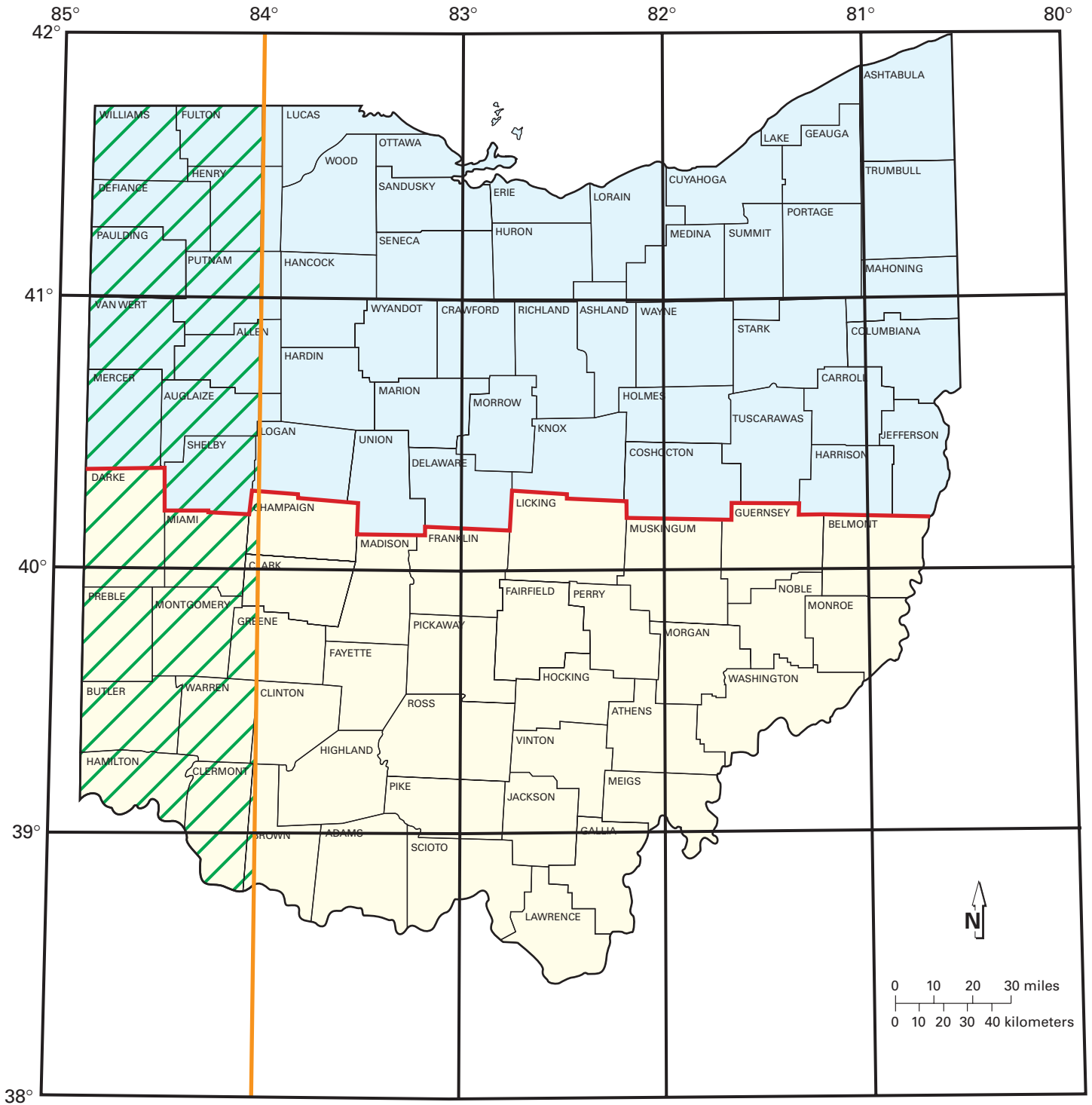


LATITUDE-LONGITUDE GRID, UTM ZONE BOUNDARY, AND STATE PLANE COORDINATE SYSTEM ZONE BOUNDARY



	UTM ZONE 16	UTM ZONE 17
STATE PLANE NORTH	/	
STATE PLANE SOUTH	/	



COMMON COORDINATE SYSTEMS USED IN OHIO

Use of a coordinate system is necessary to define a position on our spherical Earth. The accompanying map illustrates the coverage and boundaries of three of the most commonly used systems in Ohio. The best known and most commonly used system of reference coordinates is **latitude and longitude**. Lines of longitude (meridians) are a series of 360 circles around the Earth that pass through the North and South Poles. Lines of latitude (parallels) run east-west parallel to the Equator; there are 90 lines of latitude in each hemisphere, north and south. Latitude and longitude are measured in degrees (°), minutes (′), and seconds (″). Ohio lies between 80° and 85° west longitude and between 38° and 42° north latitude. To use this geographic coordinate system, measurements and computations must be performed using angular units and relationships because it is a network of gridlines placed around a sphere.

Rectangular coordinate systems use different methods to represent (project) Earth's three-dimensional spherical shape on a two-dimensional reference grid. Rectangular coordinate systems involve less complicated calculations of distance, area, and position. However, the projection methods used cause distortions of the Earth's surface by stretching or compressing shape, area, or scale. The two most commonly used projection systems in this area are the *Lambert* and *Transverse Mercator*, both of which have varying scale but retain the proper shape of the mapped surface.

The state plane coordinate system was introduced in the 1930's to allow the entire conterminous United States to be mapped on a set of flat surfaces with very little local distortion. The size and orientation of each state determines how many zones are used and which projection provides the least distortion. Two Lambert projection zones cover Ohio: a north zone and a south zone. Measurements are in feet and, within each zone, are all positive. The boundary between the two zones follows county lines as depicted on the accompanying map.

The Universal Transverse Mercator (UTM) coordinate system was developed by the U.S. Department of Defense for global military operations. The UTM system consists of 60 north-south zones arranged around the globe. Each zone is 6° of longitude wide. The zones are numbered from west to east beginning at the 180th meridian, and within each zone all coordinates are positive values. UTM measurements commonly are in meters, although these can be converted to feet. Ohio lies within a portion of zones 16 and 17 as depicted on the accompanying map.

Most maps being produced by the Ohio Division of Geological Survey today are prepared electronically. The most common coordinate system used by the Survey in its digital mapping systems is the state plane coordinate system. For statewide maps, the south zone of the state plane system is extended over the entire state. When using the Survey's digital map products, it is important to obtain the accompanying metadata files that explain the coordinate system, scale, and projection used in creating the map. Most digital mapping systems provide easy methods for converting between different projections and coordinate systems.