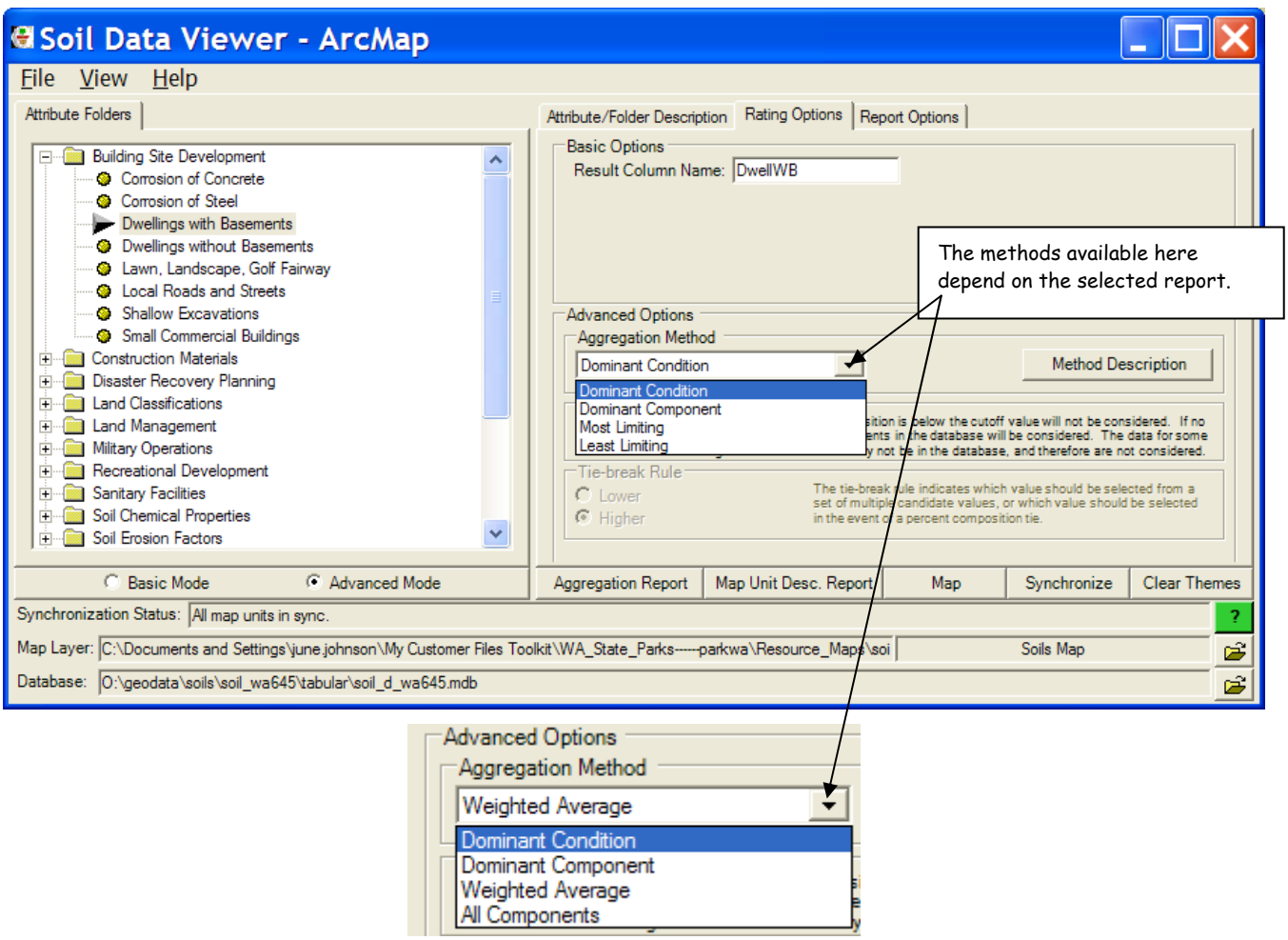
Helpful Hint—Soil Data Viewer Advanced Mode

Applies to Version:	Soil Data Viewer 5.2
Written by:	Brad Duncan Washington NRCS Assistant State Soil Scientist
Helpful Hint Date:	July 24, 2008

Background: With the release of Soil Data Viewer 5.2, you may have noticed there are several aggregation options for processing soil survey data in the ***Advanced mode***. When you select the soil interpretation to make a map or just run a report, you have several choices for the Aggregation method under the Ratings Tab in Soil Data Viewer. These are Dominant Condition, Dominant Component, Most Limiting, Least Limiting, Weighted Average, Absense/Presense, or All components. Let's take a closer look at the processing methods; there is an example towards the end that is helpful in visualizing the methods.

Procedure:

Go to the Rating Options tab and click the down arrow next to Aggregation Method.



Dominant Condition

For each component in the map unit the attributes are grouped into like rating class values. Component percent compositions are summed for each group of attributes. The attribute value with the largest percent composition is used to class the map unit. Where two or more attribute groups have equal percent composition the group with the most restrictive attribute is used. *Dominant condition is probably the most commonly used processing method if the user wants to know the general overall rating of a map unit.* *See example on page 3.*

Dominant Component

The attribute of the component with the largest percent composition is used to class the map unit. Where two or more components have equal percent composition the component with the most restrictive attribute is used. *Dominant component is very similar in how we processed our data years ago by selecting the first component (dominant).*

Most Limiting

Out of all the selected components in the map unit the component with the most limiting restriction for the interpretation is used.

Most limiting is like it sounds. The component with this *most limiting* restriction is used to rate the soil map. A user might want to use the *most limiting* option when a conservative approach for management of the soil landscape suggests that knowing the most limiting component on the landscape will aid in the decision or planning process.

An example might be – a land owner wants to irrigate a field and is very concerned about ground water quality. The majority of components that dominate the map units are deep loamy with good filter and water holding capacity. However, a minor component, a deep sand pocket, has a direct connect to ground water. In processing interpretations to protect ground water quality, the sand pocket would be the *most limiting.* If the user had processed the data using *dominant condition* the site might have returned *not limiting* results.

Least limiting

Out of all the selected components in the map unit the component with the *least limiting* restriction for the interpretation is used.

Least limiting is the opposite of *most limiting*. The component with the *least limiting* restriction is used to rate the soil map. This might be used where a land owner has the ability to site a specific application on the landscape and wants to know which soil map units have the potential of a component with the least limiting restriction for a use.

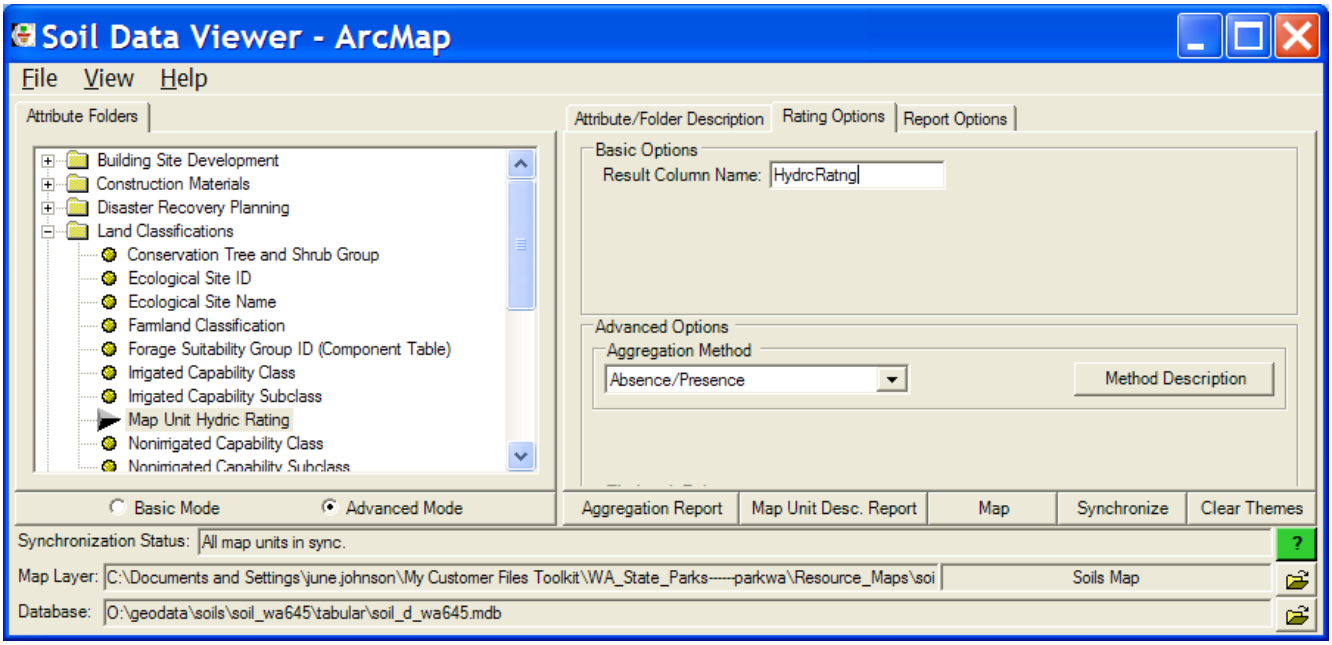
An example might be a user wants to build a house with a basement utilizing an on-site septic system. The majority of soil components in the map units in the area are *limiting* for dwellings with basements. If however, the landowner has the option of building the house and septic on any given part of the landscape, they will likely be interested in knowing if there are any map units with components that have the least restrictions.

Weighted Average

Each component's value contributes to the final answer based (weighted) on the components percent composition of the map unit. For each selected component, the numeric value is multiplied by the component percent composition. These values are summed for all selected components and represent the

weighted average value for the map unit. Examples are crop yields and forest productivity data. *Weighted average* uses the components selected to generate the rating based on the contribution the component contributes to result. The percent composition of the component is used to weight the result in processing all the components in the map unit. See example below.

Absence/Presence



All the components in a map unit are evaluated for the presence or absence of an interpretation or soil property. The map unit can be classed where the interpretation is present in all components, absent in all components, partially present in all components, or unknown. This processing method is used for the hydric soil map unit rating, i.e. **Map Unit Hydric Rating**.

Absence or presence is used to find which map units have a component with a specific result. Right now this is used for creating the hydric soil map unit rating. It evaluates all the components for hydric rating equal to yes. If all components in the map unit are yes, then the map unit is all hydric. If some of the components in the map unit are yes and some no, then the map unit is rated partially hydric. If all the components in the map unit are no, then the map unit is rated not hydric. If some components have hydric rating no and some components don't have a rating and no component is rated yes, then the map unit is rated hydric unknown. If in the last case at least one component is rate yes, then the map unit is rated partially hydric.

All Components

All the components in a map unit are evaluated for the soil property or feature. This component processing method is more commonly used for physical or chemical soil properties, flooding, ponding, or water table.

Several soil features use the all components processing method. When flooding, ponding or water table is selected the default processing method is to evaluate all components of the map unit for the specific feature.

Let's look at how a map unit rating might change depending on the processing or aggregation method chosen.

Example

Component	% Comp	Rating
Alpha	**40**	**Moderate**
Beta	**35**	**Severe**
Charlie	**20**	**Severe**
Delta	**5**	**Slight**

Dominant Component = Moderate (40 %)
Dominant Condition = Severe (55 %)
Least Limiting = Slight (5 %)
Most Limiting = Severe (55 %)

A map unit has four components – 40% Alpha, 35% Beta, 20% Charlie and 5% Delta.

If **dominant component** is processed, the rating result would be ***moderate.***

If **dominant condition** is processed, the rating result would be ***severe,*** the combination of Beta and Charlie make up 55% of the map unit.

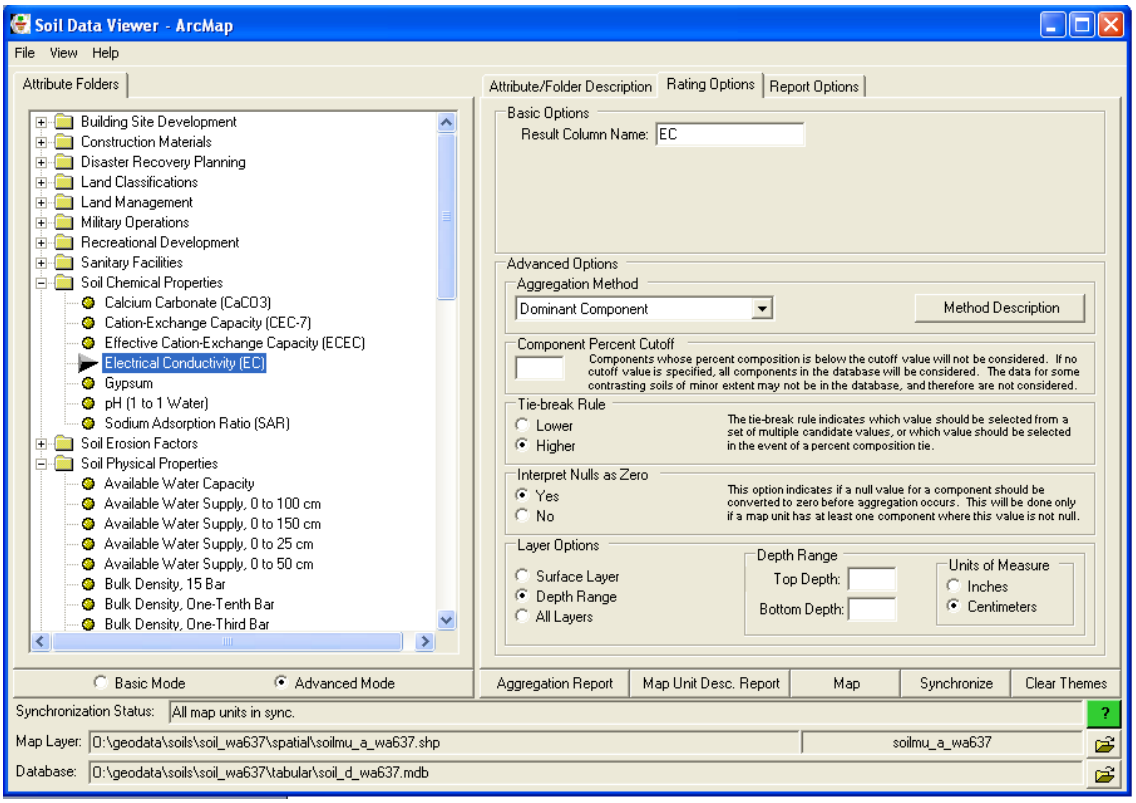
If **least limiting** processing method is selected, the rating result would be ***slight*** for the 5% component Delta.

If **most limiting** is the processing method selected, the rating result would be ***severe.***

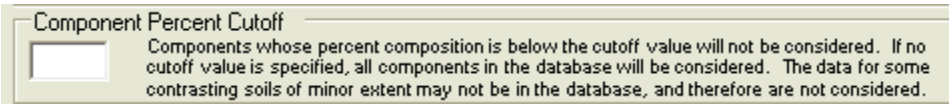
Weighted Average example (crop yield)-Alpha-Beta complex

Alpha component - 60%	40 bushels	.60*40=	24
Beta component - 40%	30 bushels	.40*30=	12
			36 divided by total percent composition = 36/1.00=36 bushels would be returned

Other features on the Rating Options tab:

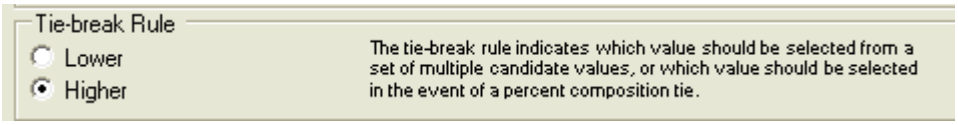


Component Percent Cutoff -



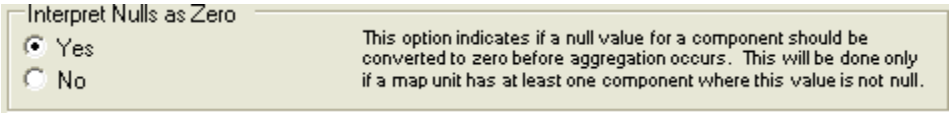
The Soil Data Viewer ignores components in a mapunit below the percent composition you enter.

Tie-Break rule –



During the aggregation process, there may be a number of points at which it is necessary to select a single value from multiple candidate values. We might be doing a **dominant component** aggregation and there are two components with 30 percent composition. We can only return one of those two values to represent the mapunit as a whole. An example might be where both components in a mapunit have 30 percent composition, one with 30% clay and the other with 50% clay. Since they have the same composition, the SDV doesn't know which value to return. You need to pick if you want the highest or lowest value to be returned (30% clay or 50% clay)

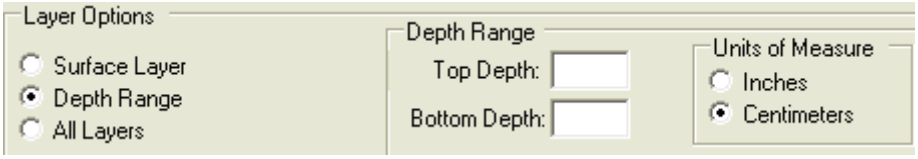
Interprets Nulls as Zero –



One of the reasons for offering this option was to produce more meaningful results when it comes to an attribute like crop yield. The default aggregation method for any crop yield attribute is **"Weighted Average".** Let's say we have a map unit with two components, each at 50 percent composition. For component 1, the yield for crop X is 100. For component 2, no yield is recorded for crop X. If the option to "Interpret Nulls as Zero" *is not set (radio button is on No)*, the yield value returned for the map unit described above would be 100. Because the crop yield value for component 2 is null, that component is not considered during the aggregation process. Therefore the component 1 effectively represents 100% of the map unit.

If the option to "Interpret Nulls as Zero" *is set (radio button is on Yes)*, the yield value returned for the map unit described above would be 50. In this case the yield value for component 2 would have been set to 0. Both components would now participate in the weighted average calculation, each contributing 50% of the result.

Layer Options



A component is typically composed of multiple soil horizons. For an attribute of a soil horizon it is necessary to specify some sort of depth qualification to indicate how much of the soil profile should be considered. When the depth qualification encompasses more than one soil horizon, a set of horizon values has to be reduced down to a single value to represent the corresponding component as a whole. We refer to this process as "horizon aggregation". You will see this come up in the *Soil Physical Properties* and *Soil Chemical Properties*.

Depth qualification can be specified in three different ways:

1. **Surface Layer** – The soil attribute value for the surface horizon serves as the value for the corresponding component. In this case there is only one value, therefore horizon aggregation does not have to be performed.

2. **Depth Range** – An upper and lower depth must be specified, in addition to units of measure (centimeters or inches). The lower depth must be greater than the upper depth, and the upper depth can be greater than zero. The specified depth range may encompass all or part of more than one soil horizon, in which case horizon aggregation may need to be performed. Note that the choice of centimeters or inches here does not alter the units displayed in the output – only the depth of soil considered.

3. **All Layers** – All soil horizons (the entire soil profile) may be considered.