A Primer on Wisconsin Soil Classification

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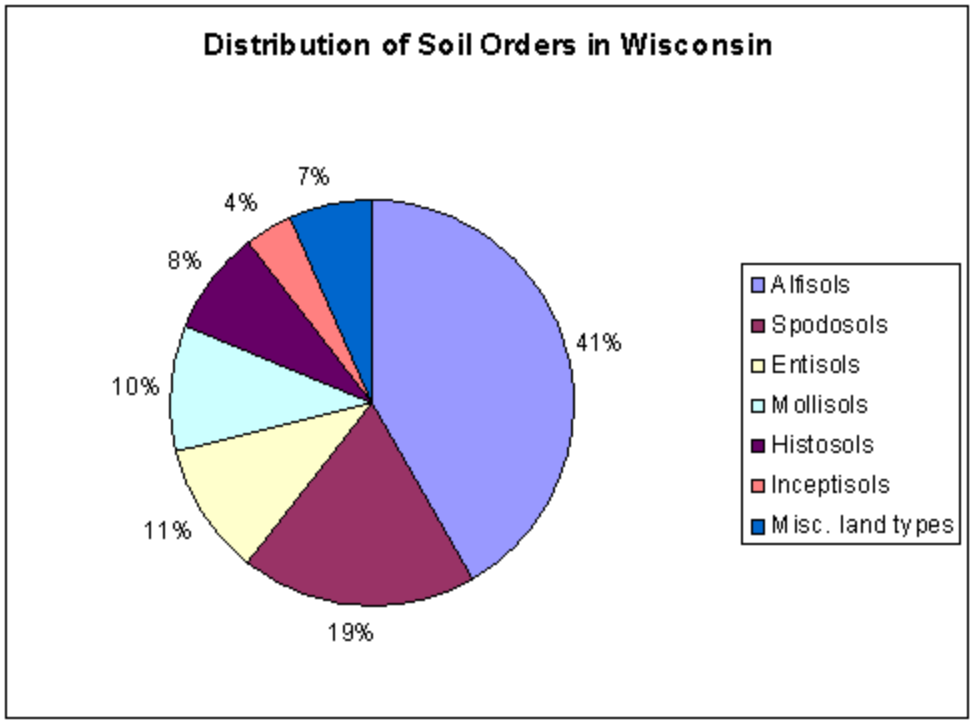
Soils play an important role in Wisconsin's economy, particularly in agriculture and forestry. Soils are also used to recycle wastes onsite as in septic systems and from landspreading of municipal effluents and sludges. The amazing world of the soil was captured in a display, "Dig It! The Secrets of Soil," at the Smithsonian National Museum in Washington, D.C. Gov. Jim Doyle declared 2006 the "Year of the Soil" in Wisconsin when soil mapping in the state was completed.

In the United States, soils are classified into orders, suborders, great groups, subgroups, families, and series. Soils are classified into 12 orders that are differentiated on the basis of key soil-forming processes and diagnostic soil layers or materials. We have seven of those orders in Wisconsin (Fig. 1).



Most of our soils (42%) are Alfisols, which are low-acidity soils with clay-rich subsoil occurring under broad-leaved forest vegetation such as oaks and hickories. Mollisols (from "soft"), which comprise 10% of the state land area, originally developed under grassland vegetation and have mostly been converted to crops. These two soil orders, the Alfisols and the Mollisols, contain our most productive soils. Nearly 19% of our soils are classified as Spodosols (Greek, meaning "wood ash"), the acidic forest soils with iron-rich subsoil. These soils occur primarily in the northern half of the state under coniferous and mixed coniferous and deciduous vegetation. Entisols (from "recent") are poorly developed soils derived from sand dunes, river sediments, and other young or active soil parent materials; these soils comprise 11% of the state land area. Histosols (organic soils) comprise 8% of the state soil area. The Inceptisols (from *inceptum*, or beginning) are weakly developed soils that are only slightly more developed than the Entisols accounting for 4% of the state land area; "miscellaneous" soils comprise the remaining 6%. Our seventh soil order contains one soil that is more commonly seen in southeastern USA—the Ultisols. This soil, the Siouxcreek series, is derived from a thin layer of wind-blown silt called loess that overlies sandstone that has been altered to reddish clay-rich material. This series occupies only 600 acres and occurs primarily in Barron County.

Wisconsin soils retain features of past environments. For example, highly weathered bedrock in the Driftless Area has features of Oxisols—tropical soils that existed in Wisconsin more than 500 million years ago. At the conclusion of the last glaciation approximately 12,000 years ago, permafrost-affected soils (Gelisols) existed throughout Wisconsin. Vertisols, soils subject to shrinking and swelling because of high amounts of clay, do not occur in Wisconsin. However, there are five soil series with Vertisol-like features, including the Alango, Bergland, Indus, Lerch, and Miskoaki, all of which occur on clayey sediments in northwest Wisconsin.

Soil orders are subdivided into suborders primarily on the basis of soil climate. There are 64 suborders in the world, of which 20 occur in Wisconsin. Soil suborders are subdivided into great groups from key soil properties. There are 325 great soil groups in the world, with 50 existing in Wisconsin. Soil great groups are subdivided into subgroups based on their linkage to other soil units. There are approximately 2,400 soil subgroups in the world, with about 200 in Wisconsin. Subgroups are further grouped into families from key soil properties that are important for plant growth. There are about 7,500 soil families in the world, with approximately 300 occurring in Wisconsin. About 19,000 soil series have been distinguished in the world thus far, with 838 existing in Wisconsin. A soil series is a group of soils with similar properties that can be mapped in units as small as 5 to 10 acres. The Antigo silt loam (Fig. 2), our state soil, is a soil series found in central Wisconsin that is used for agriculture, grazing, and forestry. The most widespread soil series in Wisconsin is the Fayette at 700,000 acres.

Normally soil series are named for the geographic location of where they are most typical, commonly villages and cities. Some soil series in Wisconsin have unusual names, such as Billyboy (a flowage in Sawyer County), Boguscreek (a creek in Pepin County), Sconsin (a "coined" shortened rendition of Wisconsin), Chinwhisker (named in Michigan), and Foxpaw (a Michigan lake). The soil series, Nuxmaruhanixete, means "ice-land-moving river" in the Ho-Chunk language and is found in Richland County.

Readers can obtain detailed information on soils from the website: http://soils.usda.gov. Official soil descriptions and mapping extent of Wisconsin soil series can be accessed from the website: http://soils.missouri.edu/soilseries.asp?st=WI.