



STEWARDSHIP AT ADKINS ARBORETUM 2021 ANNUAL REPORT

This year was a year of transition. We began the year with the Visitor's Center closed to the public and ended with a relatively busy 4th quarter of programs and projects. We accomplished a great deal on the grounds, in the gardens, at the nursery, and in the facilities. We are in a good position going into 2022.

By the Numbers

- 661 volunteer hours in the nursery and gardens
- 254 ticks removed from our grounds team
- 12 acres of meadow bush hogged
- 13 wave hill chairs built for the grounds
- 32 wood duck hatches (76% success rate)
- 49 bluebird fledges
- 2,500 square feet of new carpet in the Visitor's Center!
- 1 patched and repainted gift shop lobby
- 11 botanical panels rehung and labeled
- 5 new raised beds installed in Emily's Play Garden
- 5 miles of trails maintained
- 3,000 square feet of invasives removed
- 37,750 square feet of gardens weeded
- 1,005 native plants planted
- 10,021 native plants sold
- 2.78 acres of thicket grazed by the goats
- 1 repaired greenhouse
- 1 renovated hoop house
- 2 wigwams recovered
- 1 entrance sign renovated
- 4,663 phenology observations recorded
- 1 more organized Visitor's Center and Grounds Office
- 1 picnic table built and painted
- 6 additional picnic tables painted
- 1 bench built
- 1 memorial bench installed on the grounds
- 52 Mystery Monday posts

With the Visitor's Center closed and all programming on hold for the first quarter, we wrapped up some major renovation projects including remodeled and improved bathrooms, new carpet, new lighting in the gift shop and gallery, and reorganized spaces to ensure everyone's safety and comfort as we looked to reopen in the face of COVID. On the grounds, our staff kept busy as ever tending to the various habitats, trails, gardens, and the goats. We were able to take care of a lot of deferred and routine maintenance on our facilities and equipment, as well as continue to streamline our operational spaces.

STAFF

Land Steward Kathy Thornton and Facilities Coordinator Michael Micriotti continued to provide care for the grounds, goats, nursery, and facilities. Consulting Horticulturist Leslie Cario led the volunteer group Garden Stewards in the care of the Parking Lot gardens, as well as led grant efforts in the plant database and native plant education and propagation efforts. In the fall, Leslie Cario took on the plant sale efforts too, bringing in seasoned nursery extraordinaire Ruth Menefee, as well as welcoming Naomi McCafferty and Chuck Barbour as seasonal employees. We are excited to introduce such a powerhouse nursery crew! Science Advisor Sylvan Kaufman oversaw and provided guidance for several grant efforts and the direction of some grounds improvements. Visitor Services Coordinator Michelle Draper and Assistant Director Jenny Houghton stepped in to help maintain Emily's Play Garden and supervise the volunteer work efforts in Emily's Play Garden.

We were sorry to say our goodbyes to our Facilities Coordinator, Michael, at the end of this year. Michael was integral to many improvements to the facilities and grounds and brought so much knowledge and enthusiasm to his position at Adkins. We wish him well on his new adventures and are so grateful for his hard work and dedication during his tenure here.

CULTIVATED GARDENS

As we welcomed visitors back into the renovated Visitor's Center in April, we also welcomed back some of our volunteers! This year, Horticulturist Leslie Cario led a group of volunteers in a Garden Steward program to maintain and learn from the Parking Lot Alive! gardens. These gardens were installed in 2019 to demonstrate various effective stormwater management practices involving native plants. The Garden Steward volunteers worked in two groups to tend some of the most prominent gardens for people to enjoy and become inspired to work with native plants.

We also welcomed back volunteers to Emily's Play Garden. Michelle Draper and Jenny Houghton met with volunteers to weed the garden and to make sure it was looking magical for families and school groups to visit. Michelle and Jenny planted the raised beds and added hand-painted plant labels. After much discussion, some of the garden components were redesigned; replacing the hugelkulture keyhole beds with galvanized raised beds to help improve accessibility and reduce erosion. Kathy and Michael also regraded the main paths and lined them with river rock throughout the garden.

Permaculture Playground

Emily's Play Garden was designed as a permaculture playspace in 2018 by CCC Member Emily Castle. Permaculture is an approach to landscape design that works with nature's patterns to address human needs. It focuses on three ethics: earth care, people care, and fair share – the idea being that a system can be beneficial to both people and the environment and that any excess that the system creates is then shared with others. Emily's plan was to create an interconnected garden and play area that encouraged different types of play, such as loose parts, imagination, reflection, and exploration.

Wetland

The wetland remains a vibrant habitat for a variety of plants and critters, including the green herons, crayfish, water snakes, and snapping turtles. Our saga continued this year of trying to grow American lotus in the wetland, though we have concluded that the growing conditions aren't quite right as our transplants have been hesitant to thrive. While the lotus was not ready to make the Arboretum



wetland its home, the beavers certainly have moved in with gusto. Now a growing family, the beavers have been, well, busy. The wetland surrounds have been opened up by their selective logging habit. Beavers prefer a variety of trees including maples, oaks, birches, and cherries and tend to leave pine trees and other conifers alone. During the bulk of the growing season, beavers will focus on the tender shoots of herbaceous and shrubby plants, giving trees a chance to resprout. Beavers are excellent ecological engineers and cultivate the wetland to their needs. It is an incredible opportunity to watch and learn from them.

Invasive Plants

Invasive plants continue to be a battle of balance and compromise. We recognize that invasive and non-native plants are part of our landscape and it is our goal to thoughtfully work towards removing them and replacing them with native plants that were growing here historically and that we expect to thrive. This year, we noticed Liriope along one of our woodland paths. This small patch was removed and will be monitored for any resprout. Liriope is a curious introduction to the Arboretum and likely either came in by bird, or perhaps through floral decorations. This is a good reminder to us all to please not bring plants in seed to natural areas and to properly dispose of them, rather than tossing them in the woods with the assumption that all plants break down and "go away." Seeds are resilient and will happily establish their roots where they can. Other invasive plants such as spotted knapweed, oriental bittersweet, Japanese honeysuckle, Japanese knotweed, lespedeza, phragmites, and mile-a-minute continue to be considerations in our annual land management plan.

Meadow Management

Our staff bush hogged and removed trees from the two meadows as well as the meadow areas adjacent to the parking lot. We spent a large portion of the late winter and early spring in the meadows, trying to keep the meadows in their meadow state. Naturally, landscapes and ecosystems go through ecological succession. The south meadow is doing well as a native meadow, though we are working on developing plans for increasing the biodiversity in this meadow. Nancy’s meadow is a successional meadow with more trees and shrubs. Our goal for Nancy’s meadow is to keep some islands of shrubby thicket and trees, but also to vastly open up some of these areas to bring a balance of warm season grasses and forbs to the mix. Nancy’s meadow has a wonderful seed bank of native plants including the splitbeard broomsedge and it is our hope to create the conditions for more of these unique native plants to grow.

Goats and Targeted Grazing

Our herd of four goats continue to provide much entertainment and work for the Arboretum. Rosie, Tiarella, Sunshine, and Pearl took their jobs seriously this year, browsing on 2.78 acres of overgrown thicket habitat. While the goats do not always kill the vines and brambles, they do knock them back allowing for our staff to either come in behind them to cut and clear, or for the goats to come in next season to repeatedly exhaust the plants that we don’t want in that area.



Woodland and Forest Edge

Some of you may have noticed that the native persimmons were prolific this year. They were so abundant and seemed to have a heavy fruit set, so much so that it will be highlighted as our 2022 Native Tree of the Year. Aside from seeing persimmons where we hadn’t seen them before, this was the first year we noticed persimmon saplings coming up in the memorial persimmon grove. This grove had been planted in honor of Master Naturalist and Arboretum volunteer Anthony Pascal.

This year, we were fortunate to have funding from the State Highway Administration to help support our grounds team to tend the trails. With increased visitorship, it was important to have additional resources to keep the trails, edges, and vistas well-maintained.

Native Plant Nursery

The plant sales remained online with scheduled pickups and continued to be successful and streamlined. The spring plant sale season began with hail during plant deliveries and completed the spring by fulfilling 425 orders of 6,418 native plants. In the fall, we welcomed Leslie Cario as the lead on the plant sale as well as a seasonal crew of Ruth Menefee, Naomi McCafferty, and Chuck Barbour. Michelle Draper and Ginna Tiernan also stepped in to facilitate order processing and scheduling. This new nursery team will allow Kathy Thornton more flexibility in her duties of stewarding the grounds moving into next year. The fall nursery season concluded with 3,603 native plants sold.

We received grant funding to focus some efforts on our nursery greenhouse, hoophouse, and educational outreach. The greenhouse electric was repaired and streamlined by C.A Matthews electricians. Our staff also did some work in the greenhouse repairing the inflation fan, replacing some outlets, relocating circulation fans, and replacing the exhaust fan belt. In the fall, we rebuilt the end walls of the overwinter hoophouse, replacing the rotten wooden sides with polycarbonate siding that will last longer and let light in. Grant funding also allowed us to replace irrigation lines and fittings as well as replace the exclusion fencing on the hoophouses that help to keep the plants protected from our resident groundhog and deer.



Introducing the Science Advisory Committee!

We are very excited to welcome Deborah Landau, Dan Small, Brian Knox, Lorie Staver, and Sylvan Kaufman as local experts to help guide our land stewardship and management practices at Adkins Arboretum. This committee will help our staff to stay informed of the current best management practices, grant opportunities, and experimental ideas.

Living Collections Database

We received grant funding to convert our database to an ArcGis format and to research and incorporate information about wildlife interactions with native plants. We partnered with the GIS Program at Washington College to transition the living collections database to ArcGIS, which will allow us to seamlessly collect data in the field, update the map and data fields, and view and analyze the data in one program. Once the database transition is complete, we look forward to launching the database and encouraging our staff, volunteers, and visitors to explore the plants at Adkins Arboretum. Sylvan Kaufman and Ginna Tiernan have been integral to providing guidance in this transition.

Bluebird Monitoring

This year, we had a high number of house sparrows nesting in the boxes. To better monitor and try to decrease the house sparrow occupancy, we will be monitoring the boxes every 4 to 6 days rather than every 7 to 10 days. It is our hope that this shorter window will allow us to take preventative measures against successful house sparrow nests.

Wood ducks

Our eight wood duck boxes did relatively well in 2021. According to Cliff Brown, Director of the Maryland Wood Duck Initiative, there has been a regional drop off in some of the nearby counties. Our data appeared steady and had a slightly better success rate than last year. This year our wetland wood duck box, which was installed primarily for educational purposes, hosted its first nest! By consulting with Cliff Brown and our resident bird expert volunteer Jim Wilson, we learned that cavity nesting ducks do not gather building material for their nests, which is why it is important for us to supply cedar shavings in the boxes. This nest of pine needles was probably started by bluebirds and then taken over by wood ducks. A hooded merganser also seems to have contributed a few eggs to the nest, which is not uncommon. This process is known as brood parasitism or "egg dumping." Wood ducks will attempt to raise all eggs in the nest, though if the egg count exceeds 20, the nest success rate tends to be less.



Reptiles and amphibians observed in 2021

Common gartersnake	Eastern painted turtle
Black racer	Wood frog
Eastern ratsnake	Pickerel frog
Eastern hognose	Green frog
Dekay's brown snake	American bullfrog
Green snake	Fowler's toad
Northern watersnake	Spring peeper
Marbled salamander	Eastern spadefoot toad
Box turtle	Five-lined skink
Snapping turtle	

Phenology

The phenology project at Adkins Arboretum returned in April with a dedicated group of volunteers. Every other week, this volunteer group spent several hours walking the Arboretum grounds and noting observations about nine species: monarch, common milkweed, cardinal flower, arrowwood viburnum, eastern bluebird, American chestnut, pink lady's slipper, red maple, and the tulip poplar. These observations are entered into Nature's Notebook, per instructions by the USA National Phenology Network. This data is not only used nationally by scientists, but also directly contributes to several campaigns, which are specific questions that scientists are actively trying to collect data for. This year, Adkins data contributed to the Nectar Connectors, Green Wave, and Shady Invaders campaigns. In 2022, the phenology group will join the recently announced Redbud campaign, which looks at variables that impact fruit production. In 2021, the phenology volunteers collected 4,663 observations.



Nectar Connectors — This campaign focuses on the phenology of important nectar sources for monarchs and other pollinators. At Adkins Arboretum, the common milkweed and cardinal flower are part of this campaign. In 2021, researchers found that generally flowers are open and available for migrating monarchs, though past years have shown a slight variation in the timing of open flowers.



Green Wave — This campaign focuses on the phenology of pollen activity and fall color in maples, oaks, and poplars. At Adkins Arboretum, the red maple is part of this campaign. In 2021, researchers found that red maples have a single peak in open flowers, which was slightly later than previous years.



Shady Invaders — This campaign has concluded and focused on the phenology of leaves on invasive and native shrubs. At Adkins Arboretum, the arrowwood viburnum was part of this campaign. At the conclusion of the study, researchers found that the leaf period was up to 77 days longer for invasive species compared to natives, which can help explain why some invasive shrubs outcompete natives.

Other Ongoing Research

This year, we welcomed Scott Smith (Maryland DNR Wildlife & Heritage Service) and Melissa McCormick (Smithsonian Environmental Research Center) to conduct their proposed research. Smith is focusing on a box turtle monitoring project and McCormick is studying pollinators of native orchids.

Asteraceae is a huge plant family. Caroline County alone hosts 115 species of Asters including goldenrods, thistle, joe-pye weed, pussytoes, sunflowers, and black-eyed susan. Two groups of plants that always seem to come with confusion in late summer and fall are the thistles and the white asters that appear along the meadow edges.

Thistles initially seem overwhelming, but when it comes down to identifying them at Adkins, it can be pretty simple. There is only one native thistle found in Caroline County and that is the field thistle (*Cirsium discolor*). Field thistle has a unique characteristic that helps in its identification: the underside of the leaf is a silvery white color (see picture). We are always excited to see field thistle growing in and along our meadows as it is an important nectar source for butterflies and bees, and provides seeds for the birds in fall. There are two other species of thistle recorded for this area, both considered non-native and invasive: Canada thistle (*Cirsium arvense*) and bull thistle (*Cirsium vulgare*). These thistles have aggressive thorns and green undersides. Bull thistles are biennials and so if you can cut the thistle back in its flowering year (before it goes to seed), you will vastly decrease its ability to spread. Canada thistle, however, is a perennial and will resprout year after year, requiring more effort in exhausting the root systems.



Related to the thistles and perhaps just as confusing, are the little white asters. Similar to how some birds are affectionately known as “l.b.b.s” or “little brown birds,” maybe white asters should be referred to as “l.w.a.s.”

There are seven species of *Symphyotrichum* local to Caroline County, all of which have white blooms:

- Heath aster (*Symphyotrichum ericoides*)
- White panicle aster (*Symphyotrichum lanceolatum*)
- Calico aster (*Symphyotrichum laterifolium*)
- Hairy white oldfield aster (*Symphyotrichum pilosum*)
- Eastern annual saltmarsh aster (*Symphyotrichum subulatum*)
- Perennial saltmarsh aster (*Symphyotrichum tenuifolium*)
- Wavy-leaved aster (*Symphyotrichum undulatum*)

KNOWING YOUR ASTERS

Of these seven species, our most recent plant survey (Brighton and Longbottom, 2018) lists three at Adkins Arboretum:

- *Sym. ericoides*: July to November, branching habit, short leaves along petiole to flower, usually covered with dense hairs, 3-5 mm long, disk flower 10-20, bracts hairy
- *Sym. laterifolium*: August to October, has broader leaves, one leaf extends from the same node as a flower cluster, hairs along newer stem growth, bracts glabrous (smooth)
- *Sym. pilosum*: August to October, hairs along stem throughout plant, disk flowers 20-40 or more, 5-10 mm long, bracts firm and smooth with inrolled tips

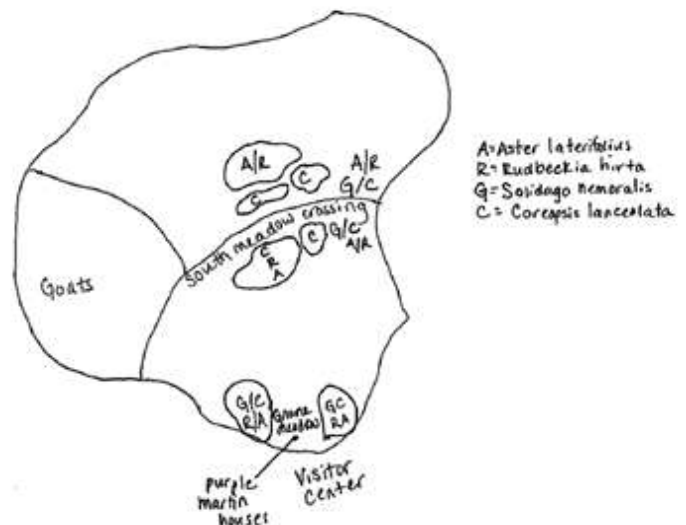


So, if you see little white asters at Adkins Arboretum blooming in July or later in November with hairy bracts, it is likely the heath aster (*Sym. ericoides*). For those blooming in August to October with smooth bracts and hairy stems, we have to do a little more botanizing. If the flower cluster also exhibits one leaf extending from the same node, it is the calico aster (*Sym. laterifolium*). If the flower cluster does not have a leaf attached, but does have inrolled tips on the bracts, then you are likely looking at the hairy white oldfield aster (*Sym. pilosum*).

WHEN SEEDS COME TRUE

When we plant a seed, we go through stages of emotions. The next few hours, days, weeks, we watch, waiting hopefully for a sprout. As time ticks on, we resign ourselves to wait perhaps a few weeks or years, for the seed to decide that now is the time to grow.

In April 2017, just after burning the South Meadow, the staff at Adkins Arboretum sowed four species of native seeds: *Coreopsis lanceolata*, *Aster lateriflorus* (*Symphotrichum lateriflorum*), *Solidago nemoralis*, and *Rudbeckia hirta* in an attempt to increase the biodiversity in the meadow. Seeds can be hard to establish in meadows as they quickly and easily can get outcompeted by the existing meadow grasses and other forbs. Many of these native meadow species evolved with grazing herbivores (bison, elk, deer, etc)



or occasional fire, which would have kept the meadow in balance. Since our grazing herbivores are solely a small herd of whitetail deer and four goats, we can simulate evolutionary browsing habits by selectively mowing.

In August 2019, the meadow platform was under construction and so we kept the path-adjacent meadow areas mowed. This mowing had the added benefit of giving our seeds a better chance of spreading their roots and soaking up some sun.

Fast forward to June 2021, four years after planting our meadow seeds, and we have our first *Coreopsis* and *Rudbeckia* blooms! *Coreopsis lanceolata* grows in small clumps, but readily self seeds and can establish colonies in the meadow. It grows well in dry, sandy loam soils and can tolerate a variety of sun and shade conditions. *Rudbeckia hirta* blooms slightly after the *Coreopsis*, and shares in its golden yellow color. As a short-lived meadow

biennial, the *Rudbeckia* spends its first year as a rosette close to the ground and then blooms in its second year. The *Rudbeckia* will continue to bloom throughout the summer and into the fall, hopefully coinciding with the *Aster lateriflorus* and *Solidago nemoralis*. These native meadow plants are an important source of nectar for pollinators, seeds for birds and small mammals, and host foliage for some lucky larva.



Needless to say, seeing the new summer blooms in the meadow this year have brought smiles to our faces. The *Aster* and *Solidago* remained elusive this fall, but we'll keep a watchful eye out next year. Perhaps it is true what they say: good things are worth waiting for.

We are grateful to Bartlett Tree Experts of Stevensville, MD and Unity Landscape Design/Build for their corporate sponsorships! As corporate sponsors, they donate their services to assist our staff with on-site projects. This year, Bartlett Tree Experts helped us with some extensive tree work and Unity helped us with site maintenance and repair.

Thank you!

