SCIOTO RIVER BASIN

The Scioto River drains 6,510 square miles and has the third largest drainage basin in the state. It is about 240 miles in length. The topography of the basin is extremely varied, from flat swamplands near the source to the rugged terrain of the unglaciated plateau near the mouth. The map in figure 14 shows the outline of the basin and flow paths of the main watercourses.

Physiography

Three physiographic sections are represented in the basin. About 65 percent of the area is in the Till Plains Section of the Central Lowlands Province. This northern part of the basin varies from an almost level plain to gently rolling terrain with thick glacial drift mantling the bedrock and filling the preglacial valleys. The streams flow in wide valleys, and a part of the area is swampy. The eastern margin of the basin from Chillicothe north is in the Glaciated Allegheny Plateaus Section of the Appalachian Plateaus Province. Here the topography is more rolling, with rounded hills and with valleys filled with glacial deposits. The southern and southeastern quarter of the basin is in the unglaciated Allegheny Plateaus Section with steep slopes and rugged topography.

The profile of the river is peculiar because of glaciation. The upper reaches are swampy and flat. From Marion County to Columbus the gradient is steeper, averaging 4 feet fall per mile, and the river is confined in a narrow gorge. South of Columbus the river flows in a wide preglacial or interglacial valley, and the gradient averages 1.7 feet per mile. The valley width in this lower section is about 1.5 miles.

Geology

The rock strata underlying the Scioto Basin ranges in age from Silurian to Pennsylvanian. East of an approximate north-south line through Columbus, the bedrock is predominantly dense, impervious shale. West of this line the rocks are dolomite and limestone that contain relatively large quantities of ground water in solution channels and joint systems. South of the Pickaway-Ross county line the dominant rock types become interbedded Mississippian and Pennsylvanian shales, siltstones, and sandstones.

Despite the fact that the underlying rocks store appreciable quantities of ground water in most of the basin, the effect of the bedrock character on streamflow is relatively unimportant. The glacial drift, particularly the melt-water deposits such as outwash, valley train, kame, and esker sands and gravels, store huge quantities of water and markedly affect low-water streamflow. The greatest influences occur where a present day stream flows in a preglacial valley over deep sand and gravel. Some of the till plain drift is relatively impermeable, and in these areas there is little sustained flow in streams.

Soils

Soils of glacial origin cover most of this area. The principal soils are those of the Miamian and Blount catenas in the glacial limestone area, and the Bennington catena of soils in the glacial sandstone and shale area. Generally, the till soils are moderately slow to slowly permeable; however, some moderately permeable soils occur. Terrace and

alluvial soils are generally more permeable. The predominant soils are the Eldean and Genesee. There are some muck soils in the basin. South of the glacial boundary the soils are residual. The dominant soils include the Shelocta, Brownsville, and Latham soil series. Alluvial and terrace soils in this area include some well-drained permeable soils, but generally, permeability of the soils in the basin is moderate to slow.

Water Development

The City of Columbus has two water supply reservoirs on the Scioto River, Griggs Reservoir built in 1905 and O'Shaughnesy Reservoir built in 1925. Hoover Reservoir on Big Walnut Creek was added to the municipal supply system in 1954.

The Corps of Engineers completed construction of Delaware Reservoir on the Olentangy River near Delaware in 1951, Deer Creek Reservoir on Deer Creek in 1968, Paint Creek Reservoir on Paint Creek in 1971, and Alum Creek Reservoir on Alum Creek in 1973.

Flow Characteristics

There are wide differences in streamflow characteristics in adjacent areas, or even within the same subbasin. For example, Big Walnut Creek has about four times the sustained flow, in cubic feet per second per square mile, at the downstream station as compared with the upstream station. This is caused apparently by the presence of thick and permeable glacial deposits in the lower reach of the stream, the upper station being in an area of predominantly shallow till overlying dense shale. Alum Creek at Columbus is similarly affected by the heavy overburden of glacial drift east and northeast of Columbus. Another anomaly is the sustained flow of Rocky Fork, that is much greater that of adjacent areas of equal size. A major portion of this flow is derived from its tributary, Clear Creek, which has its headwater in the Cuba Moraine, and flows on glacial outwash material throughout most of its course.

Generally, the streams in the northern part of the Scioto River Basin above Columbus have lower sustained flows than those in the southern part. There is a remarkable consistency in the sustained flows at stations in the upper half of the basin. The bedrock in the above areas contributes a negligible amount of ground water to streamflow, and the overburden of glacial drift consists mainly of impervious till.

The Scioto River above Prospect is an ice-front stream in origin and derives its low flow from morainal masses both to the north and south. Rock exposures are few in this area. The channel is in glacial drift throughout practically its entire course and the morainal hills rise from 50 to 100 feet above the valley floor. Although the sustained flow above Prospect is not great, it clearly shows the effect of the relatively permeable morainal hills in contrast with flow of streams in strictly till areas.

Darby Creek and Deer Creek drain areas that have very similar surface features. Both streams flow through areas in which the glacial drift is relatively thick but variable in its physical characteristics. Deer Creek is influenced somewhat by the moraine south and west of Marysville.

The dry-weather flow index of Paint Creek at Bourneville prior to completion of Paint

Creek Reservoir was three times that at Greenfield and remains about the same. Above Greenfield the stream drains an area of thin till that yields little ground water to sustain streamflow. Ground-water discharge from the buried valley deposits that underlie the floodplain of Paint Creek in the area between Bainbridge and Bourneville and contributions made by Rocky Fork apparently account for the higher dry-weather flow at Bourneville.

At first glance, the low-flow index for Rocky Fork at Barretts Mills appears abnormally high. As mentioned above, the high sustained flow is attributable to storage in the glacial deposits, particularly on Clear Creek, but it appears probable that storage in the cavernous limestone and dolomite may be a contributing factor. Also, the average annual precipitation in Highland and Clinton counties is greater than any other place in the state. The low-flow index of Salt Creek at Londonderry is slightly greater than that of Little Salt Creek at Richmond. A considerable volume of permeable outwash material may be present along Salt Creek in the vicinity of Laurelville and south of the Pine Cottage col where a drainage reversal occurred during glacial times. Little Salt Creek drains an area underlain by lower Pennsylvanian strata that as a whole are quite impermeable. Mine drainage may contribute somewhat to the flow.

In the Scioto River Basin there are areas of both relatively high and relatively low dryweather flow indices. On the average, the indices are lower than those of other large tributaries to the Ohio River, but higher than those of most Lake Erie tributaries. The median-flow indices and the high-flow indices are below the average for the state. The Scioto River is not as much of a flood-producing stream as some others, although large floods have occurred at intervals.

Figure 74: Scioto River Watershed

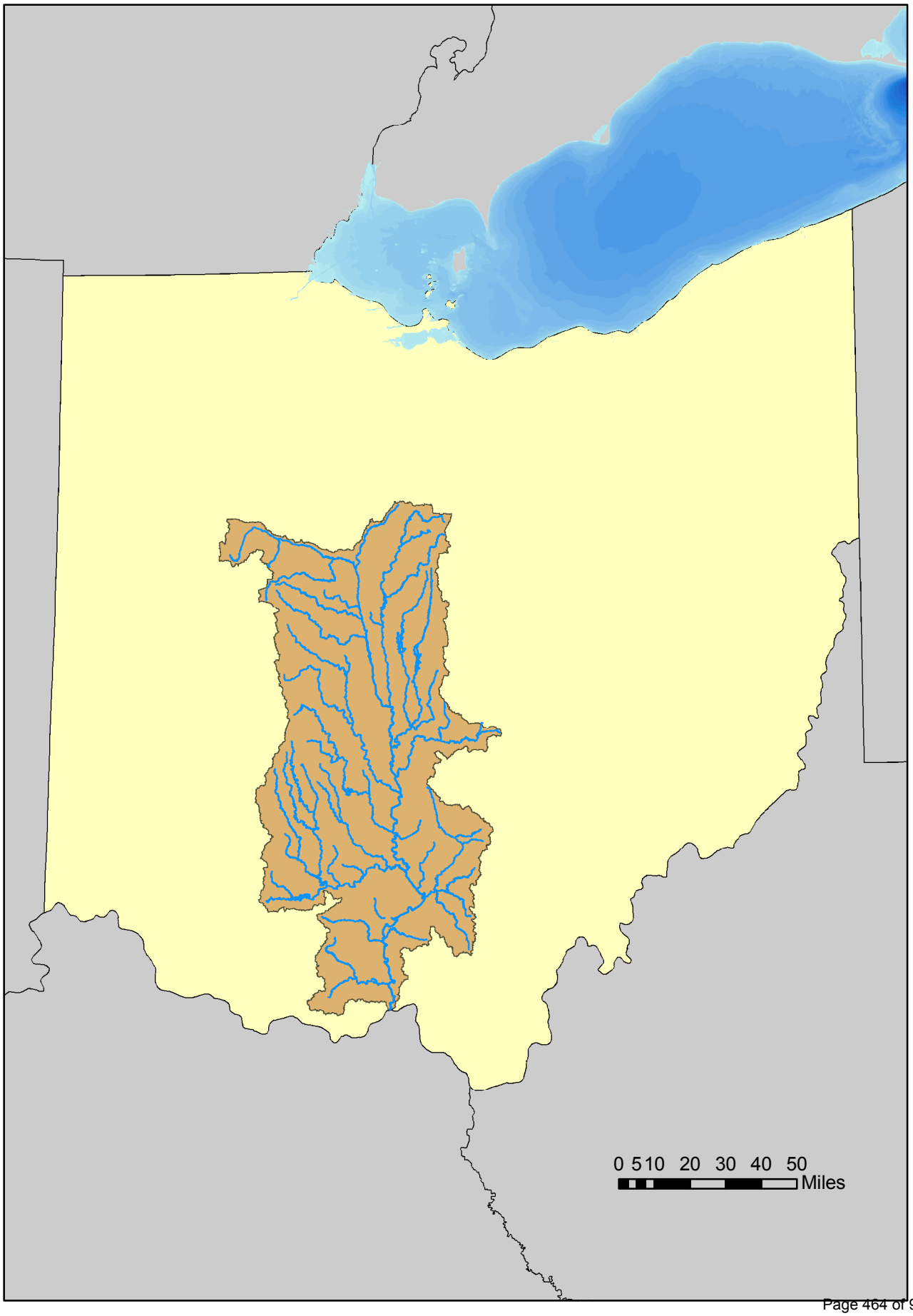

Figure 75: Upper Scioto River Watershed Land Cover

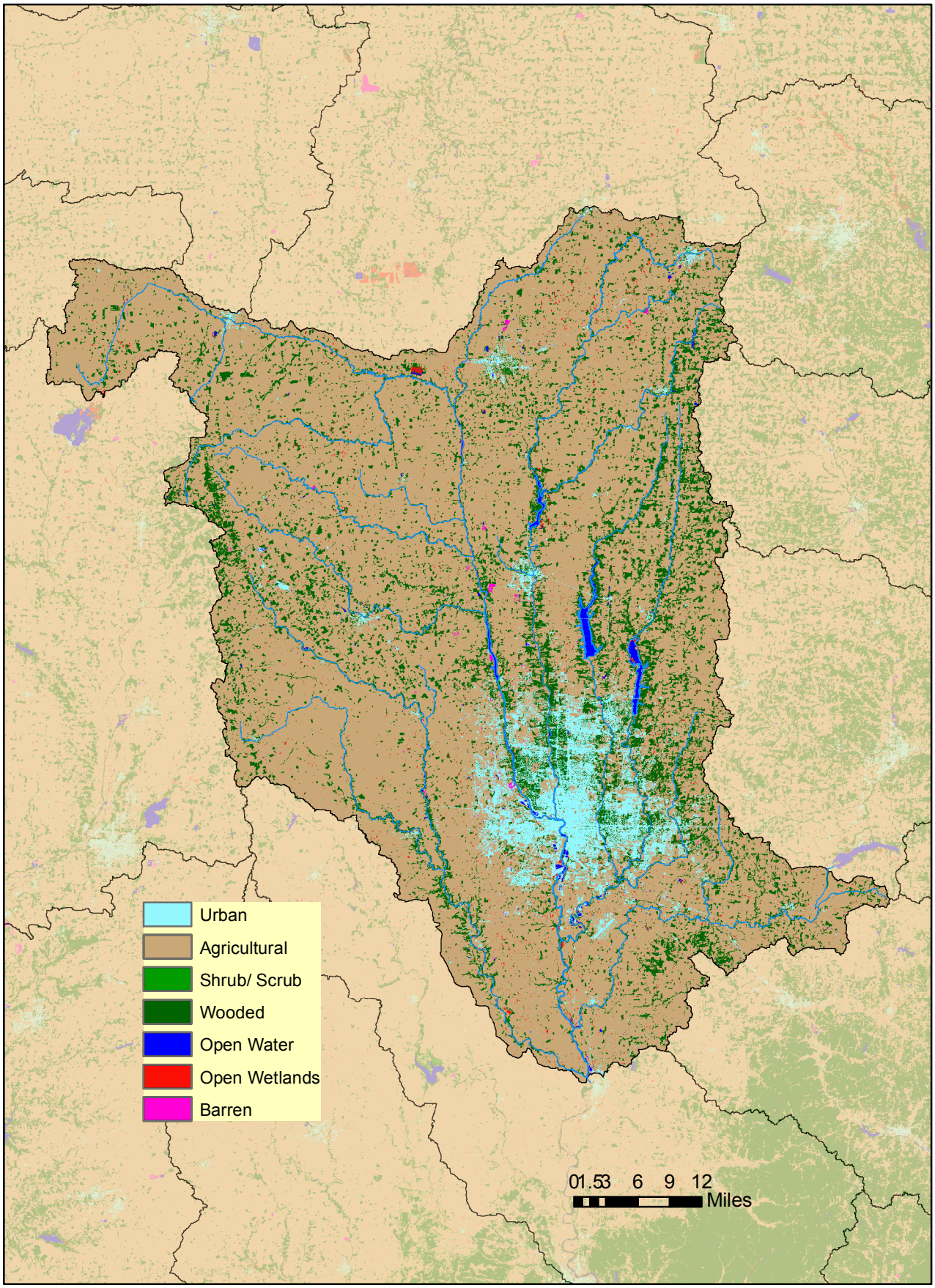

Figure 76: Lower Scioto River Watershed Land Cover

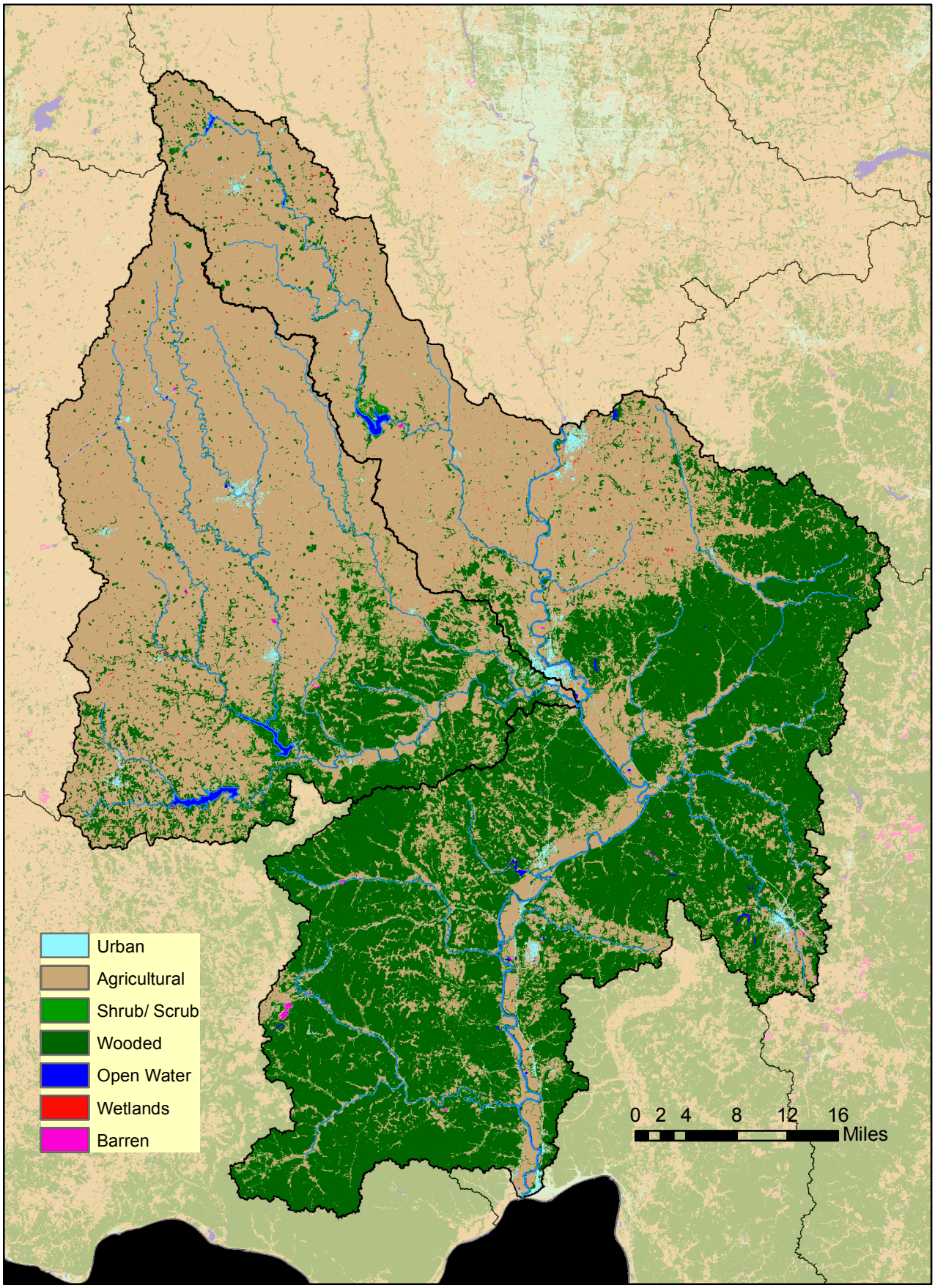

Figure 77: Upper Scioto River Watershed Protected Lands

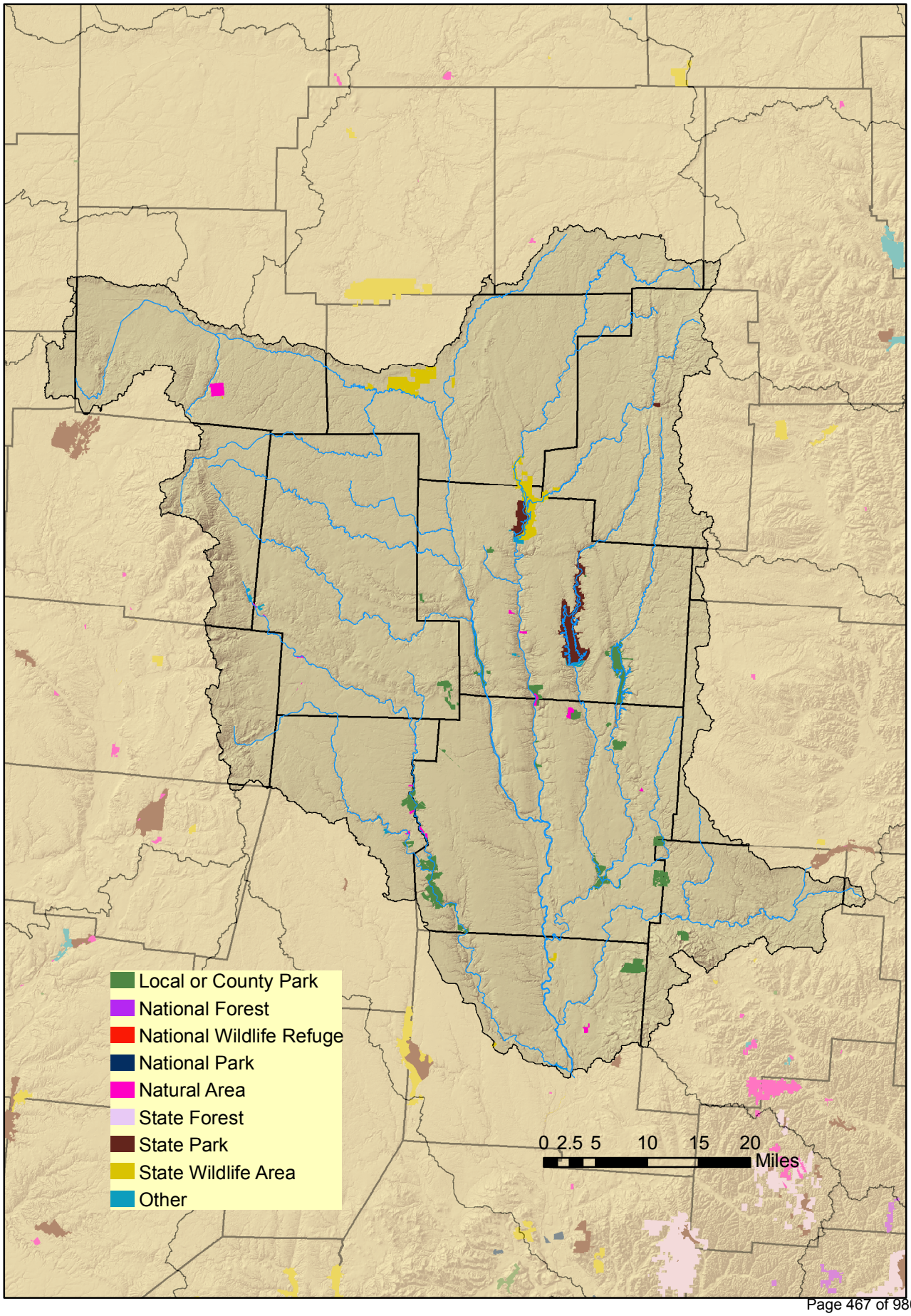
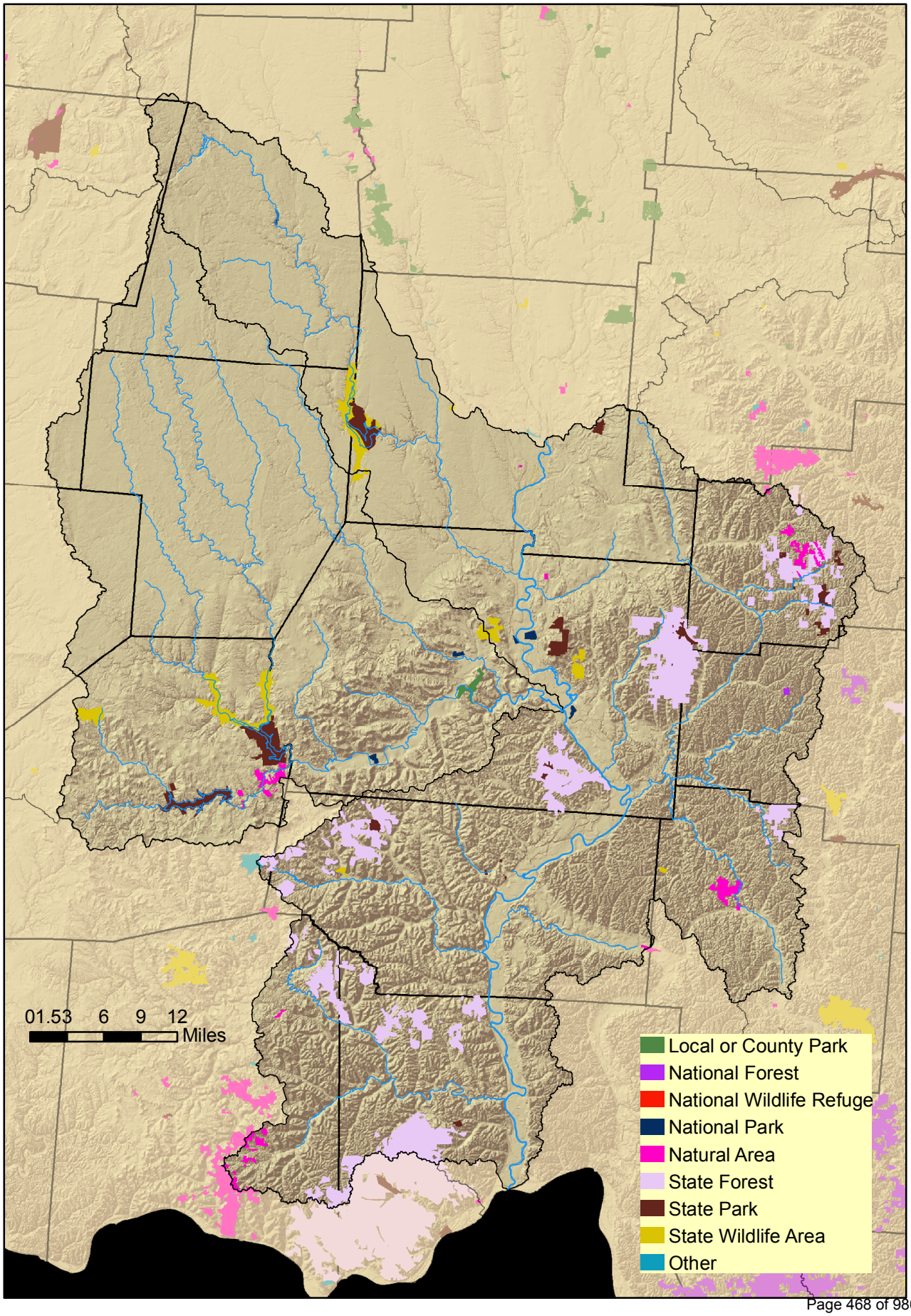
Figure 78: Lower Scioto River Watershed Protected Lands