BARBOUR'S POND RIPARIAN ZONE RESTORATION
FRIENDS OF GARRET MOUNTAIN RESERVATION
FIVE YEAR REPORT

Riparian Zone Restoration - June 2024

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INTRODUCTION

The Riparian Zone at the southeast end of Barbour's Pond (Garret Mountain Reservation) had suffered much damage during the dredging work which took place during the winter of 2017-2018. Many trees had been removed and the existing native vegetation was eliminated during the process.
In an attempt to restore the area to a thriving and vibrant natural habitat, the Friends of Garret Mountain Reservation designed a plan to restore the site. This involved stabilizing the soil with erosion control matting and native riparian seed mix, and replanting the area with shrubs, trees, perennials, and native seed mix. The restoration work took place took place mainly in Fall 2018 and Spring 2019 with additional plantings and work in subsequent years.

This report is a follow up to our Project Report, "Riparian Zone Restoration at Barbour's Pond" dated November 11, 2020.

PRE-EXISTING CONDITIONS

Disturbance of the Riparian Zone by the removal of trees and clearance of other existing riparian vegetation, soil surface scaring (ruts) and compaction by construction vehicles, topsoil stripping, and placement of dredging spoils during the 2017- 2018 Barbour's Pond Dredging Project. In addition to the loss of vegetation, the organic surface layer and topsoil of Holyoke-Rock Outcrop Complex native soil with the higher fertility for plants was lost.

RESTORATION GOALS AND ACTIVITIES:
FALL 2018 — SPRING 2020

Project Goals:
1. To stabilize the soil and prevent further erosion into Barbour's Pond.
2. To re-establish native riparian vegetation, and return the site back to a vibrant and thriving natural habitat.
3. To restore important environmental functions including wildlife habitat, water quality, shoreline protection, and biodiversity.
4. To enhance the natural beauty and appearance of Barbour's Pond and Garret Mountain Reservation.

Restoration Activities:
Soil Stabilization – The first priority was to stabilize the site and prevent further soil erosion. In Fall 2018, we installed erosion control coir matting along the shoreline and planted native riparian buffer seed mix.
Revegetation — Planting of Shrubs, Trees, Perennials, and Native Grass/Wildflower Seed
Thirty-eight native shrubs, seven trees, several perennials, and three different native grass/wildflower seed mixes were planted in the Spring of 2019. Deer repellents were scattered around the plantings.

Nineteen additional perennials were planted in June 2019. Additional wildflower seeds and herbaceous perennials were planted in Spring 2020.

Site Evaluation and Assessment:
In Fall 2019 and in the Spring, Summer, and Fall 2020 we assessed the site and evaluated the success of the plantings. Results were included in our November 2020 report.

ADDITIONAL RESTORATION ACTIVITIES: 2021 - 2022

In March 2021, a series of temporary fences were placed around the surviving shrubs and trees. Green plastic fencing (approx. 3 1/2 ft. high) and metal posts were used to make cages for some of the larger shrubs and trees, including Red Chokeberry, Sweet Pepperbush, Northern Bayberry, River Birch, and Red Maple. Three-foot high, thin black plastic fencing and bamboo canes were used for the remainder of the plantings.

In Spring 2022, five small Pussy Willow shrubs were planted near the pond edge. Plastic fences (2 - 3 ft. high) were placed around them.

In Fall 2022, four additional Bayberry shrubs were planted in the upland area and fenced with chicken wire (3 ft. high).

PROBLEMS AND CHALLENGES

Herbivory/Browsing by Wildlife: The main problem at the site is herbivory by Whitetail Deer. Any plants or shrubs not well-protected with fencing have been eaten. The thin black plastic fences proved to be inadequate and did not hold up to wind and storms. The sturdier fences with metal posts worked well, however the shrubs quickly outgrew them.
In March 2024, we installed four pre-constructed "Deer Cages" made from galvanized steel with a green polymer coating. Four-foot high cages were placed around Arrowwood and Red Chokeberry. Five-foot high cages were placed around the largest Northern Bayberry shrub and a River Birch tree. These were all shrubs and trees that survived from the original planting in 2019. The Deer Cage fences have held up well and appear to be very effective.

In addition to the Deer Cages, plastic fencing (approx. 3 ft. high) was used around several smaller shrubs and volunteer tree seedlings. These fences will eventually need to be replaced with bigger and stronger wire cages.

Other Damage by Wildlife: Young trees (Red Maple, River Birch) without adequate trunk protection have succumbed due to bucks rubbing their antlers and removing the bark.

Invasive Species: Japanese Barberry was present at the site and were removed in May 2024. Mile a Minute Vine was also found and removed. Japanese Stiltgrass can be found along the upland edge and should be removed, however it does not appear to be spreading. Monitoring for invasive species needs to be ongoing and invasives removed immediately.

Climate Change: Prolonged drought, fluctuating temperatures, floods, and storms of greater severity have stressed trees and other plants, and are making them more vulnerable in general. It is uncertain how future climate change will impact the area.

CURRENT STATE OF THE RIPARIAN ZONE HABITAT RESTORATION

After five years the affected area is now approximately 95-100 % covered with both planted and native vegetation. The most difficult area to revegetate was the southeast corner with shallow bedrock and thin compacted clay soil. Presently relative to the expected natural pattern of secondary plant succession, the area is in an overall perennial herbaceous plant community stage. The vegetative cover was enhanced by small tree and shrub plantings, starting in 2018 with the planting of small trees (Redbud, Pin Oak) by the Contractor; and in 2019 (Red Oak, Red Maple, River Birch) by Passaic County and Friends of Garret Mountain. These small understory layer trees cover approximately 10% of the area, with planted tall shrubs at 5% and low shrubs/tree seedlings covering 5%. The remaining majority 80% of the cover consists of planted and volunteered native herbaceous perennial and annual plants.

Shrubs and Tree Seedlings

Although many of the original plantings have been lost to herbivory, there have also been some important successes.

Currently there are six Northern Bayberry shrubs growing on the site, all of which are doing very well. The largest one is enclosed in a five-foot high wire Deer Cage. The others have smaller fences that will need to be made bigger.

Red Chokeberry and Arrowwood (from the original plantings) are also doing very well. The Arrowwood is enclosed in a four-foot high wire Deer Cage, and Red Chokeberry has a four-foot high green plastic fence. Smaller shrubs on the site include Sweet Pepperbush, Pussy Willow, Buttonbush, and a small Serviceberry. These shrubs have plastic fences (2 – 3 ft. high) and will eventually need bigger ones.

Based on our observations, it appears that shrubs can thrive at the site, however protective fencing must be provided.

In early Spring 2024, we found many small volunteer tree seedlings present on the site, mixed within the grasses. River Birch seedlings are predominant; other species found include Sycamore, Sweet Gum, Red Maple, Redbud, Eastern Red Cedar, Eastern White Pine, Willow, Elm, Chestnut Oak, and Dogwood. It is possible that the dense grasses have protected them from herbivory. Plastic fences were put around the larger seedlings. It is unknown whether the others will survive or not.

Trees

The two Red Oak saplings planted in 2019 are both doing well. However the Oak tree that was planted farther from the disturbed area has grown significantly taller. The River Birch growing along the wooded edge (to the north of the site) is doing very well. A five-foot high wire Deer Cage was installed around it for protection. The birch tree planted along the pond shoreline was broken due to fishing activity. It was later fenced and appeared to regrow, but then was lost when the water level rose due to a log jam in 2022- 2023. The third birch tree was broken and eaten by deer. The fences around the two Red Maples broke and both trees have succumbed to antler damage.
Based on our observations, it appears that young trees are able to survive on the site, however strong fencing is essential. All young trees need adequate trunk protection from antler damage or will not survive.

Restoration Area Sept. 2024

River Birch Seedling

Common Milkweed

Herbaceous Plants

Native grasses and rushes have been extremely successful and currently predominate at the site. Grasses include Indian Grass, Red Top, Deertongue, Virginia Rye, Switchgrass, Little Bluestem, and Big Bluestem. Rushes include mainly Soft Rush, and also Woolgrass. These were all included in the original seed mixes planted in 2018 and 2019. Existing native Broad-leaved Arrowhead and various species of Sedges are found along the pond shoreline.

Wildflowers — Common Milkweed and Mountain Mint have also been very successful and are flourishing at the site. In Spring 2020, six Common Milkweed plants were planted and additional seeds dispersed throughout the area. At first, it appeared the plants were being eaten; however by 2022, a large patch of Common Milkweed was found thriving among the grasses. This patch produced many flowers and seedpods and is now self-sustaining. Common Milkweed is now the predominant plant in the northeast upland section of the site. Other large patches can be found throughout the area.

Three species of Mountain Mints are also found thriving at the site. Narrowleaf Mountain Mint was included in the original deer-resistant seed mix planted in Spring 2019, and Short-toothed Mountain Mint seeds (collected from plants at Garret Mountain) were dispersed at the site in 2020 and 2021. Six Virginia Mountain Mint plants were planted in Spring 2020. Common Milkweed and Mountain Mint are both plants which are avoided by deer.

Other deer-resistant species can also be found at the site including Black-eyed Susan, Purple Gerardia, Boneset, American Burnweed, Thistle, and native Wild Mint. Some wildflowers such as Oxeye Sunflower and Ironweed, were observed growing inside the fence cages. In 2022 we conducted a wildflower study of the Garret Mountain Parks. A wide variety of wildflowers were observed in the Restoration Area. Details can be found in our report, "A Survey of the Wildflowers at Garret Mountain Reservation & Rifle Camp Park, Passaic County, New Jersey, March - October 2022".

Summer 2024

October 2024

ECOLOGICAL VALUES AND SERVICES PROVIDED BY THE RESTORATION

- Erosion control by stabilizing the slope area with vegetation to reduce soil loss
- Water Quality Maintenance of Barbours Pond to prevent turbidity of waters and siltation/sedimentation
- Carbon Sequestration by plant cover to off-set Climate Change Effects
- Wildlife Habitat Enhancement. Observed small resident and migratory bird use by such species as Kingbird, Robin, Phoebe. Red-winged Blackbird, Song Sparrow, Eastern Goldfinch, White-throated Sparrow, and Yellow-rumped Warbler. Abundant pollinating insects and grasshoppers provide food for the above birds.
- Human Social Values. Human visitors enjoy the visual appearance of the flowering vegetation and take photos of it, especially in the summer

RECOMMENDATIONS FOR THE FUTURE

- Add soil amendments (leaf mold/mulch and organic topsoil) to improve soil fertility to accelerate revegetation in selected areas. Consider placing fertilizer tablets and topdressing for selected trees and shrubs.
- Replace any dead trees from the original 2018 Contractor/County plantings. As a result of the severe drought of Fall 2024, recheck any affected trees and shrubs at the time of Spring 2025 leaf-out to confirm need for replacement
- Provide four or five-foot high cages, constructed of 14-gauge wire for all unfenced or weakly-fenced shrubs (until grown above browse height). Continue other feasible methods (repellents etc.) to reduce herbivory by deer.
- Provide trunk tubes for all young trees to guard against antler damage.
- Monitor regularly and remove any invasive plant species, including Japanese Barberry, Japanese Stiltgrass, and Mile-a-Minute Vine.
- Replace desirable trees and shrubs lost by various factors both inside and outside the fence line.
- Improve the waters edge of Barbour's Pond by planting stabilizing woody shrubs, such as Buttonbush and Willow species, and provide logs and sand piles for resident turtles to rest and lay eggs.
- Install a public educational sign to highlight wildlife habitat value of the restoration which provides food, water, cover, and sustainable breeding area. A good example of such a sign can be obtained from the National Wildlife Federation website for Certified Wildlife Habitats at www.nwf.org/Native-Plant-Habitats.

CONCLUSION

In conclusion, the area is currently in a perennial herbaceous plant community stage. We would expect, if the natural succession process occurs, much of the site will eventually be dominated by trees and shrubs. Although factors such as climate change, herbivory by deer, and invasive species may impact the rate and quality of the succession process.

Overall the Barbour's Pond riparian restoration project has been very successful and the original goals have been met. Common Milkweed and Mountain Mint, both important pollinator species, are flourishing on the site. Milkweed is of particular importance as it is the host plant for the Monarch Butterfly. With proper fencing and trunk protection, shrubs and trees will also thrive and grow. The trees and shrubs growing on the site today will one day provide berries, seeds, and nesting habitat for many species of birds and wildlife.

June 2024