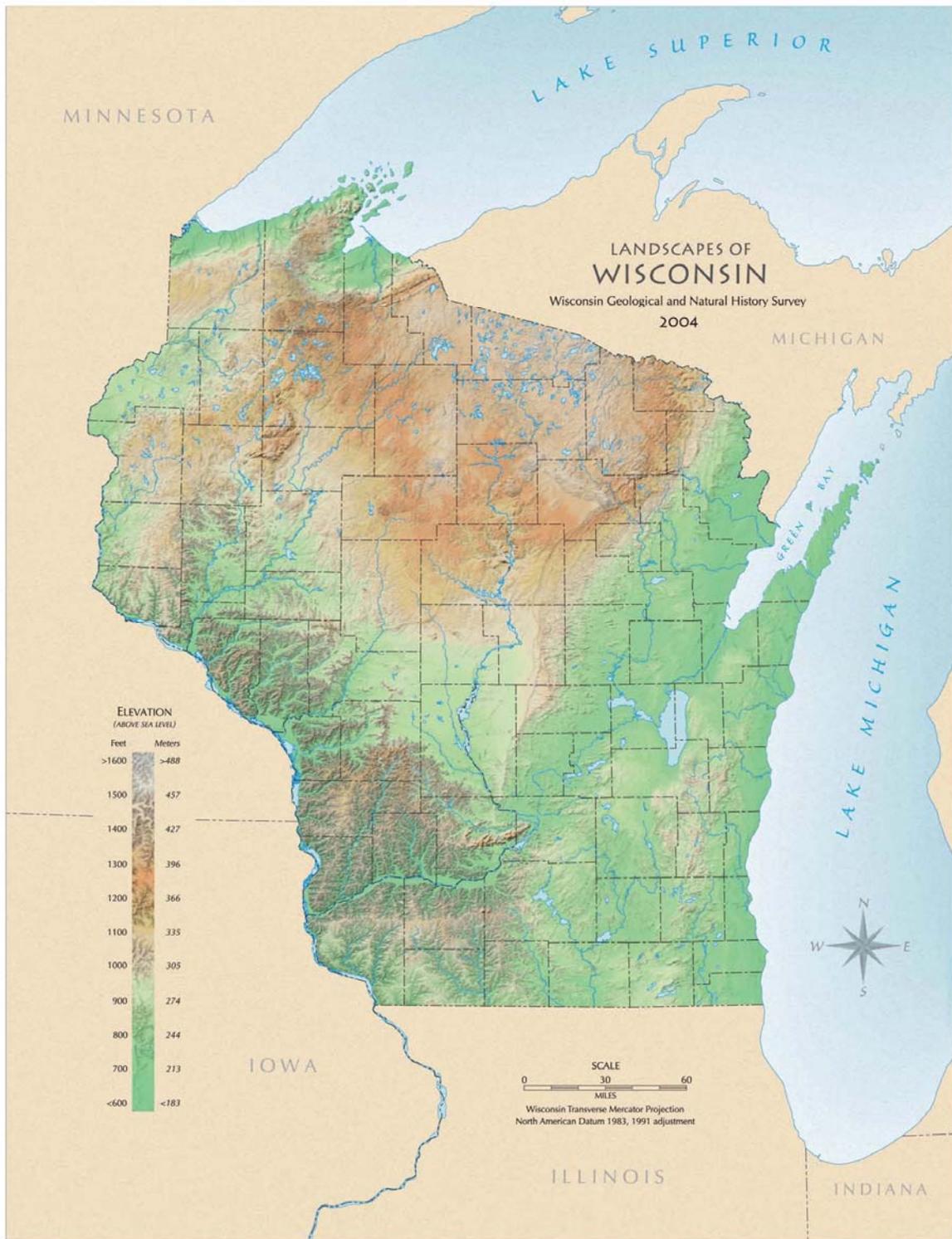




Soil formation is a complex process involving a number of variables including parent material, mode of deposition, climate, time, water table position, erosion, and geography. In Wisconsin, glaciation has had a major impact on soil development, and soil distribution. This can be seen by comparing maps of glacial activity in the state with those showing soil distribution. In addition, glaciation and the corresponding soil distribution and development have played a major role in development of the landscapes of Wisconsin. [Figure 1](#), “Landscapes of Wisconsin” (<https://wgnhs.uwex.edu/pubs/m146/>), presents a map of Wisconsin stripped of vegetation and human influences that illustrates the topography of the state. Despite the complexity and variability of soil development, the soils of Wisconsin can be divided into a few broad groups.

Figure 1



3-5.1 Glacio-fluvial Soils

This group includes soils developed in sandy material carried, sorted and deposited by glacial melt water. Large areas of these soils are found on outwash plains fronting both terminal and recessional moraines. Smaller areas of these soils are found as melt water features in glacial till deposits. These soils are also common on valley trains along major rivers that carried large volumes of glacial melt water such as the Wisconsin, Chippewa, and Mississippi Rivers. Extensive areas of glacio-fluvial soils are found throughout the central, northern, and northeastern parts of the state. Because of their association with glacial outwash plains, these soils are often called outwash soils.

3-5.2 Glacial Till Soils

This is a large and diverse group of unsorted soils, more or less dropped in place as the glacier waned. Till is defined as non-sorted, non-stratified sediment directly deposited by a glacier. Till can be composed of a variety of particle sizes from clay-sized up to large boulders. Tracts of water-sorted glacio-fluvial soils are often intermixed with till soils. There is considerable textural variation in the till soils across the state, reflecting the direction of glacial movement and the underlying bedrock along the path of movement. In general, till soils in the southeast area tend to be silty, while those in the south central area are more of a silt/sand mixture. Sandy till soils predominate in the central and east central areas. In the east from the Fox River valley to Lake Michigan, reddish silt/clay soils are common. Till soils in the far north east and the north central area tend to be a silt/sand mixture, while those in the northwest are more silty.

3-5.3 Lacustrine Soils

These soils have developed in material accumulated as bottom deposits in now-extinct glacial lakes. These glacial lakes ranged in size from small local features only a few acres in size, to large bodies of water occupying areas of hundreds of square miles. There can be considerable textural variation in these soils resulting in distinct layering in the soil profile. Depositional factors affecting texture of the deposits include season of the year, texture of the adjacent till, and distance from the shoreline or ice front. As a result, layers of sand, silt, or clay may be found in lacustrine soils. The principal areas of lacustrine soils in the state occur in the beds of the major glacial lakes including Glacial Lake Wisconsin in the central area, Glacial Lake Oshkosh in the east central area, and in the lowlands adjacent to the south shore of Lake Superior in the north.

3-5.4 Alluvial Soils

Alluvial soils have developed in mixed materials derived from erosion of soils in the adjoining uplands and then deposited by flowing water along rivers, streams or water courses. This deposition may still be active. As a result, these are considered more recent soils that have not had time to develop a clear profile. They may also contain older buried "A" or "B" soil horizons. Alluvial soils are found along rivers and streams across the state. They are also common in many of the flat bottom valleys of the southwest.

3-5.5 Aeolian Soils

These soils have developed from windblown materials deposited on other materials formed or deposited at some earlier time. Aeolian soils can be separated into two categories. The first and most prominent are the loess silt deposits found across the southwest part of the state. Strong winds blowing off of the glacier to the north and east picked up fine material from the exposed drift and re-deposited it many miles to the south and west. The deposited material is uniform in texture and has a distinct brown or gray-brown color. The second category is windblown sand forming dunes on outwash plains or lacustrine basins. These tend to be localized, but there are significant areas of stabilized dunes in central Wisconsin. The sand grains in these features are uniform in nature and are noticeably rounded.

3-5.6 Residual Soils

Residual soils are formed in place by weathering of the underlying bedrock. The type of rock and its degree of weathering determine the texture and properties of these soils. Limestone tends to weather into a material with a high clay content which will then produce a soil with this property. Sandstone weathers into sand with limited amount of fine material which in turn produces a sandy soil with little or no "B" horizon. Shale weathers into silt or silt/clay materials while intermixed sandstone and shale will develop layers of sand intermixed with silt and/or silt/clay layers. The developed soils will reflect these factors. Igneous and metamorphic rocks exhibit a wide range of materials derived from weathering, ranging from a coarse gravelly-like material to high clay content material. Finer grained rocks tend to produce finer weathered materials while the coarser grained rock, such as granite, will weather to a coarser material. Residual soils developed from sedimentary rocks are found principally on hillside and slopes throughout the west and southwest parts of the state. They are often in close association with loess soils which tend to occupy the ridge tops and gentler slopes. Residual soils derived from

igneous and metamorphic rocks are commonly found in a band across the north central area including parts of Marathon, Portage, Wood, and Clark Counties. Soils in this area are often in close association with pre-Wisconsin till soils or show influences from the pre-Wisconsin till.

3-5.7 Organic Soils

Organic soils are unique in their process of development and in their properties. As the name suggests, these soils are primarily composed of plant remains in various stages of decay or decomposition. While some mineral material is present, the organic material controls the properties of these soils. Organic soils are common throughout the glaciated regions of the state occurring as everything from a small pothole to large tracts of many acres. Very large tracts of organic soils involving thousands of acres are found on the glacial lake beds of central and east central areas. More recent organic soils may be found in oxbows and cutoffs along all of the rivers of the state. Organic soils can range in depth from as little as 1 foot, to more than 50 feet. Because of the special nature of these soils, a more detailed discussion will be presented in [Geotech Chapter 4](#) of this manual.