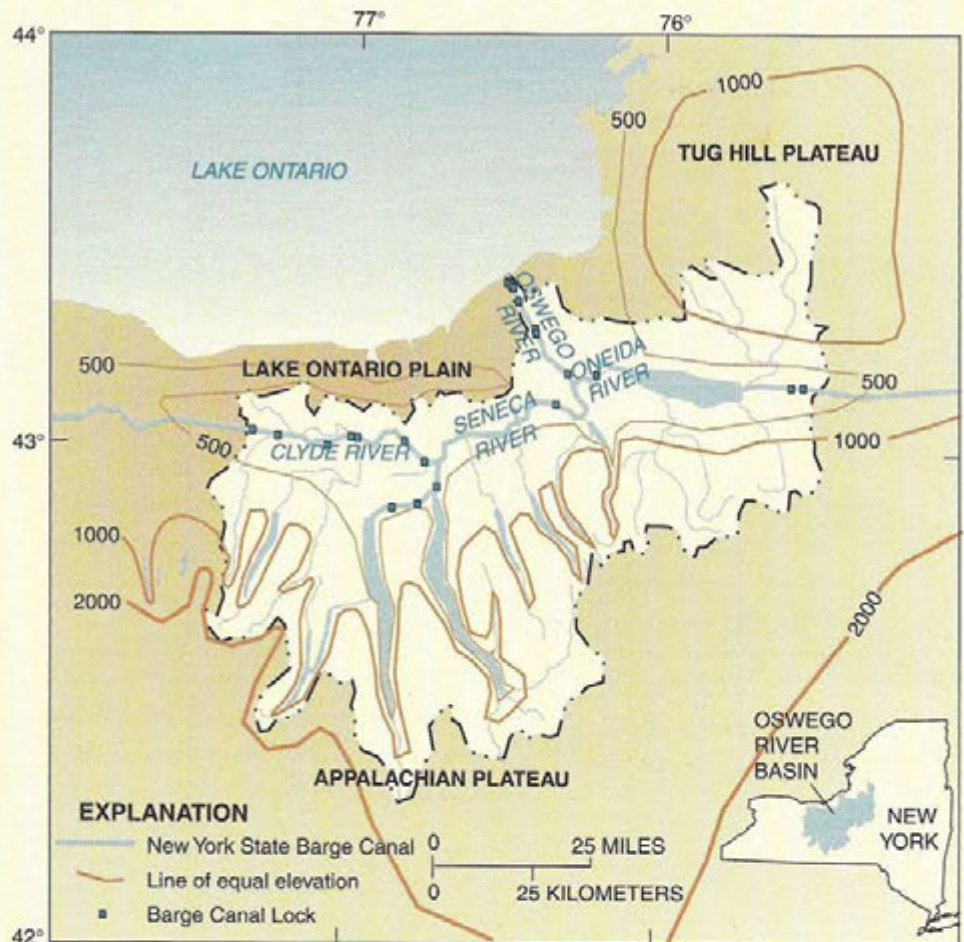


Clyde/Seneca River-Oneida Lake Trough

The trough is a product of regional geology and glaciation. During and after the last Ice Age (ending about 14,000 years ago), glaciers carved-out erodible shales that lie between the Lockport Dolomite bedrock "ridge" to the north of the trough and Onondaga Limestone bedrock "ridge" that forms the northern edge of the Appalachian Plateau to the south. The trough was subsequently filled with mixtures of clay, silt, sand, and gravel from the receding glacier. The result was a flat, low-lying area with many square miles of wetlands, some of which are now farmed as muckland. The New York State Barge Canal was constructed within the trough because the gradient is exceptionally low. The Canal's surface elevation drops only 23 feet in 60 miles along the main stem between Locks 27 and 24. Before construction of the canal in the early 1800's, the gradient averaged about 0.4 feet per mile; with the canal, the water-surface elevation changes in steps at each of the locks. The low gradient poses a challenge to water-resources management because the natural and man-made gradient inhibits the rapid movement of large volumes of water.

Effect of the Trough on Basin Drainage

Surface water and ground water in the Oswego River Basin flows from upland watersheds to rivers and lakes and then to the trough containing the main stem of the New York State Barge Canal. As illustrated in figure 3, water flows from the outlet of Keuka Lake to Seneca Lake, with a change in elevation of about 270 feet, and from Seneca Lake to Cayuga Lake with an elevation change of about 60 feet, then from Cayuga Lake to the Barge Canal through the Mudlock gate-structure where the fall is only 9



Base from U.S. Geological Survey digital data, 1:2,000,000, 1972. Standard parallels 29 30' and 45 30', central meridian -96 00'.

Figure 2. Physiographic provinces of the Oswego River Basin and generalized land-surface elevation

feet. During some major storm-runoff periods, the water-surface elevation in the Barge Canal near Montezuma (just downstream from the Cayuga Lake outlet) has exceeded the water-surface elevation in Cayuga Lake; and if the Mudlock gates had been open, water would have flowed from the Barge Canal into Cayuga Lake.

The area near Montezuma receives about 48 percent of the runoff from the Oswego River Basin's 5,100 square miles. Further downstream (to the east), the canal receives additional water from the Owasco, Skaneateles, and Otisco Lake watersheds, which, like Canandaigua Lake to the west, are at higher elevations and drain readily to the trough. Similarly, the uplands around Oneida Lake drain to the eastern end of the trough

from the surrounding watershed, and the additive contribution of these lake outflows to the Barge Canal results in a "bottleneck" at Three Rivers junction (the confluence of the Seneca, Oneida, and Oswego Rivers). This junction receives water from 96 percent of the Oswego River Basin but is within the flattest, slowest-moving reach of the Barge Canal and the Oswego River Basin. At times, inflow to the trough exceeds the channel capacity and causes flooding within Seneca, Cayuga, and Oneida Lakes and along the Seneca and Oneida Rivers. The gradient in the Oswego River, downstream of Fulton, increases markedly to 118 feet in 29 miles (4 feet per mile), and allows the water to flow more readily toward Lake Ontario.