NRCS

United States Dept. of Agriculture
Natural Resources Conservation Service

Wisconsin State Soil: *Antigo Silt Loam*

Wisconsin State Soil

Antigo Silt Loam was named the official state soil of Wisconsin by the State Legislature in 1983, a declaration intended to remind us of the importance of our soil resources. Antigo Silt Loam represents the more than 800 different soils in Wisconsin.

This soil occurs only in Wisconsin, across the north central part of the state. It is a versatile and productive soil and is representative of the many silty soils that cover nearly half of the state. It is named after the city of Antigo in Langlade County.

How did Antigo Silt Loam form?

Near the end of the last Ice Age, about 11,000 years ago, the glaciers covering Wisconsin began to melt. Glacial meltwaters deposited the sand and gravel outwash deposits that form the lower subsoil and substratum of the Antigo Silt Loam. As the glaciers melted and the land was exposed, winds swept across this new land picking up glacial dust, called loess, and depositing it on top of the sand and gravel.

Forests grew, dropping leaves and other forest debris on the surface, creating a dark, organic-rich surface layer. Rainwater carried organic acids downward, bleaching the subsurface layer and depositing clay and humus in the underlying subsoil. The sand and gravel substratum remains relatively unaltered.

This soil forming process created one of the most productive soils in north central Wisconsin. Due to the leveling effect of the glacier, Antigo Silt Loam occurs mostly on nearly level land suitable for crop production. The organic-rich surface layer results in excellent tilth. The silty upper layers provide plenty of available water for plant growth. The underlying sand and gravel layers create a permeable soil, contributing to good drainage. And because Antigo Silt Loam is a relatively young soil, it has a favorable pH and high natural fertility.

The Science of Soil

No two soils are exactly the same. Soil features change across the landscape. A group of soils that have similar properties is called a *soil series*. A series generally is named after a town or local landmark. More than 17,000 soil series have been named and described in the U.S. and more are being named each year.

In mapping, properties that are important to soil use, such as surface texture and slope, are used to divide a soil series into *phases*. These soil phases all have characteristic suitabilities and potentials for various uses.

Soil scientists prepare a soil survey to identify the soils in an area and characterize their properties. They interpret the properties of the soils to determine suitability and potential for many uses. These soil interpretations provide important information for managing the resource.

A soil survey contains soils data for one county. During a soil survey, soil scientists walk over the landscape, bore holes with augers, and examine cross sections of soil profiles. They determine the texture, color, structure and reaction of the soil and the relationship and thickness of the different soil horizons.

What are Soil Horizons?

Soils are formed in layers. These layers, called horizons, can be seen where roads have cut through hills, where streams have scoured through valleys, or in other areas where the soil is exposed.

The uppermost layer of an undisturbed soil is generally an organic horizon, or O horizon. It consists of fresh and decaying plant material from leaves, twigs, moss, lichens and other organic material. This horizon is dark because decomposition is producing humus.

Below the O horizon is the A horizon. This horizon is organic-rich mineral material. This is where the most root activity occurs and is usually the most productive layer of the soil.

The subsurface E horizon generally is bleached or whitish in appearance. As water moves through the soil, soluble minerals and nutrients are leached from this horizon and deposited in the subsoil. The main feature of this horizon is the loss of silicate clay, iron, aluminum, and humus leaving a concentration of sand and silt particles.

Below the E horizon is the B horizon, or subsoil. The B horizon is usually lighter colored, denser, lower in organic matter, and higher in clay than the A horizon. It is the zone where materials leached from the upper layers accumulate.

Still deeper is the C horizon, or substratum. The C horizon is relatively unaltered parent material.

How is Soil Formed?

Rocks and sediments, what are referred to as parent materials, disintegrate and decompose through the action of weather and organisms. This process called weathering, controls the rate of soil formation. Rainfall, temperature, and the type of parent material all contribute to the process of soil formation. It can take hundreds to thousands of years to form a soil that can support plant growth.

Parent material

Parent material refers to the organic and mineral material in which soil formation begins. Minerals may be weathered rock, sediments moved and deposited by wind and water, or ground up rock deposited by glaciers.

Climate

Climate is a major factor in determining the kind of plant and animal life on and in the soil. It determines the temperature of the soil and the frequency and intensity of wetting and drying and freezing and thawing cycles. These factors affect the weathering of minerals, and the kind and amount of biological and chemical processes occurring in the soil.

Warm, moist climates encourage rapid plant growth and thus high organic matter production. Higher temperatures favor rapid soil development due to more intense chemical and biological processes. More rainfall causes more leaching of the soil profile, greater clay formation, lowering of the pH, and loss of natural fertility.

Living Organisms

Plants affect soil development by supplying upper layers with organic matter, recycling nutrients from lower to upper layers, removing water from the soil, and helping to break down bedrock layers and prevent erosion. Leaves, twigs, and bark from large plants fall onto the soil and are broken down by fungi, bacteria, insects, earthworms, and burrowing animals. These organisms break down organic matter releasing plant nutrients and help to mix the soil.

Landscape Position

Landscape position, elevation, steepness, shape, and length of the slope all have a dramatic effect on soil development.

Steepness, shape and length of slope influence the rate at which water flows into or off the soil. If unprotected, soils on slopes may erode leaving a thinner surface layer. Eroded soils tend to be less fertile and have less available water than uneroded soils of the same series.

Landscape position and slope determine the amount of direct sunlight the soil receives, which affects soil moisture and temperature.

Time

The longer a soil has been exposed to soil forming agents like rain and growing plants, the greater the development of the soil profile. Young soils formed in recently deposited alluvium or windblown materials, or soils on steep slopes where erosion has been active may show very little soil development.

Improper use of a soil can damage the soil itself and harm the ecosystem. The quality of soil is a good indicator of the health of the ecosystem. Soil quality indicators can be used to diagnose the health of a soil. Some indicators are compaction, erosion, sediment deposition, crusting, infiltration, organic and nutrient losses and chemical contaminants.

Why Soil Quality Matters

The soil stores water for plant use and filters our surface water. We depend on the soil to provide us with food and fiber. Soils play a major role in recycling carbon to the atmosphere and nitrogen to the soil. Without soils neither we or the ecosystems in which we live could exist. The quality of our soil resources directly affects our quality of life.

NRCS

Wisconsin April 1999

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.