TECHNICAL NOTES

March 5, 2009

MO-1 Technical Note Number 21 (Version 1.3)

Re: NASIS - Water Table and Wet State

This technical note provides guidance and examples for populating water table depth in the NASIS Component Soil Moisture table. Version 1.3 includes:

1. Water Table depths are no longer required to correspond with horizon depths
2. Eliminate the requirement that water table top depth low = top depth RV
3. Propose increments of 10 cm (4 inches), not meant to be a rule, just guidance in terms of precision for this data element
4. Change arbitrary bottom depth for apparent water tables to 200 cm (L, RV, and H) instead of 183 cm (6.0 ft). This clarifies the soil has endosaturation instead of episaturation. Water Features reports on Soil Data Mart and Web Soil Survey (WSS) will still display >6.0 feet for a bottom depth.
5. Clarification on the normal or average year concepts

National guidance on population of soil moisture data can be found at;
http://soils.usda.gov/technical/technotes/note1.html

In summary of the National Tech Note, the data entry for soil moisture should reflect:

- Monthly averages for the extent of the component across the landscape.
- Best estimates that local knowledge can provide.
- Not expected to be exact but to be generalized and to reflect an average condition.
- Entries for RV should reflect the conditions of a "normal year."
- Enter the condition that dominates for the month.
- This is the condition for more than 15 days on the long-term average, not to represent the extremes

Additional concepts to consider;

- The wet state equates to satiated water content with free water present, e.g. condition below depth of water in an auger hole or monitoring well.

- Only the wet state needs to be populated for water tables to appear in soil survey manuscript tables, Soil Data Mart, WSS, and the SSURGO Access template.

- Population of data for moist or dry states is optional.

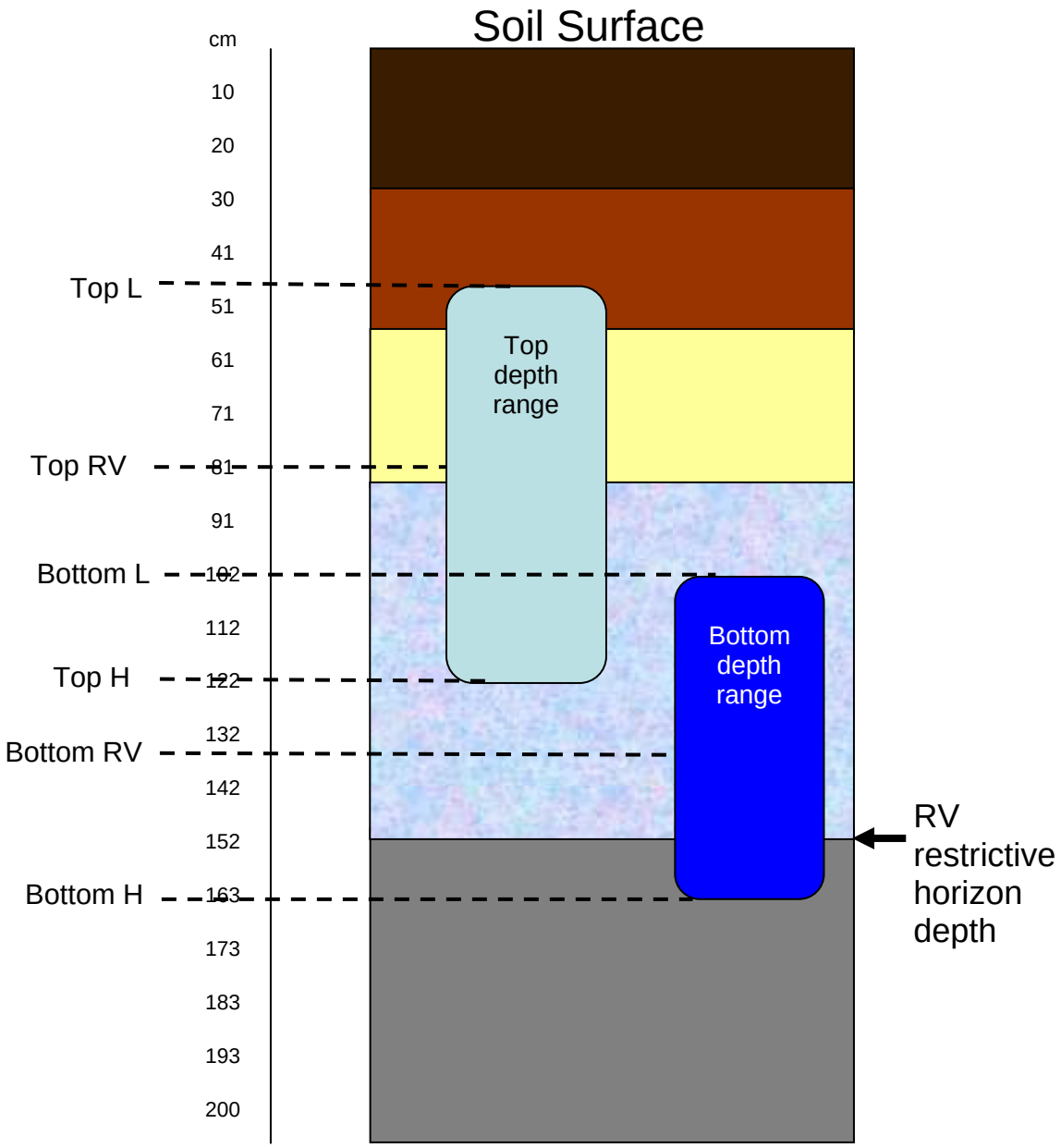
- If you describe redoximorphic (redox) features, the depth at which the features occur should show a wet state for one or more months unless the soil is drained or the features are relict. However, this does not mean that the water table will not occur above the depth of redox features. Saturation without resulting in observable redox features commonly occurs when the soil water is not depleted of oxygen due to cold temperatures. Soils with very low or very high iron and organic matter or salts can also be problematic in forming observable redox features under saturated conditions. Monitoring these types of soils for saturation data is highly recommended.

- If the soil has frequent flooding or ponding and duration of long or very long, you may want to consider the upper portion of the soil to be saturated (top depth RV value of zero) during the months the flooding or ponding occurs.

- Soils with two separate zones of saturation are relatively uncommon in MO-1. Due to the unique nature of this situation, contacting the MO staff for assistance is recommended if questions arise in how to populate NASIS.

- At the time of this technical note development, the WSS (WSS) reports only display the ranges in depth of water tables in tenths of feet. Soil Properties and Qualities reports through the WSS will display a RV top depth in centimeters.

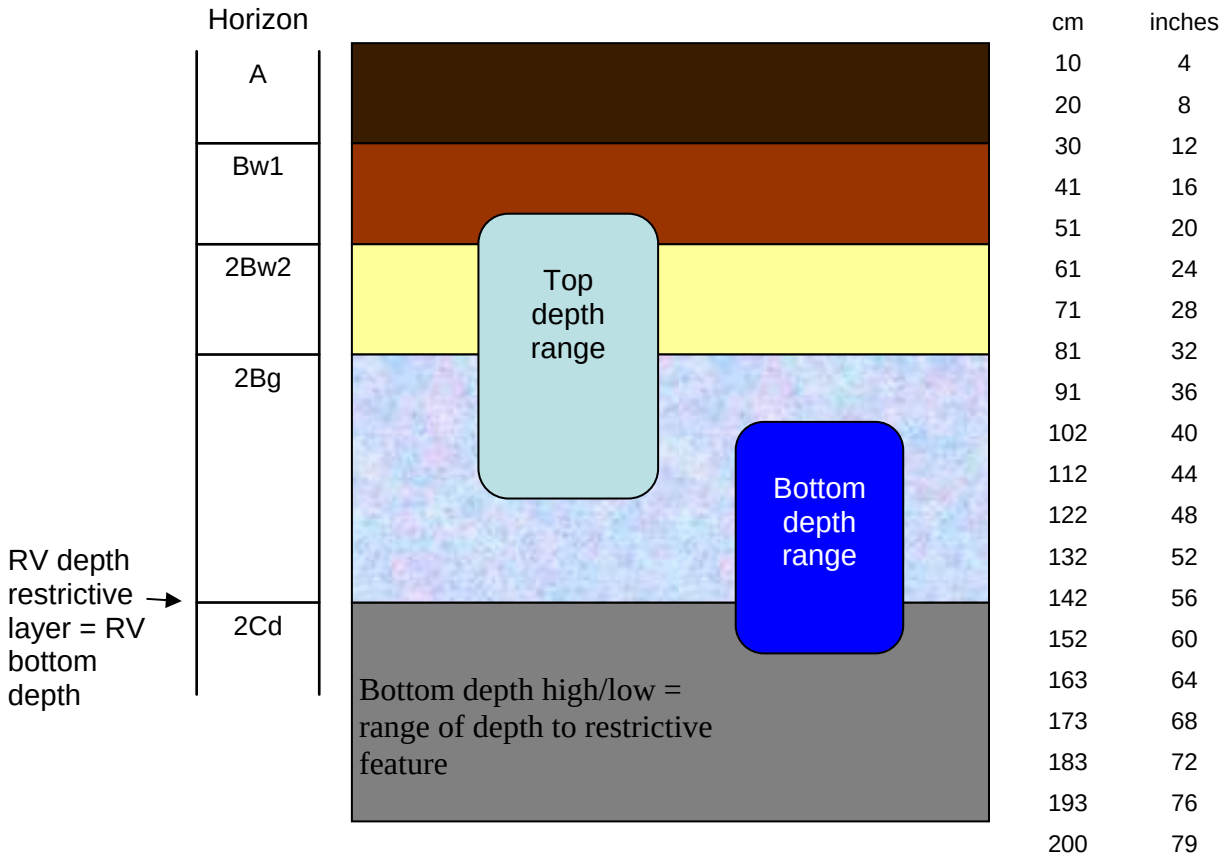
The naming strategy for the top and bottom depths ranges (e.g. top depth low) can be confusing. The following graphic illustrates the location of each data field.



Depths are distance from the soil surface, so that top depth low is shortest distance from surface and top depth high is longest distance from soil surface.

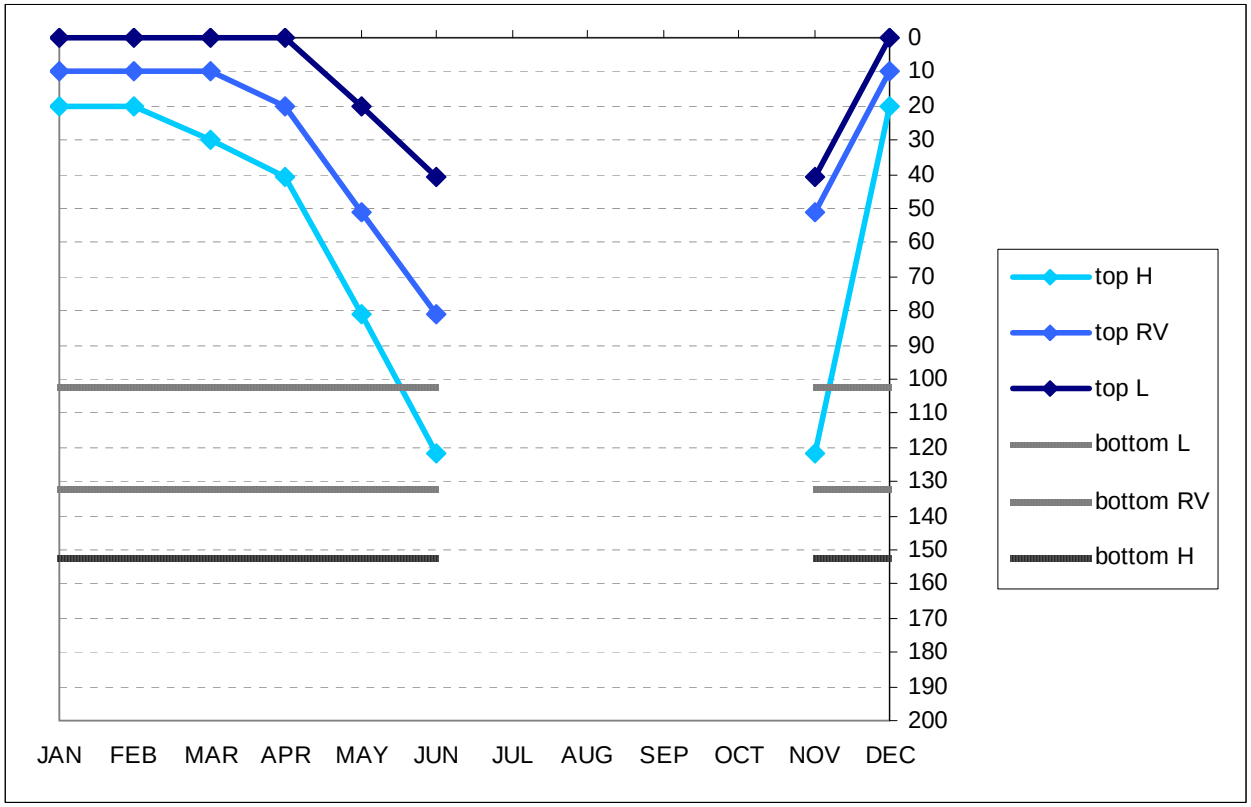
Estimate the low, RV, and H values for the upper and lower boundaries of the water table for each month of the year. Below is a graphical representation of the range in top and bottom depths to the water table. Note how the range in bottom depth in this example relates to the restrictive layer.

Example Month - January



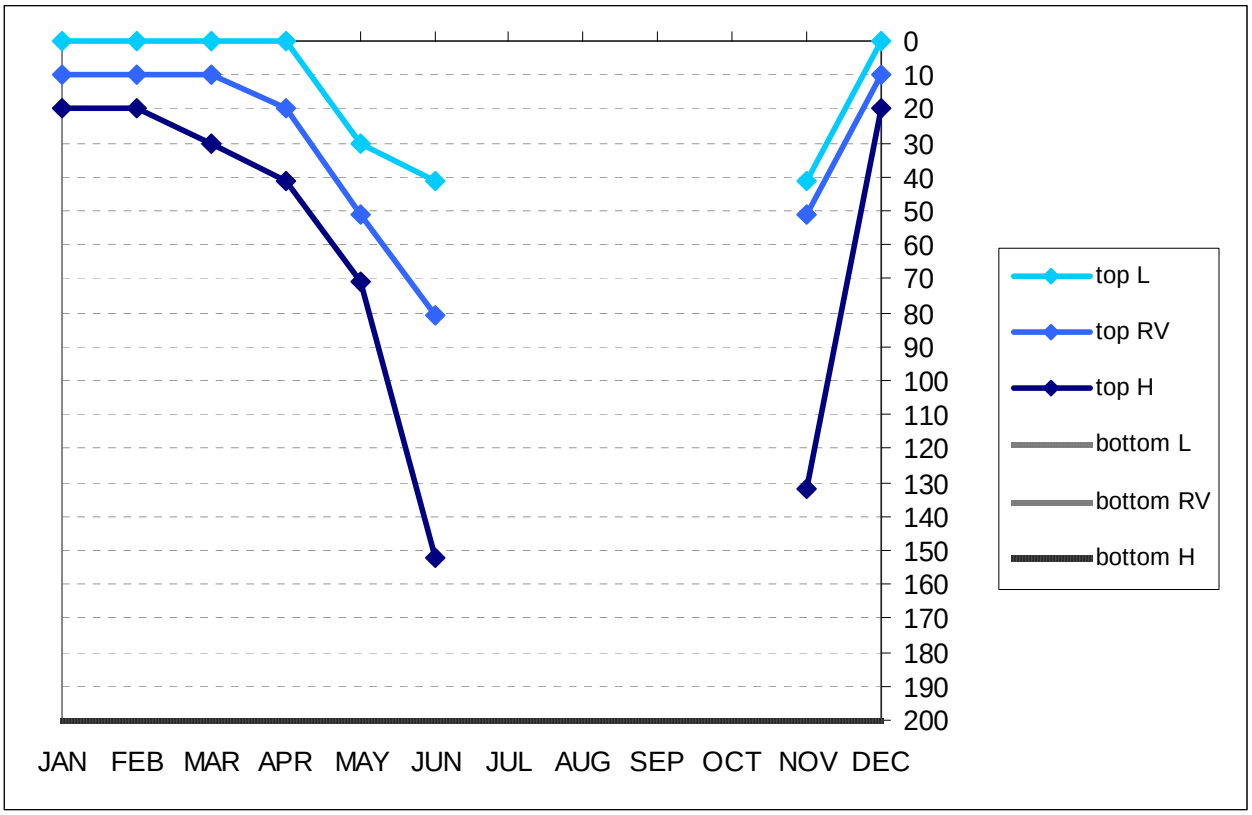
The estimates can be plotted to approximate the data. Three examples are provided, one with episaturation, one with endosaturation, and one with a combination of epi and endo saturation.

Example 1. Perched Water Table (Episaturation), note the bottom L, RV, and H depths are constant. Table following the graph illustrates the corresponding NASIS data entry.



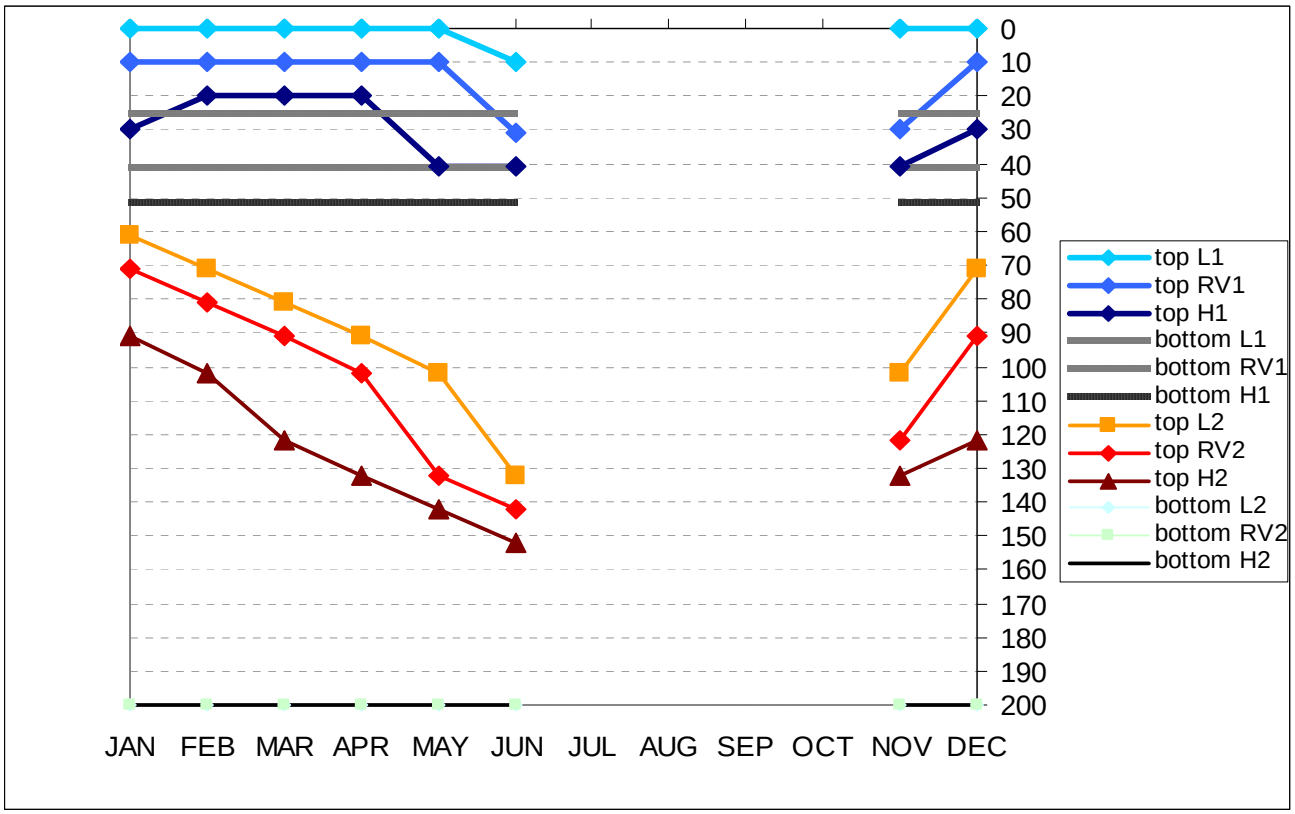
	top L	top RV	top H	bottom L	bottom RV	bottom H
JAN	0	10	20	102	132	152
FEB	0	10	20	102	132	152
MAR	0	10	30	102	132	152
APR	0	20	41	102	132	152
MAY	20	51	81	102	132	152
JUN	41	81	122	102	132	152
JUL						
AUG						
SEP						
OCT						
NOV	41	51	122	102	132	152
DEC	0	10	20	102	132	152

Example 2. Apparent water table (Endosaturation). In the figure, the horizontal lines (3) at 200 cm represent the bottom depth L, RV, and H which are all arbitrarily set at 200 cm.



	top L	top RV	top H	bottom L	bottom RV	bottom H
JAN	0	10	20	200	200	200
FEB	0	10	20	200	200	200
MAR	0	10	30	200	200	200
APR	0	20	41	200	200	200
MAY	30	51	71	200	200	200
JUN	41	81	152	200	200	200
JUL						
AUG						
SEP						
OCT						
NOV	41	51	132	200	200	200
DEC	0	10	20	200	200	200

Example 3. The graph represents the condition of more than one saturated layer in a month. This situation is uncommon in MO-1. The following is an example of how to develop data for NASIS. In some cases water tables may merge as the upper and lower saturated zones expand during the wet season. If the two zones merge, then populate only one zone of saturation. If a restrictive layer exists between the two saturated zones avoid overlapping depth ranges (two values for saturation at the same depth).



The upper three lines represent the upper range in water table. The gray horizontal lines represent a restrictive layer (such as a fragipan). The lower set of lines represents an apparent water table within 200 cm but confined by a restrictive layer above. The lines at 200 cm represent the arbitrary 200 cm depth for apparent water table bottom L, RV, and H depths (actually three lines on top of each other, see legend bottom L2, RV 2, and, H2).

Example NASIS Component Soil Moisture Table corresponding to example 3.

	top L	top RV	top H	bottom L	bottom RV	bottom H
JAN	0	10	30	25	41	51
JAN	61	71	91	200	200	200
FEB	0	10	20	25	41	51
FEB	71	81	102	200	200	200
MAR	0	10	20	25	41	51
MAR	81	91	122	200	200	200
APR	0	10	20	25	41	51
APR	91	102	132	200	200	200
MAY	0	10	41	25	41	51
MAY	102	132	142	200	200	200
JUN	10	31	41	25	41	51
JUN	132	142	152	200	200	200
JUL						
AUG						
SEP						
OCT						
NOV	0	30	41	25	41	51
NOV	102	122	132	200	200	200
DEC	0	10	30	25	41	51
DEC	71	91	122	200	200	200