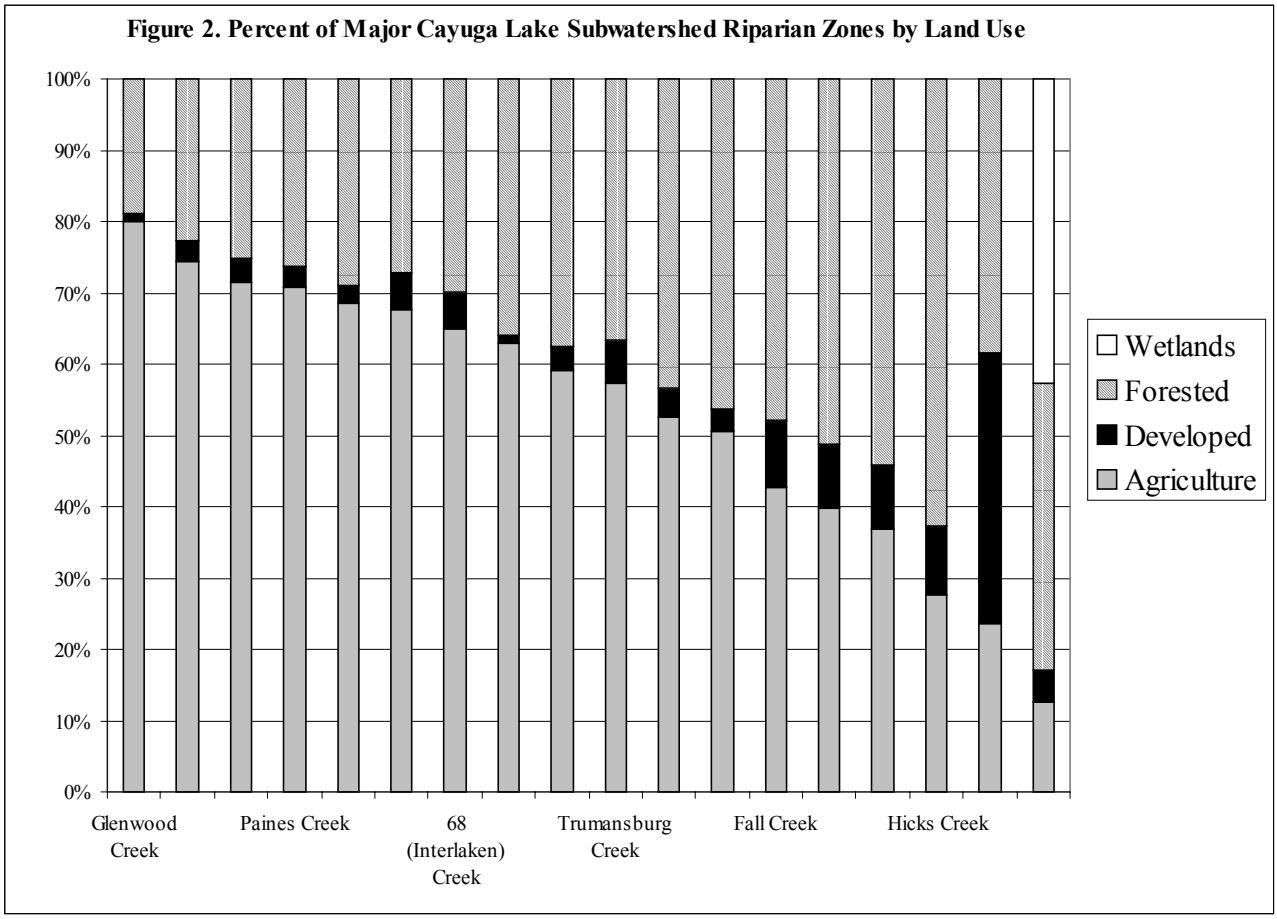

4. Technical Strategy Stage 2: Functional Assessment

This stage of the technical strategy evaluates the functional role played by the wetland and riparian corridors for each subwatershed. Wetland functions are the physical, chemical, and biological processes that characterize wetland ecosystems. Examples of wetland functions include: storage and attenuation of flood flows; nutrient trapping and removal through mechanisms including denitrification; trapping and removal of pathogens, metals, and organic compounds; provision of habitat for organisms; and support of aquatic life. The value of a wetland is a measure of its importance to society, which could include aesthetics, open space, and recreation.

Riparian corridors also provide these functions. In addition, they are important in stabilizing shorelines and sediments. The water quality related functions are most important in the context of the Cayuga Lake watershed and the goals of the *RPP*. It is important to recognize the linkage between the hydrologic functions of flood flow storage and desynchronization of peak flows in protecting downstream water quality.

Most functional analyses require intensive site-specific data and analysis. For illustrating the approach in this technical strategy, function was inferred from the NWI cover types and geomorphic position within the watershed.

4.1 Wetland and Riparian Function and Stream Order

It is the combination of landscape position and wetland cover type that determines the water quality functions provided by wetlands within the watershed. Water that flows from the outside rim of the watershed first encounters headwater wetlands associated with small streams (Figure 3 and Y2). Headwater recharging wetlands are frequently source waters for these creeks. As water flows into higher order streams (second-fourth), most of the water contacts wetlands only during periods of flooding or when it enters areas where flow has been reduced, such as impoundments or larger palustrine (forested) wetlands. Many of the streams and rivers in the Cayuga Lake watershed are dominated by first and second order, steeply sloping creeks. It is only on the larger stream systems (such as Taughannock) that third and fourth order streams are developed. In these larger streams natural topographic depressions dominate the subwatersheds as a result of the glacial parent material. Examination of the topography of the Taughannock subwatershed shows that the stream flows from one depression to the next, forming a sequence of wetland systems along the riparian corridor. As water moves into higher order streams the percentage of total flow that passes through (or contacts) the wetland system decreases.

As a general rule the amount of nutrients that can be processed (or renovated) by a wetland is directly proportional to the amount of flow that is going through that wetland. Within these subwatersheds maximum contact occurs in areas associated with smaller streams, in areas where stream flow is constricted and in areas were water flows through wetlands. Wetland areas with maximum contact are noted on the Figures. Healthy vegetated streamsides, or riparian zones, improve water quality by filtering contaminants from groundwater, trapping suspended sediments, and retarding floodwaters.

4.2 Wetland and Riparian Function and Landscape Position

While the physical, biological, and chemical characteristics of riparian areas and wetlands largely determine how they function, the impact of the riparian corridor on water quality depends on its geomorphic position within the watershed. Vegetated riparian corridors, including wetlands, that are located upstream of first order streams serve important water quality functions. They are particularly important because of their sediment trapping capacity and ability to remove nitrogen, particularly nitrate, from groundwater. Sediment retention is primarily a physical phenomenon. The ability to remove nitrate seems to be related to the presence of waterlogged soils, high organic matter inputs, and relatively elevated concentrations of nitrate in ground water; these conditions promote denitrification (Whigham, et. al., 1988).

These functions are characteristic of riparian areas (Johnson and McCormick, 1979). Riparian vegetation has been shown to be particularly important in agricultural landscapes (Schlosser and Karr, 1981), which comprises the majority of the Cayuga Lake watershed. Downstream from first order streams, nutrients and sediments contact riparian wetlands either during flooding