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# STEWARDSHIP AT ADKINS ARBORETUM 2019 ANNUAL REPORT



As 2019 comes to a close, we mark the completion of several large stewardship projects, and the continuation of many more at Adkins Arboretum. This year we reconstructed and planted the parking lot and adjacent gardens, completely redesigned and planted the children's garden, built a platform in the South Meadow, welcomed a beaver pair to the wetland, increased mapping and monitoring of species on the grounds, and revisited several gardens and edge habitats in need of restoration and enhancement.

## METRICS

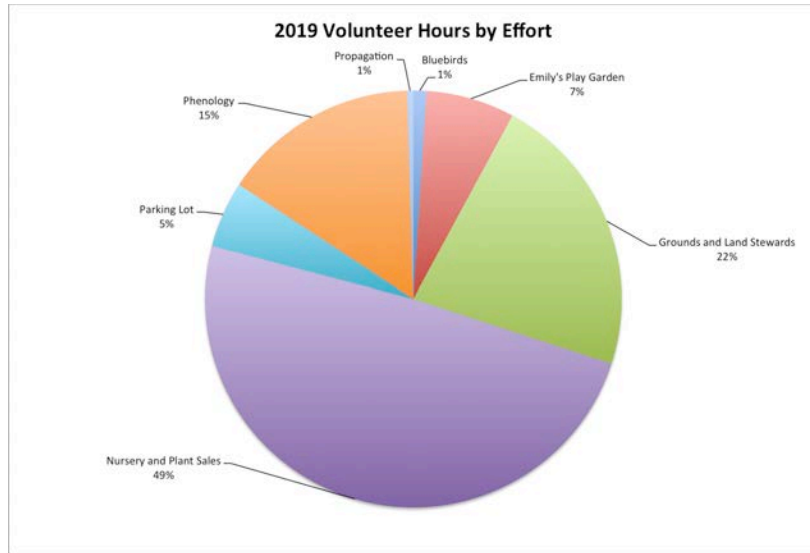
100+ volunteers dedicated over 1,660 hours!  
100+ invasive trees removed  
20 bluebird boxes monitored  
114 nest fledglings recorded  
8 wood duck boxes maintained  
34 successful wood duck hatches  
45 feet of woodland trail platform rebuilt  
17,100+ native plants planted  
25,383 square feet of gardens weeded  
4,000+ square feet of invasive removed  
20,000 square feet of vines removed by the goats  
1,000 square feet of trail added  
80 trees professionally tended  
188 preorders placed and filled  
7,272 (\$109,500) native plants sold  
3 turtle logs added to the wetland  
1 beaver deceiver constructed  
2 labyrinths built  
1,600 square feet of educational play space revived  
5,176 phenology observations recorded  
232 accessions cataloged

## STAFF

Our focus on land stewardship, conservation, and grounds increased throughout 2019. While Kathy Thornton completed her second full year as Land Steward, we welcomed new staff member Michael Micriotti as Facilities Coordinator. We continue to have seasonal employees Ray Davis and Ruth Menefee, who provide essential assistance during our busy seasons and off hours. Sylvan Kaufman, PhD serves as our consulting Science Advisor and Leslie Cario serves as our consulting horticulturist, managing several grants focused on our living collections database, propagation efforts, and native plant nursery. We were fortunate to have two talented Chesapeake Conservation Corps members for part of 2019. Nathan Simmons led us in wildlife monitoring and grounds care efforts until his departure for a job with DNR in May

2019. Emily Castle thrived in a combination of environmental education and horticulture. Emily designed a permaculture play garden and taught a homeschool class, in addition to assisting in our native plant nursery. Emily's term ended in August 2019 and she is now working for the Mt. Cuba Center and Stone Pier Press.

In addition to our staff, we have an amazing group of dedicated volunteers who helped us with a variety of stewardship projects. In 2019, we are so fortunate to have had the help of over 100 volunteers who dedicated over 1,660 hours to stewardship at Adkins Arboretum. We could not accomplish what we do without the unwavering support of our volunteers.



## *PARKING LOT ALIVE!* GARDENS



June marked the completion of *Parking Lot Alive!*, a retrofit project in the Arboretum parking lot. The project transformed a barren sea of asphalt into a parking lot that demonstrates best practices for managing stormwater.

Over the span of four months, Unity Landscape Design/Build implemented a design by Campion Hruby Landscape Architects and DesignGreen, LLC to create a beautiful, functional, and innovative cultivated garden designed as a series of stormwater management devices. The parking lot is outfitted with six erosion sediment control devices and seven additional planted gardens. Eleven areas throughout the lot have been densely planted with 17,000 native plants.

Areas of the lot were excavated and regraded to direct and slow stormwater, and allow it to be absorbed into the landscape instead of flowing unchecked to the Arboretum wetland, Blockston Branch, the Choptank River, and, ultimately, the Chesapeake Bay. Asphalt was replaced with permeable pavers that function as a pathway to the entrance bridge. An underground hydraulic bridge connects the gardens, serving as an overflow redundancy for heavy rain events.

The new plantings of trees, shrubs, and herbaceous perennials have already attracted numerous species of birds and pollinators and will offer much-needed shade once they become established. A broad variety of native plants were selected for both dry and wet conditions, and plants were installed densely to reduce weed pressure.

The parking lot project effectively doubled our cultivated gardens, involving about 22,000 square feet of gardens that were prepared, planted, weeded, and watered by Adkins staff and volunteers.

*Parking Lot Alive!* was funded by the Chesapeake Bay Trust G3 Implementation Phase Grant Program and the Chesapeake and Atlantic Coastal Bays 2010 Trust Fund. The Arboretum has been fortunate to partner with project designers Campion Hruby Landscape Architects and Design Green, LLC and contractors Unity Landscape Design/Build, and to consult with the Caroline County Department of Planning and Codes and the University of Maryland Sea Grant Extension Program.

We are looking forward to seeing the parking lot gardens return in the spring. We will continue planting, weeding, and mapping the specimens.

## EMILY'S PLAY GARDEN



Have you visited the children's garden this past year? It has undergone quite the renovation! Inspired by permaculture, Chesapeake Conservation Corps Volunteer Emily Castle led a team of volunteers to create and sustain a dynamic and engaging nature playspace. Formerly the Funshine Garden, Emily's Play Garden welcomes children of all ages to explore and experience nature in a safe space. Complete with a labyrinth, mud kitchen, passionflower teepee, herb spiral, and balancing logs, this garden displays a variety of sensory plants and keyhole beds that are planted with seasonal vegetables.

Funded by a mini-grant from the Chesapeake Bay Trust, Emily created a permaculture design for the space. Permaculture is a systems-thinking approach to landscape design that emphasizes working with nature's patterns to address human needs. Rather than focusing on the inclusion of particular plants and objects in a garden, a permaculture designer looks at how features will relate to one another to create a healthy, sustainable, and interconnected whole. A familiar iteration of permaculture design is a food forest; however, a distinctive plan reveals itself for every landscape, and our visitors find inspiration in the natural harmony of the space.

What's next for the garden? We're getting excited for spring planting in the vegetable and herbaceous beds. We're also looking forward to installing the willow den that Emily mapped on her design.

## WETLAND

The wetland saw quite a few changes this year. Between an extensive drought and a resident beaver, the water level was perpetually in flux.

Chesapeake Conservation Corps Volunteer Nathan Simmons focused on the wetland during his time at Adkins. He researched beavers and constructed a beaver deceiver, which would help to keep the beaver from blocking the water outflow structure. Beavers, by nature, dam up running water in an attempt to maintain their surrounding habitat as a flooded pond where they can thrive. The beaver made many attempts to block the outflow, which our staff then removed. The beaver deceiver was installed with the help of a group of volunteers and is constructed in a funnel shape to keep the beaver far enough from the sound of running water to keep the beaver happy, while keeping the water flowing, which kept our staff happy. Win-win! The beaver remains aloof, but every now and then our staff see trees that the beaver has chewed down. Some trees have been protected with wire to ensure that the trees we want in the wetland stay in the wetland.



In addition to his beaver project, Nathan also installed a wood duck box in the wetland as a means to teach people about wood ducks and their habitat. Wood ducks are cavity nesters and prefer flooded woods. This wood duck box joins seven others in more remote locations on the property.

Our staff have been researching and learning about various native plants and their potential roles in keeping out some invasive plants. One plant that we tried to propagate and introduce into the wetland was the American Lotus (*Nelumbo lutea*). Although native, American Lotus can be aggressive and so we were advised to plant it in a pot. Our first attempt was to sprout wild collected local seeds. The seeds successfully sprouted into young leaf pads, but they did not seem to establish successful roots and eventually disappeared. Come Spring 2020, we will try again.

## NATIVE PLANT NURSERY AND PROPAGATION

In 2019, we wrapped up improvements on the covered greenhouse! We finished securing the poly roll-up siding and installed a new irrigation system. Though we did not secure grant funding for this year to continue our native plant propagation initiative, we were able to inventory and start a few seeds. These trials allowed us to experiment with the newly installed irrigation to ensure proper plant care. For those seeds that were locally collected, we will be able plant some of their progeny on our grounds as well as pot them up for sale. It is our hope that in 2020, we will be able to propagate a variety of seeds successfully and include volunteers in the process.

The native Plant Sales were very successful this year. We brought in over 11,000 plants between the two sales, fulfilled 188 preorders, and had about \$109,500 in sales. The nursery season kicked off in April with the Spring Native Plant Sale and Open House and continued through mid-November.

At the fall plant sale preorder, we introduced a new item – pre-planned garden plug packs! We generally get a few requests at each sale regarding plugs and while they can be hard to sell and take care of long-term, they are perfect for people looking to plant a large space. We kicked off with a meadow pollinator plug pack, inspired by the design of our entrance garden. We hope to offer two plug pack options come springtime. Plugs that were not sold through the preorder were planted in our gardens at Adkins.

## LIVING COLLECTIONS DATABASE

Adkins staff and consultants wrapped up the IMLS grant, which updated the living collections database at Adkins. This included a mobile data entry application and protocol as well as volunteer training workshops for the continued mapping and maintenance efforts. Staff also presented information about the LCD at the APGA conference in June.

In addition to developing the technical platform and protocols, our staff uncovered past research plots throughout the grounds. These plots were focused on tree communities and their growth throughout different habitats. We are excited to start planning how to best reassess and map these plots.

## INVASIVE PLANTS AND MEADOW MANAGEMENT

Spotted knapweed is one of the invasive plants that we are working to eradicate at Adkins. Spotted knapweed can produce between 1,000 to 20,000 seeds per plant per year! With a 90% of the seeds viable and seed life of 5 to 8 years, it's best to catch it early and easy to pull by hand! In 2019, we cleared spotted knapweed from about 7,000 square feet of meadow. Spotted knapweed tends to appear in relatively disturbed and nutrient-deficient soil. Spotted knapweed can accumulate unavailable phosphorus and make it bioavailable within the soil. While knapweed is something we hope to control and eventually remove, it is an indicator of soil chemistry. We can potentially seed in a native aster that will fulfill a similar role, without spreading aggressively.

We are fortunate to have been able to partner with the Maryland Conservation Corps for the past few years. The MCC crew is part of the Tuckahoe State Park staff and donated a full day of work in March. With their help, we were able to remove over 100 Bradford pears in Nancy's Meadow.



The Callery pear was introduced in the early 1900s to be used as rootstock. From the Callery came the cultivar “Bradford,” which did not have the spines on the branches. Both pears have been widely planted as fast growing ornamental trees. Theoretically a sterile tree, the “Bradford” pear (and other cultivars) are able to cross pollinate and produce viable seeds, which are widely spread by birds and other animals. Both Callery and cultivar pears have naturalized in our region and can outcompete early successional native trees. Serviceberry (*Amelanchier canadensis*) blooms a week or so later than the Bradford pear making it an excellent native alternative.

The South Meadow is on the list to be burned early 2020, which will help to keep successional woody species, as well as invasive species, at bay. Burning also helps to “fertilize” the meadow and clear any overcrowding. The meadow was last burned in February 2017. Nancy’s Meadow will continue to be managed through selective tree removal and bush hogging.

## GOATS

Tiarella, Pearl, Sunshine, and Rosie are the resident goats in the Adkins Arboretum Targeted Grazing Program. In 2019, they helped to clear almost 20,000 square feet of forest thicket edge by the pavilion, as well as on the south side of the South Meadow. Goats generally consume 3.5



to 5 percent of their body weight each day. By grazing these selected plots, the goats are not only assisting our staff in clearing vines, but they are eating a nutrient dense varied diet of different plants. If we notice the goats starting to graze on tree bark, that is an indication to us that they have run through the weeds that they are willing to eat and it is time for us to move them to a plot with more forage.

## WOODLAND

In March 2019, Arboretum staff removed the rotten boards of the boardwalk on South Tuckahoe Valley Trail. Eagle Scout Matt Webster volunteered to replace the boardwalk for his Eagle Scout project. In April, Matt brought a group of Boy Scouts and constructed the new boardwalk, allowing for safe crossing for trail goers.

We have a variety of forests at Adkins, some young and some mature. Along Upland Walk, we have a young pine forest on land that was once farmed. Further along trails such as South Tuckahoe Valley and near the floodplain, we have more mature forests of oaks and beeches. As trees age out, we let the forest naturally regenerate. Any fallen trees are left to serve as important habitat.

## PHENOLOGY

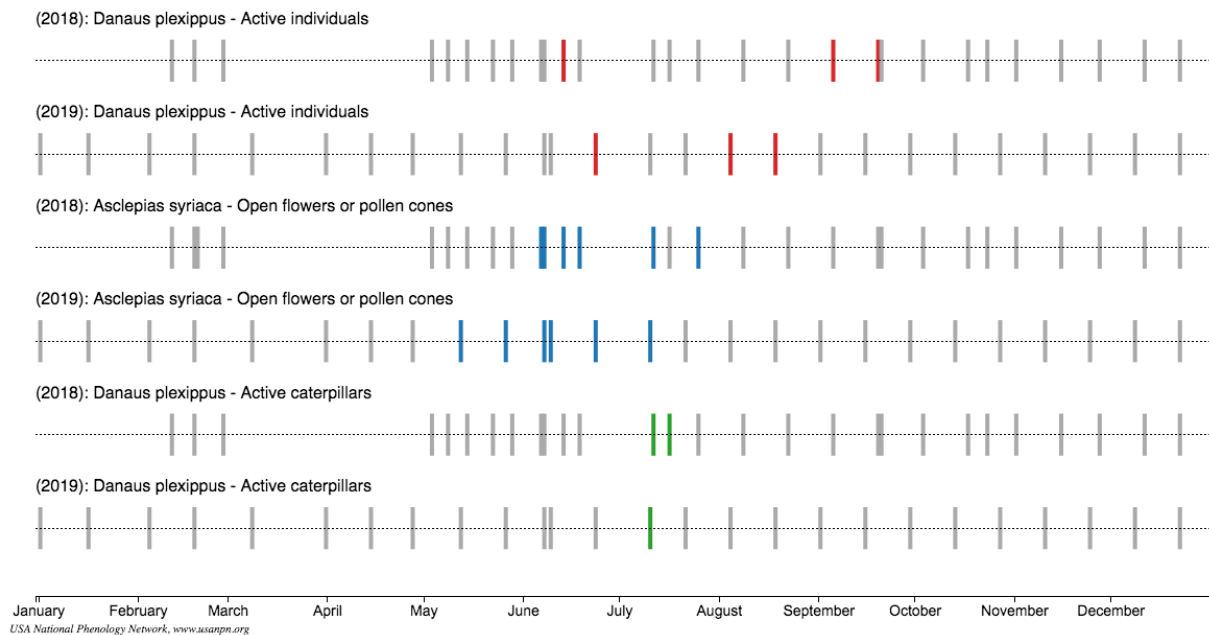
A core group of volunteers have taken the lead on the phenology program at Adkins. Led by volunteers Marilyn Reedy and Trish Hargrove, the phenology team meets every other week,

observing eight plant and animal species throughout the seasons. They recently added American Chestnut (*Castanea dentata*) to their list. There are two known Chestnuts on the Arboretum grounds, both of which are in decline, but not yet dead.

Phenology is the study of nature’s calendar – following plants and animals through their seasonal cycles and behaviors and correlating it with weather and time. These observations are contributed to a national online database called Nature’s Notebook, which gives scientists (professional and citizen) access to data regarding many species of flora and fauna. At Adkins, we are interested in contributing data to an existing data gap on the East Coast, as well as how the information that is collected can help to inform our own stewardship practices.

Chesapeake Conservation Corps Member Blake Steiner started the phenology program at Adkins in late spring in 2018. Thanks to the continued efforts of the volunteers, 2019 was the first full year of observations. While two years of data cannot reveal many trends, we make a few comparisons between 2018 and 2019.

- In 2019, the red maples appear to have leafed out 3 weeks earlier than in 2018. We also noticed accelerated progression through the red maple natural leaf coloration and senescence in 2019.
- In 2019, the pink lady slipper orchids bloomed slightly earlier and for a shorter period of time than in 2018.
- Observations of active monarch butterflies and caterpillars indicate that they overlap with the bloom time for common milkweed. As the milkweed blooms decline, the monarch adults would rely on other genus with later bloom time. (See calendar visualization below).



As we collect data year to year, we should be able to determine some trends. 2019 had several extreme weather periods from heavy rain to a prolonged drought and high temperatures.

Phenology allows us to trace how factors should as extreme weather can impact the plants and animals at Adkins Arboretum.

## WILDLIFE MONITORING

In addition to the detailed observations that the Phenology team collects every other week, Adkins Arboretum has a series of twenty bluebird boxes, eight purple martin houses, and eight wood duck boxes that are monitored throughout the year by staff and volunteers. In 2019, we noted 114 fledglings from our bluebird boxes, slightly higher than the 111 fledglings recorded in 2018. Of the 114, 55 were Eastern bluebirds, 6 Carolina chickadees, 24 Carolina wrens, and 24 Tree swallows. Our staff observed some purple martins flying around the boxes on the edge of South Meadow, but no nesting attempts were noted. It was a good year for wood ducks at the Arboretum with 34 successful hatches noted. Wood duck boxes are monitored at the end of the season so as not to disturb nesting hens. Staff counted the embryo sacs in each nest and made any necessary repairs.



## MONARCH METAMORPHOSIS

Our grounds crew is fortunate to witness some very cool moments in nature. One day in August, we noticed a monarch caterpillar had latched onto the underside of the play garden fence. It started swinging back and forth and appeared to be performing some challenging crunches. Before long, we noticed a gradual wave of bright green and gold emerging through its black, white, and yellow skin. Seemingly in the blink of an eye, the once caterpillar had completely morphed into a bedazzled chrysalis. Most monarchs will emerge from their chrysalis within eight to fifteen days.



## PRAYING MANTISES

We noticed lots of praying mantises this fall and it got us wondering, how do you tell apart the native and non-native mantises, and are the non-native mantises causing any harm? In short, identifying the mantises comes down to the shape of their facial shield, the presence (or not) of a dot between their raptorial arms, and the shape of their egg case. Chinese mantises seem to be the most common. The color of the mantis can change with its maturity and is not a good indicator of native or non-native. So, should we worry about the non-native mantises? Not necessarily. The non-native mantises do not appear to outcompete the native ones significantly, and they are still beneficial predators keeping insect populations in balance. So for now at Adkins, we leave them to themselves.





## RABID WOLF SPIDER

With the newly installed parking lot, our staff spent a lot of time in the weeds. We were amazed by the amount of wildlife that set up camp in those gardens. Birds, butterflies, toads, snakes, and spiders abound! We particularly noticed quite a few rabid wolf spiders. These gorgeous guys are easy to identify with their white line down their abdomen.



## PROFESSIONAL DEVELOPMENT

Our Land Steward and Consulting Horticulturist were fortunate to go to the Chesapeake Conservation Landscaping Council conference in December. The big takeaways were from Rick Darke speaking about landscape design and creating modules that can be extrapolated to various situations and Susan Smith Pagano who conducted studies on the nutritional value of the fruits of native and non-native plants, specifically for birds.

## COMMUNITY SUPPORT

Special thanks to our local arborists! At Adkins Arboretum, we are fortunate to have generous sponsors and local companies who assist us on the grounds. This year, the Maryland Arborist Association held their annual Arborist Day at Adkins in April providing over \$30,000 in tree work.



Throughout the year, Bartlett Tree Experts of Stevensville donated \$2,000 of tree work on our front entrance drive (and helped us take down some precarious holiday lights!). They have also attended both plant sales offering tree care advice to our customers and have assisted our grounds staff with hazard trees.



Unity Landscape Design/Build continued their support of the Adkins grounds, completing several trail additions, the parking lot construction and planting, and several in-kind projects. Thank you!