

## **LITTLE MIAMI RIVER BASIN**

The Little Miami River Basin drains an area of 1,755 square miles. The source of the main stream is a few miles southeast of Springfield, and the mouth is just east of Cincinnati. The length of the stream is slightly less than 100 miles. East Fork, its principal tributary, originates near Hillsboro and joins the main stream about 12 miles above the mouth. East Fork drains 501 square miles of the total area comprising the Little Miami Basin.

### **Physiography**

The entire basin lies within the Till Plains. The northern part of the area is flat to gently rolling but with occasional deep gorges, such as Clifton Gorge near Yellow Springs. Generally to the south the relief is greater, although a large area in the East Fork drainage is flat swampland. The valleys are generally relatively narrow and bordered by rock bluffs. At places where the streams traverse preglacial drainage lines, the valleys are broad and flat-bottomed.

### **Geology**

Dense calcareous shale, dolomite, and limestones of Ordovician and Silurian age underlie the basin. There is minor karst sinkhole terrain in the Silurian limestone, but it is poorly developed. Although there are springs and spring lines where a relatively permeable limestone outcrops over an impermeable shale, their effect on streamflow is negligible. Glacial deposits of two ice advances occupy the area of the Little Miami Basin. Approximately the upper half of the basin is covered by drift of Wisconsinan age and the lower half by Illinoian deposits.

### **Soils**

The soils in this basin vary widely. In areas of late Wisconsin drift are Miamian, Celina, Crosby, Kokomo, Birkbeck, Reesville, and Ragsdale soils. They range from very poorly drained to well drained and are for the most part slowly permeable. The moderately to slowly permeable Russell, Xenia, and Fincastle are the important soils series in areas of early Wisconsin drift. Rossmoyne, Clermont, and Avonburg are the dominant soils in the Illinoian drift area. The well-drained Bonnell and Jessup soils are common in areas in the southern part of the basin where the Illinoian till deposits are thin. These soils are slowly permeable. There are also terrace and alluvial soils with good drainage but these are rather limited in extent.

### **Water Development**

The Corps of Engineers completed Caesar Creek Reservoir on Caesar Creek in 1973 and East Fork Reservoir on East Fork Little Miami River in 1977.

### **Flow Characteristics**

There is a wide range of difference in the flow characteristics of the streams in this basin. The effects of glacial material on flow characteristics are manifest in this area. As the drift thins toward the south and changes from dominantly gravel terrain to till cover, the dry-weather flow decreases in relative magnitude from the source to the mouth.

The gaging station on the Little Miami at Spring Valley shows an exceptionally high sustained flow as a result of the widespread gravel deposits that lie above drainage in the headwater area of the basin. High-level outwash materials in the form of valley fill, terraces, and kame terraces are present in northern Greene county and southern Clark County. These materials, which are highly permeable, absorb large quantities of rainfall and release it rather uniformly throughout the year. In addition to the ground water contribution from the glacial deposits, a minor amount is contributed by the limestone and dolomite formations.

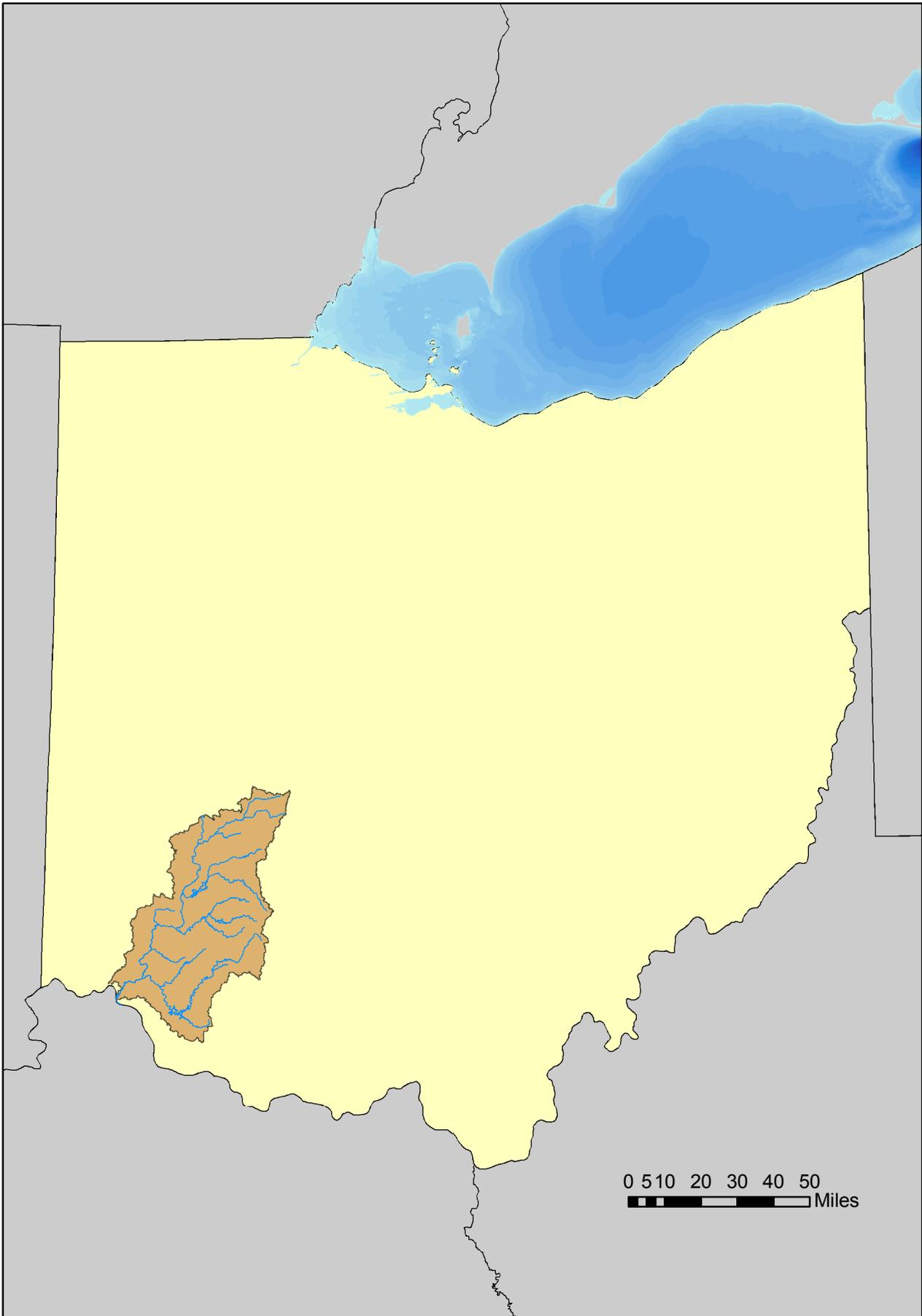
The record of flow at the Oldtown gage on the Little Miami River indicates a relatively high index of median flow in the upper part of the Little Miami valley. Fifty percent of the time the flow exceeded about 0.5 cubic feet per second per square mile which is above average for an uncontrolled stream. The record at the Spring Valley station has an even higher median-flow index although augmented by wastewater discharges. Between Spring Valley and Fort Ancient, the Little Miami follows the course of a preglacial valley in which more than 100 feet of unconsolidated valley fill is present. However, there are no high-level glaciofluvial deposits that greatly affect streamflow. The relatively high base-flow index at the Fort Ancient is a reflection of the influence of ground-water discharge in the headwater area above Spring Valley and flow augmentation from wastewater discharges. Caesar Creek that is the principal tributary above Fort Ancient is cut into the shale bedrock throughout much of its course and the unregulated flow relatively low during dry periods.

The record of flow at the Milford gaging station shows a high dry-weather flow index. This is still a reflection of the influence of conditions in the headwater area, although some additional flow is contributed by terrace deposits in the valley north of Milford and releases from Caesar Creek Reservoir.

Cowan Creek drains an area in which impervious shale and dense till predominate. This accounts for the very low indices of flow indicated by the records near Wilmington and at Clinton County Air Force Base.

The index of flow of East Fork of Little Miami River should be similar to that of Whiteoak Creek because of the similarity of geologic conditions in the two basins. East Fork drains an area in which the surface material is almost entirely glacial till of Illinoian.

Figure 59: Little Miami River Watershed



# Figure 60: Little Miami River Watershed Land Cover

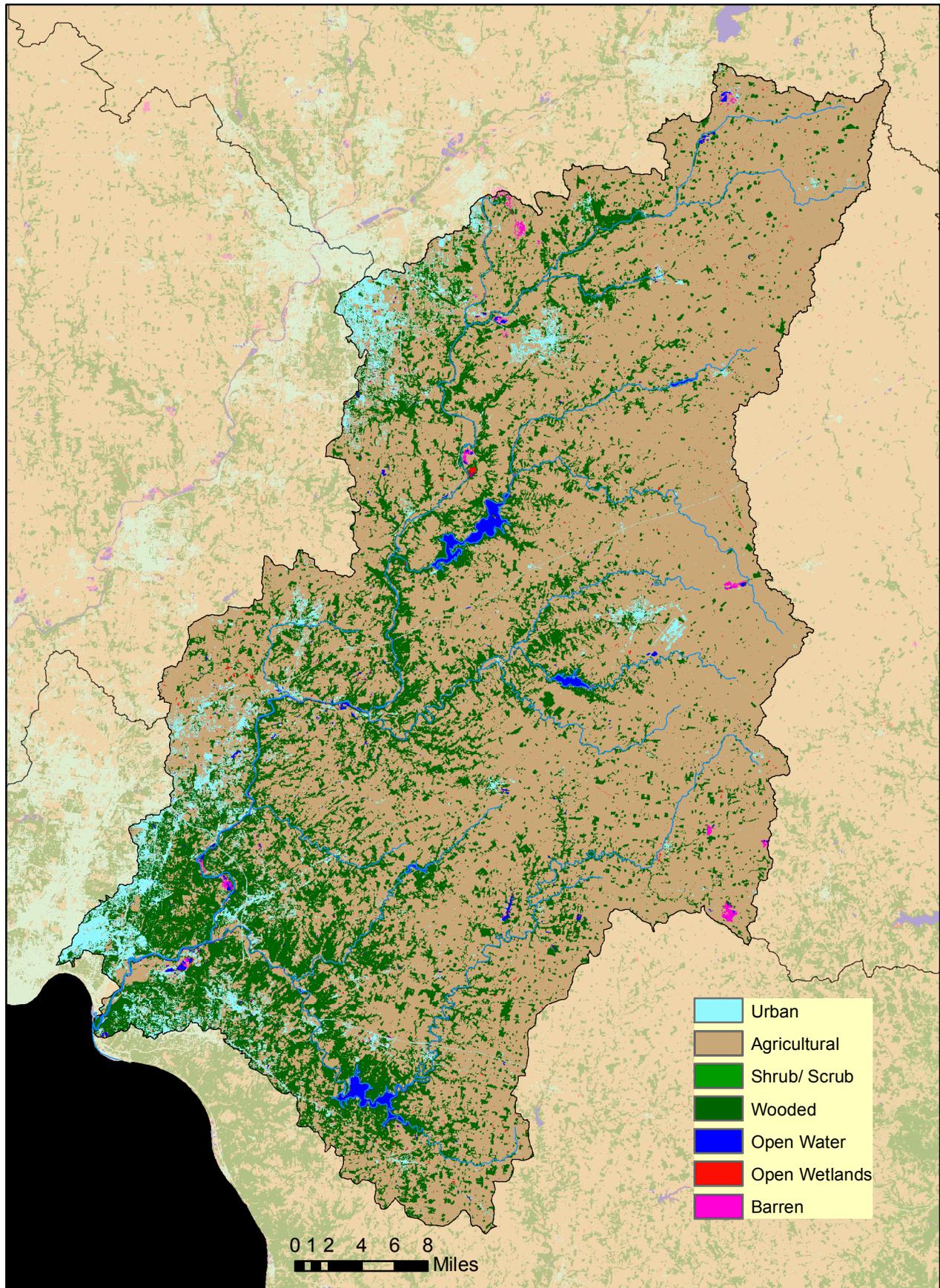


Figure 61: Little Miami River Watershed Protected Lands

