

# *HOPKINS MEMORIAL FOREST*

## *The Year in Review*

*2019-2020*



Center for Environmental Studies

Williams College

December 2020

## SUMMARY

*September 2019 through August 2020*

This was not the year we expected in Hopkins Forest or anywhere else for that matter. As happened almost everywhere, operations ground to a halt and things changed dramatically with the outbreak of the Covid-19 pandemic in mid-March. Until that time, we had been running a full slate of research and educational activities at Hopkins Memorial Forest (HMF), Williams College's environmental field station. However, once the College shut down its academic operations, much of the Forest's regular teaching and research programming went on hold. Spring class visits, public events, outreach programs, and student caretaking were all effectively stopped and this closure continued throughout the summer.

Prior to, or in spite of, the shut-down some research in the Forest did continue. Among it was Mea Cook's investigation of ecosystem dynamics through the monitoring of stable carbon, nitrogen and water isotopes at different locations within the forest, and Joan Edwards' study of differential mowing regimes and their effects on late season wildflowers and pollinators. In addition, Jay Racela continued to run the biogeochemistry and meteorological monitoring in the Forest; he was able to keep the weather and stream gauging stations open and continue regular collections of isotope samples. The Northern saw-whet banding program continued for its 19<sup>th</sup> season in the fall of 2019.



Throughout the fall the Forest served as a focal point for College and regional educational programming. Williams College Biology, Geosciences, and Environmental Studies and Physical Education classes made use of it for field trips and study sites and, once again, a Winter Study course was based there. We were also able to host a full slate of guided field trips for elementary schools, with Williams students serving as instructors. Students kept busy working as forest caretakers in the fall and late winter; this involved contributing to a variety of

maintenance and upkeep needs on the property and well as preparing the annual Fall Festival. The annual special permit hunting season went on in December without a hitch.

In spite of the untimely shutdown, we were to salvage the maple sugaring season and produce about 25 gallons of finished syrup. About this time, the trails became much more popular with hikers, joggers, and anyone looking to get outside amid the lock-down. This push in recreational use continued throughout the summer.

During fall 2019 a team of students in Hank Art's Environmental Planning (ENVI 302) class undertook an ambitious assessment of various alternatives to protect Hopkins Forest in perpetuity. In December, their report – '*Protecting Hopkins Memorial Forest: An Evaluation of Conservation Alternatives*' by Emily Elder, Anna Lietman, Ivy Spiegel-Ostrom, and Ingrid Thyr – was presented to the public, including conservation officials, college Faculty and Provost of the College, Dukes Love. The students made a compelling case for codifying the protection of the Forest using some form of conservation easement. At the time, the College Senior Staff was taking it under review and we look forward to re-visiting this conversation in the future.

This coming year we intend to incorporate Allison Gill's research program into the Forest. Dr. Gill is planning to set up experimental plots for her Ecosystem-level study of carbon and nitrogen cycling dynamics. We are confident that improved public health conditions in summer 2021 will allow this and other research and teaching activity to return to the Forest in earnest.

## RESEARCH and MONITORING

The following scientific studies were underway during the past year.

### Ecosystem Isotope Study

During 2019-20, Geosciences Professor Mea Cook continued her study of water isotopes and C and N isotopes. The goal of this study is to show the seasonal cycle and range of variability of the dynamic environment. Professor Cook (working mostly with faculty and staff this year due to Covid restrictions) continued her thrice annual sampling of stations along the length of the south and main stems of Birch Brook and collected water isotope samples at those sites. In addition, Jay Racela continued to collect water samples from the new catchment under the rain gauge in the main weather station.

### Impacts of Mowing Patterns on Flower Production and Pollinator Activity



Joan Edwards' study of the effects of differential mowing regimes on fall wildflowers and their pollinators continued this year. The goal of this study is to assess the impact of both timing and frequency of mowing on flower production and pollinator activity. The sixteen plots are divided into four blocks with treatments in a full-factorial randomized block design. This year, according to the schedule, we implemented the annual and biennial treatments (eight plots were mown in July with eight more done in early November). During autumn 2019 faculty and students, including Hopkins Forest caretakers, gathered data on the flowering stems within the plots.

### Garlic Mustard (*Alliaria petiolata*) Dynamics

Three distinct sites – early successional (near the Rosenberg Center), mid-successional (Red Oak Stand) and late-successional (Beineke Stand) – have been the focus of Joan Edwards' garlic mustard study, which entered its 21st year. This ongoing investigation involves a complete annual survey of the three sites in mid-July when researchers count all rosettes, reproductive stems and seeds in 0.5m x 0.5m permanent quadrats. Henry Newell '21 provided field assistance this year, with most of the work coming in early fall (due to Covid-related summer staffing reductions). Henry is currently analyzing the data, which will be the subject of his Honors Thesis.

### Lyre-leaved rock-cress (*Arabydopsis lyrata*) Genetics

This year University of Basel (Switzerland) graduate students Antoine Perrier and Dario Sanchez Castro transitioned to the data analysis and write-up phase of their study of geographic distribution limits in plants using lyre-leaved rock-cress (*Arabydopsis lyrata* var. *lyrata*). They are currently working on manuscripts, which may be published in 2021.

### Ant/Tree Hopper Mutualism

Manuel Morales did not conduct field work on his continuing investigation of an insect-based mutualism in goldenrod fields during the summer, instead focusing his attention on lab work. The fields that host the study were bush-hogged in the fall 2020 to reduce competition from invading saplings.



### Documenting Mammals using Trail Cameras – a preliminary study.

In the summer of 2020 Noah Savage '22 was awarded a Center for Environmental Studies (CES) summer research grant to evaluate the feasibility and efficacy of trail cameras to study mammals in Hopkins Forest. Due to a cut-back in summer funding awards during 2020, Noah was only able to finish the data-collection (16,000 field images over 900 camera-days) phase of the study. He intends to continue to process and analyze his findings should funding become available in 2021.

### Ecosystem-level study of Carbon and Nitrogen Cycling Dynamics

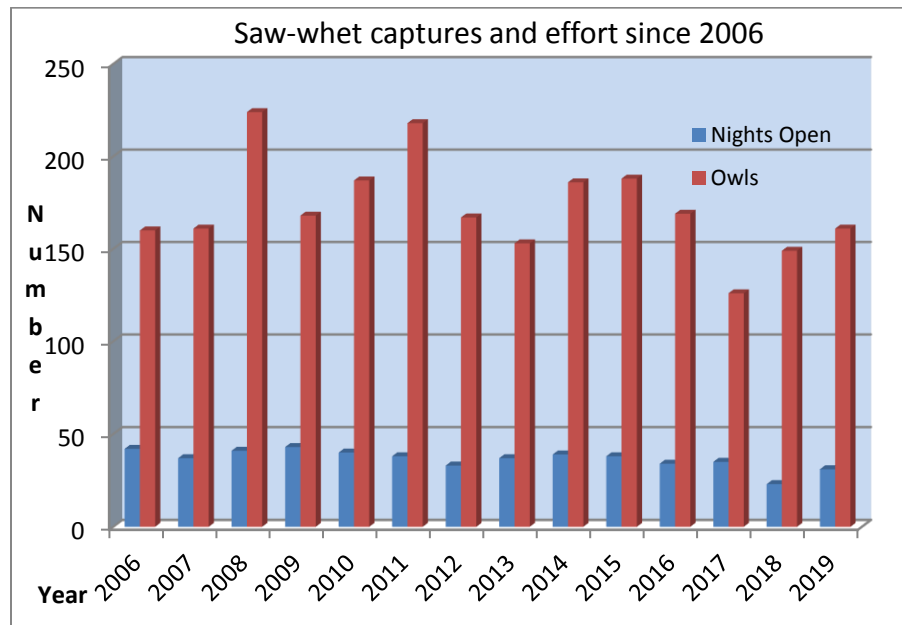
During summer 2020, Dr. Allison Gill, newly arrived in the Biology Department, began preliminary work for her ecosystem-level study of carbon and nitrogen cycling dynamics in Hopkins Forest. This will involve establishing an array of experimental plots where the forest's litter layer will be manipulated. Due to the extenuating circumstances that summer, Dr. Gill was only able to do some initial reconnaissance as to potential research plots. We expect this study to begin in earnest in 2021.

### Northern Saw-whet Owl (NSWO) Migration Banding

Working with Dr. Ken Schmidt of Texas Tech University, we operated the Northern saw-whet owl (*Aegolius acadicus*) banding station again in autumn 2019. Due to past problems with barred owl predation, we cut our linear array of mist-nets from four to three 12-meter panels. In 2019 we ran the nets on 31 evenings for 156.5 total hours between October 4<sup>th</sup> and November 16<sup>th</sup>. During that period, we captured 161 individual saw-whets, including eight “foreign recaptures” that were previously banded at other stations (Figure I). The season saw the introduction of an electronic “net occupancy sensor” designed by Jason Mativi of the Science Center. The design showed promise in early trials toward the end of the season.

In 2019 there was no class or public visitation due to uncertainties brought on by the predator issues.

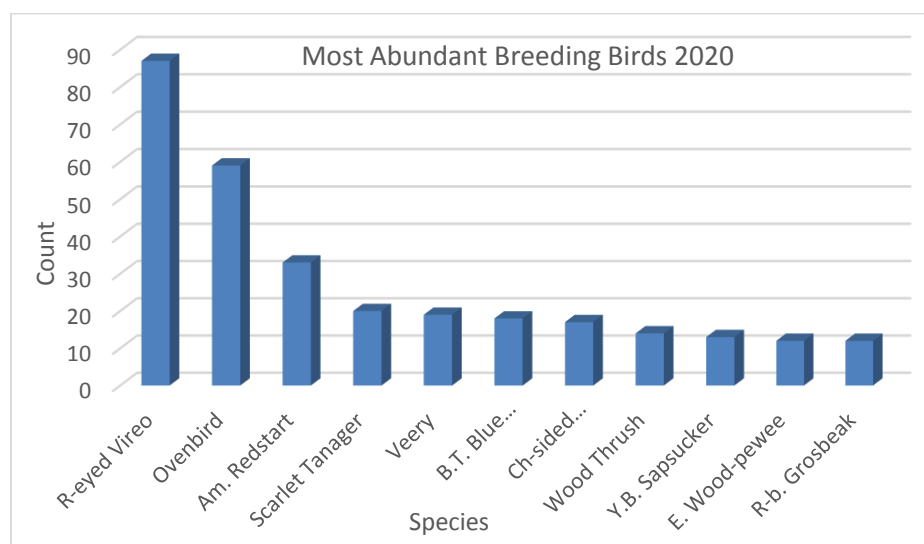
**Figure I.** Saw-whet owl banding results.



### Breeding Bird Point Surveys

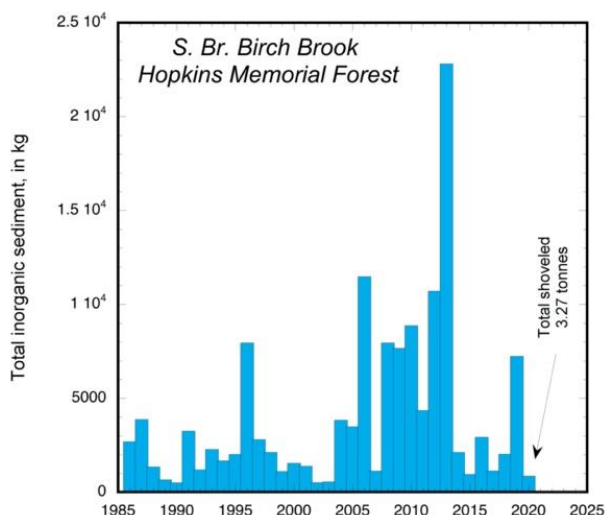
In June 2020, I sampled singing males at the 44 breeding bird monitoring points around the Forest for the 20<sup>th</sup> consecutive year. The year's total of 420 individuals was a significant increase over the previous year, while the total of 50 species was also up. Again the red-eyed vireo ranked as the most abundant species, with the ovenbird, American redstart, scarlet tanager and veery rounding out the top five (Figure II).

**Figure II.** Most abundant bird species from 2020 point surveys.



#### **Watershed/Meteorological Monitoring (Environmental Analysis Lab)**

As part of our long-term climate monitoring in and around Hopkins Memorial Forest, CES's Environmental Analysis Lab – under the guidance of David Dethier (Geosciences, emeritus) and Lab Supervisor and Lecturer Jay Racela – continued to gather, analyze and archive meteorological, hydrological and biogeochemical data from the Forest and surrounding areas. Four standard weather stations – one 50-m tower and two stream gaging stations – all using digital data loggers, ran continuously throughout the year. We also continued bi-weekly and monthly collection and laboratory analysis of rain and stream water, respectively, as part of ongoing forest geochemical research studying nutrient cycling and deposition by the forest ecosystem.



In August, in the midst of the pandemic, masked volunteers (including Williams alums and a variety of professors) dredged and weighed sediment in the weirs along the South Branch and Main Stem of Birch Brook. Lower than the previous five years, a total of 3270 kg of sediment was removed from the South Branch weir. This comprised about average for dried, organic material (total ~795 kg), but below the long-term average for inorganic material (total ~862 kg) and the lowest amount of inorganic sediment removed since 2003 (Figure III). All of this reflects lower than average streamflow from fall 2019 through summer 2020 and the absence of large precipitation and flooding events.

**Figure III.** South Branch Birch Brook sediment shoveled 1986-2020.

Independent research and thesis projects either continued in the Environmental Analysis Lab and/or Hopkins Forest, including PFOA/S (Anna Jackowski '21, Marika Massey-Bierman '22), PCBs (Mia Holtze '22, Abe Eafa '21), Tallevast, FL air quality (Molly Lohss '21), and HMF stream and rain water carbon isotopes (Mea Cook, GEOS). During the summer, research assistants Julia Peabody-Harhigh '24, and Catherine Powell '22 were hired for remote help with continuing our Environmental Justice research in Centreville, IL and Xiaoyi Zhang '23 was hired as work-study, for help with the PCB lab research.

## EDUCATION & OUTREACH

### Undergraduate Classes

The following Williams Classes organized repeated or one-time visits to the Forest during the past academic year:

- BIOL/ENVI 203 – *Ecology* (Bassar)
- BIOL 220 – *Field Botany and Plant Natural History* (Edwards)
- ENVI 102 – *Introduction to Environmental Science* (Cook and Auer)
- ENVI 101 – *Nature and Society* (Martin)
- ENVI 101 – *Nature and Society* (Merleaux)
- ENVI 302 – *Environmental Planning* (Art)
- GEOS/ENVI 255 – *Environmental Observation* (Bradley)
- WS BIOL 18 – *Animal Tracking* (Yacobellis)

### Elementary Education

This was our ninth year partnering with the College's Center for Learning in Action (CLIA) to provide field-based educational experiences for regional elementary school classes. The program was again popular with Williams student educators during both seasons (Table I). Unfortunately, the spring crew was only able to host one field trip (Pownal Elementary) before the Covid-19-imposed shutdown cancelled subsequent programs and sent everyone home. The fall, by contrast, offered a full slate of programming for elementary schools from around the region. During this time, we hosted 11 curricular-based field trips for 4<sup>th</sup> through 6<sup>th</sup> grade classes; 346 students participated (Appendix I). As in the past, we provided funding for transportation to several schools that requested such assistance.

**Table I.** Student Educators 2019-20.

<u>Fall 2019</u>	<u>Spring 2020</u>
Paul Sheils '20	Regina Fink '22
Billy Donoso '23	Noah Savage '22
Kaitlin Han '23	Harold Chambers '20
Regina Fink '22	Cristina Mancilla '20
Jesus Payan '20	Isabelle Zollinger '23
Janae Rasmussen	Billy Donoso '23
Harold Chambers '20	Alameda Chapman
Nate Orluk '22	Avery Dunn '20
Jacques Lybarger-Martel '22	Grace Guidotti
Charles Kerzner '22	Tali Natter '23
Paul Sheils '20	Alice-Henry Carnell '22
Billy Donoso '23	

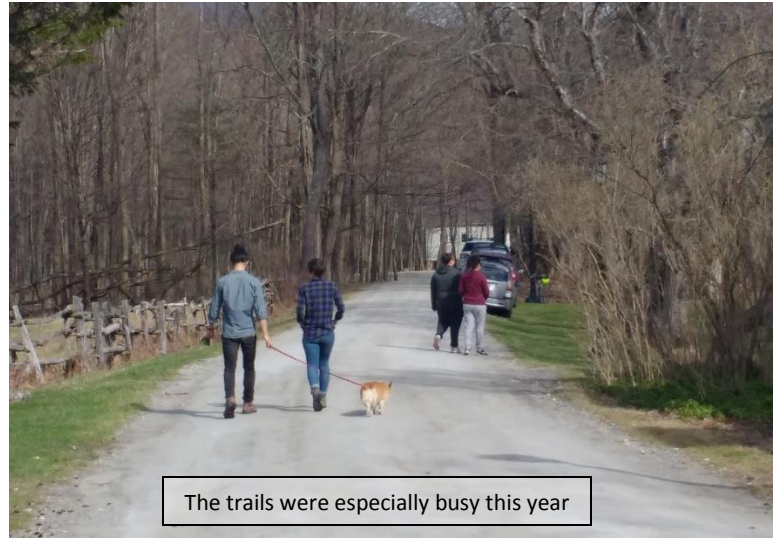
### Community Events

Hopkins Forest hosted fewer public events this year because of the public health crisis that dominated 2020.

- **Fall Festival** – This annual event took place on Sunday, October 6<sup>th</sup>, 2019. On a cloudy fall afternoon, it drew approximately 150 people; this figure might have been suppressed somewhat due to the competition with the annual fall foliage parade in North Adams.
- **Animal Tracking** – Naturalist Dan Yacobellis conducted his annual wildlife tracking workshop on Saturday, February 8<sup>th</sup>. This year the program was again divided into two shorter walks.
- **Maple Festival** – This year Mapfest had to be cancelled due to the Covid-19 outbreak.
- **Amphibian & Reptile Foray** – Not held in 2020.
- **Wildflower Walk** – Not held.
- **Alumni Day** – Cancelled due to Covid-19.

## RECREATION

As usual numerous hikers, joggers, horse-back riders, skiers, and nature observers took to the Forest's trails. However, this year saw a substantial increase in recreational use of the Forest – more that 100 percent – in the early weeks of the Covid-19 pandemic. On weekends the public parking area was routinely filled to capacity with overflow vehicles parked along Northwest Hill Road. Even as more alternative venues opened up and trail use declined slightly in the summer, the “Covid wave” never really receded, and the Forest continued to experience elevated recreational activity into the fall. In spite of the increased use, we noted few problems or ill effects to infrastructure.



In November, in conjunction with BFAIR of North Adams, we offered a guided walk for two disabled individuals in their program. Students Regina Fink '22 and Eva Castanga '22 were instrumental in facilitating this visit.

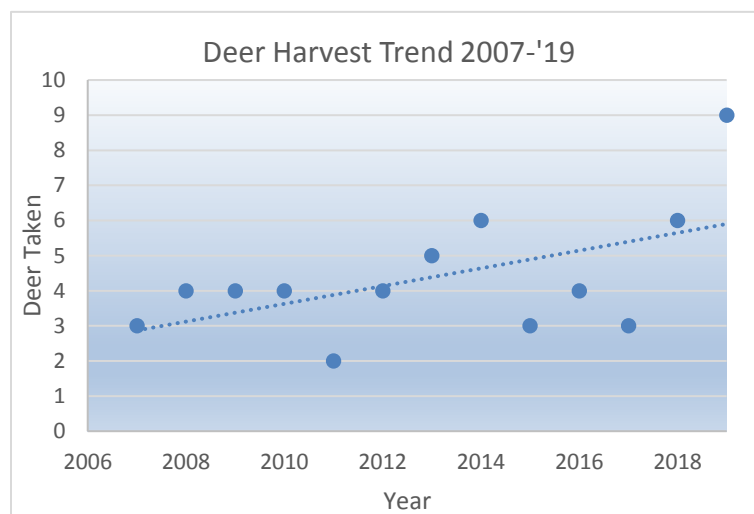
### Williams Outing Club (WOC)

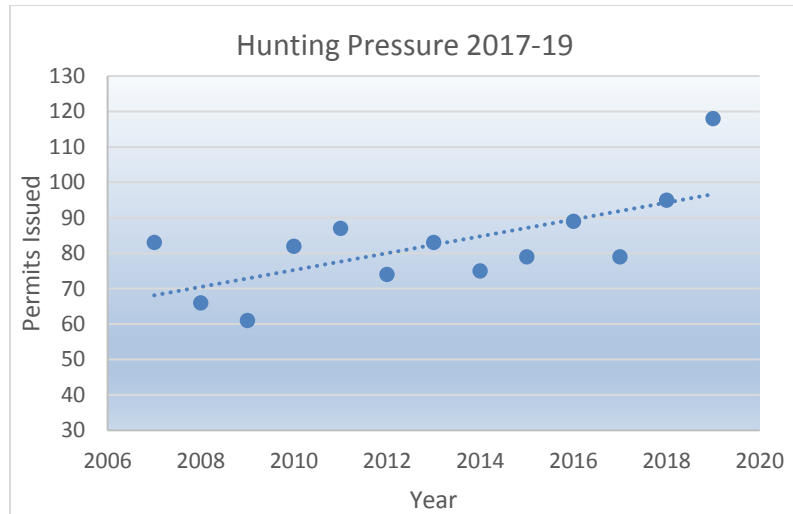
The Outing Club cabin was shut down for much of the year in order to upgrade the wood stove and for other needed repairs. It is slated to reopen again for the 2021-22 academic year.

### Hunting

The 2019 special permit shotgun hunt for deer again went smoothly. A near-record (for HMF) number of registered hunters (118) harvested a total of nine white-tail deer according to our unofficial sign-in. This was the largest take from Hopkins Forest in a dozen years and came in spite of depressed hunter turnout on opening day due to a heavy snowstorm. This year's hunting pressure and harvest numbers continued the positive trends that we have been observing over the past dozen years. (Figures IV & V). Once again Williams College security officers were on site during the busiest days of the hunt.

**Figure IV & V.** HMF Deer hunting harvest and participation trends since 2007.





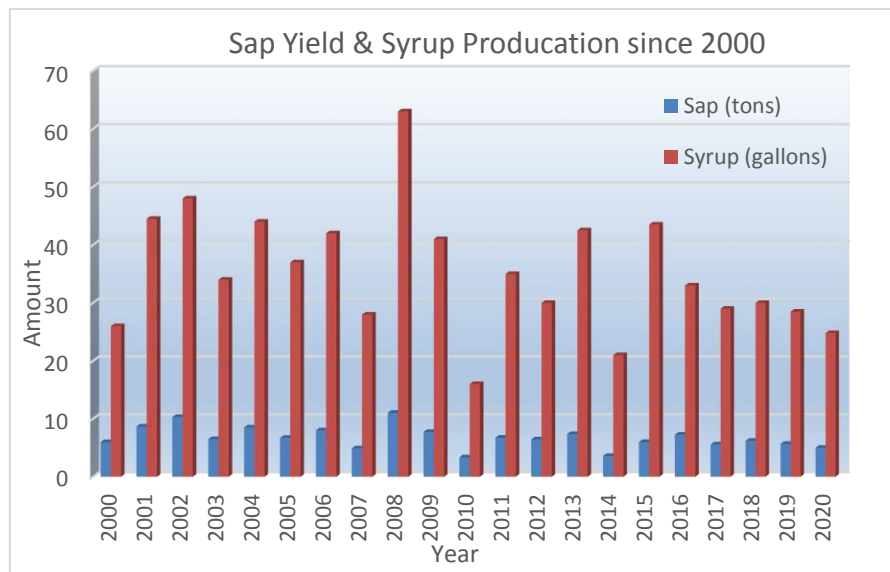
### MAPLE SYRUP PRODUCTION

The 2020 maple season was a challenge due to personnel shortages driven by the Covid-19 shut-down and my being on family leave for much of February. Nonetheless, between the Northwest Hill Road hedgerow and the sugarbush, we managed to gather approximately 1000 gallons of sap and boil it into 24.8 gallons of finished syrup (Figure VI). Fortunately, we were able to engage a few local volunteers and one local student to assist during the later stages of the season and clean-up. One local school managed to visit the sugarbush for a scheduled field trip before the rest of the spring education season was cancelled.



The last few years we have noticed a decline in the evaporator's boiling efficiency, evidence of years of wear and tear on the rig. We expect that the summer 2020 improvements to the sugarhouse – including the pouring of a concrete slab, leveling of the arch and repairs to the arch and chimney – might improve the evaporator's boiling efficiency in the coming seasons.

**Figure VI.** Hopkins Forest maple syrup production since 2000.





## LAND MANAGEMENT, CARETAKING & FACILITIES

### Forest Management—Vermont Parcel

We did not do any commercial or pre-commercial work on the Vermont Parcel this year, although I did send an update to the Bennington County forester and the parcel remains in the Vermont Use Value Appraisal program. Its management plan, approved by the Vermont Department of Forestry, calls for timber harvesting in the next few years.

### Wire Bridge Farm

This year, Jay Galusha of Williamstown took over cultivation of the Wire Bridge Farm from Joel Burrington of Pownal, who had farmed the property for more than 20 years. Galusha is expected to grow hay on the property in the coming years; it may take a few mowings to restore the meadow to its former quality. No academic activities involving the farm took place during this year although the area continued to be used occasionally for recreation and wildlife viewing.

### Infrastructure

This year, due to staff and budget cut-backs we were only able to perform basic trail maintenance throughout the Forest. The entry road to the Rosenberg Center was graded by the Williams Facilities Department this year; no new gravel was applied in order to comply with Covid-related budget cuts. In order to keep up with summer maintenance needs – trails, lawn-service, and the like – we hired local contractors including Countryside Landscaping and Belle Furman. The pouring of the slab in the sugarhouse was done by Boino Masonry of Dalton, Massachusetts. We have a quote from this company to do major repairs on the two stream gauging stations in 2021.



### Caretaking

As in the past we employed student caretakers to assist with maintenance, upkeep and outreach activities in the Forest. The program continued to be popular among students with 16 students engaged in the Forest job during the academic year (Table II). Of course the spring crew had to be disbanded after just a month due to the Covid-related shut down. We were very fortunate to have had the services of local resident Noah Savage '22 who was able to stay on as a spring caretaker even after the shut-down. Noah was instrumental in cleaning the maple sugaring equipment and performing other customarily arduous spring tasks.

**Table II.** Student Caretakers academic year 2019-20.

Jared Bathen '20	Gavin McGough '22
Kristen Bayrakdarian '20	Henry Newell '21
Liza Berg '21	Jay Schroeter '22
Siri Bohacek '22	Patrick Postec '21
Alice-Henry Carnell '22	Abraham Steinberger '20
James FitzGerald '21	Christina Mancilla '20
Isabelle Furman '20	Noah Savage '22
Brenden Harshbarger '20	Hadassah Lurbur



During the summer 2020 we were not able to hire the normal cast of two full-time caretaker interns, but instead relied on local contractors to take care of the essentials. Thankfully, we were cleared to re-hire Debra Rogers-Gillig to again serve as part-time seasonal gardener, focusing on the Buxton Garden; this was especially key given the cutbacks we had to make in other areas.

### Rosenburg Center/Moon Barn

In the fall the Rosenburg Center continued to function as a focal point for classes, lab set-ups, public events, and school field trips as well as an exhibit space for visitors. The Moon Barn was used during the Fall Festival. On Halloween 2019, after a forty-two year run, the barnyard sculpture, *Echoes of an Era*, was demolished by a falling black locust tree. We salvaged as many component parts as we could but the future of this piece remains uncertain.

### Canopy Walkway

This year the canopy walkway was used during the fall festival and for a Williams Outing Club physical education class led by David Ackerson, also in the fall.

## MEETINGS/AFFILIATIONS

I and several other HMF Users Committee members sat on the planning committee and participated in the *5<sup>th</sup> Annual Berkshire Natural History Conference* – November 16th 2019, at the Clark Art Institute in Williamstown.

On November 21, 2019, we had a visit from the Chief of the US Forest Service Vicki Christiansen, who visited the forest along with a cadre of officials involved with the Massachusetts Woodland Initiative (pictured on title page). Hank Art give a brief outdoor presentation to the group. Ours was one of several sites on the Chief's itinerary that day.

## FUTURE – What's in store for 2020-21?

I am most hopeful that 2021-22 will see a gradual return to business as usual in Hopkins Forest – with a full slate of research, teaching and outreach eventually returning to the program. We expect to facilitate and expand our educational and research activities, which will include integrating the research program of Dr. Allison Gill, new to the Biology Department, into the forest. Dr. Gill will be implementing her ecosystem-level study of carbon and nitrogen cycling dynamics by establishing an array of experimental plots the in the Forest. In addition, we will continue to support ongoing research, including the study of differential mowing regimes on late season wildflowers and pollinators and the ecosystem-level isotope study.



With an expected gradual relaxation of public health protocols, we will look to re-integrate the Forest into the various courses that have used it in the past. We also intend to eventually re-open the facility as a venue for guided field trips for regional elementary school classes, public events and weekend programs. When exactly this will all happen, we cannot be sure, but I expect that by fall 2021 things may start to run more like they have in the past. In the meanwhile we will continue to work to bolster our virtual educational offerings.

*Special thanks to Jay Racela and Dee Dee Lewis for their contributions to this report.*

