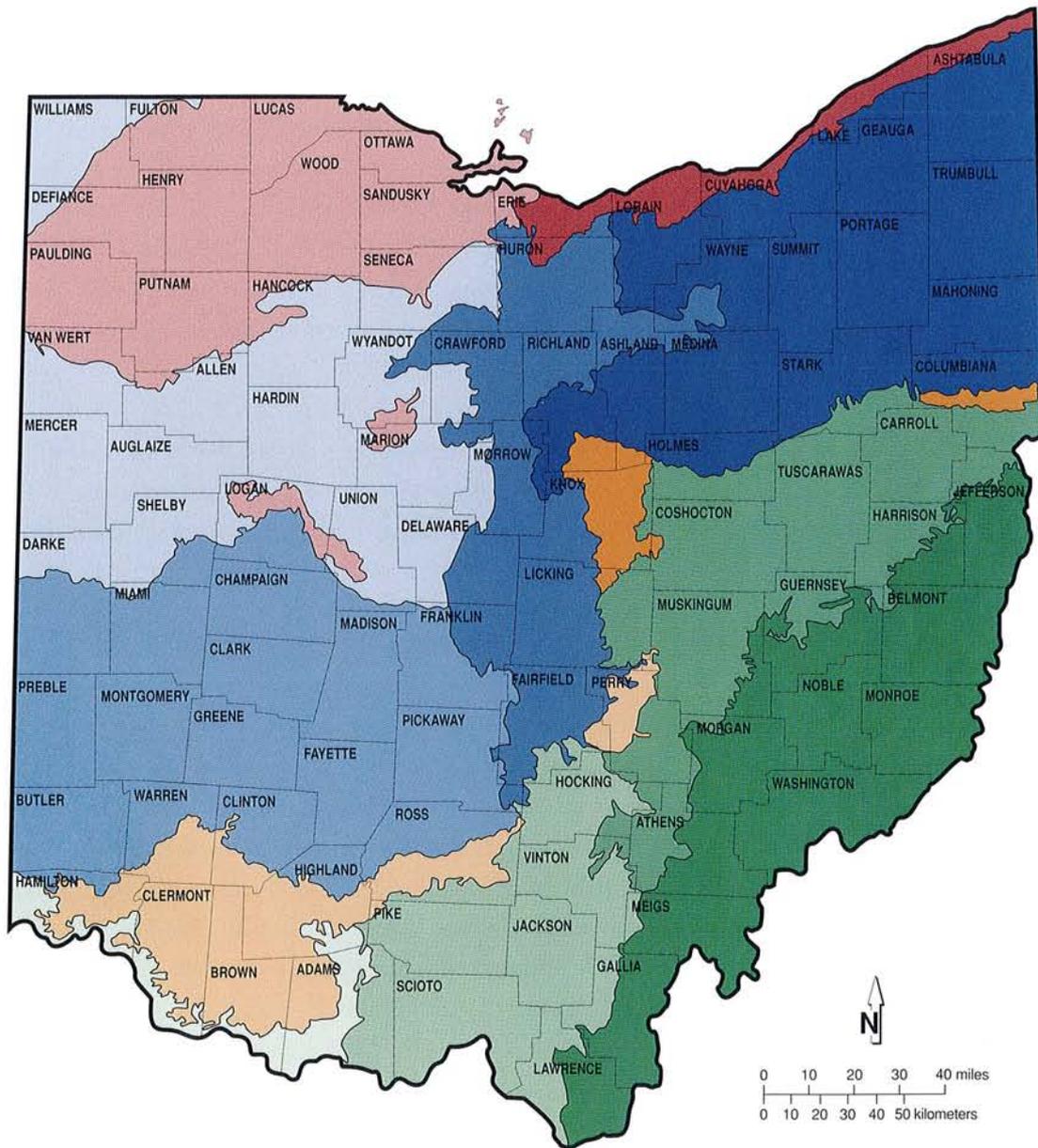


# Soil Regions of Ohio

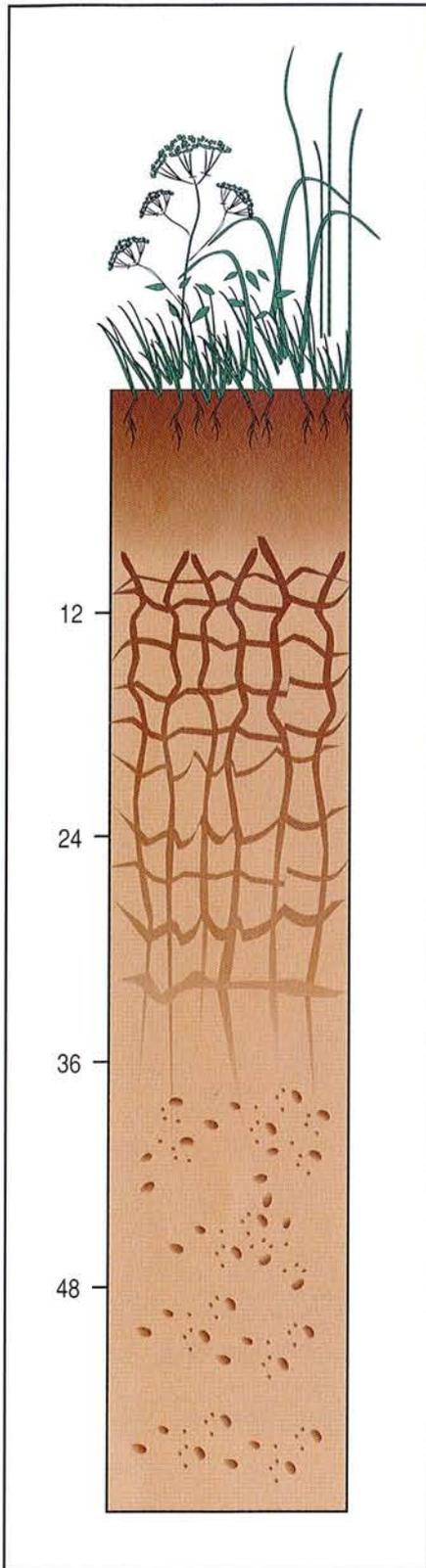


LEGEND\*

1 Hoytville-Nappanee-Paulding-Toledo	5 Bennington-Cardington-Centerburg	9 Eden-Bratton-Brushcreek
2 Conotton-Conneaut-Allis	6 Mahoning-Canfield-Rittman-Chili	10 Shelocta-Brownsville-Latham-Steinsburg
3 Blount-Pewamo-Glynwood	7 Clermont-Rossmoyne-Avonburg-Cincinnati	11 Coshocton-Westmoreland-Berks
4 Miamian-Kokomo-Eldean	8 Westmoreland-Homewood-Loudonville	12 Gilpin-Upshur-Lowell-Guernsey

\*Soil Regions are identified by the names of the soil series that are most common in each region

# THE SOIL REGIONS OF OHIO MAP AND LEGEND



## WHAT ARE SOIL SERIES?

Scientists have classified the world's soils according to a six-level system, much as plants and animals are classified. The system follows a "most general to most specific" arrangement; order-suborder-great group-subgroup-family-series. Soil "series" are at the most specific level in the system. A soil series corresponds to the "species" level in the classification system for plants and animals. Soil series are commonly named for cities or towns near where the soils were first studied. Soils classified in the same series have horizons (or layers) that are similar in composition, thickness, and arrangement.

Soils in the Miamian series, for example, are well drained. They typically have a very dark grayish brown to brown silt loam or loam topsoil layer ("A horizon") 5 to 10 inches thick. They commonly have a brown or yellowish brown subsoil layer ("B horizon"), 8 to 35 inches thick, with a higher clay content than the A horizon. Below the subsoil, soils in the Miamian series have a brown to light olive brown substratum ("C horizon") that is slightly or moderately alkaline and has a lower clay content than the B horizon.

## HOW WERE THE SOILS IDENTIFIED?

Soil surveys in Ohio have been conducted on a county by county basis by soil scientists with shovels, augers and other tools since 1899. The Soil Survey of Montgomery County, Ohio, published in 1900, recognized only one soil series (Miami). A statewide soil survey was conducted in 1912, and 24 different soil series were recognized.

By 1992, soil surveys had been completed in every county in the state. Modern soil surveys must be much more detailed than the early surveys in order to provide the information needed to manage Ohio's soil resources. Today, soil maps for Montgomery County show 38 different soil series, delineated in areas as small as five acres. More than one hundred soil series are recognized on detailed soil maps in the area identified as Miami in the 1912 survey. (The most common soil series in this part of the state, corresponding to Soil Regions 3 and 4, are Miamian and Blount.)

## HOW WAS THIS MAP PREPARED?

In the late 1980s, information on thousands of detailed Ohio soil maps was analyzed for the Natural Resources Conservation Service to develop a statewide geographic soil data base known as STATSGO. This data base identified 166 different groupings, or "associations," of soil series that are common in areas that could be mapped at a scale of 1:250,000. The Soil Regions of Ohio map was prepared by combining these associations into twelve regions at a scale of 1:2,500,000, with the assistance of ODNR's Division of Real Estate and Land Management's geographic information system (GIS).

# GEOLOGY AND SOIL REGIONS



Soil Regions 1 through 8 represent the portion of Ohio that was covered by glacial ice during one or more glaciations. The most common soils in these regions formed in glacial deposits. The older glacial deposits are in Regions 7 and 8. Most of the soils in the glaciated part of the state are very deep to bedrock.

The most common soils in Regions 9 through 12 formed in materials weathered from sedimentary rocks. Because soil forms more slowly from bedrock than from unconsolidated glacial material, soils in Regions 9 through 12 tend to be more shallow to bedrock than soils in Regions 1 through 8.

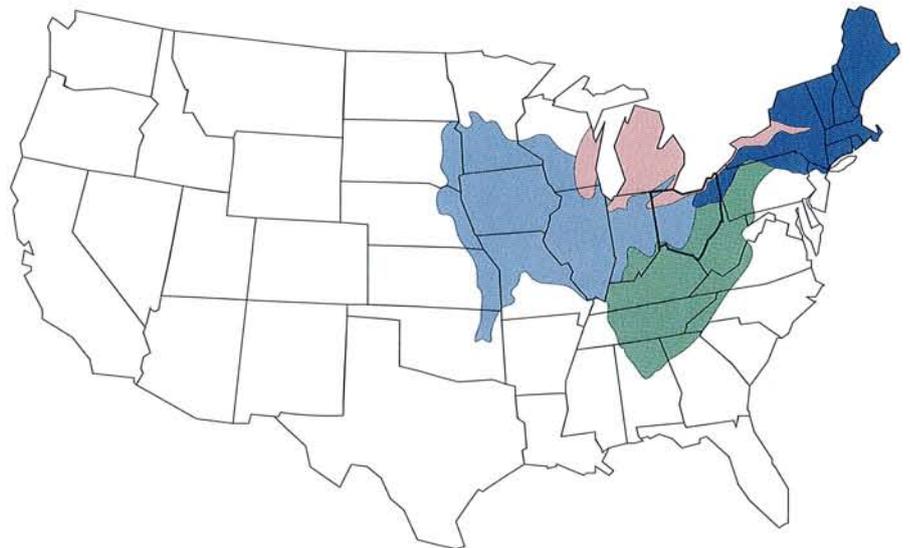
Soil Regions 1, 3, 4, 7 and 9 occur in the part of Ohio where limestone, dolomite and limy shales are the most common bedrocks, and so the soils in these regions tend to have a relatively high lime content in the substratum. The glacial deposits in Regions 2, 5, 6, and 8 have a lower lime content. In most of Regions 10, 11 and 12 the soils formed in materials weathered from acid sedimentary rocks, mainly sandstone, siltstone and shale.

Soils naturally become more acid over time under Ohio's weather conditions, but soils with lime in the substratum are neutral or only slightly acid in part of the subsoil. Since most plant nutrients are chemically active under neutral or slightly acid conditions, soils with more lime in the substratum are generally more fertile for crop production. Ohio farmers commonly increase crop yields by spreading lime to neutralize the acidity of the topsoil and the upper part of the subsoil.

## SOIL REGIONS AND LAND RESOURCE REGIONS

Because soil affects and is affected by other elements in the environment, it is not surprising that boundaries between the twelve soil regions correspond to boundaries between other natural and cultural regions. USDA Agriculture Handbook 296 recognizes 24 distinct Land Resource Regions in the country based on the following elements: land use, elevation and topography, climate, water, soils, and potential natural vegetation.

Ohio is part of four Land Resource Regions that extend from Maine to northern Alabama and as far west as eastern Nebraska. The name of each Land Resource Region reflects the types of agri-



*Ohio is part of four Land Resource Regions that extend from Maine to northern Alabama and as far west as eastern Nebraska.*

cultural activities that affect the economy and ecology of that region. A brief summary of characteristics of Ohio's soil re-

gions, by Land Resource Regions and by subregions called Major Land Resource Areas (MLRA), follows:

# LAND RESOURCE REGIONS IN OHIO



**Lake States Fruit, Truck, and Dairy Region:** The most common soils in Ohio Soil Regions 1 and 2 formed in lake and beach sediments and in glacial till associated with glacial lakes. Region 1 is part of the Erie-Huron Lake Plain (MLRA 99), and Region 2 is part of the Erie Fruit and Truck Area (MLRA 100). Region 1 is characterized by nearly level crop fields with drainage ditches and subsurface drains. Coarser-textured and sloping or steep soils are more common in Region 2, which is also more urbanized.



**Central Feed Grains and Livestock Region:** Ohio Soil Regions 3, 4, 5 are part of the Indiana and Ohio Till Plain (MLRA

111). The glacial deposits in Region 4 are coarser-textured than those of Regions 3 and 5, and well drained soils such as the Miamian soil are more common in this region than elsewhere in MLRA 111 in Ohio. Region 7 is associated with the Southern Illinois and Indiana Thin Loess and Till Plain (MLRA 114). Because the soils in this region formed in older glacial deposits than the soils in MLRA 111, they are more weathered and less fertile for crop production.



**East and Central Farming and Forest Region:** Ohio Soil Region 9 is on the fringe of the Kentucky Bluegrass (MLRA 121), Regions 10 and 11 make up nearly all of the Western Allegheny Plateau (MLRA 124), and Region 12 is in the Central Allegheny Plateau (MLRA 126). These soil regions are heavily wooded and include many scenic areas. Soil Regions 10, 11 and 12 include areas where coal has been surface-mined. Many of the less

sloping areas in Region 10 are associated with the remnants of an ancient stream system. Relatively wide ridgetops and valleys are associated with Region 11. Soils with a clayey, red or yellowish brown subsoil are common in Region 12.



**Northeastern Forage and Forest Region:** Ohio Soil Regions 6 and 8 are in the Eastern Ohio Till Plain (MLRA 139). The glacial deposits in Region 6 range from coarse-textured to fine-textured, but coarser-textured and better drained soils are more common in the southern portion of the region. Dairy farms are still common, but many areas that were once farmed are now in urban or wooded areas. Many areas in Region 8 have soils similar to those in Region 11 (note Westmoreland). Glacial deposits are relatively thin in Region 8, and have eroded from many of the steeper areas.

# SOIL CHARACTERISTICS BY REGION

Percentage of Soils in Regions with Selected Characteristics												
CHARACTERISTICS	REGION NUMBER											
	1	2	3	4	5	6	7	8	9	10	11	12
More than 8 percent slope	1	7	6	19	12	17	38	65	83	79	68	88
More than 3 percent organic matter in the upper 10 inches	63	8	32	20	14	2	<1	<1	5	<1	2	<1
More than 27 percent clay in the topsoil	61	11	32	22	11	2	2	<1	38	1	3	40
Seasonal high water table less than 1 foot below the surface	63	24	31	17	17	15	20	2	<1	1	3	<1
Bedrock less than 40 inches below the surface	<1	11	1	2	<1	3	7	26	49	25	14	19

## SIGNIFICANCE OF SELECTED CHARACTERISTICS

**Slope:** Slope, expressed as a percent, measures the change in elevation over a distance of 100 feet. For example, an 8 percent slope has a change in elevation of 8 feet over a horizontal distance of 100 feet. Soils on slopes of more than 8 percent generally do not meet the criteria for “prime farmland,” because of the hazard of erosion on cropland. Soils on slopes steeper than 8 percent commonly have at least moderate limitations for urban uses.

**Organic Matter Content in the Upper 10 Inches:** As plants and animals live and die on and in soil, they contribute organic matter that is then decomposed by micro organisms in the soil. Organic matter contributes to the fertility and stability of the topsoil. The soils in Ohio that have more than 3 percent organic matter in the upper 10 inches are most commonly associated with areas that were in prairie grasslands and elm-ash swamp forests at the time of settlement. The higher organic matter content in these soils make them appear darker in color at the soil surface than the more common soils in Ohio.

**Clay Content in the Topsoil:** Clay particles are very small (less than .002 millimeters in diameter), but they have a big effect on soil texture, and determine how “sticky” the soil becomes when it is wet. Topsoil with a silt loam texture has less than 27 percent clay, and such topsoil is dominant in all but one soil region

in the state. Topsoil with a silty clay loam, clay loam, silty clay or clay texture is generally more difficult to till or excavate, especially when it is wet.

**Depth to Seasonal High Water Table:** Water accumulates in soils that receive rainfall or runoff from adjacent slopes faster than it can move through the soil. Soils that are not saturated for more than a few days in the typical year are generally the easiest to manage for a wide variety of uses. Wetlands are common in soils that are saturated in the upper 12 inches for a month or more during a typical year.

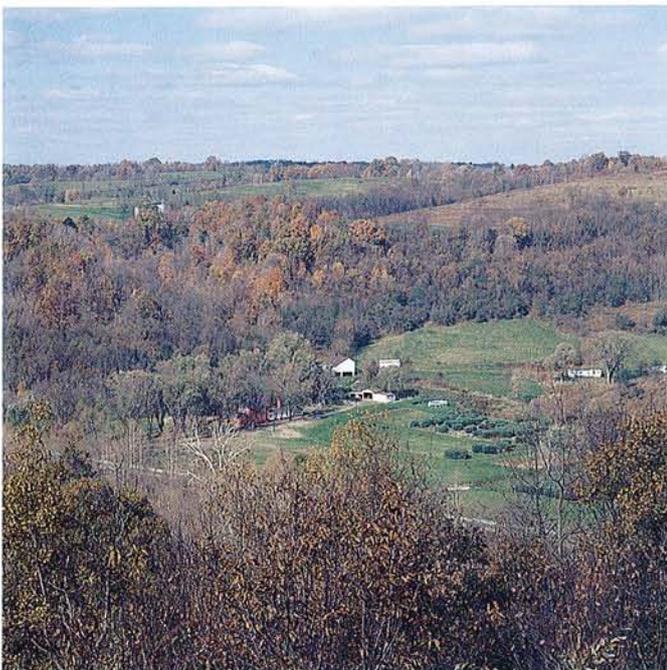
**Depth to Bedrock:** Glacial material, hundreds of feet thick in places, covers the bedrock in much of the western and north-eastern parts of the state. Bedrock is encountered in construction projects more commonly in the other areas of the state. Crop growth on soils with bedrock less than 40 inches below the surface is restricted during part of many growing seasons because of insufficient moisture available to the root system.

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*Soil surveys in the state are conducted under the guidance of the Ohio Soil Inventory Board, whose membership includes representatives from the Ohio Department of Natural Resources, Division of Soil and Water Conservation; United States Department of Agriculture, Natural Resources Conservation Service; and Ohio Agricultural Research and Development Center.*

Soil is one of our most basic natural resources, but we rarely see more than its surface - and even that is usually hidden by pavement, crops or trees. To most people, the soils of Ohio all look and feel pretty much the same. However, farmers and builders know that soils differ within most fields and city blocks. Soils are also different from region to region across the state.

The vast majority of soils are composed mostly of mineral material - small bits of decomposed rock. But soil is more



than a collection of mineral particles. Pore spaces between these particles contain air and water required by the plants and animals living in the soil. Most soils also contain organic matter (from plants and animals), which darkens the uppermost layer of soil and affects the way in which soil particles hold together. While many people think of soil as “dead”, soil literally teems with life, from roots, insects and worms to molds, fungi and bacteria that number in the billions.

Soils form slowly over time as the mineral particles from geologic or “parent” materials are changed by the effects of weather, plants and animals in a landscape setting. Soils vary between regions largely because there are so many different types of parent material across the state.

This publication describes how, over the past century, soil scientists have identified more than 400 different kinds of soils, called series, in Ohio. It also describes how the soil regions are related to geologic regions and to four nationally recognized agricultural regions. Finally, this publication provides information about five basic soil characteristics in each of the soil regions.



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