Spy Pond Phase 1 Report, Native Planting 2019
With Outcomes Update

Executive Summary, September 2020

This is a project envisioned by the Spy Pond Committee of Arlington Massachusetts, and implemented beginning early in 2019. It is an effort to harmonize and carry out the visions of five agencies:

- the Spy Pond Committee, consisting of abutters and interested residents;
- the Town of Arlington Conservation Commission, which oversees permissions for wetland activities and improvements;
- the Appalachian Mountain Club Boston Chapter Trails committee, which has helped with landscaping and trail work for the past decade;
- the Appalachian Mountain Club Boston Chapter Conservation Committee; and
- MassDOT, the state Department of Transportation, which has property rights to the concerned area.

The purpose of the effort was to answer MassDOT's need to control hillside erosion at the southwest area of Spy Pond along Route 2. The vision was to incorporate native plantings to help with erosion and restore wildlife-friendly habitat to the area. Work was accomplished by volunteers, with plan approvals by the town and state. MassDOT provided funding for botanicals and materials, as did AMC for some materials.

A Planting Day was held May 11, 2019 in conjunction with Spy Pond Day. This annual conservation gathering was canceled during the pandemic of 2020, with only monitoring performed during 2020. With watering and monitoring the first year, the species of plants were well suited and thrived, with the exception of evergreen arborvitae which may have succumbed to a problem with the nursery stock. Cages made from hardware cloth were excellent to project plants from trampling or wildlife damage, and may now be reused for further plantings.

Immediate future needs include:

- extending the successful slope plantings to more areas, with more varieties;
- managing invasive oriental bittersweet (severe), black swallow wort (beginning), and purple loosestrife (becoming established);
- intervention planning for a disturbed hillside for the adjoining fence;
- introducing modest explanatory signage to educate the public to stay on the trails and off the slopes; and
- establishing large evergreens along the fishermen steps.

The Phase 1 project can be considered a great success and a model for like efforts. 🌳

Spy Pond Phase 1 Report, Native Planting 2019 With Outcomes Update

by Kristine H. Atkinson, Ph.D.

Certified Master Gardener, MMGA; Trails Committee, Appalachian Mountain Club Boston Chapter;
Plant Conservation Volunteer, Garden in the Woods Plant Preservation Project

This report summarizes the conditions, strategies and efforts accomplished during our first year of reclaiming the natural habitat of the southwest border of Spy Pond in Arlington, Massachusetts.

Addendums written in February and September 2020 detail the outcomes. They include suggestions for future stages regarding types of plants needed, immediate problems which should be addressed, with discussion and ideas for long-term policy and steps.

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This report summarizes the conditions, strategies and efforts to be accomplished during our first year of reclaiming the natural habitat of the South border of Spy Pond in Arlington, Massachusetts. It concludes with suggestions for future stages regarding types of plants needed, problems to address over time, and a plan for taking the next steps.

Changes from the Preliminary Plan

Some of the suggestions had to be substituted for reason of cost and availability; any changes were submitted for approvals from all the agencies. An earlier start next year, and turning to bare-root vendors now shown to be reliable, may smoothe future planning. The MassDOT vendor Heimlich nurseries were uncooperative in providing quotes in a timely way, did not have materials or plants we needed, and gave a very expensive quote. The alternative Northeast Nurseries were easy to deal with, reasonable costs, but plant choices were limited. Perhaps if we float a tentative order in fall it might mean they could stock the natives we need.

This is not a definitive report, as the site tours and assessments were brief, and done in winter. It is only a guide for getting started on a long-term project plan, and to suggest avenues for immediate implementation that will do no harm but can ameliorate the condition of this densely used, at-risk conservation area.

This is an excerpt from the MA Dept. of Conservation:

> The most commonly regulated wetlands are bordering vegetated wetlands (**BVWs**), which are wetlands that share a border with a stream, pond or lake.
>
> **What is a buffer zone?** A buffer zone is the area of land within 100 feet of coastal banks, inland banks, freshwater wetlands, coastal wetlands, tidal flats, beaches, dunes, marshes, and swamps. Work (activity) in a buffer zone could have an impact on the nearby wetland, depending on the type and location of the work and the wetland. Thus, many activities done in a buffer zone (other than minor activities set forth in the regulations and exempt activities) are subject to regulation under the Act and require prior approval by the conservation commission. A conservation commission may impose conditions or limits on activity done in a buffer zone so that the nearby wetland is protected.
>
> Wetlands are valuable to wildlife, providing food, breeding areas, and protective cover. Naturally vegetated riverfront lands also provide essential travel corridors for many species. Shellfish beds and commercial and recreational fisheries are dependent on good water quality and healthy coastal and inland wetlands.
>
> **What activities are prohibited in wetlands, riverfront areas, and other resource areas?**
>
> Under the Act no one may "remove, fill, dredge, or alter" any wetland, floodplain, bank, land under a water body, land within 100 feet of a wetland, or land within 200 feet of a perennial

stream or river (25 feet of a few urban rivers), without a permit (known as an Order of Conditions) from the local conservation commission that protects the wetland "interests" identified in the Act. The "interests" or values protected by the Act are: flood control; prevention of storm damage; prevention of pollution; and protection of fisheries, shellfish, groundwater, public or private water supply, and wildlife habitat. The term "alter" is defined to include any destruction of vegetation, or change in drainage characteristics or water flow patterns, or any change in the water table or water quality. **The wetland regulations prohibit most destruction of wetlands and naturally vegetated riverfront areas,** and require replacement of flood storage loss when floodplains are filled.

For small projects located entirely in the 100-foot wetlands buffer zone (but not within 200-feet of a perennial stream or river) you may submit a Request for Determination of Applicability (RDA) with a plan, sketch or other description of the work to be done, showing any measures you plan to take to protect nearby wetlands from alteration. If the project is determined to have no wetlands impact, you will be given permission to proceed as soon as a 10-day appeal period passes. Certain small projects are exempt.

The committee will obtain the proper permits in compliance with these regulations, and are starting with plants already approved for other projects. For this year, it was decided to focus on the southern shoreline only, so the other areas will not be addressed. However, building a policy and securing cooperation of abutters in creating marginal natural areas would be an important adjunct to the pond's restoration. The efforts of Vermont in implementing its Shoreline Protection Act includes suggested planting design templates that can be useful to create these natural margins. *https://dec.vermont.gov/sites/dec/files/wsm/lakes/Lakewise/docs/lp_VTlakescape.pdf*

I've known Spy Pond as an AMC Trails member, volunteering to pull invasives and build steps for several years. For this review a friend and I walked the path on a cloudy, cold Sunday afternoon, and there was never a time when there weren't several walkers, some with dogs, going in both directions. I haven't personally encountered the fishermen who are a source of hillside trampling concern, but have had experience while pulling invasives with finding their tackle caught in the shore undergrowth and submerged plants. So protecting this narrow strip of wetland poses challenges exceeding good plans and intentions.

For the sake of brevity, I haven't included here all of the wonderful parameters of many plant recommendations. The basis of my criteria was finding tried and true native species that are widely adopted for reliability of growth and survival. They serve as food, pollinator attractors, survival in wetlands, greenery or color in winter, and to restore the habitat to what it once was.

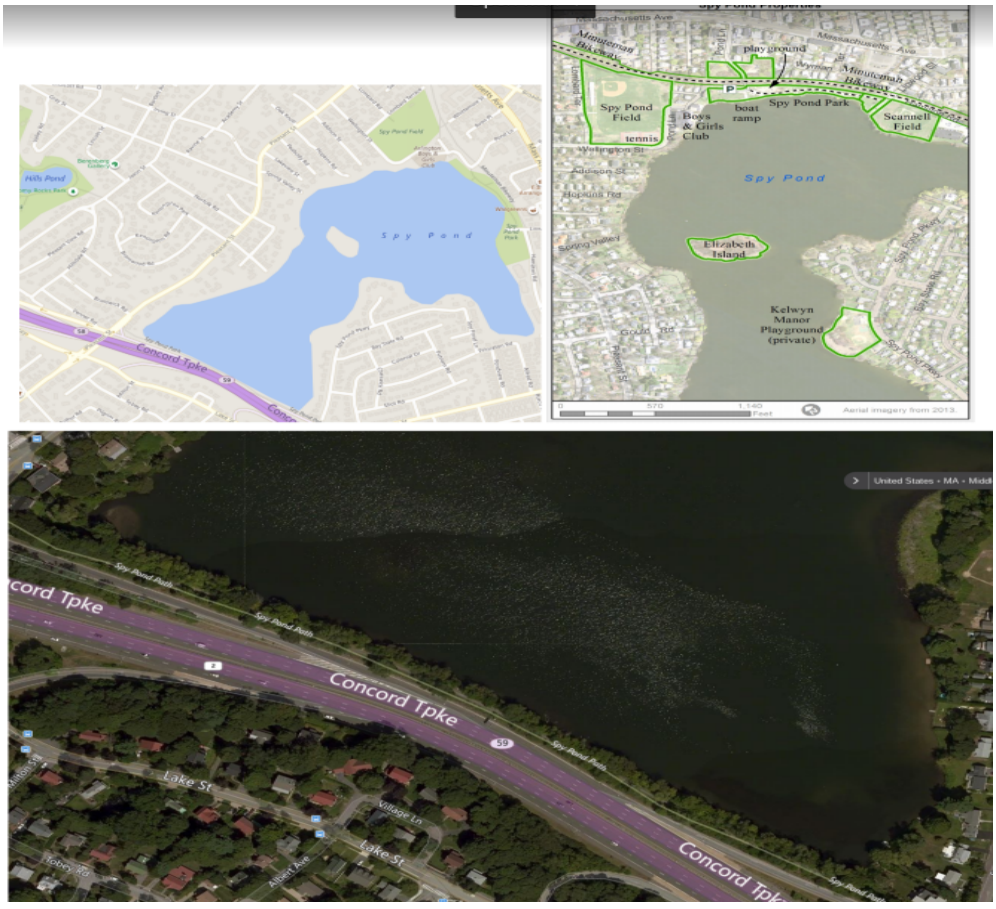
Project Information Needed

Some of the information needed for a complete project plan includes pH and composition of soil samples at various parts of the site, a geographic assessment of the area before and after the construction of Route 2, and pH and composition of the pond water (tannins?). A proper plant inventory can be done in spring and summer when herbaceous plants appear and shrubs and trees can be better identified by their leaves. These facts are needed over the long term in order to

choose the right plants for the right soil, and to keep apart plants that can't thrive alongside others. Shoreline planting to promote nesting and clean water is not here now, but should be incorporated into the long-term strategy.

Nevertheless, moving forward with the focused planting project for this year will do no harm, even if the best sites and companion plantings don't happen yet. A Phase One rollout is practical in setting up the groundwork of volunteers, donors and action plans. It provides another year's growth, and will generate further help and suggestions as it gets underway. It's a proactive step that's a visible incentive for long-term rehabilitation of a valued natural area.

Southwestern Border Environment



The map shows that the southern border of Spy Pond was artificially filled in and chopped off in the construction of Route 2. A hillside of rock fill adjoins the elevated roadway, with a paved access road below, with further rock fill and soil on a slope that ends at a chain link fence forming the southern boundary of the pond BVW.

Although the Spy Pond environment may end at the chain link fence, what happens beyond it does have an effect: for instance, many large shady trees on that outside slope were cut down recently, which will add to water and gravity erosion and deplete shade and protection alongside the path. Was there an inquiry with the highway department before they were permitted to cut down so many trees adjoining a wetland?

This photo is the typical view along the site, showing the chain link fence at left, the level area of the paved path[1] with grass (?) strips along each side, then the steep wooded bank leading down to the pond.

[1] Modern trail maintenance in national parks calls for porous, drainage-friendly pavement solutions, which might be considered in the future as a replacement for nonporous asphalt.
http://www.asphaltpavement.org/index.php?option=com_content&view=article&id=521&Itemid=1117

The purpose of the planting project is not only to restore native plants to the wooded bank, but also to choose types of plants that will deter the public from walking into the wooded areas other than at the 10 narrow flights of stone steps. A further deterrent would be to line the pond side of the path with logs (more rustic than landscape timbers)[2] that would not only deter passage down the slope, but also provide a place to sit for nature appreciation. In parks such as Acadia and the North Maine Woods, benches made of large log slabs are placed at viewpoints, which discourages offtrail wandering. Also, there is no signage instructing path users to remain on the path and not travel along the sloped bank.

The types of plants present now and suggested for the future are discussed in the next sections. Regarding future planting on the grassy strips or the chain link fence, I was informed that some female runners feel safer with the bare fence instead of hedges or trees, which is understandable. However, we constantly must remove invasives such as bittersweet from the fence, and it is rather unsightly; other vines may be suitable? In future, you may wish to consider a climbing native vine such as *Clematis virginiana* planted at the base of each fence section. This would go far in removing the urbanized appearance at the end of Spy Pond, as well as having acceptable plantlife

[2] Note, the lack of logs in the area might be addressed by asking tree companies to donate logs before they are chipped. Also, there are some smaller logs outside the chain link fence at the west end, where some trees were cut down.

growing on the fence instead of invasives. 

Present Flora

Trees

The beautiful white birches (*Betula papyrifera*) are notable (also some gray?), but their condition may not be good: one large (dead) pair with beautiful bark is what is call a snag[3], and a few others do not look healthy. The white birches on my own property also have disappeared over the years, and their loss may be something that just has to be accepted. The poor condition of many of the larger trees is probably related to the stress from the damage to their roots by the building of Route 2.

There were some specimens of Striped Maple (*Acer pensylvanicum*), a small, deciduous understory tree or shrub which flourishes in cool, moist woods. These tend to be short-lived, and

[3] In forest ecology, a snag refers to a standing, dead or dying tree, often missing a top or most of the smaller branches. Contrary to the manicured city garden where dead trees and limbs are neatly removed, in the wild dead snags are valued as rich habitat and food for many species from lichens and mushrooms to small mammals.

are mentioned only for their diversity.

There is a notable lack of evergreens, except for a few specimens of *Juniperus virginiana* (eastern red cedar) near the west end. Planting 5-yr young cedars[4] is strongly recommended, as they are very well suited to the habitat, are evergreen and have the "prickly" profile desirable for keeping two-footed invaders off the banks.

Although I love the eastern hemlock *Tsuga canadensis* and have many large ones, they are dying everywhere in the wild because they require regular treatment to combat wooly adelgid; thus it's not recommended to plant new ones. Also, balsam fir *Abies balsamea* is a lovely tree, but as the

[4] My favorite tree source, Musser Forests in PA, offers 4-yr bareroot ERC at 50 for $0.83 each— but they say sold out since last fall. I could contact them to see whether they can now supply, or perhaps go with another vendor. If much larger red cedars could be funded, this would be ideal.

favorite Christmas tree it is expected they would quickly succumb to random harvesting in December once they reached any size.

Most of the trees are deciduous, dropping a rich mulch of leaves (some may have blown in from neighboring areas) that include elm, beech, and apparently linden (basswood).[5] The healthiest trees are the oaks, which are thriving in the perfect habitat for them; they seem to be pin oak *Quercus palustris*, having smallish marcescent leaves and bushy branches. The oak leaf mulch needs to be considered when choosing a suitable groundcover, as many types of plants won't grow among oak leaves.

I didn't see any Norway maple, which is on the Massachusetts prohibited list of invasive status;[6] easiest method of control would be removal. If more deciduous hardwood trees are to be planted, an excellent choice for this habitat is *Acer rubrum*, red maple[7].

Three other small trees that should do well and promote wildlife support are:

Amelanchier laevis (Allegheny serviceberry)  ;

Rhus typhina (staghorn sumac) 

Sorbus americana (American mountain ash)  

Shrubs

Because of the season, I was unable to inventory what shrubs already exist on the bank.

The committee has already expressed strong interest in planting silky (swamp) dogwood, *Cornus amomum*; it is suitable for stream and pond banks, and can grow in the shade. 

[5] American lindens, *Tilia americana*, originally lined Massachusetts Avenue during much of the nineteenth and early twentieth centuries.There is a very large specimen at the western end of the trail.

[6] https://lancaster.wickedlocal.com/news/20181213/life-outdoors-invasive-species---norway-maple

[7] https://www.des.nh.gov/organization/commissioner/pip/factsheets/cp/documents/cp-21.pdf

Other shrubs well adapted for this environment include winterberry, *Ilex verticillata*, which although deciduous does provide color in winter and is a spreader. 

Common viburnum does very well in oak woods in our area, has attractive flowers, can grow in partial shade, and is amazingly tolerant of poor soil and conditions. American Cranberrybush *Viburnum trilobum* prefers moist woods and bogs, and Wild Raisin *V. cassinoides* prefers shrub swamps and forested wetlands, making them good choices for wetland mitigation plantings. Both grow in full to partial shade conditions. Arrowwood (*V. dentatum*) is another wetland shrub, but also grows in upland areas in soils with high moisture-holding capacity; many arching stems, needs space. 

Aronia prunifolia (black chokeberry) is a popular cold-hardy deciduous shrub available at many nurseries; it has white flowers in spring, reddish fall foliage, and the berries can be used for juice or jelly. 

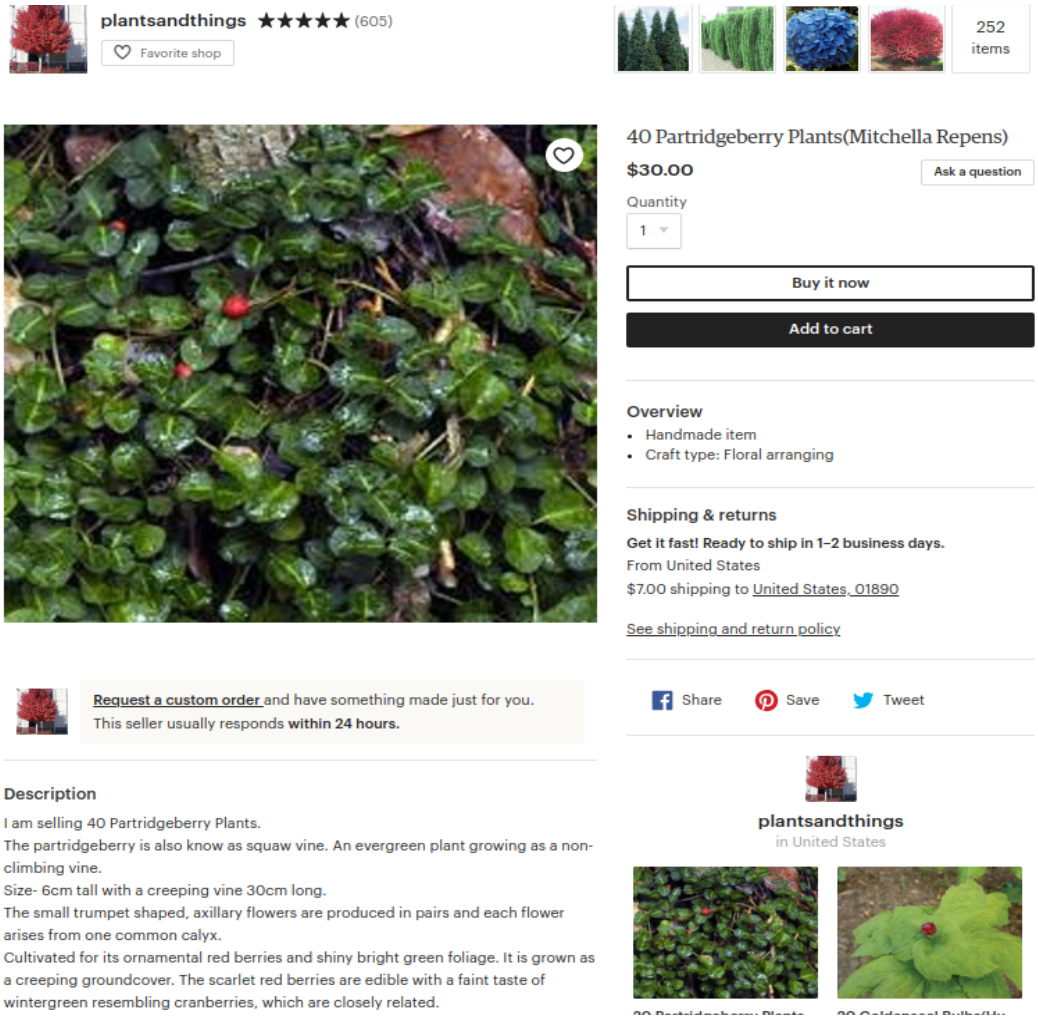
Perhaps the most important shrub to fulfill the intent of the plantings may be *Rubus pensilvanicus*, Pennsylvania blackberry, a prickly bramble native to eastern and central North America from Newfoundland south to Georgia. Purchasing the right species here is important, as many blackberries either aren't native or are from the Pacific coast. A thicket of blackberries would make an excellent deterrent to those tempted to invade the bank. They grow in full or partial sun, moist to dry-mesic conditions, and soil containing loam, clay-loam, or some rocky material; often found in areas of disturbance.

What is this structure? Opposite ~fence post 170… (could be nicely planted)

Herbaceous Groundcovers

The ideal groundcover would be evergreen, like partridgeberry *Mitchella repens,* or clubmoss (Princess pine, *Lycopodium obscurum*). *Lycopodium* is very difficult to propagate; if we can locate a source of plants derived from cuttings it would be excellent, but it's unlikely we will be able to afford or locate some specimens.  Some angelic donor?

A few batches of partridgeberry are highly recommended.



Mayapples *Podophyllum peltatum* spread readily, are about a foot high and have a broad leaf;

Christmas fern (*Polystichum acrostichoides*; wood fern) is evergreen and bushy: "A good plant for massing on slopes (including dryish, rocky ones) to help combat soil erosion."

A species that thrives in full sun is milkweed, *Asclepias syriaca*. Attracting monarch butterflies may attract many volunteers. I've entered an application for a flat of free plants that may not be ready until several weeks after Planting Day. These can be grown near the chain link fence, if that area is not mowed.

To create a green berm alongside the path, I can highly recommend *Carex plantaginea* (plantainleaf sedge). These are like a low mounds looking like monkey grass that need no attention all season long, and the mound increases in size each year. They are used in hillside erosion prevention:

.

And: are they mowing those grassy strips? That should stop, encourages going offpath onto the bank.

Replace with *Panicum virgatum* (switchgrass)

, *Coreopsis lanceolata* (lanceleaf tickseed)

and *Vernonia noveboracensis* (ironweed)

Tall

Zones and Locating Plantings

The map prepared by Stroker Rogovin shows four zones of interest for this year, which is an excellent way to keep focused and to tailor the work appropriately in different areas. Because I wasn't able to find the fence numbers I looked at the areas by their positions among the stone steps.

A further review could pinpoint the worst defined area(s) in each zone in desperate need of help. They can be named for later reference (e.g. zone 4A), and their particulars such as soil condition, slope, sun and other problem can be specified on the map. Then a planting map can be designed

for each showing the proposed plants, their distance apart and distribution, and long-term reminders.

Planting Considerations

Woodland soils are usually dense with roots, and digging a hole large enough to accommodate a root ball and humus or loam can take a long time. A proper hole is important to let the transplant thrive, not having to compete against stronger roots that might strangle it. It will be important to train the teams doing the planting to be careful in disturbing the ground as little as possible, and to consider adjusting the hole location so that it doesn't go straight into a major root or rock. Post hole diggers may be useful, if they can be borrowed. Mulch should be applied as topdressing.

A support team to water later needs to be identified, and a gardener should monitor growth and condition every week for the first month, then biweekly. Watering weekly is sufficient unless drought conditions begin. A bucket may be used to collect water from the pond. An annual report on survival of the plantings would be useful, performed before the subsequent annual Spy Pond Day.

It is strongly recommended not to scatter plantings evenly throughout the zones, but to create small specialized "beds" with prepared soil and some companion plants, and perhaps a protective enclosure. In this way the right plants can be clustered together in special spots-- such as on a sandy (friable), barren hillside, or a worn old shady path that is being brushed in. The present "zone map" can be further detailed to show the special areas to be addressed.

Protection of the plantings by various means are being considered by the committee, and this will be very important. Small signs can be printed and laminated easily[8], and small identifier stakes will be a strong deterrent for trampling prevention. For affordability and ease of use, these plastic stakes can have a laminated tag adhered, are easily inserted and durable, and we can identify species name, common name, and donor. If the committee decides on this route, I would be happy to do the legwork and donate stakes and labels. Labels should be inserted at the time of planting, so that they can be found easily when watering and upkeep begins— and of course to discourage stomping on them.

[8] Unfortunately, the laminations quickly deteriorated under natural exposure.

We should also consider more substantial markers to explain and identify the project, such as these. They can promote the cooperation of the public to keep off the protected area, and gain project support.

These are more costly,[9] but very informative.

[9] For example: https://www.alumaphoto-plateco.com/products/tree-marker.html

Wrap-Up: Suggested Hit List for 2019

- Create plantings map of subzone sections, characteristics, and proposed plant bed templates.
- Choose plants, identify donors/suppliers and acquire: (suggested best options)
  - silky dogwood
  - blackberry canes
  - eastern cedar (start 4-yr bareroot early)
  - partridgeberry
  - plantainleaf sedge
  - [milkweed: donated]
- Get DOT and conservation approvals, Digsafe review and map of area; open a discussion with MA Audubon re their policy or plans for Elizabeth Island.
- Approach nursery donors for topsoil and wood mulch (Mahoney's, McCue, Arlington Ace Hardware, etc.); create volunteer list for planting and maintenance.
- Scope out getting logs (trees) from arborists, NStar— 12-15' lengths? Deliver over fence? For edging off the protected slopes.

Problem Plants to Address

Euonymus. As a neighbor adjoining a highway, the pond slope bears many large-size (8' and smaller) *Euonymus alata*, burning brush, a former highway planting. There is a thicket of them at the west end. Though they should be removed and replaced with natives, this would require major uprooting and replanting. Meanwhile these can be vigorously pruned immediately, to prevent further spread and to allow understory citizens more light and growth area; smaller bushes along the path can be removed. It's desirable to replace them with natives providing the same root stability and undergrowth fill-in. Gray dogwoods are affordable, and eastern red cedars are also desirable as replacements.

Willow removal. A large old weeping willow *Salix babylonica* at post 180 is resprouting, and these suckers and small trees should be cut off and removed from the area (they do resprout easily). Herbicides and other means to kill off the roots can't be used in this wetland environment: however, by killing off sprouts as they appear, the roots' stored food reserves eventually will be depleted and the roots will stop sending up sprouts. If possible, if any logging of dead trees will be done, sawing off the bottom of the tree near the roots and removing the pieces could help deter further suckering, but patiently removing any living sprouts is probably the best plan. In addition, there were a few

established small weeping willow trees which can be cut down and uprooted (as well as possible) immediately.

> Other native willows are available if there is strong preference for willows. The Bebb (diamond) willow and coyote willow are shrubbier and historic. The peach leaf willow *Salix amygdaloides* is a colorful, fairly large tree that grows quickly but isn't long-lived. It can be used to quickly fill bare areas and to control erosion. Pussy willow *Salix discolor* isn't recommended because it would be attractive for picking. Yellow willow *Salix lutea* is sometimes planted to repair areas that have had floods, erosion, or other problems: it reproduces easily both through cuttings and seeds, and could be a good choice for that shoreline hole in zone 2.

Brushing in. It seems the DOT may be removing brush along the trail that has been used by AMC to brush in unwanted paths accessing the pond over the slope. It benefits stabilizing the area to leave this brush in place. Large logs placed at the top of the slope would also deter pedestrian traffic, as well as provide organic matter as they slowly decay.

Norway maple. Any invasive Norway maples *Acer platanoides* should be uprooted (if small enough) and removed once surely identified. Because there are *Acer saccharum* (sugar maple) and *Acer rubrum* (red or swamp maple) mixed throughout, it is important to have a definitive i.d. before removal. Since many larger trees and the birches are dying, planting newer trees of species that will thrive in this disturbed soil needs to be a priority. Evergreen red cedars https://www.hgtv.com/outdoors/flowers-and-plants/trees-and-shrubs/the-atlantic-white-cedar

are a good choice, but also other good wetland trees, such as black ash, river birch and Atlantic white cedar *Chamaecyparis thyoides*[10], should be added to supplement the already thriving maples and pin oak (*Quercus palustris*).

> There is a beautiful specimen of a non-native London plane tree *Platanus x acerifolia* (sycamore family, star-shaped leaves). It does not seem to be proliferating or invasive. It is very large and doing a great job of stabilizing the shoreline. I think it can be spared the axe if we shut our eyes for now.

Path turfgrass. The grass alongside the path forms a thick, stabilizing sod; however, it not only requires mowing, it invades the slope which chokes out the natives. It is unattractive in winter, and antithetical to native habitats. But in this case, replacing it would be a major project that perhaps would require MassDOT to perform a major sod extraction then replanting with something that can do the same job, perhaps sedges or wildflower meadow mixes. For now, removing grass during native replantings on the slope is advised, and in future perhaps small pathway strips along the pondside could be replaced, positioned so that these areas could be skipped at mowing time.

> There are also several methods of removing turf by covering it over (e.g. with tarps or cardboard then mulching over it) and letting the roots die in place. This could be a very good choice so as not to destabilize the soil; however, it must then be proactively replaced, otherwise invasives will quickly establish themselves.

The fence and bittersweet. The removal of most of the bittersweet from the chainlink fence now reveals an eyesore, not just of the fence but of the trash that collects behind it. Cars are also

[10] This one is available from Musser Forests as 6" potted seedlings, 10/$27.50 or 25/$51.50

zipping by at close range, fully audible and visible. The fence should be planted with something, otherwise the invasives will keep returning. Suggested is native *Clematis virginiana* (virgin's bower or woodbine), a fragrant, August-to-September blooming, twining vine that readily grows over and covers fences. Another choice could be trumpet (coral) honeysuckle, native to the U.S. east coast. My personal feeling is that it would look less "wild" than virgin's bower, but it does qualify as a native in Massachusetts.

Eutrophication of the pond. It doesn't take testing to know too much fertilizer is going into the pond. The heavy green algae on all of the submerged rocks of the shoreline is unlike anything encountered on natural trails. One homeowner has planted non-native iris at the shoreline-- not a problem, but not a fix. The nice reeds in the Kelwyn Manor area are very positive for nesting and keeping the pond healthy. Where there is more sun (not the southern shoreline where we are working) cattails would be a good addition, but for this area suitable submerged water plants may be limited. We also have to be cognisant that fisherman may easily uproot them during their activities.

> Though many find duckweed a nuisance and try to remove it, that there is none at all seems to be a sign of poor pond health. There don't seem to be any waterlilies (?). I'm comparing in particular to ponds I know well at Mass Audubon's Ipswich River sanctuary, Horn Pond, Ponkapoag, Walden and several ponds on Cape Cod. I would expect to see snails and other invertebrates in a healthy pond, but I must beg ignorance of the status here at Spy Pond. The entire issue of why this slimy green algae covers all the rocks perhaps needs an entire research project of its own. A fisherman I spoke with who has been coming here for 40 years stated there are now much fewer types of fish. Addressing the problem may need stronger citizen adherence to fertilizer consideration when bordering a wetland.

Simple Phase 2 Rollout

A hit list of easy things to do for the remainder of Phase 1 and to start Phase 2 follows. It will need another round of permissions and interagency negotiations, but provides a clear path toward progress.

This season:

1. Remove weeping willow and severely prune back Euonymus as described above.
2. Flank Euonymus with gray dogwoods.
3. Start meadow seeds and perennial natives in the non wetland zone near post 200 (an invasive nightmare).

   We can transfer milkweed (I'm growing and hope for other supply), violets, false Solomon's seal, and other hearty, sun-loving growers

For next year's Pond Day planting effort, Phase 2:

1. Draft a planting plan (what species and where), then find vendors.[11]

[11] WIll Musser Forests be able to supply Eastern Red Cedars if we order this fall for spring? They had 4-yr old seedlings for 83 cents per, but were sold out since last fall.

2. Extend the gray and silky dogwood plantings and groundcovers (Christmas fern) to other zones, bare spots. Also include eastern red cedar.
3. Plant a bare hillside with a small cedar plantation.
4. Plantainleaf sedge plantings along all steps.

Respectfully submitted,

Krystine H. Atkinson

September 20, 2019

Outcomes Addendum, February 2020

A total of eight arbor vitae, 25 3-year *Cornus amomum* (silky dogwood), 25 2-year *Cornus racemosa* (gray dogwood), 40 *Polystichum acrostichoides* (Christmas fern), 40 *Gaultheria procumbens*(wintergreen) and 40 *MItchella repens* (partidgeberry) were planted on May 11, 2019. Planting volunteers registered and received instruction, with a few more joining and some leaving over the course of the day. Most work was completed by 3 p.m.

Circular cages (10" diameter) were fashioned onsite from half-inch (3ft high) hardware cloth with pliers to make joins; they were attached to 4' steel posts which were sunk a few inches into the ground for stability.. These were placed around the dogwoods positioned in areas selected for erosion and brushing-in potential. The cages were designed to prevent vole damage or having small plants stepped on by off-trail pedestrians or fishermen. Cages held one dogwood, a Christmas fern, and a wintergreen or partidgeberry plant.

Successes

The cages survived the winter beautifully, not a single one knocked over or out of place. Although it was hoped the dogwoods might be big enough by spring to remove the cages and reuse them, the plants are still small and another season of protection seems a good idea. But the cages can definitely be reused, a significant cost savings for the future. They were not a terrible eyesore, and their success in protecting the plants (and perhaps discouraging offtrail wandering) was excellent; no apparent vole damage.

The amount of work and time worked well, finishing by midafternoon, and coordination overseen by Stroker Rogovan with the different teams went very smoothly. Having several people to get the materials acquisitions done was helpful (Stroker, Joan and Kris). Our donated budget was small and highly effective.

2019 Spy Pond Trails Day
Dogwood and Arbor Vitae Planting

EXPENSES

ITEM	SOURCE	DATE	COST	PURCHASER
10 bags Topsoil	Northeast Nurseries	4/20/2019	52.5	MassDOT
10 bags Mulch	Northeast Nurseries	4/20/2019	180	MassDOT
4 Arbor Vitae	Northeast Nurseries	4/20/2019	69.5	MassDOT
1 bag Peat Moss	Northeast Nurseries	5/1/2019	8.75	MassDOT
4 Arbor Vitae	Northeast Nurseries	5/1/2019	180	MassDOT
		Sub-Total	490.75	MassDOT
55 4' Steel Fence Posts	Wanamaker Hardware	5/9/2019	212.3	Stroker
Fence Post Driver	Wenamaker Hardware	5/9/2019	24.99	Stroker
2 rolls Hardware Cloth, 1/4" x 3' x 100'	Shattuck Hardware	5/10/2019	377.98	Stroker
		Sub-Total	615.27	Stroker
Groundcover	plantsandthings (Etsy): shipping and 40 each Christmas fern, wintergreen, partridgeberry, @$30 per group	3/25/2019	113.75	Kristina
25 Silky Dogwoods	bittygarden	4/6/2019	46.28	Kristina
25 Gray Dogwoods	bittygarden + shipping	4/6/2019	52.68	Kristina
		Sub-Total	212.71	Kristina
ALL PROJECT EXPENSES		Total	1,318.73	

INCOME

SOURCE	AMOUNT
Mass DOT	490.75
Arlington Land Trust	300
Town of Arlington	250
Appalachian Mountain Club	251.76
Total	1,292.51

Failures

The signs installed did not weather well, and should be replaced with something waterproof: but 5x7” size was good, not intrusive while informative.

The wintergreen stock proved prone to rot during early explanting, and was not as hardy as the Christmas fern and partridgeberry. It is not recommended to continue with this species for groundcover purposes.

The arborvitae were planted at two sessions, four in April by two master gardeners, and four on planting day by volunteers and a master gardener. All four of the first group died, and two of the second four. Assessing why this happened may have to do with the site, planting, the plant source and type, or disease.

There were two survivors, one was down on the shore near the steps, and the other above at the far end. Because they were not especially near any other arborvitae, it could be considered that others may have succumbed to some sort of infection. This was suspected to have claimed the tall arborvitae on the property at 11 Spy Pond Parkway nearby: the owner said Mahoney's told him it was winter kill, but it seems more likely it could have been arborvitae needle blight.[12] This particularly affects trees under stress, but in watching the browning which began to occur within two months after planting, it didn't look like an infection, but rather like drying out. The ground was well watered through fall by volunteers, so hydration was not the problem.

Because the two survivors were at different sites but where others succumbed, and because one was planted by a master gardener and the other by a supervised volunteer, we can rule out these factors. Disease must remain an unknown. But a possibility was discovered that may have to do with the plant source: the two survivors had strong central leaders, while the deaths occurred in specimens consisting of mostly equal-sized laterals. I dug up two of the dead trees, and the root ball was still tight with barely any growth, and if you pulled apart at the center of the tree, it had the appearance of several small plants clustered together, with few established roots.

I would recommend approaching Northeast Nurseries about the problem and see whether replacements could be received, on the condition they have strong leaders and a good root ball.[13] A MassDOT inspector who was working on the lighting installation along the Route 2 ramp told me

[12] https://ag.umass.edu/landscape/fact-sheets/arborvitae-needle-blight

[13] I have two of the dead trees bagged and can provide them if needed.

they had planted a lot of arborvitae last fall In Lexington along the MinuteMan bike path, with very few losses over the winter. It would be informative to learn what the source of their arborvitae were; Northeast was second on our provider list after Heimlich in Woburn, which never responded to us.

This loss was very disappointing: the trees were attractive and filled a bare area beautifully. As a linchpin of year-round habitat restoration, I think it's worth trying again.

Immediate Environmental Threats

This area has potential to be a truly native wildlife habitat, unlike the north shore near Spy Pond Park. The contrast of the two areas is that although the park has adopted excellent permeable paths and native plants, the ground has been disrupted and replaced by artificial fenced and bagged earth; it also has noisy human use with the playground and playing fields.The bikepath area is a peaceful, quiet haven where birds congregate.[14]

Land Stabilization

My understanding last year was that native plantings would help mitigate erosion of the slope leading to the pond. Then the highway department had a contractor cut down all of the trees outside the fence, which would surely destabilize that hillside (not to mention permit invasives free rein). Over the course of the winter I was able to observe and reach a more informed view of what type of erosion is occurring: in my opinion the greatest problem is not surface runoff, but land subsidence and erosion by hydrostatic pressure moving the sand from under Route 2 underneath the path into the pond.

If you examine the path itself you will see soil being eroded from underneath the path particularly in areas of disturbance, namely the new fishermen access steps. I live on a hillside myself, and this type of hydrostatic pressure when the ground is frozen in winter was mitigated by a drainage system to draw water downslope from the house. Rain was not the worst problem, but snow melt (ground frozen, and water can't drain downwards).

If this were my property, I would put a large drainage pipe underneath the entire asphalt path with side conduits leading to the pond. As is, the subsiding of Route 2 over time pushes down on the fill underneath it (and it looks disastrously sandy), where the waterborne path of least resistance is into Spy Pond. The far large drain near the Kenwyn Manor end seems to be hardly functional, and isn't properly sited to handle the lion's share of water drainage pressure from above the pond.

The asphalt path is already not level, tipping toward the pond. This was what happened on my own property over three decades, where the front walk subsided so badly a new one had to be superimposed on top. If the bikeway should be replaced (by porous paving?), it is an opportunity for a drain system for water runoff to be installed under a new path between the two lines (gas and communication). I see this as the best way to keep the southwestern border of Spy Pond intact. I

[14] A huge blue heron was reveling alongside the freshly fallen white birch in February, as were mallards and small birds: please leave the fallen trees in place, a very important habitat niche for fish and birds.

dread that the recent disturbances (the excavation of the street lighting and planned dredging with heavy equipment) will have disastrous impact.[15]

I'm at a loss to understand why MassDOT needed to put tall highway lights along the access ramp to Route 2. In addition to tremendous disturbance to the hillside (which is apparently only a huge berm of sand), the additional light levels are very disturbing to wildlife. This act (February, 2020) will have a profound effect on this wetland. I hope there was proper assessment of the impact that these activities (tree removal, bulldozing the hillside) have on Spy Pond, and that the town Conservation Commission was informed.

Future Steps

The local committee that spearheaded this project suggested that because of imminent dredging and disruption, a planting day should not be held this year. My disappointment that we couldn't continue and expand the native plantings suggested last year is overshadowed by construction developments that may impact preservation of this fragile area. It's an area loved and protected by many people; I do hope they can use their energy and purpose to devise a mitigation plan and put it into effect to safeguard a precious environment. A great blue heron was foraging there last week as I worked, and monarch butterflies abounded last summer. There needs to be more understanding from MassDOT of the effect of their operations on the pond, as uphill tree removal and bright lighting at night may have been major indiscretions.

A long-term idea may be to have an ecology student perform a project of fully mapping the botany of this area of the pond. It could be an excellent model for revitalizing wildlife biota in urban and suburban environments.

In the immediate future, invasive control can continue. Black swallowwort has been identified and is spreading rapidly. The bittersweet control can be more complete. Targeting purple loosestrife in summer is wise. As soon as possible, the hillside outside the fence should be replanted (suggest sedges, creeping juniper and white pine), or it will be a garden of Eden for invasives.

Black Swallowwort Vine on Pond Slope

BSW climbing Oriental Bittersweet

Caged plantings

[15] Note: the contractor on the ramp lighting installation informed me that apparently MassDOT is facing a similar problem (dredging required) at Spot Pond in Stoneham, along highway 93.

Outcomes Addendum, September 2020

A Special Year, Need for New Procedures. The COVID pandemic meant that almost all activities and many civic services were cancelled during 2020. This had no effect on botanical patterns, so invasives thrived without their annual cull, drought had its ramifications on growth and survival, and a potential replacement and recapture of a growth year (for arborvitae) didn't happen.

In future, teams might be set up that can operate with social distancing and get the work done that has been performed previously on the annual Pond Day.

Arborvitae Update. Only one of eight survived, located before post #110, distant from most of the others. Even one near the shoreline that looked healthy in February succumbed, and apparently was sawed off and removed. I removed most of the others. I suspect this wasn't disease, but that the nursery stock had been small plants tightly clustered together (perhaps in groups of three) then potted together for a season; the root balls were very poor and condensed, and not spreading laterally like standard arborvitae; the structures didn't show a strong central leader, but rather clusters of smaller multiple leaders. The roots showed no outgrowth at all.

It would have been a good idea to return to the nursery with this complaint and ask for replacements, with the caveat to inspect that there were good central leaders, and perhaps from a different grower. I spoke with a MassDOT overseer in February (overseeing the roadside work on the ramp leading up to route 2) who told me they had done many arborvitae plantings at a different site on the bikeway in Lexington, and that most had survived. Whether they were from the same source isn't known.

Invasives. The lack of ***oriental bittersweet*** management this year has permitted rampant overgrowth, especially the outer fence along the highway hillside. This needs removal without delay, either through a special volunteer day or having MassDOT intervene on the fence.

The ***black swallowwort*** first noted last fall is multiplying, now in numerous places.

The pulling of ***purple loosestrife*** last fall in one area quelled most of it in that spot, but it has started proliferating elsewhere. The plants are deeply rooted along the shore and hard to remove. There should be consideration to release predator *Gallerucella* beetles to keep this under control, as the habitat around the pond can be difficult to reach and manage. This beetle was used by the Friends of Winter Pond in Winchester with great success.

Cypress spurge ***Euphorbia cyparissias*** is spreading, along the main double steps. Manual removal should be simple.

oriental biitersweet

hillside between ramp and pond

Highway Hillside Disruption. The hillside soil has been severely disturbed, and it would be a surprise if much of it didn't wash down into the pond. It has an unhealthy looking sandy-clay appearance (covered over with subsoil?), and the plants taking hold are undesirable weeds like ragweed. Though sumac is a good native and the large individual trees should have been left alone, they were removed and now there are small sumac growing everywhere, almost a monoculture shared with bittersweet. It is hard to believe MassDOT would have conducted a hillside upheaval like this. Because of its nearness to wetland, the Conservation Commision may need to intervene and have them correct the disruption, which surely can't be permissible.

Year Two Analysis. The arborvitae plan was unsuccessful, perhaps because of stock quality rather than species choice or conditions. If large red cedars, which grow well along this area, could be obtained, perhaps they could be a more successful evergreen choice to make the fishermen's areas better used, less prone to erosion and keep people off of the hills. Signage would also help, to alert people not to wander off the trails: presently there's no warning against this.

The species chosen for restoration in our small area all survived, with the Christmas ferns and partridgeberry found in almost all of the little cage parterres. The wintergreen was not as robust, and not recommended for future plantings. All the cages remained intact, and two years seems to be a good period to keep them in place. The dogwoods were not as enthusiastic in growth as might have

been wished[16], but all survived and look very healthy, despite almost no care this year; perhaps they will have a growth spurt in future, in case the cages are depriving them of light. One cage became invaded by oriental bittersweet, which seems to have stunted the growth of that particular dogwood. All of the cages are in excellent shape, although one disappeared. It's recommended to remove and reuse the cages at this point, but leave the support stakes in place to prevent trampling of the small shrubs. It's also possible these cages were a deterrent for walking over the hillside, one of our goals in preventing erosion.

Action Needs. Invasives need to be managed. The highway hillside needs to be planted with something suitable, perhaps with soil improvement. The chainlink fence is ideal for planting with native vine such as *Lonicera sempervirens* (coral honeysuckle), and the walkway looks as if it is ready for replacement, which should be with a porous substrate. Replacing grass with sedges and low shrubs can remove the need for mowing, improve soil retention and keep people off the slopes next to the shore; the idea of large timbers along the path where people might also sit could also help deter offtrail meandering. Better (durable yet modest) signage to explain the project may also assist in keeping people from trampling the slopes.

Extending the restoration planting cages to more areas (especially to replace abundant residual *Euonymus alata*) will be an excellent plan forward. Perhaps *Rubus pensilvanicus* (Pennsylvania blackberry) plants can be spotted along slope access paths (our brush fill-ins usually get disrupted), and *Cephalanthus occidentalis* (buttonbush) is a fast-growing shrub that can thrive in partial shade near ponds. As the white birches succumb and fall, new hardwoods such as river birch or oaks need to be started to maintain a wooded edge; growth of Norway maple needs to be impeded.

pondside buttonbush

It is recommended that small volunteer groups practicing social distancing can continue this effort to conserve this area of Spy Pond that is well used and appreciated as a natural habitat.

[16] Recommend trying red osier dogwood *Cornus sericea*, which seems to be a more rapid grower, more tolerant of poor conditions and nice winter color; also native and used in shoreline restorations.

Grant funding may be available for this model restoration project so close to an urban area, so that larger plant stock can be acquired, and to give attention to the good procedures we developed.[17]

Respectfully submitted,

Krystine H. Atkinson

September 9, 2020

[17] *e.g.* see Massachusetts Executive Office of Energy and Environmental Affairs planning grant program and the state's 2019 and 2020 District Local Technical Assistance Program, providing funding for pollinator projects; also USDA restoration grants to Mass Aububon, many others such as National Fish and Wildlife Foundation (NFWF) Monarch Butterfly and Pollinators Conservation Fund to protect, conserve, and increase habitat for the monarch butterfly and other pollinators.