

Introducing a New Index of Soil Wetness, and its Potential as a Landscape/Landform Visualization Tool

Background

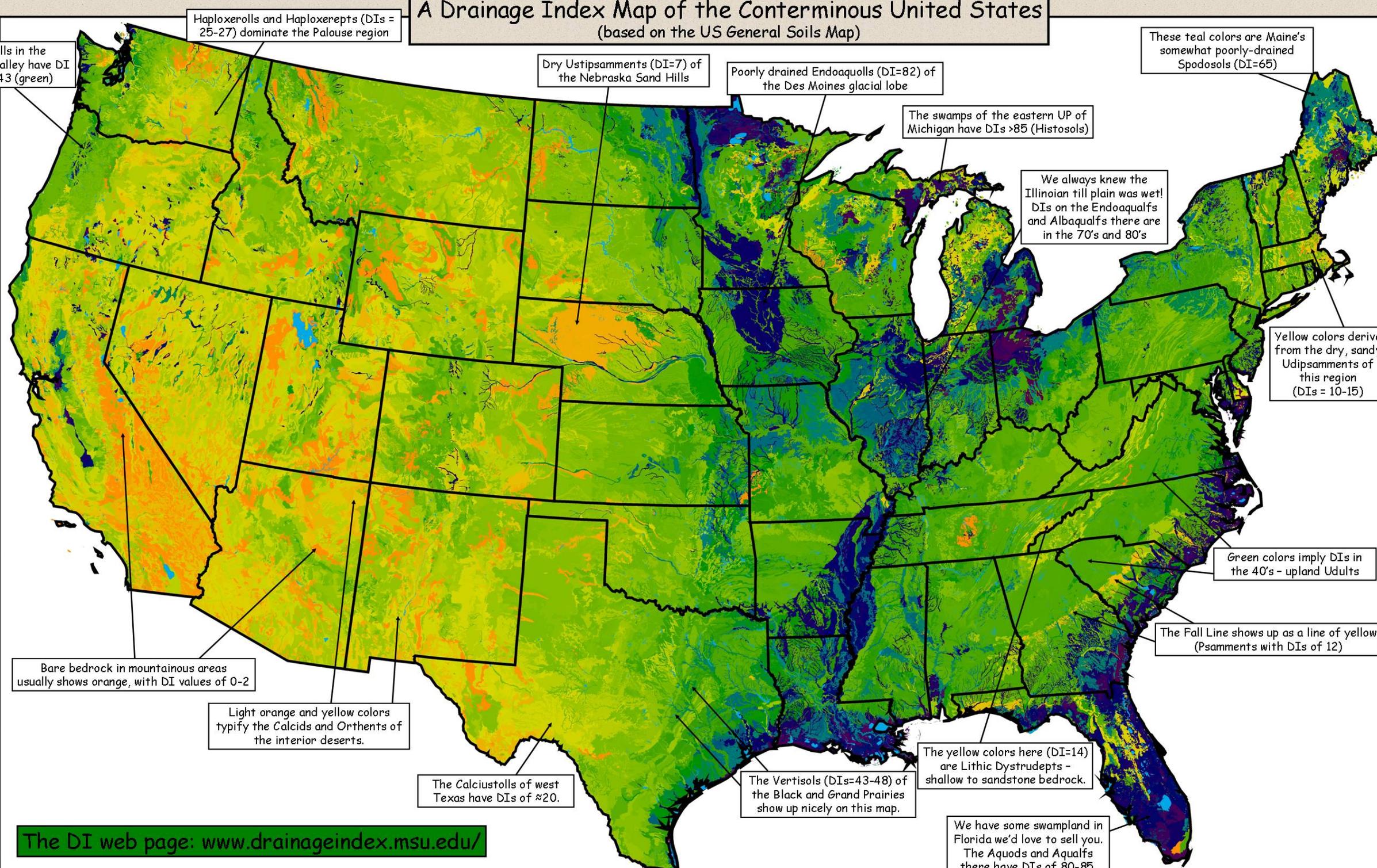
We apply an ordinal based, **Natural Soil Drainage Index (DI)**, intended to reflect the amount of water that a soil can supply to growing plants under natural conditions, to the US General Soil map. The result is a map of **soil wetness** in the lower 48 United States. The DI ranges from 0 for the very driest soils and exposed bedrock, to 99 for areas of open water. It can be calculated for any soil by knowing its taxonomic subgroup and, if GIS applications are desired, map unit slope. The DI mainly operates on the assumption that soils in drier climates and with deeper water tables have less plant-useable water, other things being equal. The soil's natural drainage class and soil moisture regime figure prominently in the DI calculation. The index has many applications in the geosciences, forestry, ecology, geography, and environmental modeling, especially when examined spatially in a GIS. DI values for all soils currently classified by the Natural Resources Conservation Service can be accessed from the DI web site: <http://www.drainageindex.msu.edu/>

Reference: Schaetzl, R.J., Krist, F.J., Jr., and K.E. Stanley. The Natural Soil Drainage Index - An ordinal estimate of water availability in soils. Soil Sci. Soc. Am. J. (under review).

A Drainage Index Map of the Conterminous United States (based on the US General Soils Map)



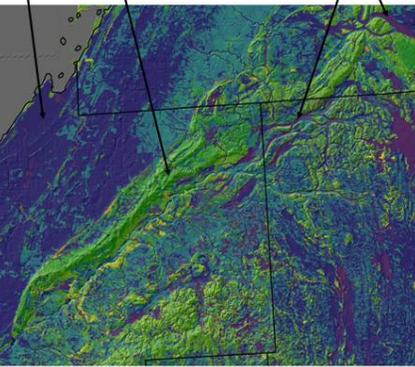
Aquic
Udic
Ustic
Torric



The DI web page: www.drainageindex.msu.edu/

This graph illustrates how DI values correlate to our color ramp, and the various soil taxonomic subgroups.

When draped over a DEM, a soils map with the standard DI color ramp does an excellent job of illustrating the effects of topography on soil wetness. This example, from Michigan's Thumb region, nicely shows the wet (dark blue) soils of the Glacial Lake Saginaw lake plain, the well-drained (green) soils of the Par-Huron moraine, and the incised spillway channels just to the SE of the moraine. Used in this way, DI maps may provide new insight into landscape evolution.



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