USDA United States Department of Agriculture

Natural Resources Conservation Service
Soil and Plant Science Division

Raster Mastery

Pixelicious Tips for the DSM Practitioner

Issue 1

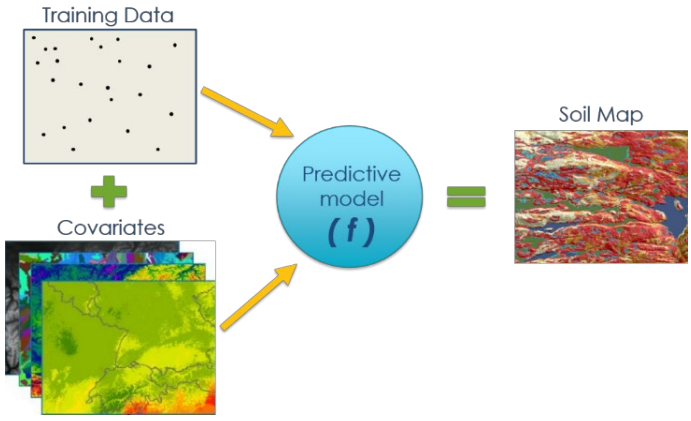
Digital Soil Mapping—The What and Why

Welcome

Raster Mastery will be gracing your inbox with tidbits, hot tips, and how-tos on all things digital soil mapping on a regular basis, but not too often. If you have ideas for topics to cover or want to opt-in or out, give a shout to raster master Jessica Philippe, jessica.philippe@usda.gov. If you have pixel-loving friends, please share!

What is Digital Soil Mapping?

Digital soil mapping (DSM) isn't about digitizing polygons…It's way more fun than that! In fact, the process is done entirely with raster-based data sources combined with point observation data, and it results in a raster-based map. Each pixel or grid cell in the resulting map will have either a soil class value (think soil map unit or component) or a soil property value (think pH or clay content), depending on whether you set out to predict soil classes or continuous soil properties in your project.

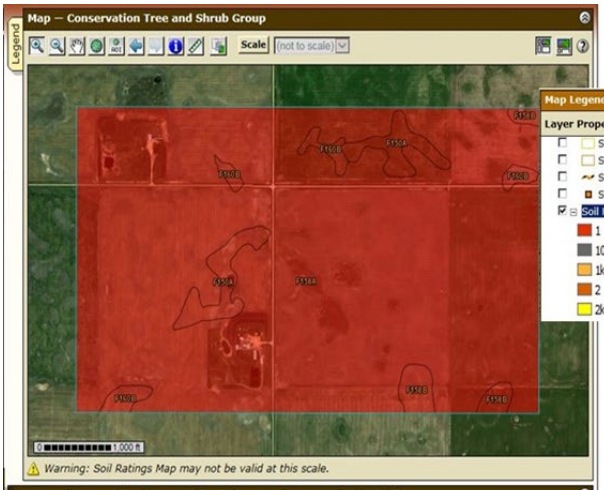


The academic definition: the generation of geographically referenced soil databases based on quantitative relationships between spatially explicit environmental data and measurements made in the field and laboratory (McBratney et al., 2003).

The working definition: the spatial prediction of soil classes or properties from point data and environmental raster data using a statistical algorithm.

Why Digital Soil Mapping?

DSM is an attractive approach to soil mapping because it allows soil scientists to use a flexible, quantitative framework to create a soil map. This quantitative framework allows for documentation of tacit knowledge, reproducible and consistent results, and easy generation of accuracy and uncertainty measures for the final map product. That's an upgrade for soil survey! The DSM framework and resulting maps can be applied to all soil survey activities: initial mapping, update mapping, generating interpretations, and assessing risk. This allows for flexibility and more rapid response to a changing environment of user needs.



Tables — Conservation Tree and Shrub Group — Summary By Map Unit

Summary by Map Unit - Renville County, North Dakota (ND075)

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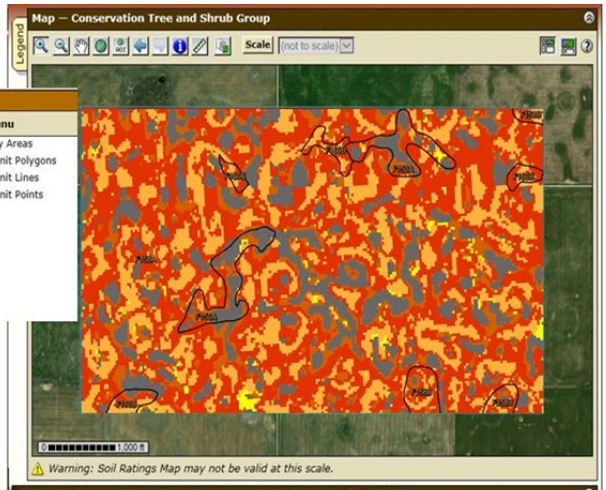
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
F150A	Hamlet-Tonka-Wyard complex, 0 to 3 percent slopes	1	24.9	3.8%
F158A	Hamlet-Souris-Tonka complex, 0 to 3 percent slopes	1	600.1	92.2%
F158B	Hamlet-Souris-Tonka complex, 0 to 5 percent slopes	1	12.9	2.0%
F160B	Hamlet-Souris-Balaton loams, 1 to 5 percent slopes	1	12.6	1.9%
Totals for Area of Interest			650.5	100.0%



Tables — Conservation Tree and Shrub Group — Summary By Map Unit

Summary by Map Unit - Northern Black Glaciated Plains, Souris Till Plain (SS55A_1)

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Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
F1004B	Souris loam, 1 to 4 percent slopes	1kk	133.6	20.5%
F1003A	Hamlet loam, 1 to 3 percent slopes	1	276.2	42.5%
F1007A	Wyard loam, 1 to 3 percent slopes	2	77.5	11.9%
F1001B	Balaton loam, 1 to 4 percent slopes	1kk	30.0	4.6%
F1002A	Hamerly loam, 0 to 2 percent slopes	2kk	8.3	1.3%
F1005A	Svea loam, 1 to 4 percent slopes	1	11.8	1.8%
F1006A	Tonka silt loam, 0 to 2 percent slopes	10	113.2	17.4%
Totals for Area of Interest			650.5	100.0%

Get involved!

Check out the DSM Focus Team website here to learn more and find out how you can participate. Contact Suzann Kienast-Brown suzann.kienast@usda.gov for more info or questions.

References

McBratney, A.B., M.L. Mendonça-Santos, and B. Minasny. 2003. On digital soil mapping. Geoderma 117:3-52.