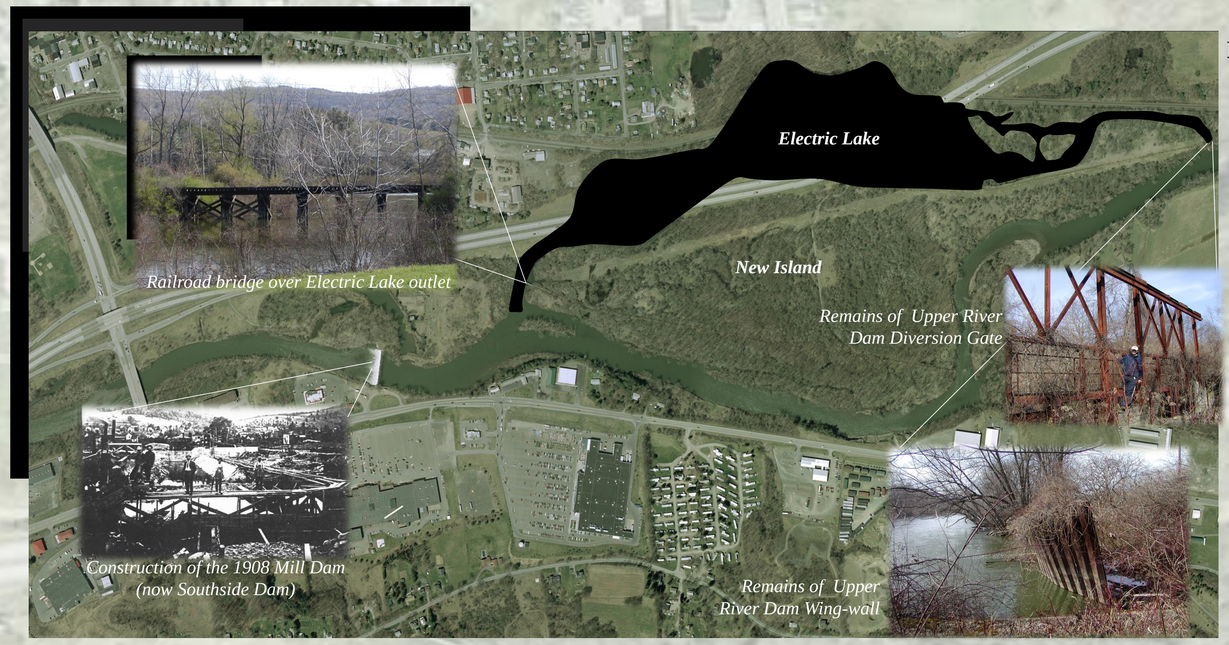
Electric Lake and New Island: A Landscape in Transition

Tracy H. Allen, PhD, Chair, Department of Geography
Associate Professor of Geography and the
Environmental Sciences Program, SUNY College at Oneonta

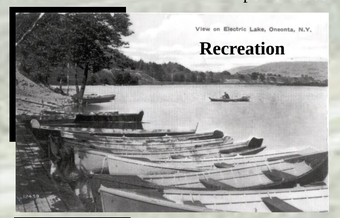
This research documents 100 years of land cover change and hydroseral succession in a 32-hectare riparian city park. New Island and former Electric Lake are located along the banks of the Susquehanna River, within the city limits of Oneonta in Upstate New York. Its rich natural history weaves a mosaic of both human and ecosystem tenacity. Once a site of extensive forested wetlands, it was briefly interrupted by human settlement, agricultural production, industrial activity, electric power generation, and railroad and interstate development. The Island was created in 1898, when a dam was constructed to impound water behind a powerhouse. The reservoir, called Electric Lake, produced electricity and recreational opportunities, until it was drained in 1958. Railroad tracks bisected New Island, severing hydraulic connectivity with the River, and a switching-yard devastated the forest. Between 1937 and 1960, there was a substantial decrease in agricultural land, and Electric Lake began to desiccate. New Island became mostly scrub shrubs and grasslands. Shrubs progressed to a young forest, and the adjacent land cover was completely urbanized. After falling into disuse by 1970, the Island's railroad property was acquired by the State of New York for the construction of an interstate. Over the next 45 years, the park had few visitors and experienced little interaction with its adjacent urban land uses. Through facilitation and hydroseral succession, New Island has recovered remarkably from past disturbances and is discernible from similar urban riparian lowlands by considerable biological diversity.

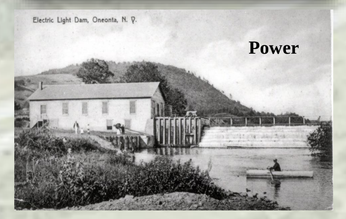


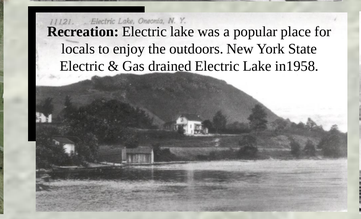
The approximate location of former Electric Lake superimposed on a 2010 aerial mosaic of New Island and Oneonta, NY

Historic Images of Electric Lake

Dam and Powerhouse: A 178-foot long Upper Dam diverted water from the Susquehanna River. The water was then impounded downstream from the diversion behind a 5-foot high, 55-foot long dam and powerhouse.

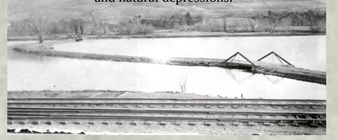






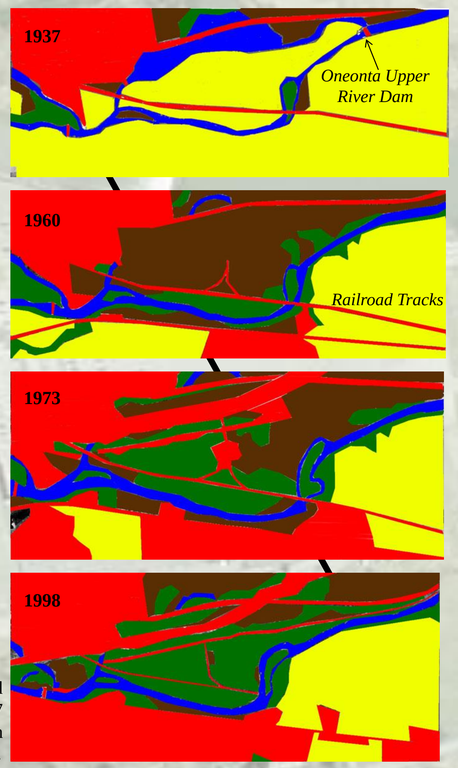
Recreation: Electric lake was a popular place for locals to enjoy the outdoors. New York State Electric & Gas drained Electric Lake in1958.

Electric Lake and Railroad, Early 1900's: The railroad remains a barrier that impedes hydrologic connectivity between the floodplain, river, and natural depressions.



Landcover and Landuse Change New Island, Upper Susquehanna

- Urban/ Built-up Land
- Agricultural Land
- Forest
- Scrub/Shrub/Grassland
- Water



Remains of former agricultural landuse

1915 USGS Topographic Map - New Island was created in 1898 as water was diverted by the Oneonta Upper River Dam to form Electric Lake.

The land-use/land-cover of New Island changed significantly from 1915 to 2006. Between 1937 and 1960 there was a substantial decrease in agricultural land, and Electric Lake was drained. New Island became mostly scrub shrubs and grasslands. By 1973, the scrub shrub and grasslands gave way to a young forest and urban/built-up land begins to increase. Interstate construction in the early 1970's significantly contributes to urbanization. The 1998 map illustrates continued secondary succession and much of New Island became riparian forest. Only small patches of scrub shrub persisted and evidence of electric Lake is all but gone. New Island is literally an island once again surround by a sea of urbanization.

Thanks to student researchers David Fyfe, Alexia Baker, and Wendy O'Sullivan

Electric Lake and Hydroseral Succession 1937-2006

1937 Air Photo - Electric Lake reservoir retaining the maximum amount of water.

Depressional surface water - much of the hydrologic conductivity with the river is broken by railroad "levees".

1960 Air Photo – Electric Lake drying-up and filling in following the 1958 removal of Upper Dam.

1973 Air Photo - Dryer conditions with increasing upland vegetation. The Construction of Interstate 88 contributed tons of fill material to the interior of the Island. Fill was stored on New Island and transported to the roadbed. Electric Lake remains further filled.

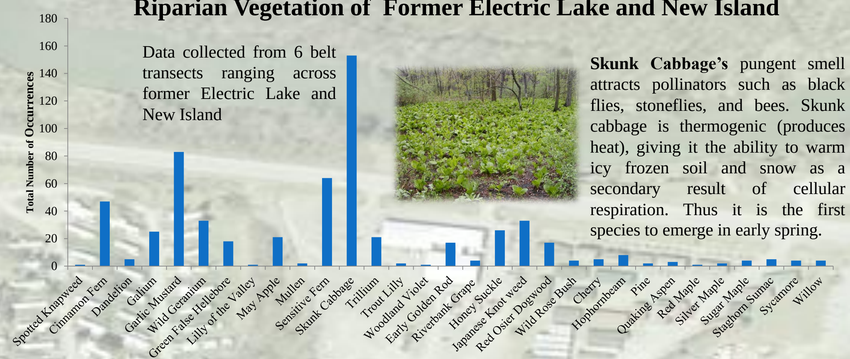
1998 Air Photo - Depressions maintain interior wetland plant species. Shrub and early to mid-successional tree species persisted. Black Willow overstory is dominate in remaining Electric Lake depressions.

Hydroseral succession is a natural, but often human accelerated process of "terrestrialization". Lakes and wetland depressions progressively fill with sediments and become dryer terrestrial environments.

Vegetation changes from obligate wetland species to mixed wetland and upland species. By removing the dam and diversion gates Electric Lake no longer had an inflow of water. Over time, standing water was replaced with sediments as the basin in-filled. Without stream-flow, Lake water evaporated and percolated to groundwater and vegetation progressively adjusted to dryer conditions. Today, "Electric Lake" consists of a few small wet depressions formed where the watertable surfaces or rainwater is perched rather than from the river.

2006 Air Photo - Minor ponding and depressional wetlands are all that is left of Electric Lake. Today the low-head Southside Dam has more of an influence on the Island's hydrology and plant cover. It reduces the frequency of small to moderate floods, decreases emergent wetlands, promotes later stage forested wetlands and impacts the geomorphology by altering the natural patterns of water, sediment and energy flow.

Riparian Vegetation of Former Electric Lake and New Island



Skunk Cabbage's pungent smell attracts pollinators such as black flies, stoneflies, and bees. Skunk cabbage is thermogenic (produces heat), giving it the ability to warm icy frozen soil and snow as a secondary result of cellular respiration. Thus it is the first species to emerge in early spring.

Dominant Species Forest Floor: Skunk cabbage, sensitive fern, garlic mustard, and Japanese knotweed
Dominant Overstory in Wet Areas: Ash, black cherry, silver maple, black willow, red maple, hornbeam, and sycamore
Dominant Overstory in Dryer Areas: Red maple, quaking aspen, black locust, and staghorn sumac
Dominant Overstory in Former Lake: Hawthorn and honey suckle (dryer) & black willow, silver maple, red osier dogwood

Invasive Species: *Garlic Mustard*

Immature forest cover and railroad bed

Invasive Species: *Japanese Knotweed*

Garlic Mustard is native to Europe. It carpets the forest floor on New Island. Garlic mustard readily outcompetes native species. It contains allelochemicals that, in effect, poison its competitors. One Garlic mustard plant can produce many seeds which can germinate up to five years later. Once garlic mustard is established, it is difficult to eradicate.

Japanese Knotweed is native to eastern Asia. It is considered one of the world's 100 worst invasive species. Japanese knotweed will infiltrate riparian zones and has been known to grow through asphalt. The main concern with this plant is that it outcompetes native species for resources and space and causes erosion.