Biodiversity at Teaneck Creek Conservancy: June 2023 Restoration Area Plot Survey

Submitted by Drs. Allyson Salisbury and Anthony Cullen, October 2023

The importance of biodiversity

Biodiversity tells us about the number of species living in a given place. It also tells us if species are evenly represented or if one species is extremely common while other species are very rare. For example, a biodiverse forest contains many different species and no single species is highly common.

A biodiverse ecosystem can better resist outbreaks of pests and disease, resist effects of climate change, and provide more benefits such as storing carbon. Generally, habitats with more types of plants will have more types of insects and birds.

It is normal for biodiversity to change over time, especially in places such as the Teaneck Creek Conservancy's (TCC) restoration areas. Restoration activities changes landscape and add native plant species to create a better environment for animals, plants, and people. We plan to repeat the restoration area plant survey in the future to document which species become more or less common and identify potential increases in undesirable invasive species. This information can be used in the future to inform potential interventions that could favor higher biodiversity or further improve habitat quality for particular animals.

Scientists and volunteers observe plants growing in study plots.

Documenting restoration area plants in Summer 2023

On June 24, 2023 a team of plant scientists and volunteers documented plants growing in the TCC's new restoration areas. A plant survey is a systematic method of documenting what plant species are growing in an environment. The restoration area covers over 20 acres and it would be too time consuming to inventory every single plant in it. Instead, biologists used a process called sampling to focus their attention on a few representative places within the park. The sample locations provide us with a snapshot of the restoration area's plants each year.

Since most of the restoration area contained short to medium sized plants such as grasses, wildflowers, and sedges, we sampled with a quadrat method. We placed a one-by-one meter square frame on the ground at a predetermined location, one plot. Then we recorded the plot's plant species and estimated the area each species

A one-by-one square meter plant survey plot. Plot locations were saved using GPS so we can revisit next year. Credit: A. Salisbury.

covered in each square. While these plots are small, we spread 20 of them throughout the site to track how the plant community changes over time.

We set up this project so that the same process can be repeated in the future. This will tell us how the type and amount of different plant species in the restoration area will change over time.

Results

Volunteers found blue vervain in a plot. Credit: sadawolk via iNaturalist

Our survey of 20 plots in TCC's restoration areas found 56 plant species as well as several species which we could not identify because they were too small and had not yet grown diagnostic features such as flowers.

Some of the most frequently observed species were big bluestem (*Andropogon gerardi*), beggartick (*Bidens* spp.), eastern cottonwood seedlings (*Populus deltoides*), and ragweed (*Ambrosia artemisiifolia*). Both big bluestem and beggartick were among the species intentionally planted in the restoration area. Big bluestem prefers drier conditions while beggartick prefers wetter soils. We observed many seedlings of eastern cottonwood and red maple, tree species found in the park's forest. These species are well adapted to begin growing in sunny and moist environments.

Volunteers found rabbitfoot clover in a plot. Credit: sadawolk via iNaturalist

About 25% of the species we identified were included in the planting list for the restoration areas. Note that this percentage excludes new woody plants added to the site, such as silky dogwood, since those were not included in the inventory. The other 75% of the species most likely grew from the seeds of other plants already in the park. These include native wetland species such as clearweed (*Pilea pumlia*) and non-native species such as curly dock (*Rumex crispus*).

May to June 2023 was an unusually dry period in New Jersey with each month having 1.51 and 0.43 inches of rainfall below normal, respectively. The stunted size of many plants in the plots, discoloration of stems and leaves, and the extent of bare ground (67% of each plot's area on average) all reflected water limitations. The May dry spell likely contributed a slow start to the restoration areas' plant community. Those conditions may have favored the growth of common weedy species such as ragweed and mugwort (*Artemisia vulgaris*).

One drawback of observing these plants in June was that many had not reached maturity, making them difficult or impossible to identify. Future observations of the plots later in the growing season may lead to a reclassification of some of the species we recorded in June 2023. Late July and August would be better months to measure these plots when the study is repeated in the future.

The species identified by the June 2023 Restoration Area Plot Survey at Teaneck Creek Conservancy.

Common Name	Scientific Name	Common Name	Scientific Name
Alsike clover	*Trifolium hybridum*	Pickerelweed	*Pontederia cordata*
American water plantain	*Alisma subcordatum*	Plaintain species	*Plantago* sp.
Beggar tick	*Bidens frondosa*	Purple loosestrife	*Lythrum salicaria*
Big bluestem	*Andropogon gerardi*	Queen Ann's Lace	*Daucus carota*
Birdsfoot trefoil	*Lotus corniculatus*	Rabbit-foot clover	*Trifolium arvense*
Black medic	*Medicago lupulina*	Red clover	*Trifolium pratense*
Black-eyed Susan	*Rudbeckia hirta*	Red maple	*Acer rubrum*
Blue vervain	*Verbena hastata*	Rush species	*Juncus* sp.
Blunt spikerush	*Eleocharis obtusa*	Sedge species	*Carex* sp.
Broom sedge	*Andropogon virginicus*	Skunk cabbage	*Symplocarpus foetidus*
Brownish beaksedge	*Rhynchospora capitellata*	Smartweed species	*Persicaria* sp.
Cattail species *	*Typha* sp.	Soft rush	*Juncus effusus*
Clearweed	*Pilea pumila*	Square stemmed monkey flower	*Mimulus ringens*
Clover species	*Trifolium* sp.	Swamp rose mallow	*Hibiscus moscheutos*
Common mugwort	*Artemisia vulgaris*	Switchgrass	*Panicum virgatum*
Common ragweed	*Ambrosia artemisiifolia*	Tickseed species	*Coreopsis* sp.
Common reed	*Phragmites australis*	Water purslane	*Lythrum portula*
Common three square	*Schoenoplectus pungens*	White clover	*Trifolium repens*
Corn speedwell	*Veronica arvensis*	Yellowseed false pimpernell	*Lindernia dubia*
Creeping yellowcress	*Rorippa sylvestris*		
Crown vetch	*Securigera varia*		
Curly dock	*Rumex crispus*		
Cursed crowfoot	*Ranunculus sceleratus*		
Deer-tongue grass	*Dichanthelium clandestinum*		
Eastern cottonwood	*Populus deltoides*		
Eastern red cedar	*Juniperus virginiana*		
Fireweed	*Chamaenerion angustifolium*		
Goldenrod species	*Solidago* sp.		
Hardstem bullrush	*Scirpus acutus*		
Hop sedge	*Carex lupulina*		
Hop trefoil	*Trifolium campestre*		
Horseweed	*Conyza canadensis*		
Japanese stiltgrass	*Microstegium vimineum*		
Joe-pye-weed	*Eutrochium purpureum*		
Northern red oak	*Quercus rubra*		
Path rush	*Juncus tenuis*		
Perennial ryegrass	*Lolium perenne*		

* A plant name that includes "species" indicates that we could only determine the genus of the plant, but it did not have enough distinguishing characteristics to determine the particular species.