HOPKINS MEMORIAL FOREST

The Year in Review

2018-2019

Center for Environmental Studies

Williams College

December 2019

SUMMARY

September 2018 through August 2019

This year continued to feature a full slate of activities at Hopkins Memorial Forest (HMF), Williams College's environmental field station. Among them was Professor Mea Cook's investigation of ecosystem dynamics though the monitoring of stable carbon, nitrogen and water isotopes at different locations within the forest. Researchers from the University of Basel in Switzerland concluded the field component of their Lyre-leaved rock-cress (*Arabydopsis lyrata*) study in the spring of 2018. This entailed the final collection of data on overwintering survivorship and decommissioning the nursery installed two years prior.

We implemented another round of mowing treatments prescribed in Joan Edwards' study of differential mowing regimes and their effects on late season wildflowers and pollinators. The fall featured another round of sampling all flowering individuals within the plots. Two seniors, Cristina Mancilla and Robert Smith, worked on honors theses as part of this broader study of goldenrods and pollination in and around the Forest. In addition, Prof. Edwards and her student assistants continued their study of population dynamics of garlic mustard at three sites in the Forest.

With the recent retirement of Professor David Dethier, our long-term meteorological and geochemical monitoring activities continued under the direction of Jay Racela. Jay also assisted with a study of the physical profiles of three springs in Hopkins Forest -- which sought to compare flow rates, temperatures and other physical parameters of regional springs -- headed up by researchers from Lamont Doherty Earth Observatory of Columbia University.

Into its 18th year, the Northern saw-whet owl banding station was active during fall 2018, albeit to a more limited degree due to some operational problems. Again we conducted annual breeding bird surveys along set routes during June 2019.

John Wheeler exhibiting fungi samples at the Bioblitz

At the outset of the fall semester we hosted the ninth annual Berkshire Bioblitz, which attracted scientists and nature enthusiasts from around the region and turned up a number of species that were not previously known in the Forest.

Meanwhile the Forest continued to serve as a focal point for College and regional educational programming. Williams College Biology, Geosciences, and Environmental Studies classes made regular use of it for field trips and study sites and Winter Study courses were also active there. It also served as the base for occasional field trips from other regional colleges.

This year, we continued our partnership with the Williams Center for Learning in Action (CLIA) and local school districts to host elementary school field trips during the spring and fall. Williams student caretakers were again instrumental in helping us host a variety of public events highlighted by the Bioblitz and Maplefest. As usual the Forest was used extensively for recreation, special permit deer hunting, and maple syrup production.

This year brought to a conclusion our contract with the Natural Resource Conservation Service (NRCS) which had provided assistance with conservation and forestry work on our Pownal, VT parcel for the past nine years. A final item, the prescribed burn, had to be deleted for logistical reasons.

RESEARCH and MONITORING

The following scientific studies were underway during the past year.


Mea Cook sampling the South Branch

Ecosystem Isotope Study
In fall 2018 Geosciences Professor Mea Cook launched a new initiative to monitor 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.

Alan Lin ’22 worked though summer and into the fall of 2019 to collect water samples from a newly installed bucket under the rain gauge in the main weather station. In addition Professor Cook and her student assistants established sampling stations along the length of the south and main stems of Birch Brook and collected water isotope samples at those sites during summer and fall 2019.

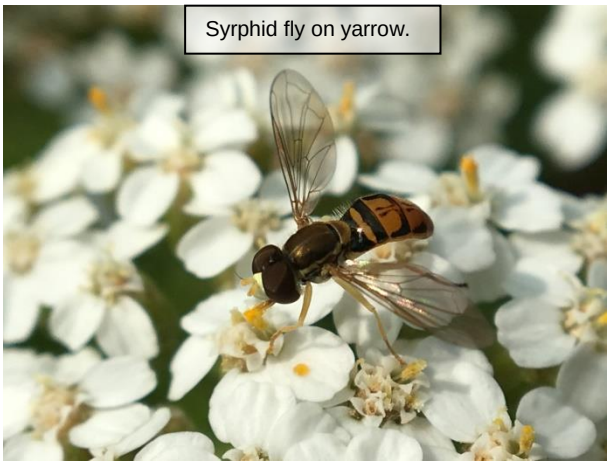
These data will be a valuable baseline for local studies looking at how water moves through the landscape, how water isotopes that are imprinted into plants and animals can be used to trace movements and life history, and how carbon and nutrients flow through ecosystems

Lyre-leaved rock-cress (*Arabydopsis lyrata*) Genetics
This year University of Basel (Switzerland) graduate students Antoine Perrier and Dario Sanchez Castro concluded their study of geographic distribution limits in plants using lyre-leaved rock-cress *(Arabidopsis lyrata var. lyrata).* This involved running over-wintering survivorship trials on the nursery specimens that were still alive after the summer of 2018. They also did a seed-survivorship study, using representative samples taken from disparate populations within the species range. In late spring, once the data were tallied, the nursery was removed and the field was restored to its original condition.

Physical Profiles of Thermal Springs
As part of a wider study on the physical and geological parameters of regional thermal springs, Dr. Dallas Abbott and Dr. William Menke of Lamont Doherty Earth Observatory of Columbia University visited three springs in Hopkins Forest in November 2018. These geoscientists were interested in flow rates, temperatures and general geological characteristics of the springs, and they took measurements and water samples accordingly. Jay Recela assisted them with their field sampling, which comprised the springs at the Wire Bridge Farm, Taconic Crest Trail and the Tri-state area. As of fall 2019, a manuscript featuring this work had been submitted to the *Journal of Geophysical Research*.

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 only the annual treatments (four plots were mown in July with four more slated for late October). During autumn 2018 faculty and students, including Hopkins Forest caretakers, gathered data on the plots.

Two students are now engaged in thesis projects involving this research. Robert “R. B.” Smith ‘21 is studying the genetic structure of goldenrods in the experimental mowing plots. He is using microsatellites to track individual stems in order to gain a good idea of patch size and genetic diversity for *Solidago gigantea* and *S. rugosa.* R.B.’s focus is on two of the late mow plots within the 16-block experimental grid.


Syrphid fly on yarrow.

Concurrently, Cristina Mancilla ’21 is comparing the primary insect pollinators that use eight different plant species found both in Williamstown and on Isle Royale, Michigan. To this end she set up and ran video cameras at several sites in Willamstown during the summer of 2019. Several plants -- including *Sibaldiopsis tridentata* (3-toothed cinquefoil), *Achillea millefolium* (yarrow), and *Rubus strigosus* (red raspberry) – were videoed in and around the southwest corner of the Forest.

Garlic Mustard (*Alliaria petiolata*) Dynamics

Three distinct sites -- early successional (near the Rosenburg Center), mid-successional (Red Oak Stand) and late-successional (Beineke Stand) -- have been the focus of Joan Edwards’ garlic mustard study, which entered its 20th 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. This year’s field surveys were conducted by Henry Newell ‘21 and Christina Mancilla ’20 (Table I).

Table I. HMF Undergraduate Student Researchers—Summer 2019.

Student	Supervisor	Project
Cristina Mancilla ‘21	Edwards	Garlic Mustard /pollinators
Henry Newell ‘22	Edwards	Garlic Mustard
Alan Lin ‘22	Cook	Stable Isotopes ecosystem level
Petra Baldwin ‘22	Racela	Hydro/Meteorology; Lab assistant
Jaya Agular ‘23	Racela	Hydro/Meteorology; Lab assistant

Berkshire Bioblitz

On September 15/16, 2018, Hopkins Forest hosted the ninth annual Berkshire Bioblitz. The weekend featured warm and fair conditions and it attracted about 125 participants in addition to about 30 registered scientists and volunteers. Aside from the scientific surveys, the event featured a number of educational sessions and guided walks. We also provided fellowships for seven area teachers and a cook-out dinner and lunches for participants. Thanks to all our partners who helped to make this event possible!.


Counting Birds at the Bioblitz with Prof. Morales

The scientists along with scores of volunteers took to the woods and wetlands to survey twelve taxa of life ranging from slime-molds and fungi though plants and insects to reptiles and mammals (survey map below). Biologists identified 491 distinct species, many of which had not been previously documented in the Forest.

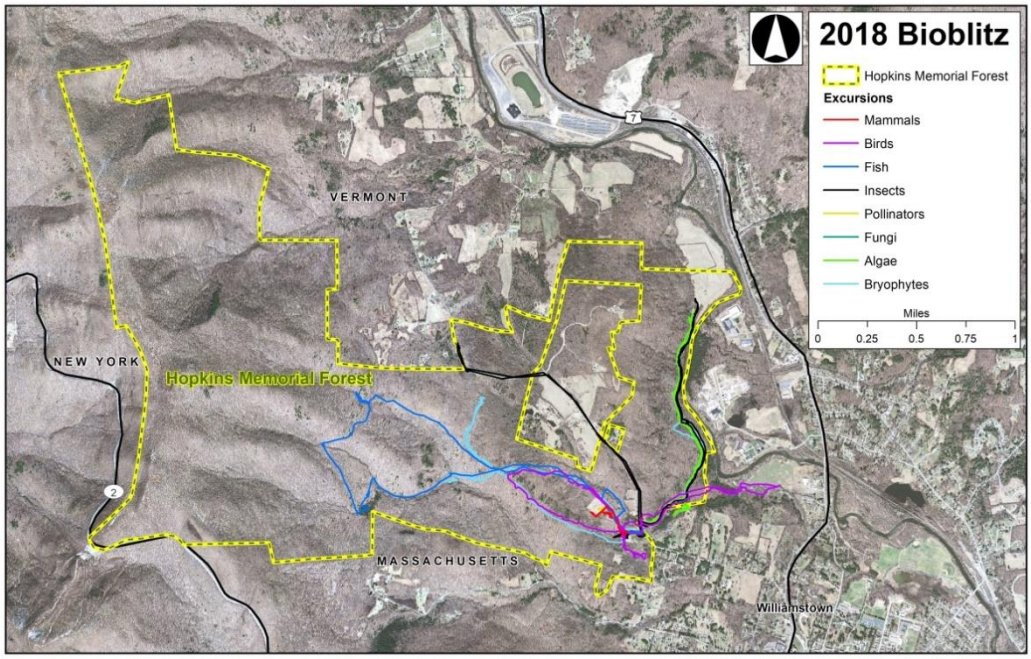
A few unexpected species of interest included a Connecticut warbler, caught in a mist net by Dan Shustack. This infamously skulky bird of the underbrush was a first-ever sighting for many of the bird watchers that morning. A second notable, albeit less showy

specimen was a bot fly, *Cuterebra fontinella,* identified by Lisa Provencher. This parasite was removed from a white-footed mouse captured by the mammal trappers. Also notable were a spring salamander, *Gyrinophilus porphyriticus*, and a smooth green snake *Odeophrys vernalis*, both found and identified by Charlie Eisman and Julia Bluthe. Both species are previously known but seldom seen in the forest; indeed there is growing concern that the green snake, in particular, is in decline regionally. We are currently working on making the Bioblitz datasets available to the public.

One of the primary goals of the Bioblitz was public education and, in addition to the biological surveys, the event included a line-up of organized walks and demonstrations. The following activities were on offer for the public during this 24-hour event:

- Bird Walk with Mary Batcheller and Manuel Morales
- Pond Invertebrates with Karen Murray & Elena Traister
- Tracheophytes (Vascular Plants) with Hank Art & Eric Doucette
- Spiders with Joe Warfel
- Electrofishing with Ronald Bassar and Ben Lecher
- Owl Prowl with Rene Wendell
- Slime Molds with Jenks Heymeyer, Williams ‘20
- Birds with the Hoffmann Bird Club
- Life in the Birdbath with Lisa Provencher, Dr. Augie’s Science Programs
- Mushrooms with John Wheeler
- Moth Demonstration with Jason Crockwell
- Mist Netting for Birds Dan Shustack, Massachusetts College of Liberal Arts
- Reptiles with Tom Tyning, Berkshire Community College
- Dragonflies with Kirsten Martin
- Leaf Miners and Invertebrates with Charlie Eisman and Julia Bluthe
- Mammal Trapping with Drew Jones and Mea Cook
- Plants and Herbs with Joan Edwards
- Animal Tracking with Elia DeMolino, BEAT
- Mosses with Sue Williams
- Stream macro-invertebrates with Gordon Batcheller, HooRWA

Figure I. GPS tracks of biological surveys during Bioblitz.



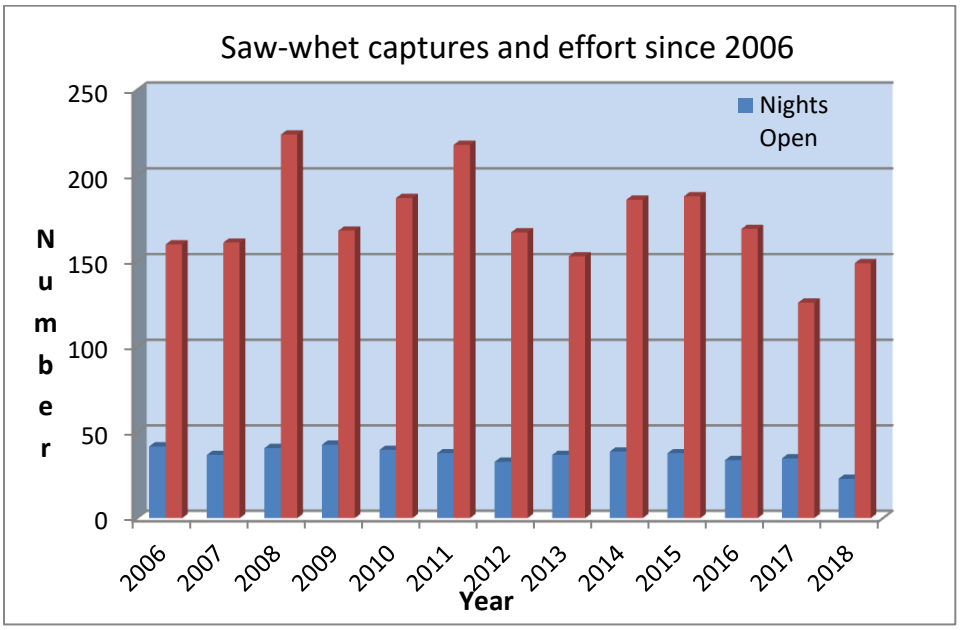
Ant/Tree Hopper Mutualism
Manuel Morales did not conduct field work on his continuing investigation of an insect-based mutualism in goldenrod fields during the summer, instead focusing his attention on lab work. The fields that host the study were bush-hogged in the fall 2018 to reduce competition from invading saplings.

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 2018. We used our customary single-tier array of four 12-meter nets (with an audio-lure) along a trail south of the Rosenburg Center to catch migrating owls. This year, due to problems with barred owl predation, we had to cut back on our activities and we were only able to run the nets for 23 evenings between September 30th and November 11th. Nonetheless we still captured 149 Northern Saw-whet owls, including several previously banded at other stations (foreign recaptures). Several nights were lost due to the sustained presence of barred owls around the nets. We are currently working on a surveillance system that will help us detect the presence of owls in and around the nets and reduce the incidences of predation and mortality.


Ken Schmidt with Northern saw-whet owl.

The HMF station did serve as the basis for education, hosting visits from Williams Biology classes as well as Environmental Science and Biology classes from MCLA. In total, the 104 registered visitors came out to see the owls during the season.

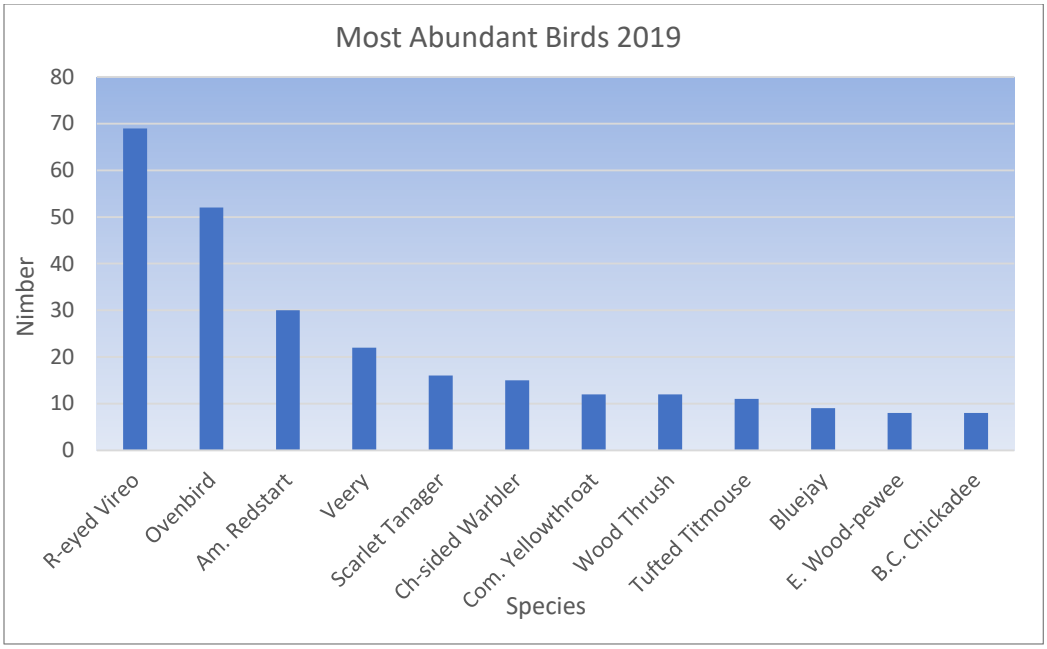
Figure II. Saw-whet owl banding results.



Breeding Bird Point Surveys
In June 2019, I sampled singing males at the 44 breeding bird monitoring points around the Forest for the 19th consecutive year. The year's total of 366 individuals was very low for our site, while the number of

species (47) fell in the normal range. This year the most abundant species were the red-eyed vireo, ovenbird, American redstart, veery, scarlet tanager and chestnut-sided warbler, a similar array to last year (Figure III).

Figure III. Most abundant bird species from 2019 point surveys.



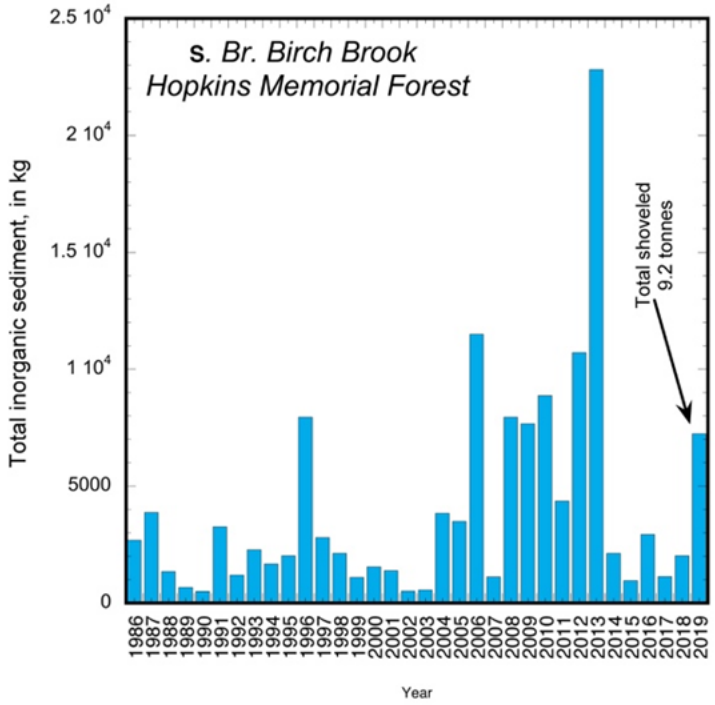
Watershed/Meteorological Monitoring (Environmental Analysis Lab)

As part of our long-term climate monitoring in and around Hopkins Memorial Forest, the Center for Environmental Studies' Environmental Analysis Lab (http://sites.williams.edu/envilab/) -- 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.

Once again HMF and lab personnel and volunteers (including alums Jordan Fields and Will Ouimet) dredged and weighed sediment in the weirs along the South Branch and Main Stem of Birch Brook at the end of July. Varying from the previous five years, sediment removed from the South Branch weir was above average, reflecting higher than average streamflow from the fall of 2018 through the summer of 2019 and the presence of occasional large precipitation and flooding events (Figure IV).

Mike Armstrong '21, Jaya Alagar '22, Petra Baldwin '21 and Molly Lohss '21 heading out to measure stream temperatures.

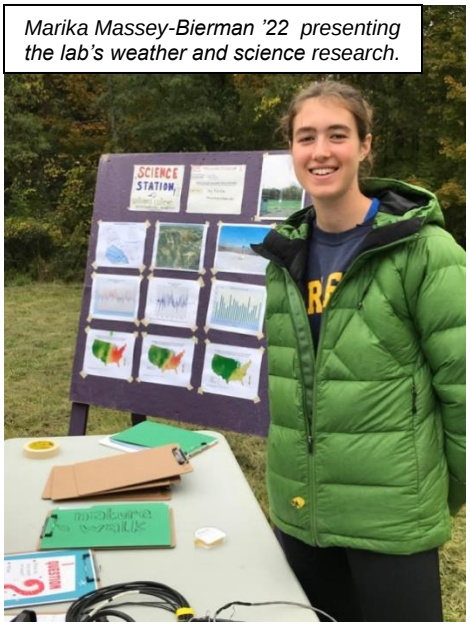
Figure IV. Sediment removed from South Branch of Birch Brook gaging station since 1996.



In May Jay Racela traveled to Flathead Lake Biological Station in Montana as part of a sensor workshop to learn about the current and future plans of the environmental sensor field. About four dozen scientists and engineers gathered from across the nation to provide input into this growing and diverse field.

Jaya Alagar ’22 and Petra Baldwin ‘21 worked as research assistants with Jay during the past summer. In addition to regular field and lab (on Williams’ main campus) research duties, they began investigating the soil properties of Poker Flats to help the Zilkha Center of Environmental Initiatives determine whether the site would be suitable for a community garden. For one week, Jaya and Petra also mentored Piper Moore, an aspiring environmental scientist from Mount Anthony Union High School, in the lab and the field. In addition, we all went to Mount Greylock Regional School (MGRS) for one day to demonstrate to Sue Strizzi’s eighth grade science class different ways of determining water quality. Throughout the summer Jaya and Petra also helped Mike Armstrong ’21, Molly Lohss ’21, and Lauren Stevens of the Hoosic River Watershed Association (HooRWA) with surveying the thermal and physical characteristics of several tributaries of the Hoosic River as part of an ongoing river and stream temperature study with HooRWA.

Marika Massey-Bierman ’22 presenting the lab’s weather and science research.



In July the lab’s 2018-19 research assistant Marika Massey-Bierman ’22 presented at a conference in Montreal the geochemical results of Cuba river samples collected in 2018. She then went back to Cuba and collected more river samples and has continued their analyses in our lab. Alongside these samples we have been analyzing Greenland ice core basal till samples as a collaboration with UVM’s Paul Bierman ’71.

Many research projects either arose or continued in the Lab and/or Hopkins Forest, including: PFOA/S (Neena Patel ‘19, Huijun Huang ’22, Anna Jackowski ’21); PCBs (Summer-Solstice Thomas ’20, Katina Massad ’20); Damiana antibiotic activity (Odysseas Morgan ’22, Joseph Flores ’20); Alaskan

glacier sediments (Harrison Toll ’22); Tallevast, Florida air and soil quality (Marco Vallejos ’20); HMF stream and rain water carbon isotopes (Mea Cook, GEOS); and HMF synoptic stream temperatures (Professor Sonya Auer, BIO). We have also been working extensively with drinking and surface water samples from Centreville, Illinois to help determine how this extremely poor community’s water handling infrastructure has been neglected. Jay traveled with Jose Constantine (GEOS), Matias Korfmacher ’19 and Maxine Ng ’22 to Centreville to meet and present results to the community members and to collect samples. Most recently the Lab has hired as research assistants Ruby Bagwyn ’23, and Xiaoyi Zhang ’23, and has hosted Henry Art, a Mount Greylock High School sophomore, as a volunteer lab technician to learn more about environmental science.

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 102--*The Organism* (multiple instructors)
- BIOL 220—*Field Botany and Plant Natural History* (Art)
- ENVI 102 -- *Introduction to Environmental Science* (Cook and Carasquillo)
- ENVI 101 – *Nature and Society* (Martin)
- GEOS/ENVI 255 *Environmental Observation* (Bradley)
- WS BIOL 18 *Animal Tracking* (Yacobellis)
- WS ENVI 15 *Natural History of New England* (Jones)

Elementary Education

This was our seventh year partnering with the College’s Center for Learning in Action (CLIA) to provide field-based educational experiences for regional elementary school classes. This year we had our largest team of student educators to date, with 17 students hired between the two semesters (Table II). They helped to develop place-based outdoor education curricula and hosted field trips for elementary schools. There were a total of ten programs in the fall involving 355 children from elementary schools around our region.

In the spring, our team of Educators hosted a series of eight field trips (252 children total) for elementary schools from throughout North Berkshire County. The spring outings highlighted themes of maple sugaring and biodiversity. Several field trips had to be cancelled on account of the weather reducing our total numbers somewhat. Again, we provided funding for transportation to several schools that requested such assistance.

Table II. Student Educators 2018-19.

Fall ‘18	Spring ‘19	
Patrick Hodgson ‘22	Ballint Szollosi ‘22	Haley Bosse ‘20
Sarah Tulley ‘21	Lyza Berg ‘21	Marco Vallejos ‘20
Kelsie Dalton ‘19	Alice-Henry Carnell ‘22	Anna Lietman ‘20
Danny Levine ‘22	Paul Sheils ‘20	Kitty Holbrooke ‘20
Katie Loftus ‘19	Rachel Morrow ‘22	Gavin McGough ‘22
Adrienne Banks ‘20	Cleveland Lavalais ‘21	

Community Events

Once again we hosted a variety of events for the public and College community:

- ***BioBlitz***— Approximately 125 people came out on the weekend of September 15/16 to assist with flora and fauna surveys and take part in educational activities.

- ***Animal Tracking—*** Naturalist Dan Yacobellis conducted his annual wildlife tracking workshop on January 13th 2019. This year the program was again divided into two shorter walks which seemed to work well; 27 people, many Williams students, took part.

- ***Maple Festival***— "Maplefest" was staged on Saturday, March 9th. Thanks to some pleasant weather the event drew 256 people to take part in maple sugaring related activities and to taste HMF-produced syrup served over pancakes and 'on snow'.

- ***Amphibian & Reptile Foray***– Tom Tyning of Berkshire Community College led his annual amphibian foray in Hopkins Forest on Saturday, April 27th. Unfortunately the weather turned out to be rather cold and gloomy that day and only 5 people attended the event.

- ***Wildflower Walk***—The annual spring wildflower walk was held on Saturday, May 4th, 2019. This year it was hosted by Joan Edwards and attracted approximately 25 community members and students.

- ***Alumni Day***— We again offered a variety of activities, including a bird walk, two hikes, canopy walkway, and children's activities during this year's Alumni Weekend (June 8th). The pleasant weather helped to attract solid numbers of participants to each activity including the student-led hike on the Taconic Crest Trail.

We did not hold the annual Fall Festival this year, deciding to focus resources on the Bioblitz instead.

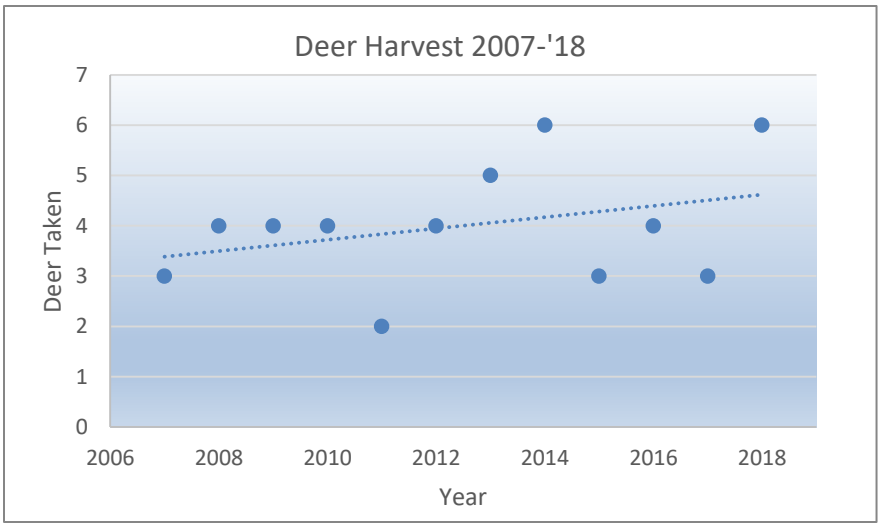
RECREATION

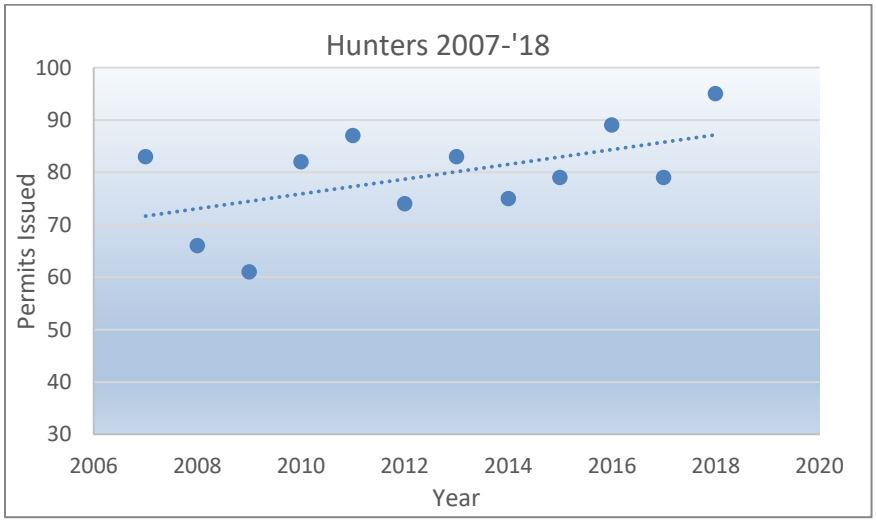
As usual numerous hikers, joggers, horse-back riders, skiers, and nature observers took to the Forest's trails. This year we received fewer reports of lost or distressed hikers although one call was received from a lost hiker on the upper loop trail in October. The hiker was quickly located and exited the forest without incident.

Williams Outing Club (WOC)
The Outing Club cabin accommodated overnighters regularly and it was integral to our hosting of the *Maplefest* event in March 2019. The Outing Club lean-to was used by students for First-year orientation activities. It is slated for repairs, including a roof replacement, in the near future.

Hunting
The 2018 special permit shotgun hunt for deer again went smoothly. During the 12-day season, ninety-five registered hunters harvested six white-tail deer according to our unofficial sign-in. This year the hunting pressure and harvest rate attained twelve-year high levels (Figures V & VI). Indeed, there has been slight uptick in hunting pressure since late '00s when the fee for permits was lifted; however the longer term trend in deer harvests remains negative. Once again Williams College security officers were hired to provide surveillance during the busiest days of the hunt.

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

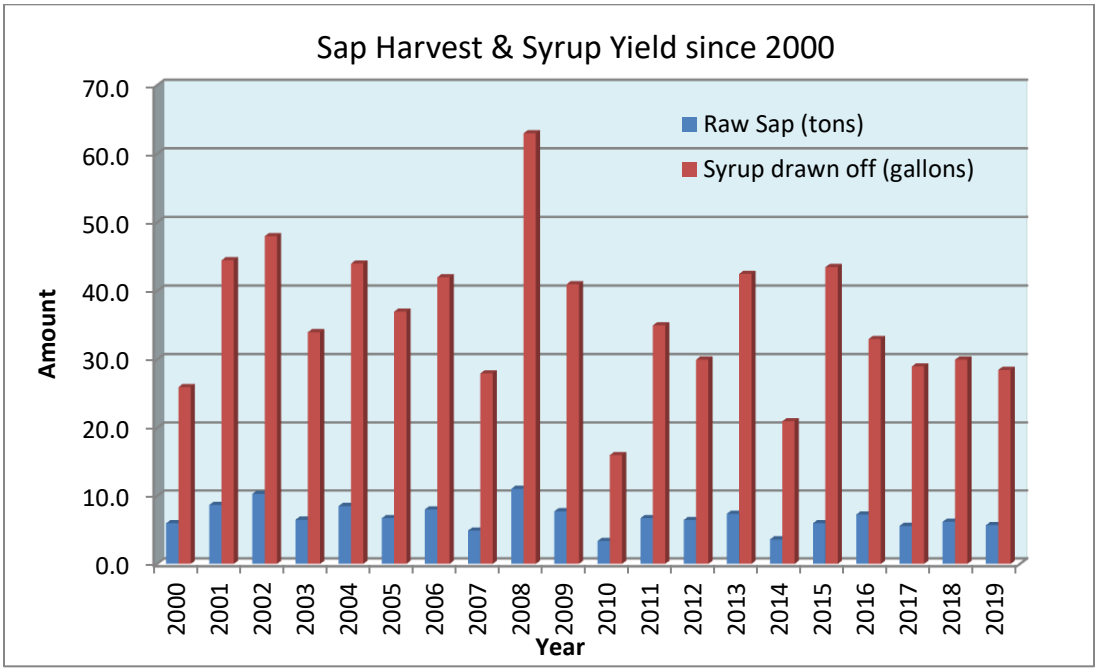




MAPLE SYRUP PRODUCTION

The 2019 maple season started off very slowly with unseasonably cold temperatures and a sluggish start to the sap run. In fact most of the 1420 gallon harvest came in the last two weeks of March, during the Williams College spring break. Fortunately Tom Merrill was available to assist with the operation during this period (as I had fled to Arizona for ten days to assist with the Outing Club's annual service project). Merrill ended up boiling about half of the 28.5 gallons of syrup that we produced this season. These figures continue the recent downward trend for our sugarbush, though once the trees finally did start to run in in mid/late March, the runs were some of the largest (350 plus gallons) that we have seen for almost a decade. (Figure VII). As in the past our sugar house served as the focus for several school field trips and our annual "Maplefest" celebration. We were able to procure some sap from a producer in central Massachusetts in time for our public event. This brought our total of bottled syrup closer to 30.5 gallons on the season.

Figure VII. Hopkins Forest maple syrup production since 2000.



LAND MANAGEMENT, CARETAKING & FACILITIES

Forest Management—Vermont Parcel
During spring 2019 we officially terminated our contract with the Natural Resources Conservation Service, which had funded timber stand improvements on the Vermont Parcel. We had to delete the final item in the contract, the prescribed burn, due to an inability to find a contractor willing to take it on. Over the past nine years NRCS support has enabled us to implement the following stand-level improvements on parts of the Vermont Parcel:

- Patch cuts (early successional habitat)
- Mast tree release (thinnings)
- Invasive plant removal
- Road improvement
- Wildlife habitat regeneration cuts and thinnings

Wire Bridge Farm
Joel Burrington of Pownal, Vermont was unable to cultivate hay on the Wire Bridge Farm due to weather and time constraints for the second summer in a row. Nonetheless, he has assured us that he will do a restoration cut this fall and continue to grow and harvest hay on the farm in the future. No academic activities involving the farm took place during this year although the area continued to be used occasionally for recreation and wildlife viewing.


Newly completed middle branch bridge

Infrastructure
Again we performed routine trail maintenance throughout the forest. We replaced the upper Middle Branch foot bridge on the Upper Loop Trail with one made almost entirely of New England-grown and locally milled untreated hardwood. Another Upper Loop Trail bridge upgrade involved replacing the deck on a smaller footbridge that crosses an unnamed tributary.

Caretaking
As in the past we employed student caretakers to assist with maintenance, upkeep and outreach activities in the Forest (Table IV). Each semester had crews of six to twelve students, each working three to six hours per week. Beyond their routine duties, maintenance, groundskeeping, etc., these teams assisted with research activities in addition to maple syrup production and hosting two public events – Bioblitz and Maplefest.

Table IV. Student Caretakers academic year 2018-19.

Jared Bathen '20	Gavin McGough '22	Julia Randall '19
Kristen Bayrakdarian '20	Henry Newell '21	Matthew Roychowdhury '21
Liza Berg '21	Sylvia Janda '21	Jay Schroeter '22
Siri Bohacek '22	Matias Korfmacher '19	Ivy Spiegel Ostram '20
Alice-Henry Carnell '22	Anna Lietman '20	Abraham Steinberger '20
James FitzGerald '21	Christina Mancilla '20	Kyle Sung '22
Isabelle Furman '20	Patrick Postec '21	Forest Williams '21
Kenneth Marshall '20		

A seasonal caretaking crew comprising Alice-Henry Carnell ’22 and Niko John ’22 was employed during the summer of 2019. They worked on many regular summer tasks—mowing, gardening, grounds-keeping, trail and water-bar maintenance, controlling invasive vegetation – and also helped with the two bridge projects over the summer. They also hosted an elementary school field trip, collaborated with the regional trail crew on some off-site trail work and worked hard to bolster the Forest’s social media presence including on *Instragram*.

Rounding out our summer crew, Debra Rogers-Gillig again served as part-time seasonal gardener, focusing on the Buxton Garden. In addition to her contribution to the garden, Debra helped to monitor the *Arabidopsis* study throughout its final year.

Rosenburg Center/Moon Barn
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 as public exhibit space during special events and school visits. We intend to have it rewired to get the lighting working once again in the coming year.

Canopy Walkway
This year the canopy walkway was open during the summer alumni event and for an occasional physical education class. In May 2019 the walkway passed its annual inspection by Canopy Construction Associates.

FUTURE – What’s in store for 2019-20?

In the coming year we will continue to facilitate and expand our educational and research activities. This will include integrating the research program of Dr. Allison Gill, new to the Biology Department, into the forest. Dr. Gill will be implementing an ecosystem-level study of carbon and nitrogen cycling dynamics in Hopkins Forest. It will involve establishing an array of experimental plots where the forest’s litter layer will be manipulated.

We will continue to support ongoing research, including the study of differential mowing regimes on late season wildflowers and pollinators and the second year of the isotope study. We will also move forward with our efforts to broaden the scope and quality of educational opportunities for Williams College students and local public school students and engage Williams students in hands-on learning opportunities through caretaking and naturalist activities.

Concurrent with the College's strategic planning process, we will undertake discussions toward finding some sort of more permanent protective status for the forest. This will involve working with partners within and outside of the College as well as helping to inform a student-directed case study during fall 2019.

Special thanks to Jay Racela, Dee Dee Lewis and Roger Bolton for their contributions to this report.