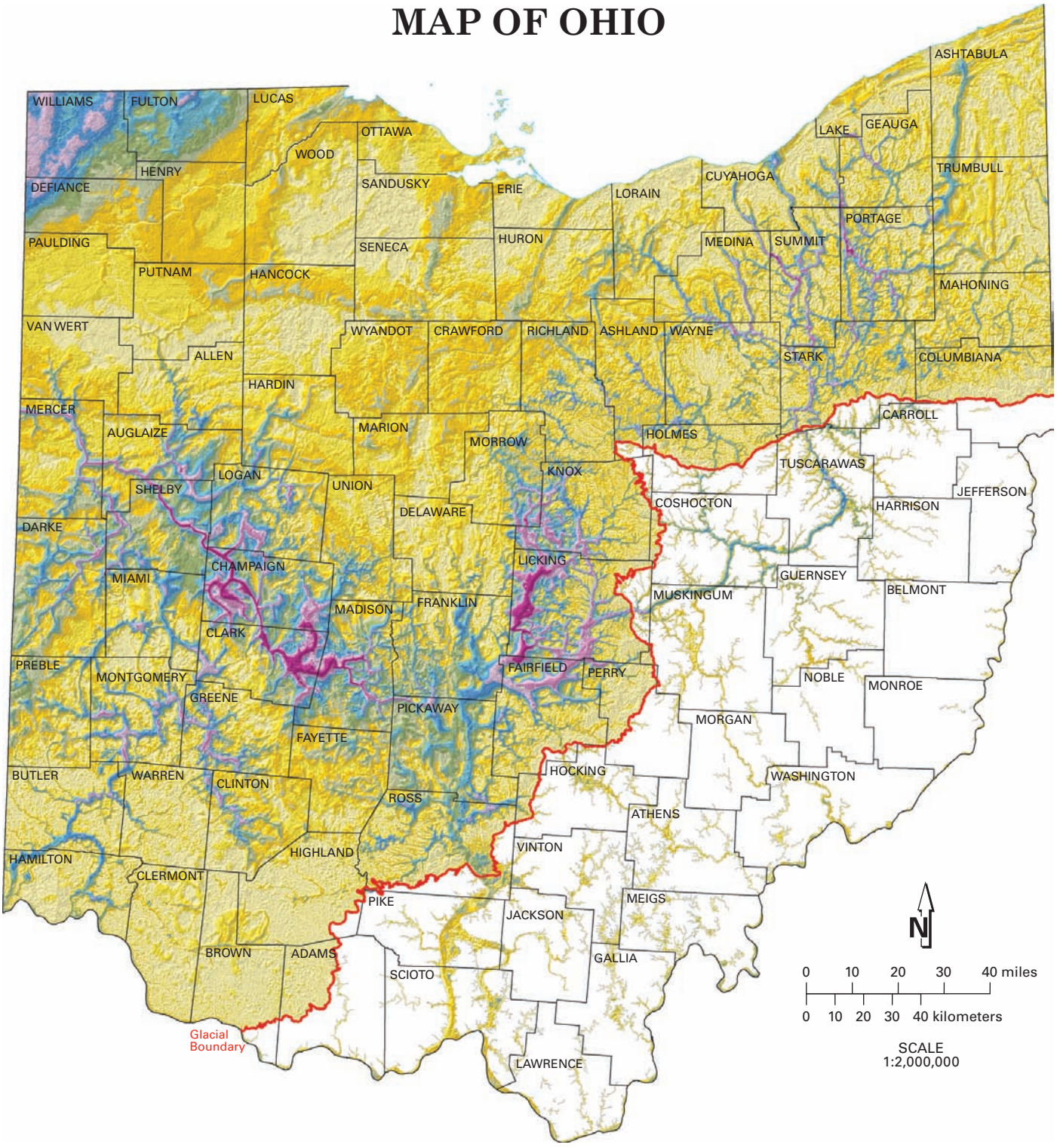
SHADED DRIFT-THICKNESS MAP OF OHIO



EXPLANATION

Thickness (in feet) of drift in glaciated areas and of outwash and glaciolacustrine deposits in sediment-filled valleys beyond the glacial boundary.

0–20	51–80	121–160	211–260	331–440
21–50	81–120	161–210	261–330	441–726

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DRIFT THICKNESS OF OHIO

The Drift-Thickness Map of Ohio depicts the thickness and distribution of glacially derived sediments (called *drift*) and post-glacial stream sediments overlying the buried bedrock surface. This map was produced by subtracting bedrock-surface elevations from land-surface elevations to produce a residual map of drift thickness (see fig. 1). Colors portray thickness intervals of glacial and modern sediments, which range up to several hundred feet.

Prior to the onset of continental glaciation about 1.8 million years ago, the Ohio landscape was dominated by rolling hills and deeply incised, mature rivers and streams. Erosion and deposition by Ice Age glaciers advancing into northern and western Ohio produced a low-relief land surface compared to the unglaciated, high-relief land surface of southeastern Ohio.

Drift thicknesses in western and northern Ohio are highly variable, a consequence of numerous geologic factors. In some areas, drift has been deposited on a relatively flat bedrock surface and changes in drift thickness primarily are the result of variations in the amount of glacial material deposited. In other areas, drift has infilled deeply incised bedrock valleys, and changes in drift thickness primarily are the result of variations in bedrock-surface elevation. In still other areas, the drift surface parallels the underlying bedrock surface to produce areas of relatively uniform drift thickness (fig. 1).

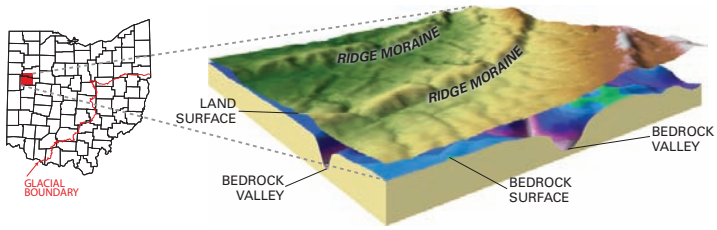

FIGURE 1.—Schematic cross section of glacial drift overlying the bedrock surface. Note areas where drift thickness is controlled by thickening of glacial sediment over a relatively flat bedrock surface, by drift infilling bedrock valleys, or by fluctuations in both the land surface and the bedrock surface. Also note areas where buried-bedrock vallys are not evident on the surface.

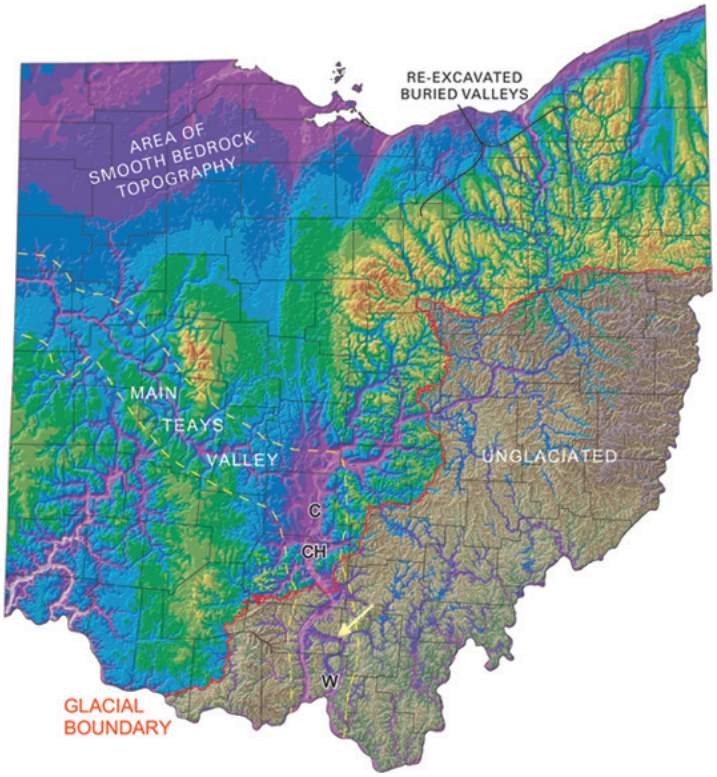

FIGURE 2.—Shaded Bedrock-Topography Map of Ohio showing the sculpted bedrock surface that lies beneath glacial drift in northern and western Ohio and the land surface in unglaciated southeastern Ohio. Note the surface expression of the Teays Valley System south of the glacial boundary (arrow), the location of the main Teays Valley (between yellow dashed lines), the area of smooth bedrock topography, and the area of re-excavated preglacial bedrock valleys in northeastern Ohio. **C** = Circleville, **CH** = Chillicothe, **W** = Wheelersburg (modified from Ohio Geological Survey, 2003).

Distinct, narrow linear patterns of thick drift in western and central Ohio are the result of deep incisions in the underlying limestone and dolomite bedrock by a large, northwest-flowing drainage system—the Teays Valley—which existed prior to and during early glaciations (fig. 2). The main Teays Valley entered Ohio at what is now Wheelersburg (Scioto County), where remnants of the Teays Valley still are evident on the land surface. At Chillicothe (Ross County), the valley disappears under glacial sediments that cover western Ohio. However, the valley continues north, below the surface, to Circleville (Pickaway County) and then northwest to Mercer County where the valley exits the state into Indiana. Early southward-advancing glaciers blocked the north-flowing river system of the Teays and created immense lakes in southeastern Ohio (Hansen, 1995).

In northeastern Ohio, narrow areas of thick drift located south of Lake Erie also were preglacial bedrock valleys. These valleys were partially filled with thick deposits of till and glaciolacustrine (glacial lake) sediment and then re-excavated later by northward-flowing rivers, such as the Cuyahoga River and the East Branch of Rocky River.

In northwestern Ohio, repeated scouring of the relatively soft bedrock surface by glacial ice flowing southwestward from the Lake Erie Basin destroyed most pre-existing drainage systems. In this part of Ohio, the bedrock surface is smooth and the upper surface of the drift has been planed off by both wave action and deposition by a post-glacial, high-level ancestral Lake Erie. In the extreme northwest corner of Ohio, in Williams County and portions of Defiance County, drift thickens considerably because of numerous moraines that formed along the northwestern edge of the Erie Lobe.

In western Ohio, draping linear features of thick drift, called *ridge moraines* (fig. 1), formed along the temporarily stationary ice front as glacial sediment was released from the ice. These ribbons of thick drift define the lateral dimensions of glacial ice lobes. Many ridge moraines in western and northeastern Ohio have a draped appearance because southward-flowing ice, impeded by bedrock highlands, moved more easily along major lowlands. The numerous resistant bedrock highlands in northeastern Ohio caused ridge moraines to be especially curved and closely stacked.

Southeastern Ohio is unglaciated and devoid of ice-deposited sediment (glacial till). However, many valleys in this area carried huge volumes of glacial meltwater away from the ice front and toward the Ohio River. In the process, many of these valleys at times were made deeper by the erosive force of fast-flowing meltwater streams. At other times, these valleys were partially filled with sediment. Some valleys in unglaciated Ohio contain thick deposits of clay and silt which accumulated on the bottoms of lakes that formed when glacial ice blocked the flow of rivers or when rapidly accumulating meltwater sediments blocked the mouths of smaller tributaries.

This map is a reduced version of Map SG-3: *Shaded Drift-Thickness Map of Ohio* (Powers and Swinford, 2004). For more information or to order a copy of Map SG-3, visit the Geologic Records Center, 2045 Morse Rd., Bldg. C, Columbus, OH 43229; or call (614) 265-6576; or visit the Division of Geological Survey website: **OhioGeology.com**.

REFERENCES

Hansen, M.C., 1995, The Teays River: Ohio Department of Natural Resources, Geological Survey GeoFacts No. 10.

Ohio Geological Survey, 2003, Shaded bedrock topography of Ohio: Ohio Department of Natural Resources, Division of Geological Survey Map BG-3, scale 1:500,000.

Powers, D.M., and Swinford, E.M., 2004, Shaded drift-thickness map of Ohio: Ohio Department of Natural Resources, Division of Geological Survey Map SG-3, scale 1:500,000.