

Runoff Mitigation Measures and Determining Hydrologic Soil Groups for the Enlist Herbicide Labels

The following is provided to assist applicators in complying with the runoff mitigation section of the Enlist product labels (Enlist One and Enlist Duo). The Nebraska Department of Agriculture (NDA) believes that compliance should not be too burdensome for most landowners and operators, however there will need to be communication between those individuals and the pesticide applicator if the applications are done by someone other than the landowner or tenant.

Applicators (both private and commercial) must know the Hydrologic Soil Group (HSG) for the soils on which they are applying the herbicide. HSGs are used to estimate runoff potential of a soil, and for these products they will be used to determine which mitigation measures a producer should have in place before applying them. The information below should be helpful in determining the HSGs and using that info for determining the minimum mitigation measures required. Once the HSG is determined for a field it should not change, and NDA recommends applicators keep a permanent record of the field's HSG for future reference.

For both Enlist labels, an HSG soil group A or B requires mitigation measures selected from the table provided on the label (Figure 1) to equal a minimum of four credits. For an HSG soil group of C or D, mitigation measures must be selected to equal a minimum of six credits.

For land with Hydrologic Soil Groups* A & B: The land manager/ applicator must effectively implement measures in the following tables to equal a minimum of 4 credits.		For land with Hydrologic Soil Groups* C & D: The land manager/ applicator must effectively implement the measures in the following tables to equal a minimum of 6 credits.	
Mitigation Measures		Credits	
Reduce number of applications - Reduced number of applications of Enlist products per year. Applications may be made at any time during crop development but must maintain a minimum 12-day retreatment interval.		3 applications	0
		2 applications	2
		1 application	4
Residue Tillage Management: no-till, strip-till, ridge-till, and mulch-till		4	
Vegetative Filter Strips	30 ft off-field vegetative buffer on down slope	HSG A or B	2
		HSG C or D	0
	100 ft off-field vegetative buffer on down slope	HSG A or B	4
		HSG C or D	1
Field border: border with dense vegetative stands with a minimum width of 30 ft.		2	
Cover Crop		2	
Vegetative Barrier: Permanent strips of dense vegetation along the contours of the field with a minimum width of 3 ft.		2	
Contour Buffer Strips or Terrace		2	
Grassed Waterway		2	
Water and Sediment Basin		1	
Contour Farming or Contour Strip Cropping		1	

*Hydrologic Soil Group (HSG) definitions: A = Sand, loamy sand, or sandy loam; B = Sandy clay loam; C = Silt loam or loam; D = Clay loam, silty clay loam, sandy clay, silty clay or clay.

Figure 1. Screenshot of the Enlist One label, which lists mitigation measures that may need to be implemented to reduce runoff risk, depending on the HSG.

For many sites, even with C and D soils, a combination of residue management and reducing the number of applications will be enough to comply with these directions for reducing herbicides in runoff. See more information, including the definitions of the mitigation measures from the table above, at www.Enlist.com/mitigationmeasures.

A relatively simple way to determine the HSGs at your application site is to use the USDA Web Soil Survey at <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm> (Figure 2). Click on the green button labeled "START WSS".

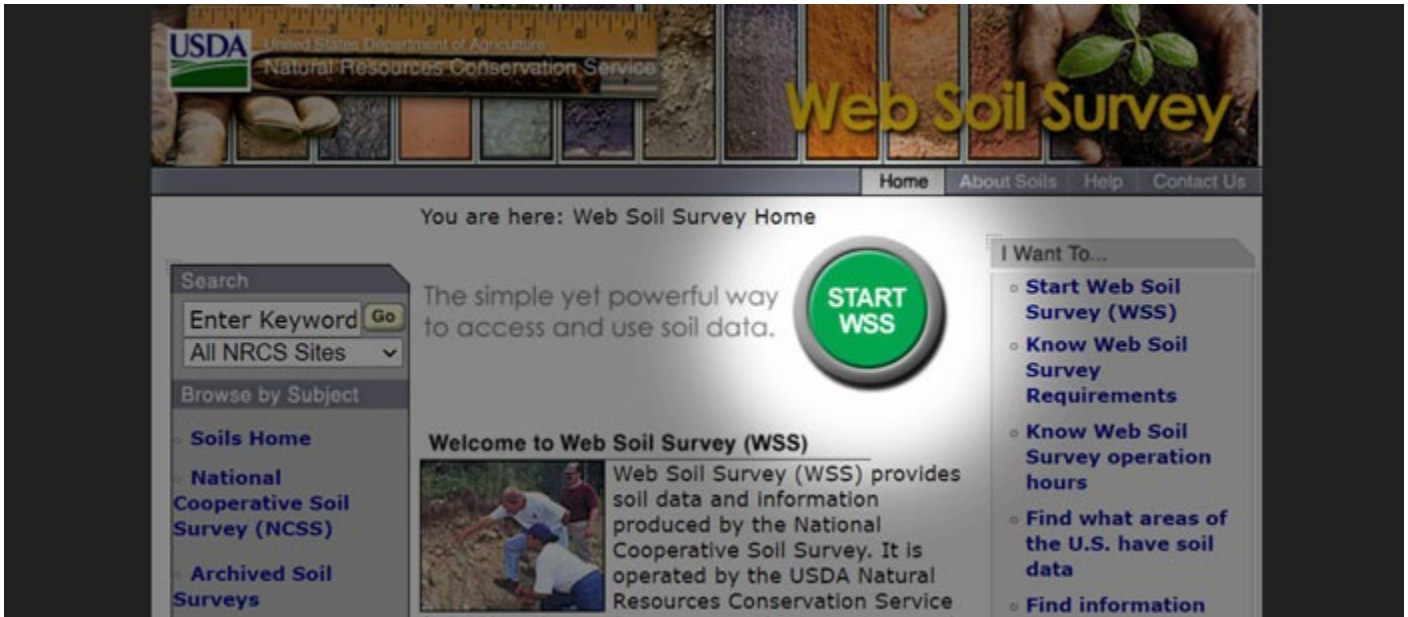


Figure 2. Screenshot of the USDA NRCS Web Soil Survey Home Page

This takes you to a map of the United States (see Figure 3). Click on the zoom icon (magnifying glass with a plus sign) and use the cursor to draw a rectangle around Nebraska or search for a specific address under "quick navigation" on the left-hand side.

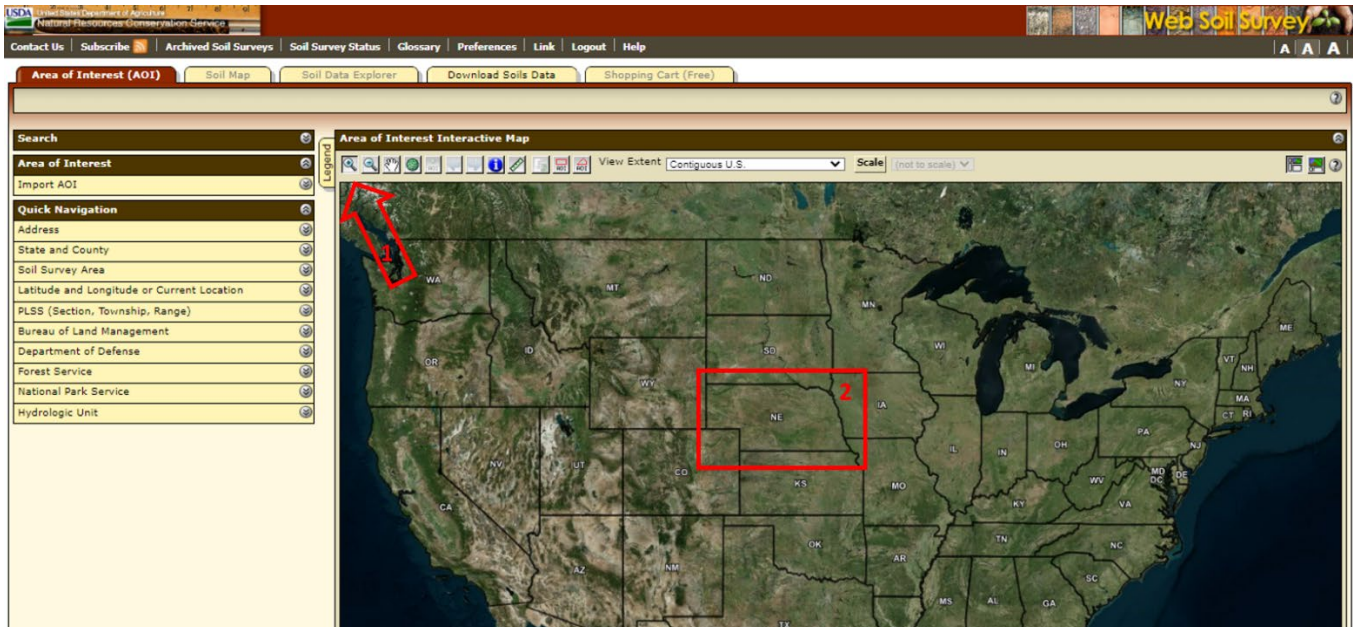


Figure 3. Screenshot of the map for the Web Soil Survey.

A zoomed map of Nebraska will appear (Figure 4). From here, continue zooming your way toward your property by drawing increasingly smaller boxes until you recognize the field to be sprayed.

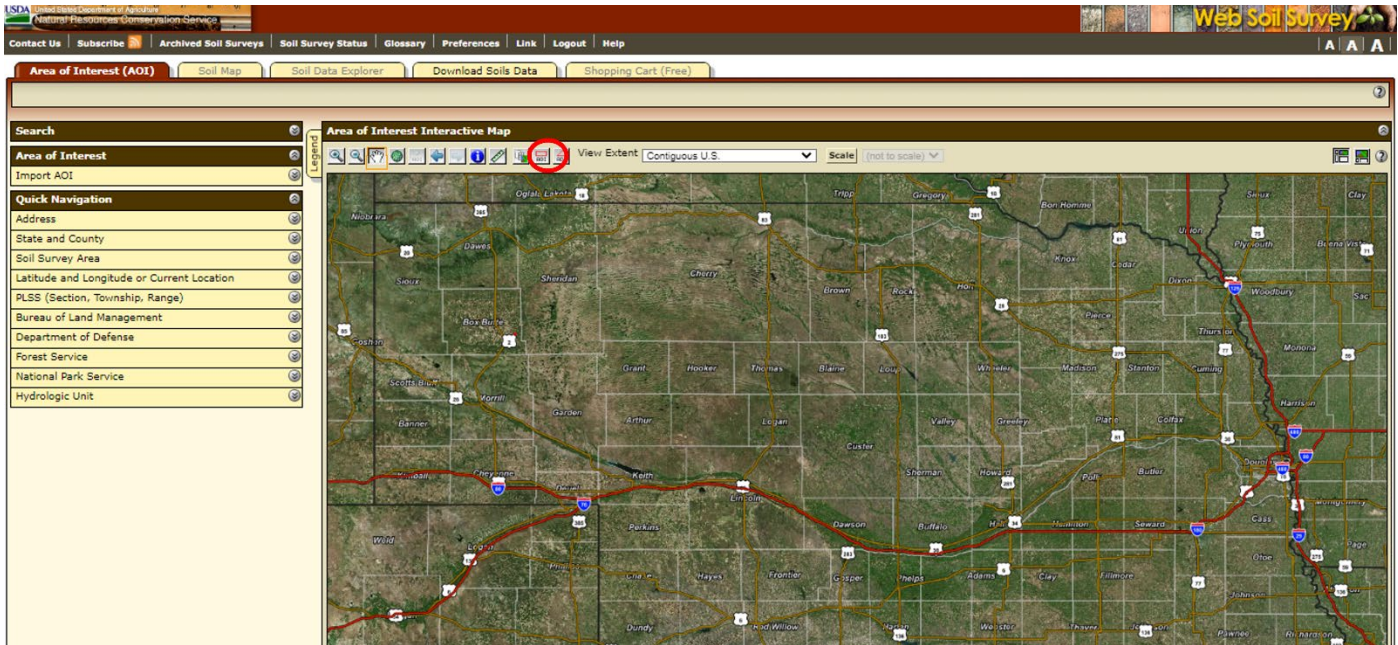


Figure 4. Use the interactive map to zoom in and find the field of interest.

Once you zoom in to your property, click the AOI (area of interest) icon (circled in Figure 4 above) and use the cursor to surround the field you plan to spray.

Now you have captured your work area giving you access to soil data specific to that area. Your AOI should appear and be shaded like the example in Figure 5.

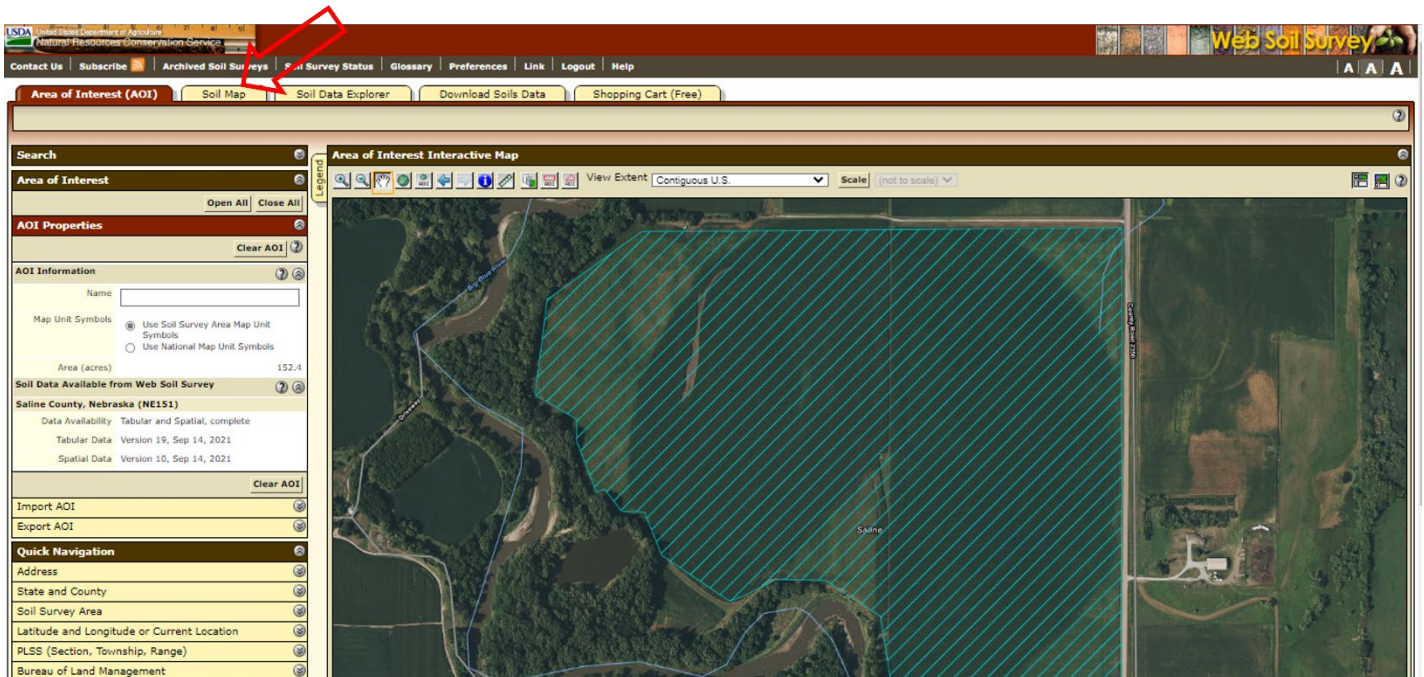


Figure 5. The field to be sprayed has been selected as an AOI (area of interest).

Now you can click on the "Soil Map" tab at the upper left to create a soil map of your work area (highlighted by the arrow in Figure 5). Note the numbers within the polygons (irregularly shaped outlines) of the field you plan to spray and click on the corresponding soil series in the table on the left of the screen, as shown in Figure 6.

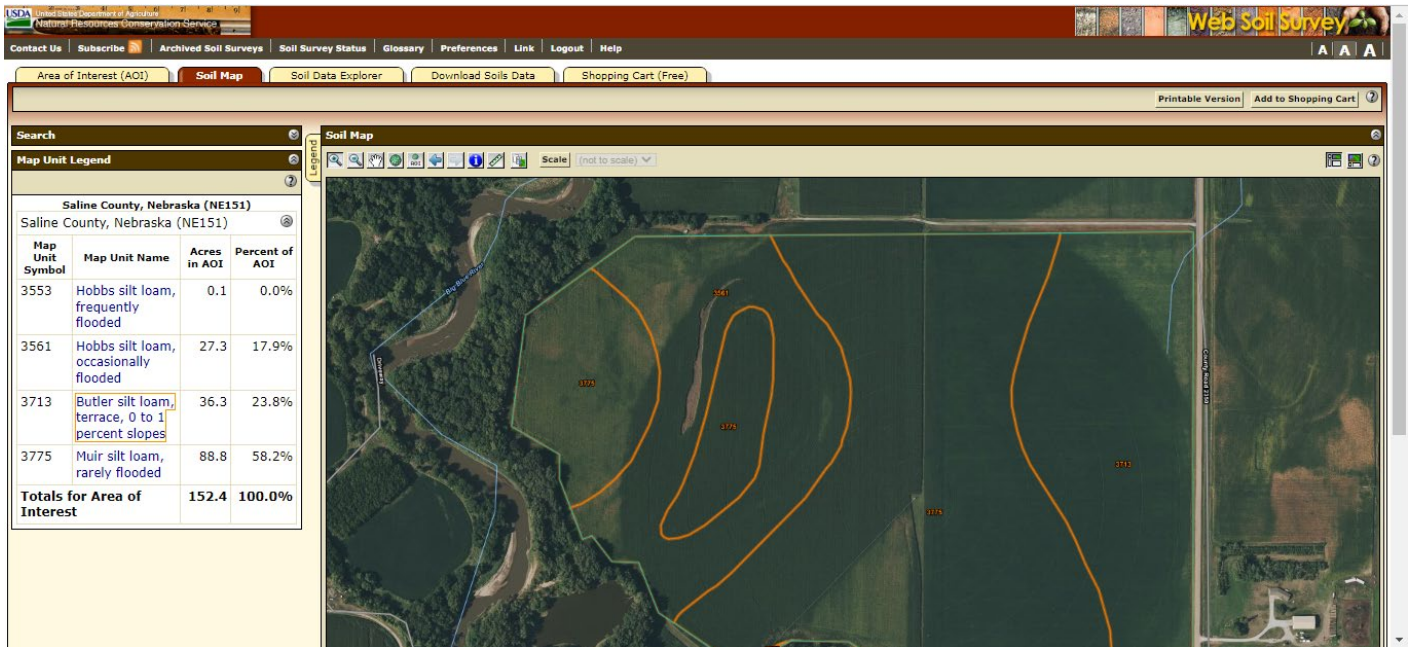


Figure 6. Example of a soil map for a hypothetical field to be sprayed.

In this example, there are several soil map units in this field, each corresponding to a map unit description in the box. Clicking on the hyperlinked text of each map unit will open a pop-up with additional narrative descriptions. Near the bottom of each narrative is a listing of "interpretive groups" including the HSG. Three of the four map units in this field are in HSG B (Figure 7).

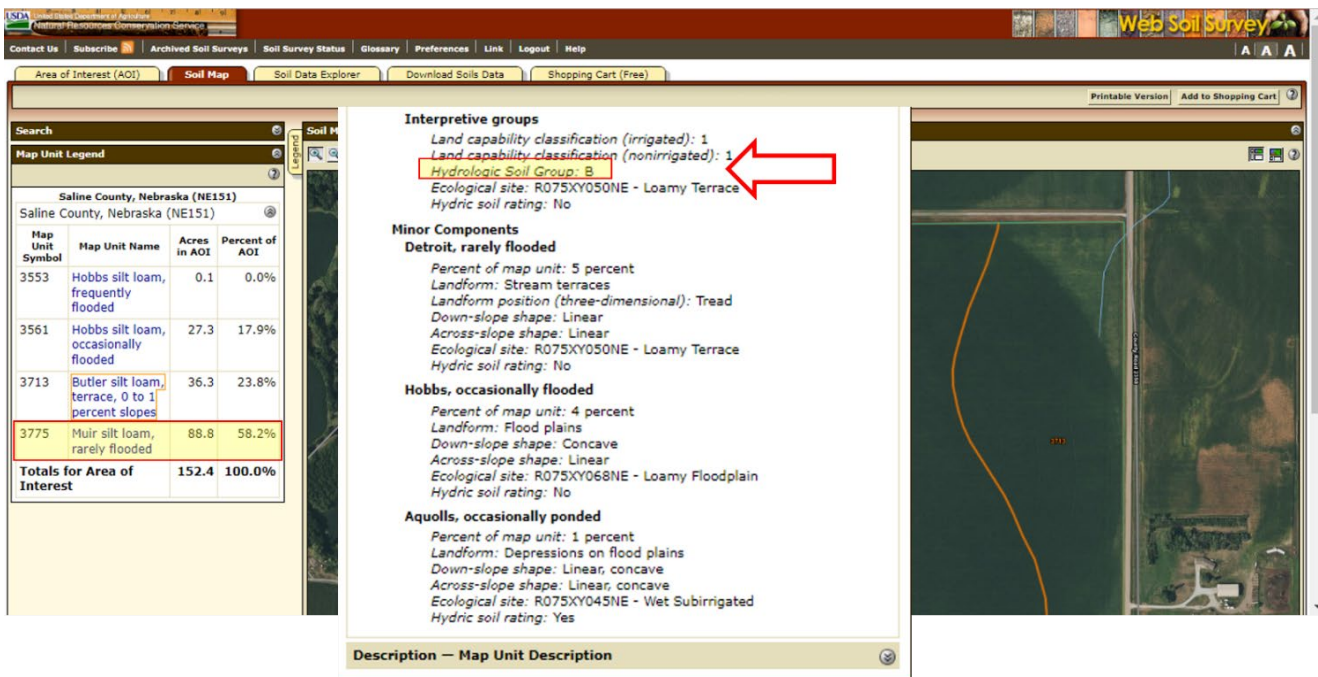


Figure 7. Identification of the hydrologic soil group (HSG) for the field.

Caution: While the Enlist label has an asterisk under the table that "defines" HSGs by soil texture, this is a generalization. Often a silt loam can be either HSG C or D, while a loam can be HSG A or C. While following the general guide on the label should suffice for label compliance, the most accurate method is to use the Web Soil Survey method outlined above to get site-specific data.

Additionally, some soils are listed in dual groups such as B/D. The first letter refers to the HSG in a drained condition, such as a field with a tile drain system, while the second letter indicates the HSG of the soil in its undrained, or natural condition.

Another consideration is what to do if your field includes multiple HSGs, as in this example. We are currently working to get a better understanding on this issue. For now, a conservative approach is recommended. To limit liability, NDA recommends using the most limiting HSG to calculate mitigation measures. In other words, if a field is interlaced with HSG A or B and C or D, calculate your mitigation measure score based on HSG C or D, which are more restrictive than A or B soil groups.

To get a map and table of the HSGs for your application area, you are just a few of clicks away. Follow the arrows shown below in Figure 8 in the numerical order indicated to get a color-coded map by HSG. That is: 1) click "soils data explorer" > 2) "soil properties and qualities" > 3) "soil qualities and features" > 4) "Hydrologic soil group" > 5) "view rating".

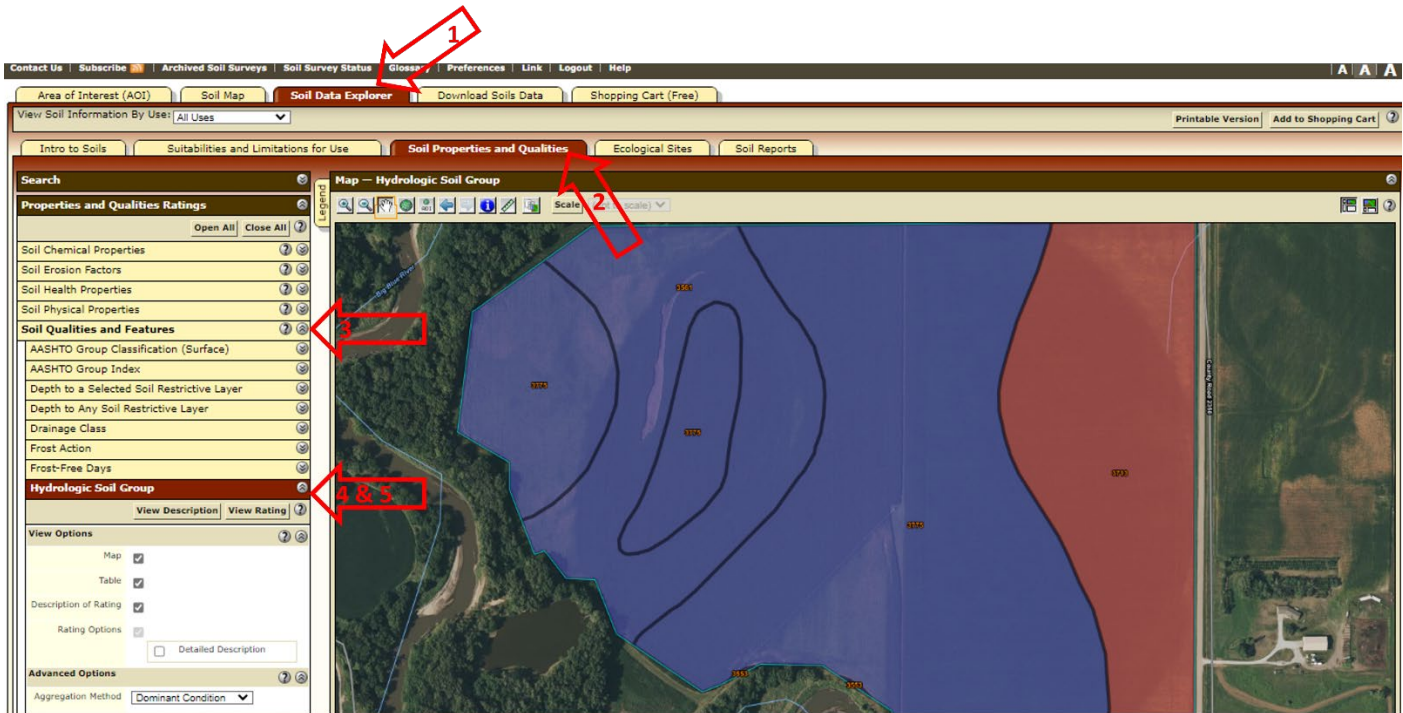


Figure 8. Example soil map with HSGs color-coded.

Scroll down below the map to see the table of the map units, HSGs, and the percentage of each in your area of interest (Figure 9 below).

Summary by Map Unit — Saline County, Nebraska (NE151)				
Summary by Map Unit — Saline County, Nebraska (NE151)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3553	Hobbs silt loam, frequently flooded	B	0.1	0.0%
3561	Hobbs silt loam, occasionally flooded	B	27.3	17.9%
3713	Butler silt loam, terrace, 0 to 1 percent slopes	D	36.3	23.8%
3775	Muir silt loam, rarely flooded	B	88.8	58.2%
Totals for Area of Interest			152.4	100.0%

Description — Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options — Hydrologic Soil Group

Aggregation Method: Dominant Condition
Component Percent Cutoff: None Specified
Tie-break Rule: Higher

Figure 9. Example soils group list and HSG descriptions.

You can easily export a PDF copy of the map and table for later reference by clicking the “printable version” button in the upper righthand corner of your view (circled in Figure 10 below). If you have multiple fields or application areas, you can give each one a map title for reference, which may be useful to send to the applicator and/or landowner/operator.

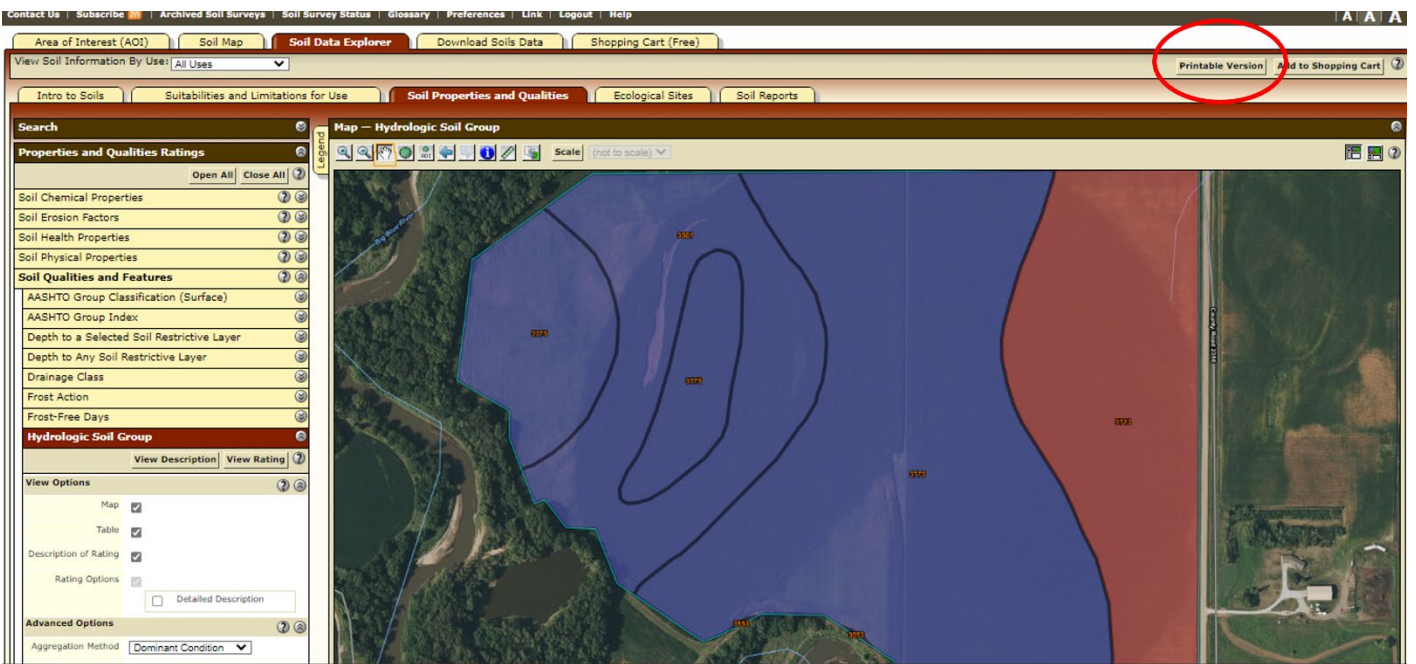


Figure 10. Example map with export or print button circled.