

☑	Table	Column	Comments
	Horizon	Particle Size Distribution	VALIDATION.
	Horizon	Texture Modifier (by fragment volume)	VALIDATION.
	Horizon	Texture RV Indicator	VALIDATION.
	Horizon	VALIDATE HORIZON VALIDATIONS	Some of the validations only check for a value and not if the value is reasonable. Checking whether or not the value is reasonable is your responsibility.
	Horizon	Organic Matter Low, High, RV	Refer to NSSH, Part 618, Organic Matter and Soil Survey Investigations Report (SSIR) 45, Section 5.5.1. Manually populate based on the Component Cover Kind and use lab data for named component or similar soils with similar land use. This is not organic carbon as reported by the Kellogg Soil Survey Laboratory (KSSL). Consider most common land use. Used in many of the calculations that follow. Critical in Kf and Kw calculations. If other factors are constant, higher contents of organic matter will lower K values (indicating a less erosive soil). Round values to the nearest tenth.
	Horizon	Gypsum Low, High, RV	Refer to NSSH, Part 618, Gypsum and SSIR 45, Section 4.4.2. Required for bulk density calculation.
	Horizon	Bulk Density 1/3 Bar & Oven Dry Low, High, RV	Refer to NSSH, Part 618, Bulk Density and SSIR 45, Section 3.2. Manually populate using lab data. A Pangaea test calculation is available for bulk density. UTIL - Comparison of Bulk Densities, stored vs. calc (Test) will give a comparison. For soils with little bulk density data this maybe a viable option. Consider similar soils and parent materials. Must be populated before calculating sieves.
	Horizon	Rock Fragments and Percent Passing Sieves	Refer to NSSH, Part 618, Fragments in the Soil. CALCULATE. Manually entered values should be rounded down to the nearest whole number.
	Horizon	pH H_2O Low, High, RV	Refer to NSSH, Part 618, Reaction, Soil and SSIR 45, Section 4.2.5. Use lab data for similar soils and parent materials based on the Component Cover Kind.
	Horizon	pH $CaCl_2$ Low, High, RV	Refer to NSSH, Part 618, Reaction, Soil and SSIR 45, Section 4.2.6. Also see MO5 Predict_pH_$CaCl_2$ on SharePoint site.
	Horizon	$CaCO_3$ Low, High, RV	Refer to NSSH, Part 618, Calcium Carbonate Equivalent and SSIR 45, Section 4.4.1. Review values with the OSD. Add values to the OSD if there should be some $CaCO_3$ equivalence in the horizon.
	Horizon	SAR Low, High, RV	Refer to NSSH, Part 618, Sodium Adsorption Ratio and SSIR 45, Section 4.5.6. Review the values with the OSD. Add values to the OSD if there should be SAR values in the horizon.
	Horizon	ESP Low, High, RV	Refer to SSIR 45, Section 4.5.6. Review the values with the OSD. Add values to the OSD if there should be ESP values in the horizon.
	Horizon	EC Low, High, RV	Refer to NSSH, Part 618, Electrical Conductivity and SSIR 45, Section 4.5. All soils have measured EC; zero is rarely measured. Review the values with the OSD. Add values to the OSD if there should be EC values in the horizon.

☑	Table	Column	Comments
	Horizon	Ksat Low, High, RV	Refer to NSSH, Part 618, Saturated Hydraulic Conductivity. Assign values for each layer. The layer with the lowest Ksat RV in the particle size control section is used in the Kf and Kw calculations. Review values with what is listed in the OSD.
	Horizon Structure	Child Table Horizon Structure Grade Size Type	This is an important value in Kf and Kw calculations. Remember, this is an aggregation for the layer in this component in a map unit. If the other three factors (texture, organic matter, and Ksat) are constant, then the coarser the structure the higher the K value (indicating a more erosive soil). For example, fine granular is less erosive than medium granular and medium granular is less erosive than blocky.
	Horizon Structure Group	Structure	CALCULATE based on Horizon Structure table population.
	Horizon Structure Group	Representative	One, and only one, needs to be marked RV.
	Horizon	CEC or ECEC	Refer to NSSH, Part 618, Cation-Exchange Capacity and SSIR 45, Section 4.1.6.2. CALCULATE if no lab data are available.
	Horizon	LEP	Refer to NSSH, Part 618, Linear Extensibility Extent and SSIR 45, Section 12. CALCULATE. This is a test calculation if no related lab data are available. Do NOT populate for layers that have more than 35 percent organic matter.
	Horizon	Water Contents, 0.33, 0.10(for sands), 15 Bar, Satiated	Refer to NSSH, Part 618, Water sections. CALCULATE if no related lab data are available.
	Horizon	Extractable Acidity	Refer to NSSH, Part 618, Extractable Acidity and SSIR 45, Section 3.3. CALCULATE if no related lab data are available.
	Horizon	LL and PI	Refer to NSSH, Part 618, Liquid Limit and Plasticity Index and SSIR 45, Section 3.8. Use lab data. If no data are available, the field can be calculated. Do NOT populate for soils that classify as PT Unified. MO5 recommends calculating.
	Horizon	Kw, Kf	Refer to NSSH, Part 618, Soil Erodibility Factors. Required National Calculation.
	Horizon	Sum of Bases	Refer to NSSH, Part 618, Sum of Bases and SSIR 45, Section 4.1.6. Lab data needed. See MO5 Sumbases_guide.
	Horizon	AWC	Refer to NSSH, Part 618, Available Water Capacity and SSIR 45, Section 13. This is not the same as water retention difference. Salt content, coarse fragments, and bulk density should be considered. Use MO5 AWC_guide if lab data are not available.
	Horizon AASHTO	AASHTO	CALCULATE.
		Representative	Check one and only one.
	Horizon	AASHTO Group Index	Refer to NSSH, Part 618, Engineering Classification. CALCULATE.
	Horizon Unified	Unified	CALCULATE.
		Representative	Check one and only one.

☑	Table	Column	Comments
	Horizon	RUN ALL HORIZON VALIDATIONS	Fix problems. Remember all the properties are interdependent. Changing one requires checking and re-calculating or changing all those below it in the list.
		RUN Pangaea UTIL – Comparison Reports	Fix problems.
	Component	HSG	Refer to NSSH, Part 618, Hydrologic Group. Required National Calculation.
	Component	Soil slip pot	Refer to NSSH, Part 618, Soil Slippage Potential.
	Component	Concrete Corrosion	Refer to NSSH, Part 618, Corrosion. Required National Calculation.
	Component	Steel Corrosion	Refer to NSSH, Part 618, Corrosion. Required National Calculation.
	Component	T Factor	Refer to NSSH, Part 618, T Factor. Required National Calculation. If the value changes, review to make sure this is what it should be and compare it with other T factors of this named component.
	Component	WEG/WEI	Refer to NSSH, Part 618, Wind Erodibility Group and Index. Required National Calculation. If the value changes, review to make sure this is what it should be and compare it with other WEG/WEI factors of this named component.
	Component	Frost Action	Refer to NSSH, Part 618, Frost Action, Potential. CALCULATE.
	Component	Excav Diff	Refer to NSSH, Part 618, Excavation Difficulty Classes.
	Component	Excav Diff Moisture	Refer to NSSH, Part 618, Excavation Difficulty Classes.
	Component	Generated Brief Soil Description	Required National Calculation.
	Component	Review Generated Brief Soil Description	The description generated above is in Component Text, where Kind is nontechnical and Category is GENSOIL. This check can point out errors.
	Component	Conservation Tree and Shrub Group	CALCULATE.
	Component	Windbreak Suitability	Obsolete. Delete.
	Component	Range Productivity (if applicable)	Based on the correlated ecological site. Work with ecological site inventory specialist and local rangeland management specialist.
	Component	Initial Subsidence L, H, RV	Refer to NSSH, Part 618, Subsidence, Initial and Total. Enter “0” if subsidence is not a concern.
	Component	Total Subsidence L, H, RV	Refer to NSSH, Part 618, Subsidence, Initial and Total. Enter “0” if subsidence is not a concern.
	Component_ ecological_ site	Ecological Site (if available)	Work with ecological site inventory specialist or local vegetation specialist (e.g., rangeland management specialist or forester).
	Component	Ord Species (Obsolete)	Obsolete. Delete all.
	Component	All Wildlife Interpretations	Unsupported. Delete all.

☑	Table	Column	Comments
	Component	RUN ALL COMPONENT VALIDATIONS	
		RUN Pangaea Report UTIL – Hydric Soil Validation	This runs on the entire selected set. It gives more information than the component validation.
		VALIDATE COMPONENT VALIDATIONS	Some of the validations only check for a value. They do not check if the value is reasonable.
	Component	Check Remaining Child Tables	Delete obsolete information, e.g., component yield.
	Component	Text	Review existing notes. Delete those no longer appropriate and create new notes for documentation.
		VALIDATE INTERPRETATIONS	Make sure the values and ratings are reasonable for the map unit and component!
		Run National Report "!SDR – DMU Quality Check"	Use this report as a final review of the MLRA DMU.