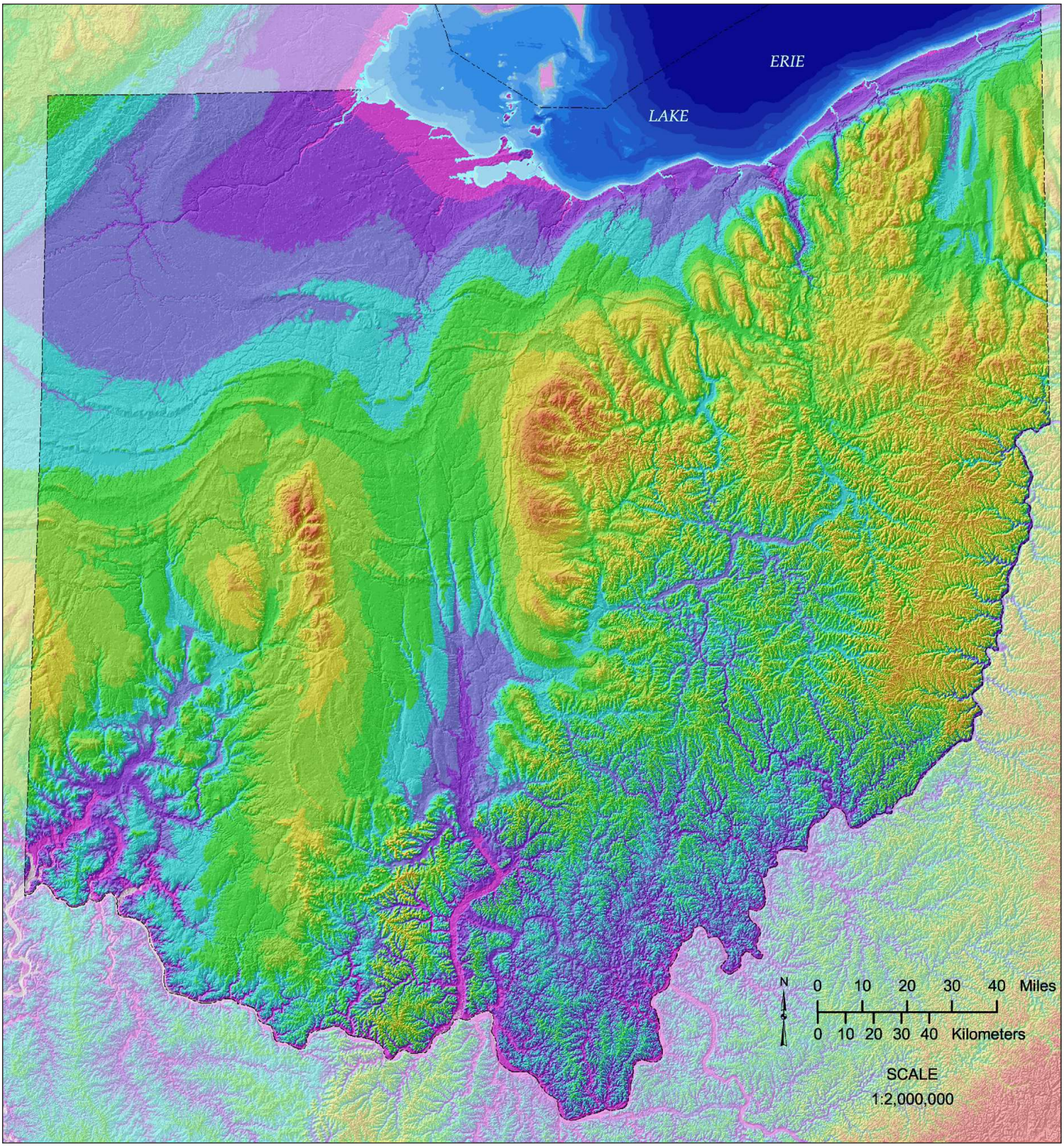
STATE OF OHIO
Ted Strickland, Governor

DEPARTMENT OF NATURAL RESOURCES
Sean D. Logan, Director

DIVISION OF GEOLOGICAL SURVEY
Lawrence H. Wickstrom, Chief

SHADED ELEVATION MAP OF OHIO

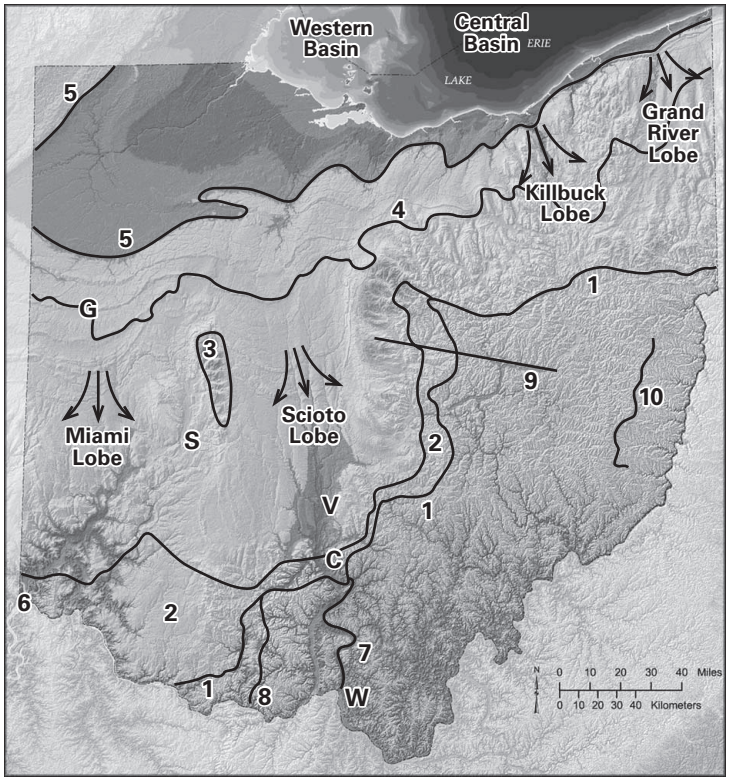


Land elevation in feet: 427-500, 500-600, 600-700, 700-800, 800-900, 900-1000, 1000-1100, 1100-1200, 1200-1300, 1300-1400, 1400-1500, >1500

Lake Erie water depth in feet: 0-6, 7-12, 13-18, 19-24, 25-30, 31-36, 37-42, 43-48, 49-54, 55-60, 61-66, 67-84

SHADED ELEVATION MAP

This map depicts the topographic relief of Ohio's landscape using color to represent elevation intervals. The colorized topography has been digitally shaded from the northwest slightly above the horizon to give the appearance of a three-dimensional surface. The map is based on elevation data from the U.S. Geological Survey's National Elevation Dataset; the grid spacing for the data is 30 meters. Lake Erie water depths are derived from National Oceanic and Atmospheric Administration data. This digitally derived map shows details of Ohio's topography unlike any map of the past. Some of Ohio's more striking topographic features are outlined on the inset map below and described in the following paragraphs.



Direction of ice flow in glacial lobes

C = Chillicothe
G = Grand Lake St. Marys
S = Springfield
V = Circleville
W = Wheelersburg

1 *Glacial boundary*—Continental ice sheets several thousand feet thick sculpted about two-thirds of Ohio's landscape and, upon melting, deposited material formerly incorporated in or beneath the ice. This boundary marks the southernmost known extent of glacial ice in Ohio. Topography in the glaciated portion of Ohio is smooth compared to the highly dissected, unglaciated part of Ohio. The glacial boundary in eastern Ohio is farther north than the boundary in western Ohio because the erosion-resistant bedrock hills in eastern Ohio impeded southward glacial advances. The glacial boundary in central and southwestern Ohio typically represents the maximum advance of Illinoian-age (130,000-300,000 years ago) glaciers. The east-west-oriented boundary in northeastern Ohio represents the maximum advance of Wisconsinan-age (14,000-24,000 years ago) glaciers.

2 *Illinoian till areas*—Thin till (an unsorted mixture of glacially deposited clay, silt, sand, and cobbles) of Illinoian age is at the surface in a 10- to 40-mile-wide belt between the Illinoian and Wisconsinan maximum advances. Terrain in this belt is typically transitional between the generally flat Wisconsinan till plains to the north and west and the dissected, unglaciated bedrock to the southeast. The surface deposits in this belt are characterized by loess (wind-blown silt) over thin till on ridge tops and thick colluvium (weathered bedrock) on slopes.

3 *Ohio's highest elevation*—An upland area known as the Bellefontaine Outlier covers portions of Champaign, Logan, and Union Counties in west-central Ohio. The outlier is an erosional remnant of Devonian-age limestone, dolomite, and shale that lies 25 miles west of the main outcrop belt of Devonian-age rock in Franklin and Delaware Counties in central Ohio. The outlier is mantled by up to 160 feet of till, which adds to the outlier's height. Campbell Hill, the highest elevation in Ohio at 1,549 feet above sea level, is on the outlier. The higher, more resistant bedrock of the outlier impeded the southward-advancing glaciers, causing them to split into two lobes, the Miami Lobe on the west and the Scioto Lobe on the east. Ridges of thick accumulations of glacial material, called moraines, drape around the outlier and are distinct features on the map. Some moraines in Ohio are more than 200 miles long. Two other glacial lobes, the Killbuck and the Grand River Lobes, are present in the northern and northeastern portions of the state.

4 *Eastern Continental Divide*—A continental drainage divide extends east-west across northern Ohio. Surface water north of this divide flows northward to Lake Erie, eventually over Niagara Falls into Lake Ontario, and into the Atlantic Ocean. Surface water south of the divide flows south to the Ohio River, the Mississippi River, and eventually into the Gulf of Mexico. The divide follows the crests of glacial moraines in western Ohio. In north-central and northeastern Ohio, the divide follows bedrock-controlled hills and glacial valleys containing thick glacial-lake deposits.

5 *Ancient Lake Maumee shoreline*—About 14,000 years ago, the last continental ice sheet retreated northward across Ohio. The St. Lawrence Seaway was blocked by glacial ice, and glacial meltwater created lakes in front of the ice. A large lake, called Lake Maumee, formed in the general position of Lake Erie but extended over a much larger portion of northwestern Ohio. Ancient Lake Maumee water levels were about 230 feet higher than modern Lake Erie, and drained westward into the Wabash River system. The shoreline of ancient Lake Maumee had a series of sandy beaches and beach scarps, much like portions of Lake Erie today. The ancient sandy beaches are visible on the map as long, thin ridges on the surrounding flat lake terrain. Other beach ridges formed as the water level receded in stages before rising to its current level of approximately 572 feet above sea level. Lake Erie is the shallowest of the Great Lakes and has three basins: the western (averages 30 feet in depth), central (averages 60 feet in depth), and eastern (not shown on map; averages 80 feet in depth; maximum depth is about 212 feet).

6 *Ohio's lowest elevation*—The lowest surface elevation in Ohio is about 455 feet above sea level and is located where the Ohio River exits the state at the extreme southwestern corner of Ohio.

7 *Teays River valley*—The ancient Teays River flowed across Ohio before and during the earliest Ice Age. A north-south-trending remnant of the Teays River valley in south-central Ohio is distinctly visible on this map. From its headwaters in North Carolina, the Teays River flowed northwest across Virginia and West Virginia and entered Ohio in the area of present-day Wheelersburg. The Teays River cut a wide, curving valley as it flowed northward through southern Ohio. This valley, partially filled with clay, silt and sand, contains only a small stream today and remains clearly visible on the map as far as Chillicothe. North of Chillicothe, the valley is buried beneath hundreds of feet of glacial sediment but can be traced using well data to Circleville; the buried valley then turns northwestward, passing beneath Springfield and Grand Lake St. Marys and into eastern Indiana. In parts of western Ohio, the valley lies beneath 700 feet of glacially derived material. The valley commonly is about 200 to 300 feet deep and has steep to near-vertical walls.

8 *Allegheny Escarpment*—Beyond the glacial boundary, the Allegheny Escarpment of southern Ohio marks a distinct change in topography. The land surface changes abruptly from the flatter, lower terrain in the west, which is underlain by soft carbonate rocks, to the higher, steeper terrain in the east, which is underlain by shale and sandstone. To the north, the escarpment was affected by glaciation, making it a less distinct topographic feature. The Allegheny Escarpment corresponds to a slight increase in the dip (tilt) of the rock layers as they descend eastward into the Appalachian Basin.

9 *Surface lineament*—A west-northwest-trending lineament (a linear topographic feature on the Earth's surface) across east-central Ohio is distinctly visible on the map. The Walhonding River and a portion of the Muskingum River flow in portions of this linear topographic depression. Although poorly understood, this feature, which is referred to as the Coshocton Fracture Zone, has been attributed to fractures in the surface bedrock that are possibly related to faults present deeper in the subsurface.

10 *Flushing Divide*—A sharp, north-northeast-trending, ridgelike feature in eastern Ohio is the Flushing Drainage Divide, named after the Belmont County village of Flushing, where it is well developed. Surface water west of the divide flows westward into a series of low-gradient creeks, such as the Sandy, Conotton, and Stillwater, and then to the Tuscarawas River. Surface water east of the divide flows eastward into a series of high-gradient, rapidly down-cutting creeks that flow into the Ohio River. The ridge is at an elevation of about 1,260 to 1,280 feet above sea level and separates two old Teays-era drainage basins.