

Prall's Island Heron Rookery Restoration and Harbor Herons Studies
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Executive Summary

Prall's Island, an 80 acre island located in the Arthur Kill between Staten Island and New Jersey, was one of the first New York/New Jersey Harbor Estuary islands colonized by a complex of wading bird colonies, locally known as the "harbor herons," but was abandoned as a breeding colony in 2006. The nine species which formerly made use of the island included Black-crowned Night-Heron (*Nycticorax nycticorax*), Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Glossy Ibis (*Plegadis falcinellus*), Cattle Egret (*Bubulcus ibis*), Yellow-crowned Night-Heron (*Nyctanassa violacea*), Little Blue Heron (*E. caerulea*), Green Heron (*Butorides virescens*), and Tri-colored Heron (*E. tricolor*). All of these species are NJ or NY species of conservation concern, and the two night-herons are listed as NJ State threatened. These species continue to breed on other islands in and around the harbor, suggesting that a change in local conditions on the island may have been the cause for abandonment.

Prall's Island was originally a salt marsh until it was filled in during the 1930s with dredge material from the Arthur Kill. A complex native suite of plant communities emerged on the island after this point, including forested uplands, grasslands, and meadows, with a perimeter of high and low salt marsh. The island since that time has experienced many human-caused and many natural disturbances, including the Exxon Bayway oil spill in 1990, and a series of intense nor'easters, followed by increasing construction adjacent to the Arthur Kill which decreased foraging habitat. This led to an initial restoration project, to remove ailanthus and restore low-branching native woody species more appealing to the herons. This project was beginning to bear fruit when Asian long-horned beetle was discovered on the island in 2007, resulting in the removal of almost all planted material, along with a significant percentage of the other dominant native vegetation on the island. Simultaneously with these disturbances, deer moved onto the island and established a resident herd, and populations of mile-a-minute vine (*Persicaria perfoliata*) and European buckthorn (*Rhamnus frangula*) exploded into the newly open and disturbed sections of the island.

Prall's was identified by the New York-New Jersey Harbor & Estuary Program Habitat Working Group as a potential site for restoration of the degraded habitat to a state in which it can once again support a colony of nesting herons, egrets, and ibis. This grant, received in partnership with New York City Audubon, has served dual purposes: to assess the use of habitat by land- and harbor herons and better understand foraging behavior of nearby populations as a baseline for future (post-restoration) assessment, and to begin the restoration process by targeting the invasive plant populations on the island.

Immediately following receipt of grant funds, the island was severely impacted by superstorm Sandy in October of 2012. Not only did the wave and wind action from Sandy almost entirely demolish the planting efforts of the previous restoration project, it also mangled and tipped the deer fence associated with that project making navigation of the north half of the island extremely difficult and deposited extensive floatable debris, especially along the north and eastern shores. These challenges resulted in a re-working of the goals and objectives of the grant funding to include removal of much of this debris, as a necessary pre-cursor to the vegetation work.

Following and interspersed with this removal of debris, NYC Parks has begun work on control of mile-a-minute vine and buckthorn on the island. Under this grant, Parks mapped and flagged dense populations of mile-a-minute vine and conducted pre- and post-emergent herbicide treatments to control these populations. Simultaneous with this grant, Parks released a biological control agent for the vine on the island, to provide long-term control of this highly invasive and highly mobile species.

Parks also completed targeted removals of seed-bearing buckthorn, to prevent thicketing of this species in the open areas of the island. Both mile-a-minute vine and buckthorn are carried by birds, so control of these species is critical prior to the re-colonization of the island by harbor herons.

Per Audubon's study results, the high value of the limited nesting habitat in the harbor makes Prall's Island a critical potential location for future habitat. Control of invasive plant species and restoration of nesting structure are critical steps in the recovery of the island as a nesting location, and Parks and Audubon are together setting the stage for that return.

Introduction

This joint project focuses on two types of restoration for a breeding colony of long-legged wading birds (herons, egrets, and ibis, hereafter called Harbor Herons): habitat/vegetation and colony composition/behavioral. The project is being undertaken to establish protocols for restoring nesting habitat for Harbor Herons on urban islands and to compile a rubric for evaluating success of the restoration effort. Ultimately, this project directly addresses the disappearance of a thriving colony of Harbor Herons on Prall's Island in New York Harbor and their potential restoration.

Prall's Island, today an 80 acre island located in the Arthur Kill between Staten Island and New Jersey, was originally a salt marsh until it was filled in during the 1930s with dredge material from the Arthur Kill. Over time, forested uplands, grasslands, and meadows, with a perimeter of high and low salt marsh emerged on the island, which, along with the adjacent marshes and forested interior along the Arthur Kills, provided attractive nesting and breeding grounds for Harbor Herons. Prall's Island, was in fact one of the first New York/New Jersey Harbor Estuary islands colonized by the Harbor Herons in the 1950s.

Subsequent degradation of the landscape, both on and adjacent to the island through a series of natural and human-caused disturbances, severely impacted this nesting and breeding habitat. The dredging of the Kill allowed for increased boat traffic, causing erosion and degradation of the salt marshes surrounding the upland. These disturbances led to invasion of the plant communities on the island by species like Phragmites (*Phragmites australis*), and small pockets of European buckthorn (*Rhamnus frangula*), Asiatic bittersweet (*Celastrus orbiculatus*), and mugwort (*Artemisia vulgaris*). Along with these other species *Ailanthus altissima*, an invasive tree species from central Asia, colonized the north end of the island along the high berm of sand that was created by dredging. This tree species grows substantially taller than the native tree and shrub species favored by the herons, provides perches for raptors above heron nests and contributes to increased predation. This combination of effects is conjectured to have caused the abandonment of the island as a breeding colony in 2006.

The suite of species collectively known as the Harbor Herons includes Black-crowned Night-Heron (*Nycticorax nycticorax*), Great Egret (*Ardea alba*), Snowy Egret (*Egretta thula*), Glossy Ibis (*Plegadis falcinellus*), Little Blue Heron (*Egretta caerulea*), Cattle Egret, Tricolored Heron (*Egretta tricolor*), and Green Heron (*Butorides striatus*). Additionally, during the past 10 years, special attention has been given to the monitoring of co-occurring harbor herons: Double-crested Cormorant (*Phalacrocorax auritus*), Herring Gull (*Larus argentatus*), and Great Black-backed Gull (*Larus marinus*). The value of these species and the need for adequate nesting and foraging habitat led to their inclusion as a Target Ecosystem Characteristic (TEC) in the USACE/Port Authority of NY/NJ/HEP Comprehensive Restoration Plan for the Hudson-Raritan Estuary. The New York/New Jersey Harbor Estuary Program identifies Prall's Island/Arthur Kill as a Restoration Priority Site and the New York State Department of State has designated Prall's Island as a Significant Coastal Fish and Wildlife Habitat.

As a result in part of these designations, and the focus of New York City Audubon on the issue of declining habitat for the Harbor Herons, NYC Parks began working on restoring habitat on the island in the early 2000s. Initial restoration included clearing and treatment of *Ailanthus*, and planting of many native low-growing shrubby tree species such as grey birch (*Betula populifolia*) and red maple (*Acer rubrum*) and a small number of slow-growing native scrub oaks. These plantings had begun to establish and achieve the stature required for nesting, when Asian long-horned beetle (*Anoplophora glabripennis*) was discovered on the island in 2007. Under quarantine by USDA APHIS, NYC Parks

was required to cut and chip all of the birch, maple and other host species on the island, including those that had been planted as part of the restoration. Furthermore, the quarantine and logistical difficulties of working on the island resulted in the deposition of all chips from these removals across the north end of the island and in wide trails bisecting the remaining healthy habitats. While effective in control of the beetle, this wreaked havoc with the ecosystem and with the Harbor Heron restoration project.

Removal of all of these shade species, and aggressive disturbance of the soils across the island resulted in an explosion of buckthorn germination. While buckthorn had been a minor component of the island's vegetation for some time, and had built up a substantial bank of seed in the soil, it had been held in check by the surrounding intact vegetation. With the removal and disturbance of this vegetation, buckthorn rapidly became dominant. Immediate action was taken, using the remains of the previous grant funding to target the mature seed-bearing buckthorn, the widespread flush of new buckthorn seedlings, and to plant in areas where the chips were shallow enough to permit planting success. However, this still left a substantial portion of the north end of the island unvegetated and many generations of buckthorn seed in the soil. To further complicate matters, mile-a-minute vine, an invasive species relatively new to the region (and not present at the time of the initial restoration project), made its way to the island during this period and rapidly established in all of the sunny disturbed areas of the island.

As noted by the Harbor Herons Conservation Plan (Elbin and Tsipoura 2010), The most immediate threats to the Harbor Herons identified in are human disturbance in the colony and in foraging areas, habitat degradation from development, invasive species, and pollutants. The challenges of maintaining healthy habitats in an industrialized and highly urbanized environment are especially difficult on islands such as Prall's, which even in the best of circumstances are difficult and time-consuming to access. Because of the high priority placed on the island by New York City Audubon, NYC Parks agreed to join forces with them and make another attempt at restoring Harbor Heron habitat on the island in 2011 through this EPA-NEIWPCP grant opportunity.

This report summarizes the efforts of NYC Parks through this funding to re-establish habitat suitable for Harbor Heron breeding and foraging on Prall's Island. Specifically, while Audubon completed surveys to assess the current condition of Harbor Heron populations and the relative importance of Prall's Island in the suite of available habitats for these species, NYC Parks focused on mapping and removal of mile-a-minute, control of buckthorn, and removal of other impediments to healthy nesting habitat on the island. The focus of this work was also substantially influenced by the impact of superstorm Sandy on the island in fall of 2012.

Objectives

The NYC Parks portion of this project focused on the restoration of appropriate nesting habitat and structure in several ways:

- Removal of human debris from the island. During superstorm Sandy, Prall's Island was completely over-washed by the storm surge. The waves tipped and mangled deer fencing on the north end of the island, and left drifts of floatable debris such as tires and plastic bottles across much of the island. Removal of sufficient material was required to navigate the island and access the target vegetation, as well as to remove trellis structures for the invasive vines, and reduce the risk of entanglement for birds.
- Initial control of mile-a-minute vine. Between 2008 and 2011, mile-a-minute vine colonized vast sections of the north end of Prall's Island. The disturbance caused by Sandy exacerbated this trend. This annual vine grows rapidly, produces prolific amounts of seed, and is moved around by birds and other wildlife. Control of mile-a-minute on the island is a critical first step to restoration of habitat, in order to prevent further expansion of this species in the region.
- Elimination of remaining mature buckthorn and other woody invasive species on the island to prevent colonization of areas opened by mile-a-minute control. As demonstrated by subsequent efforts on the island, small populations of low-level invaders can rapidly become dominant and set the stage for degradation in the event of wide-spread disturbance on the island. With the increasing frequency and power of storms in the region, future disturbances are quite likely. Control of these seed sources, especially in conjunction with the removal of mile-a-minute is critical to ensure that the island's habitat doesn't further decline.

While further deer exclusion fencing and planting was initially proposed as part of this project, the impacts of Sandy made the removal of debris far more significant for the island's ultimate restoration. In addition, many of the birch and maple which were cut in 2007 are now vigorously re-sprouting from those stumps, and a number of the slow-growing oaks which were planted through the previous restoration appear to have survived the subsequent storms. We are eager to see if control of the most dominant invasive plant species will create sufficient space for these survivors to colonize the newly opened areas.

I. Removal of Debris

As discussed above, the wind and wave action during superstorm Sandy resulted in substantial disarray on the island. Before any other work could be undertaken, acres of tangled deer fencing, goose line and flagging needed to be cut through and removed. In addition, hundreds of tires, plastic bottles, sections of boat insulation, and other human debris were washed into drifts across the island, along with huge amounts of vegetative wrack. As you can tell from the below photos, while the debris and wrack impaired access and safety, it did not substantially limit the growth of mile-a-minute.

Initial conditions following Sandy



Due to these unexpected conditions, we requested a shift in focus for the restoration work to include removal of much of this debris, preliminary to vegetation work. In part because of this delay, and its potential impact on control efforts, we applied for and received permission from USDA APHIS and NYS DEC to release *Rhinocomimus latipes* (*R. latipes*), commonly known as mile-a-minute weevil, as a biological control agent on the island. While not directly part of this grant-funded effort, the release of the control agent complements the efforts undertaken as part of this grant and has the potential to provide long-term control of mile-a-minute on the island now that the more intensive management funded through the grant is complete. As part of the release agreement, we will do tri-annual monitoring of the release site this year, and for two additional years.

The waters surrounding the island are quite shallow, and points of access and feasible landing craft are limited. We regularly accessed the island via canoe in the initial stages of debris removal, and created piled debris in staging areas to make removal with a hired boat more efficient and cost-effective.

Debris staged for removal.



A low-draft boat with a bow-loading door was hired from Miller's Launch, and the majority of these piles were removed in spring of 2014. Damaged fencing and other debris that directly impaired access to the site, and created structure for vines to trellis was prioritized for removal. Some debris does still remain and will be removed after the conclusion of this grant.

Debris being removed from the island



II. Control of Mile-A-Minute Vine

The primary objective of this grant was the control of mile-a-minute vine on Prall's Island. Mile-a-minute is extremely aggressive and fast-growing, and has rapidly gained a foothold in the region. Its colonization of new sites is aided by transport of seed and propagules by birds, wind and water, making the infestation of Prall's Island of special concern. Following previous disturbances, the vine had become well-established on the island prior to this grant.

Initial cover by mile-a-minute vine



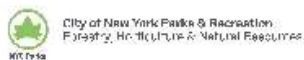
While the impacts of superstorm Sandy were substantial in terms of debris deposition, the inundation of the island had little to no dampening effect on mile-a-minute germination. In fact, the overwash appears to have pushed the vine further into the interior of the island along the line of debris deposition, beyond the extent of the original disturbance from ALB-host tree removal and chipping.




Following the procedures outlined through the QAPP completed for this project, areas of densest infestation were mapped and flagged for treatment with pre-emergent herbicide, and areas with lesser infestation were selectively targeted for post-emergent herbicide treatment and hand-pulling. Because of the long and snowy winter, and the shifting of vegetation due to the movement of debris, initial flagging that was done in 2013 had to be redone following the mapped polygons in spring of 2014.

Extent of mile-a-minute prior to grant versus mapped during the grant period



Pralls Island Heron Rookery Restoration and Harbor Herons Studies



-  Extent of mile-a-minute 2013
-  Extent of mile-a-minute 2011
-  NYC Parks



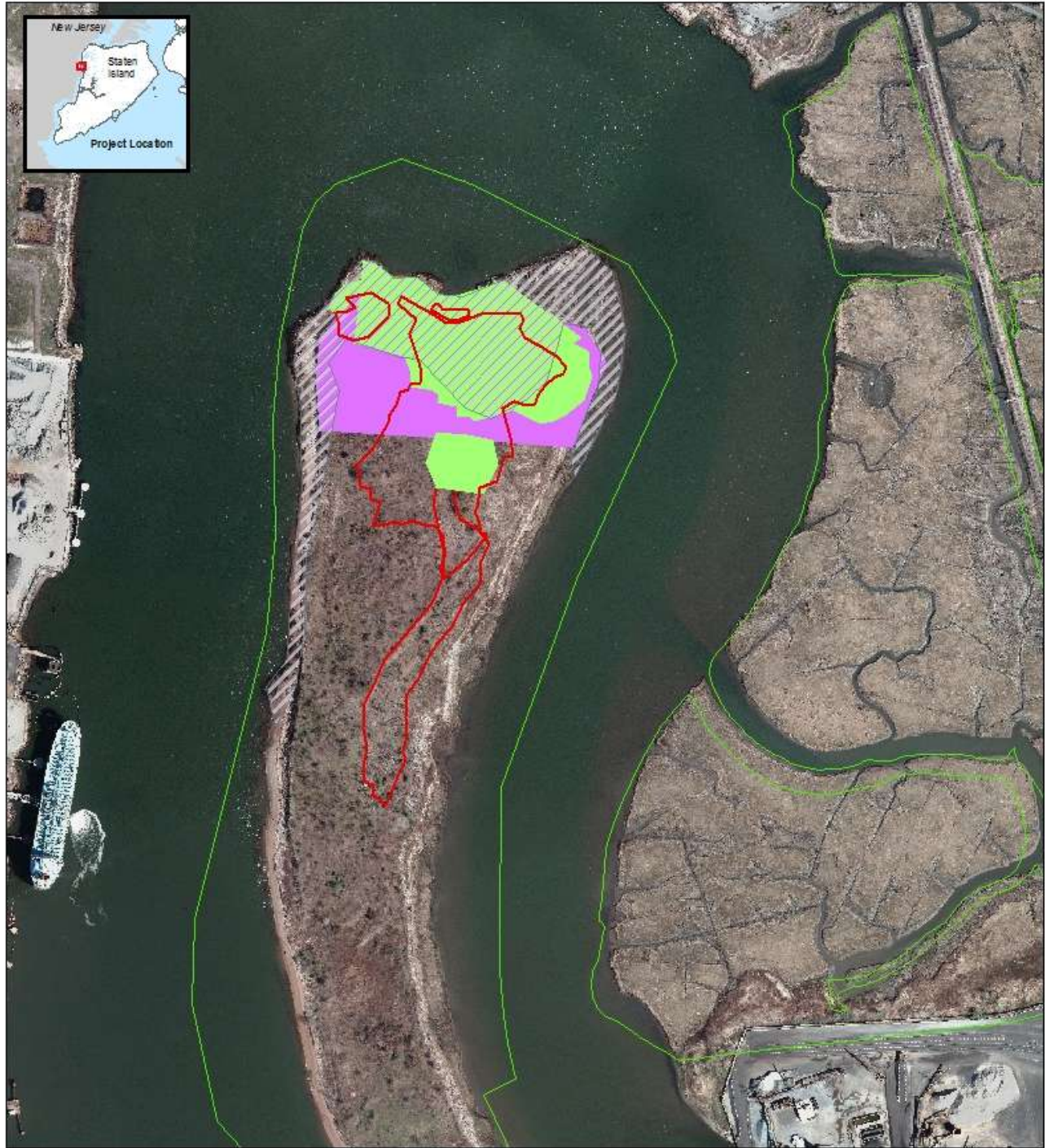
The pre-emergent herbicide used in areas with high density infestations these locations was Oust XP, which targets root and shoot tip growth, effectively stalling germination of small seeds at the surface for a long enough period that they desiccate. For areas with multi-year infestations of buckthorn and mile-a-minute, this type of treatment essentially rests the bank of seed in the soil at zero, eliminating the risk of future germination from seed that has built up in the site over many years. These areas then can be colonized by mature plants that are producing seed in the surrounding areas. The bulk of these areas occurred where the 2011 and 2013 extent of infestations overlapped, but also included a section of treatment of fruiting mile-a-minute vines atop a debris drift at the north end of the island prior to disruption of the debris, to ensure that moving the debris would not further spread the problem.

Because areas treated with pre-emergent herbicides are susceptible to re-invasion, control of invasive plants in the surrounding areas is critical. The post-emergent treatments were done with a low percentage of Accord XRT II, a systemic herbicide which is applied to the leaves of the plant through a foliar application or directly to the cambium through a cut-stump treatment. In either case the herbicide is drawn in by the plant's vascular system and circulates through the plants roots, ensuring the effectiveness of the treatment. The areas surrounding the pre-emergent treatments, which had less dense infestations of mile-a-minute and buckthorn, were targeted with this type of treatment to eliminate seedlings which had already emerged (while leaving the bank of seed intact, as it was presumed to hold a complement of beneficial seed capable of germinating and competing with any later waves of invasive germination). These treatments were only done where the target vegetation could be effectively isolated and collateral damage to native vegetation minimized. The sharp southern line on the map below showing the extent of these treatments is the line of oaks surviving from the previous restoration efforts, which marks the southern boundary of the ALB deep chip deposition. Most occurrences of mile-a-minute below this line were spotty, pre-dominantly atop debris, and surrounded by native herbaceous vegetation. We are hopeful that the concurrent release and spread of the mile-a-minute weevil will be sufficient to hold these remnant populations in check.

Release of the mile-a-minute weevil (R. latipes) as a bio-control agent





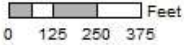
Extent of treatments



**Pralls Island Heron Rookery Restoration
and Harbor Herons Studies**

 City of New York Parks & Recreation
Forestry, Horticulture & Natural Resources

-  Debris Removal
-  Pre-emergent Herbicide
-  Post-emergent Herbicide

 Feet
0 125 250 375



III. Elimination of European Buckthorn

The other prolific invasive species present on the island, and rapidly spreading due to disturbance in 2007-2009, is European buckthorn (*Rhamnus frangula*). Buckthorn is a multi-stemmed shrub that invades spots of light in intact forest, and grows in areas of sun or moderate shade. It leafs out earlier than most native species, and thickets these areas creating dense shade that prevents germination of other species. Its common access point for invasion in the northeast is tree-falls in otherwise intact woodlands. On Prall's, it was present during earlier restoration efforts, but not perceived as an urgent threat because of the substantial cover anticipated to be created by restoration plantings. When these plantings were removed however, the many years of buckthorn seed rapidly germinated and gained dominance in the highly disturbed high nutrient environment created by the wood chips. While not as fast-growing or as easily spread as the mile-a-minute, the population of buckthorn on the island became significant enough to merit focused control efforts.

Initial treatment prior to this grant was only enough to scratch the surface, taking out the first wave of germination in the newly disturbed areas, and removing the bulk of the mature fruiting specimens. Several mature plants were missed however, and a new wave of germination occurred throughout much of the area also colonized by mile-a-minute. Buckthorn gets its start on the season prior to the germination of mile-a-minute, which then uses the structure of the buckthorn plants to gain elevation and spread.

The texture in this field of mile-a-minute is created by the growth of buckthorn, evidenced by the photo on the right which was taken underneath the edge.



Through the work of this grant, the remaining mature individuals were cut to the ground and their stumps treated with Accord XRT II. In addition, post-emergent herbicide spray treatments conducted on the mile-a-minute also targeted the buckthorn seedlings and saplings, the leaves of which are equally susceptible to these treatments. Similarly, pre-emergent treatments of the dense infestation sites served

the dual purpose of emptying the seed-bank of the reserves of both species.

Current Condition of the Island, Discussion and Conclusions

The funds provided by this grant helped provide a baseline understanding of the Harbor Heron populations, the need for additional breeding and nesting areas to support these populations, and the barriers to habitat suitability present on Prall's Island. In addition, these funds allowed NYC Parks to take the initial steps needed for the recovery of the habitat. Restoration is clearly not complete, but it is well-underway.

The population of mile-a-minute vine on Prall's Island has been substantially reduced through pre- and post emergent treatments. These treatments have also effectively targeted the European buckthorn present throughout these areas, ensuring that it will not emerge as the likely successor within the mile-a-minute areas. Mature buckthorn and sapling buckthorn were also removed, limiting seed-source and preventing mile-a-minute from using them as a trellis to gain elevation.

In addition, removal of debris has minimized the number of available structures on the island for mile-a-minute to trellis over and further spread. These removals have brought sections of the island back to their initial soil surface, potentially allowing for germination of native seed that is latent in the soil, and allowing productive surfaces for new influxes of seed from the remaining native plants in the surrounding areas to flourish.

The activities of this grant also brought to our attention the impact of Sandy on the island, and allowed for rapid response to the damage caused by the storm. This series of events, and our presence on the island, also made us consider the long-term implications of increasing storms on the specific invasive plant populations present on the island, leading to the release of the weevil as a biological control agent. In the long-term, now that the dominant population of mile-a-minute on the island has been controlled, the weevil will enter into a stable relationship with the vine, reducing its spread and vigor, and thereby allowing for the germination of native plant species. As mentioned above, the birch and maple are vigorously re-sprouting, and the slow-growing oaks appear to finally be reaching maturation, assuring that there is a positive seed source waiting to take advantage of the newly opened space and capable of providing healthy and productive habitat for Harbor Heron populations. This positive cycle will in turn help keep species like buckthorn from re-invading by providing positive shade and cover.

Restoration of habitat in urban areas is a complex endeavor, even when undertaken inland. On an island, things have a way of spiraling out of control in between visits. This grant was perfectly timed to take advantage of a unique confluence of events, and to allow us to emerge hopeful for the future of the habitat on this little island in the Arthur Kill.

Literature Cited

Craig, E.C. 2010. New York City Audubon Society's Harbor Herons Project: 2010 Nesting Survey. NYC Audubon. Elbin, S. and N. Tsipoura, editors. 2010. Harbor Herons Conservation Plan - NY/NJ Harbor Region. NY/NJ Harbor Estuary Program.