HOPKINS MEMORIAL FOREST

Activities Report

2010-2011

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Williams College--Center for Environmental Studies

November 2011

SUMMARY: The Year 2010-11

During the period September 2010 through August 2011, Williams College's environmental field station, Hopkins Memorial Forest (HMF), hosted a wide variety of research and educational activities. Henry Art and a crew of ten students completed the fourth iteration of surveys of 400 permanent vegetation plots. Research continued on Joan Edwards' study of population dynamics of garlic mustard at three sites in the forest. Additionally, we completed the fifth and final year of our study of amphibian populations at two wooded ponds on the former Buxton Lane parcel; Williams staff and students finished monitoring the pitfall traps in the fall 2010, and the trap array was subsequently decommissioned. In addition, David Dethier and Jay Racela continued their meteorological and geochemical monitoring activities. The northern saw-whet owl banding station was again open during fall 2010.

A new study of the diversity of asters and goldenrods and their pollinators was begun in 2011 with final surveying of the site and mowing of the grid lines. Baseline data collection, under the direction of Joan Edwards, was slated to begin in fall 2011. Tufts University masters student Tegan Morgan undertook a second season of data collection at two locations in the Forest as part of her thesis study of site dependent variation in chemical defenses in garlic mustard.

During 2010-11, Hopkins Forest continued to be a focal point for local and regional educational programming. In July we hosted a three day teacher workshop in conjunction with the statewide Museum Institute for Teaching Science program. As in the past, Williams College Biology and Environmental Science classes made regular use of the forest for field trips and study sites. Classes from other regional colleges, including Massachusetts College of Liberal Arts (MCLA), made use of the Forest for their educational activities as well, and we conducted a variety of programs for local schools and the general public. Student caretakers were again instrumental in helping us host a variety of public events, highlighted by the Fall Festival and Maplefest.

In addition to our routine management activities, in 2010 we began doing some road maintenance and invasive species control work on the Vermont parcel and plans were underway to implement a wildlife habitat patch cut in fall 2011. These activities are being funded by the Natural Resource Conservation Service's Environmental Quality Incentive Program and will continue in the coming year.

During the summer of 2010, we collaborated with the Stetson-Sawyer project managers to help broker the removal and milling of about 30 large pine and hardwood trees from the Kellogg House project site. We identified a local saw mill and wood shop in Florida, Massachusetts to process and store the wood pending a decision by the design team on its potential use in the new building or landscaping features.

Fortunately, the Forest seems to have been spared the brunt of the force of the heavy rains and flooding that resulted from Tropical Storm Irene in late August, 2011. Minor damage—local flooding and trail erosion--was noted and remediated. The Wire Bridge Farm and other low lying areas on the Forest's eastern edge, were not seriously flooded by the Hoosic River.

RESEARCH and MONITORING: Summer 2011 and Ongoing

Several scientific studies were underway during the past year (Table I).

<u>New Research -- Conservation of Asters, Goldenrods, and their Pollinators</u>
Professor Joan Edwards began to implement a study of old field management using the main weather station field. The design features a grid of twelve 24x24 meter plots on which the effects of four different mowing regimes will be tested: annual spring and fall mowing and a biennial early and late mowing. The goal is to ascertain the impact of these four distinct treatments on the diversity and vigor of members of the Asteraceae family and the insects that pollinate them. This might ultimately suggest best management practices for old fields. The plots have been delineated and staked out and baseline surveys will begin in fall 2011.

Table I. HMF Undergraduate Student Researchers—Summer 2011.

Student	Supervisor	Project
Wade Davis ‘13	Art	Permanent Plot Survey
Julio Luquin ‘13	Art	Permanent Plot Survey
Abby Martin ‘11	Art	Permanent Plot Survey
Claudia Corona ‘13	Art	Permanent Plot Survey
Eric Outterson ‘12	Art	Permanent Plot Survey
Sarah Rowe ‘13	Art	Permanent Plot Survey
Amelia Simmons ‘13	Art	Permanent Plot Survey
Mark Lyons ‘13	Art	Permanent Plot Survey
Gordon Smith ‘13	Art	Permanent Plot Survey
K. B. DiAngelo ‘12	Art	Permanent Plot Survey
Julieanne Fontana ‘14	Art	Permanent Plot Survey
Emily Ury '13	Edwards	Garlic Mustard
Rebecca Shoer '13	Edwards	Garlic Mustard
Emily Levy '13	Edwards	Garlic Mustard
Elizabeth Greiter ‘12	Racela	Hydro/Meteorology; Lab assistant
Hanna Saltzman ‘12	Racela	Hydro/Meteorology; Lab assistant

Garlic Mustard, Tufts University

Tegan Morton, a Masters student at Tufts University, continued her study on the effect of a geographic mosaic (with regards to soil quality) on defense allocation in garlic mustard (*Alliaria petiolata*). She returned during summer 2011 to sample populations in high nutrient sites in Hopkins Forest in order to compare them with other high and low nutrient sites throughout the state to detect differences in the concentrations of glucosinolates and other defenses between sites. Morton collected soil and leaf tissue samples from individuals at two sites: one near the sugarbush and another near the Beinecke Stand. These samples will be analyzed for genetic relatedness of populations as well as glucosinolates and other chemical defenses.

Ongoing Research -- Permanent Vegetation Plot Surveys

During summer 2011, Professor Henry Art and a crew of ten students conducted a re-survey of the Forest Service’s original permanent plots. This is the fourth such survey in the 75 year existence of the grid: one by the Forest Service in the 1930s and two others by Art, one in the 1970s and one in the 1990s. The 2010 survey covered approximately 180 of the more than 400 plots in total. Funding assistance was provided by CES, the Biology Department, and the Williams College Science Center.

Ant/Leaf Hopper Mutualism

There was no field work conducted on the study during the summer 2011 as Professor Manuel Morales was on sabbatical. His work on mutualistic interactions between ants (*Myrmica spp.)* and leaf hoppers (*Publilia spp.*) on goldenrod plants will continue in future field seasons.

Garlic Mustard--Population Dynamics in Forested Ecosystems

Professor Joan Edwards’ study of population dynamics of garlic mustard (*Alliaria petiolata*) continued in 2010. Emily Ury '13, Emily Levy '13, and Rebecca Shoer '13 provided the field assistance with this study, collecting growth and recruitment data on established plots in three separate areas in Hopkins Forest: the Beinecke Stand, the former mansion site, and the red oak stand.

Vernal Pool Amphibian Communities

Fall 2010 was the final season for field work on the study of amphibian use of two vernal pools on the former Buxton Lane property. A crew of students, staff and volunteers continued to check the pitfall

traps around the two vernal pools until early November 2010. At that time the traps were closed and the drift fence was dismantled. This marked the end of the fifth and final year of this study of amphibian use of these two wetlands. The next step in this study will be to process and report the data. In addition, Andrea Danyluk (Computer Sciences Department) is working with students to develop algorithms to enable individual spotted salamanders to be indentified photographically by their spot patterns.

Northern Saw-whet Owl (NSWO) Migration Banding

With the assistance of Dr. Ken Schmidt of Texas Tech University, the Northern saw-whet owl (*Aegolius acadicus*) banding station was active once again in autumn 2010. We used a single-tier array of four 12-meter nets (with an audio-lure) along a trail south of the Rosenburg Center to catch

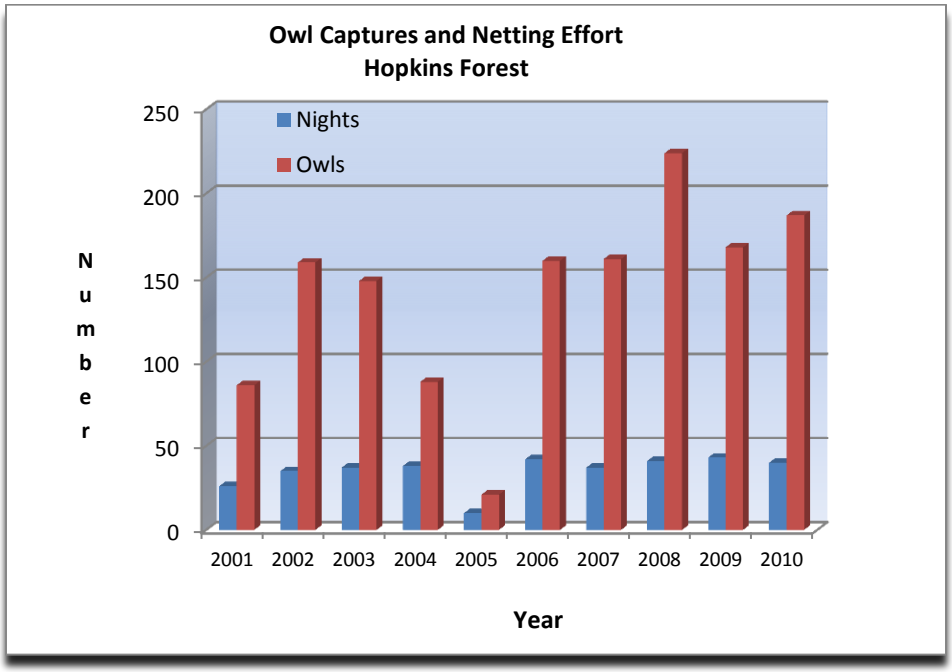

Figure I. Northern Saw-whet owl captures at HMF, 2001-2010

migrating owls. The station was open on dry, calm nights from dark until around midnight between October 2nd and November 19th (for a total of 40 nights of operation). During this period we captured and banded 187 saw-whet owls (Figure I), our station's second highest total in its 10 year history. The HMF station served as the basis for field trips by Williams Biology classes as well as Environmental Science classes and a Zoology class from MCLA. In total, the station attracted 292 registered visitors during the season. In addition, the HMF banding station was featured in an a November 2011 full-length article in the Berkshire Eagle, "Sighting Owls."

Breeding Bird Point Surveys

During June 2011, I sampled singing males at 44 points that were established to monitor breeding bird populations throughout the Forest in 2001. This year's total individuals (467) and species (52) fell in between those recorded for 2009 and 2010. This year the red-eyed vireo and ovenbird were atop the list of most abundant species, followed by the American redstart, veery and scarlet tanager (Table II). These points will continue to be surveyed on an annual basis.

Table II. Most abundant bird species from point counts, June 2011.

Rank	Species	Number	Percent of total
1	Red-eyed Vireo	82	17.6
2	Ovenbird	81	17.3
3	American Redstart	36	7.7
4	Veery	26	5.6
5	Scarlet Tanager	19	4.1
6	Chestnut-sided Warbler	18	3.9
7	Black-and-white Warbler	15	3.2
8	Wood Thrush	13	2.8
9	American Robin	12	2.6
10	Eastern Wood-pewee	11	2.4

Watershed/Meteorological Monitoring (Environmental Analysis Lab)

The Center for Environmental Studies' Environmental Analysis Lab--under the guidance of David Dethier and Technical Assistant Jay Racela--continued to gather and analyze meteorological, hydrological and biogeochemical data in the Forest. Four standard weather stations, two stream gauging stations, and one vernal pool water depth and temperature station (using digital data loggers) ran continuously throughout the year. Data from the main weather station are streamed to the campus information network and displayed (http://web.williams.edu/weather/) along with data from the Taconic Ridge 50-m MET tower and the Morley Science Labs photovoltaic array. Bi-weekly and monthly collection and laboratory analysis of rain or stream water also continued (1983-present) as part of ongoing forest geochemical research that focuses on acid deposition and how it and other pollutants are "processed" by the forest ecosystem.

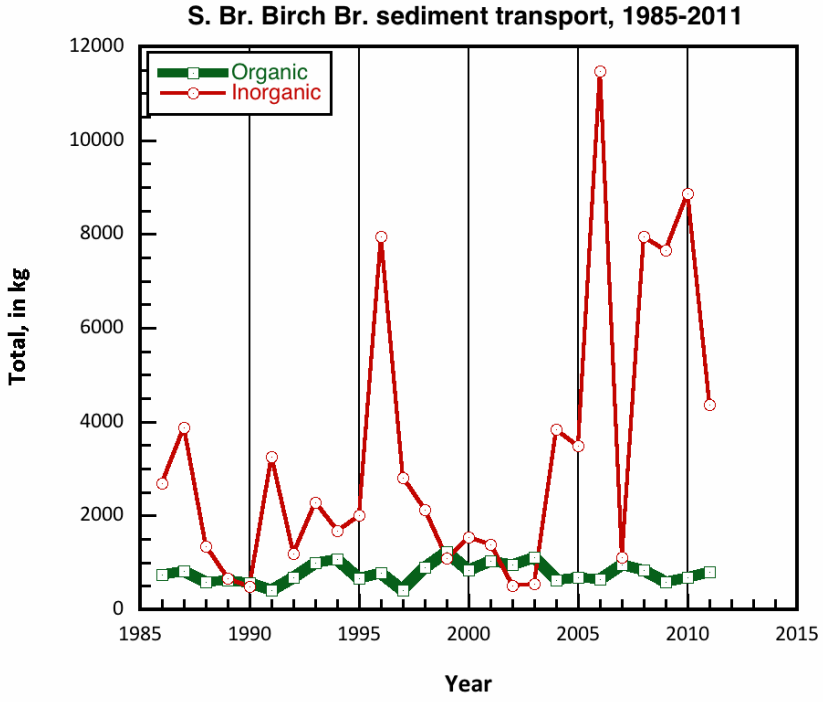

Figure II. HMF Birch Brook, South Branch sediment transport in kg., measured from 1985-2011

With the help of Chris Warren and Todd Gould from OIT, the lab also upgraded the data-logger and Temperature/Relative Humidity sensor on the main weather station in the forest. The lab also continues the monitoring of the Taconic Ridge wind using the "real-time" MET tower that has been in operation for seven years (http://sustainability.williams.edu/installation/berlin-pass-wind-measurement-tower).

Sugi Min '13 and Johanna Eidmann '14 worked as research assistants with Jay Racela during the past summer. During their tenure in the lab, in addition to their regular field and lab research duties, Sugi and Johanna investigated the chemical components of local springs versus commercially available bottled waters, and created a poster illustrating their results. The lab also provided training and lab research equipment to help support the Hoosic River PCB summer research project of Ariana Chiapella (MCLA '12) and Olivia Gannon (Bennington '12) working out of Jay Thoman's and Dave Richardson's labs. Additionally, the lab helped to support the Geoscience research of James McCarthy '11 and James Winkler (UConn '12), working with David Dethier.

In July 2011, sediment in the weirs along the South Branch and Main Stem of Birch Brook was dredged and weighed by HMF and lab personnel and volunteers. The sediment volume removed from the South Branch weir was higher than normal (Figure II), consistent with the wet weather of the past year. Incidentally, the rainfall and subsequent discharge from Tropical Storm Irene (Aug 27-28, 2011) moved enough sediment to replace what we had removed and potentially more (Figure III).

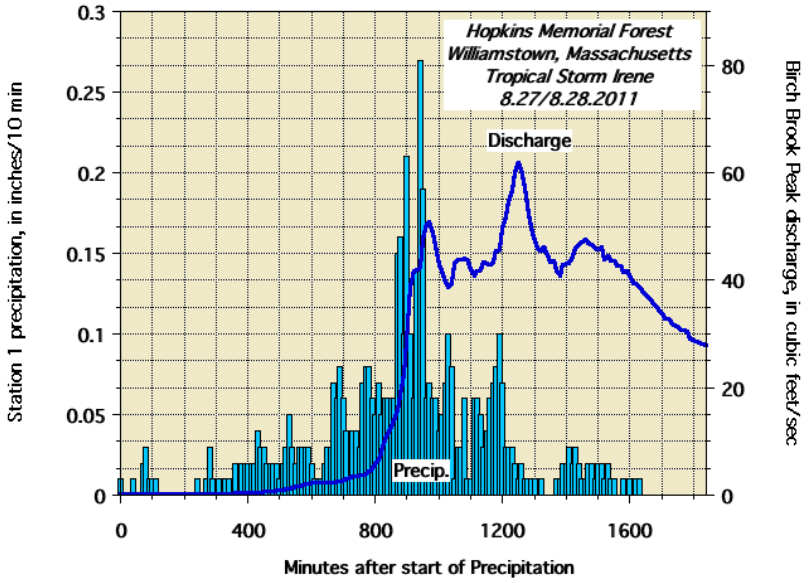

Figure III. Tropical storm Irene precipitation and Birch Brook discharge in HMF – Aug 27-28, 2011

EDUCATION and OUTREACH

Classes

During the fall semester, BIOL/ENVI 203—*Ecology* (Edwards) held several lab sessions at the Forest. In spring 2011, ENVI 102--*Introduction to Environmental Science* (Cook) used the Forest for some of its laboratory exercises aimed at estimating carbon storage in biomass and soils. A team of students from that class sampled sugar maples for their independent study of the chemistry of maple sap. BIOL 102--*The Organism* also visited the Forest for laboratory exercises in the spring. In addition, BIOL 220—*Field Botany and Plant Natural History* made numerous visits to the Forest for field investigations. The Forest also hosted field trips and lab sessions by Biology and Environmental Science classes from Massachusetts College of Liberal Arts and Berkshire Community College. These colleges took part in field activities ranging from saw-whet owl banding to wetland delineation to botanical surveys (Appendix I).

In January 2011 Hank Art and I taught a Winter Study Course, *"Winter?!"*, which made some use of Hopkins Forest and its resources.

MITS Teacher Workshop

In July, Hopkins Forest hosted a three day workshop for Massachusetts teachers as part of a two week in-service training sponsored by the Museum Institute for Teaching Science (MITS). The Berkshire workshop was coordinated by the Berkshire Museum, which held a series of planning sessions several months in advance. Hank Art and I were involved in developing and implementing the HMF phase of the workshop, focused on inquiry based learning. Hank used his research on long term vegetation dynamics to illustrate this concept and teachers were, for one activity, paired with Williams students in conducting their field surveys (Figure IV). Eight teachers from around the Berkshires attended the workshop.

Figure IV. Measuring trees during MITS workshop.

Public Outreach

Community Events

Once again HMF hosted several events for the public and college communities. The following events were held the past year:

- ***Fall Festival***— The Fall Festival was held on Sunday, September 26th and, on a pleasant afternoon, drew more than 200 visitors. In addition to the traditional forest and harvest activities—beam hewing, shake-splitting, cross-cut sawing, apple butter and cider production, and live fiddle music—the event featured guided tours of the canopy walkway.
- ***Animal Tracking—*** Drew and Leslie Reed-Evans led an animal tracking workshop on February 6th, which attracted about 20 participants, many of which were Williams students.
- ***Ski Excursion***– On February 12th, we hosted a Nordic ski trek on the Hoosic River Trail to the Wire Bridge Farm. The event, which was co-sponsored by the Hoosic River Watershed Association, drew only one other participant.
- ***Maple Festival***— "Maplefest" was celebrated on Saturday, March 12th, drawing a crowd of 206 on a seasonable late winter afternoon. People came to see sugaring exhibits and demonstrations and to taste HMF produced syrup served over pancakes and 'on snow'.
- ***Wildflower Walk***– Hank Art led this annual event on Saturday, May 7th; a group of approximately 15 people attended.
- ***Alumni Day***— HMF again offered a variety of activities, including a bird walk, hikes, and children's activities during this year's Alumni Weekend (June 11th). However, for a second consecutive year, rain forced the canopy walkway to remain closed and generally reduced the attendance at other activities as well.
- ***Urban Scholars***-- After a two year hiatus the Urban Scholars program returned for summer programs at Hopkins Forest. This year the students (high-schoolers from New York) visited the forest twice, once for a canopy walkway tour and again for a program on aquatic life.

Schools

School groups from around the region made several visits to the Forest for hands-on educational programs; these groups included C.T. Plunkett Elementary, Adams, MA; Buxton School, Williamstown; Williamstown, Elementary (preschool); and schools from Hancock and Lenox (Appendix I). Again I visited Mount Greylock High School in June to lead two aquatic biology workshops as part of the "Where I Am" program for 11th graders, and in fall 2010, I visited the school again as a guest speaker in two 11th grade Environmental Science classes.

RECREATION

This year numerous hikers, joggers, horse-back riders, skiers, and nature observers took to the trails of the Forest in their recreational pursuits. Fortunately, the year was a quiet one insofar as trespassing and public use problems were concerned. We have been active with the Taconic Crest Trail (TCT) Consortium, which is dedicated to the stewardship of the TCT.

Williams Outing Club

The Outing Club cabin accommodated hostelers regularly during 2010-11. The cabin was also used during *Maplefest* in March. Unfortunately, the cabin was damaged by a large tree that was felled during a storm in June 2011. Repairs to the building were scheduled for fall 2011. The Outing Club lean-to was used sparingly by the Williams Community. The low-ropes course was not in use as it is in need of maintenance.

Hunting

In fall 2010, HMF again hosted its annual special permit deer hunt during the Massachusetts shotgun season. As usual, no hunting was permitted in Vermont, New York or east of Northwest Hill Road, nor was archery hunting allowed. Eighty-two hunters harvested four deer during the twelve day season according to our unofficial sign-in (Table III). In 2010 we made permits available at no charge and this change resulted in a significant increase in permits awarded over the previous two years. Nevertheless, the harvest remained the same and no crowding or problems were noted. Williams College security officers were hired to provide surveillance during the busiest days of the hunt. As in the past, the program was subsidized from the Forest's operating budget (Appendix II).

Table III. Hunting effort and deer harvested at HMF since 1999.

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Mean
Permits Issued	110	86	90	86	86	100	93	89	83	66	61	**82**	**86.4**
Total Deer Harvested	13	9	9	20	10	8	10	14	3	4	4	**4**	**9.5**
Success Rate (percent)	11.8	10.5	10.0	23.3	11.6	8.0	10.8	15.7	3.6	6.1	6.6	**4.9**	**10.9**

MAPLE SUGARING

2011 was a better one in the sugarbush with sap and finished syrup production rebounding from their low 2010 levels. Student workers gathered 1685 gallons of raw sap, which was boiled into 35 gallons of syrup. The finished syrup was darker this year (over 60 percent B-grade) in spite of rather average sap sugar content (2.35 percent) but a return to more "normal" conditions resulted in a yield that was much improved from 2010 and that approached our 12-year mean (Table IV). During the sugaring season, we again hosted the 'Maplefest' celebration, which attracted a solid crowd of community members and Williams students.

Figure V. Maple sugar house in action.

Table IV. Hopkins Forest Maple Syrup Production 2000-2011.

Year	Beginning Tap Date	Taps	Sap gallons	Sap per tap	Boil hours	Syrup drawn off gallons	Bottled syrup gallons	Sap boiled per hr.	Wood burned (cords)
2000	22-Feb	130	1495	11.5	135	26	23	11.1	1.3
2001	23-Feb	125	2170	17.4	100	44.5	40	21.7	2.2
2002	18-Feb	125	2580	20.6	109	48	40	23.7	2.4
2003	4-Mar	135	1625	12.0	68	34	30	23.9	1.7
2004	27-Feb	130	2130	16.4	93	44	39	22.9	2.2
2005	28-Feb	125	1680	13.4	71.5	37	35	23.5	1.9
2006	15-Feb	139	2005	14.4	72	42	39	27.8	2.1
2007	28-Feb	127	1225	9.6	46	28	26	26.6	1.4
2008	25-Feb	125	2760	22.1	116.5	63	58	23.7	3.2
2009	25-Feb	125	1935	15.5	84	41	40	23.0	1.9
2010	25-Feb	125	840	6.7	32	16	15.5	26.3	0.8
2011	23-Feb	128	1685	13.2	69.8	35	33.0	24.2	1.8
Mean	25-Feb	128	1844	14.5	83.1	38.2	34.9	23.1	1.9
Median	25-Feb	128	1935	14.4	84	41	39	24	1.9

LAND MANAGEMENT

Forest Management--Vermont Parcel

In 2011 we began implementation of our conservation plan for the Vermont parcel of HMF (Table V). Under this plan, which is largely funded by the Natural Resource Conservation Service (NRCS), we carried out maintenance on approximately one mile of the logging road that accesses the property. A local contractor was hired to do this job, which entailed putting in and re-conditioning waterbars at regular intervals. In addition, we cleared approximately one acre of invasive honeysuckle, barberry and multi-flora rose along the road and near a former log landing. As of fall 2011, planning was underway to implement a 5-acre early successional clearing on the Taconic Crest; this work was slated to be conducted by a Vermont contractor in October 2011. In the summer of 2011, I visited the site with an NRCS Forester to review the work and plan for future practices.

Table V. Progress of practices to be implemented on the Pownal Tract as part of the NRCS Environmental Quality Incentive Program.

Practice	Purpose	Scope	Progress	Year
Forest Roads and Tails	Maintenance and restoration of access road	15000 feet	6000 feet	2010
Pest Management	Removal of invasive plants along road	2 acres	2 acres	2010
Wildlife Habitat Management	Mast tree release for oak	10 acres	future	2012
Forest Stand Improvement	Thinning, releasing competing trees	30 acres	future	2013
Early Successional Habitat	Creating clearings for biodiversity on Taconic Ridge	10 acres	planned	2011

Wire Bridge Farm

Joel Burrington of Pownal, VT continued to cultivate corn and hay on the HMF's Wire Bridge Farm Parcel and to perform rudimentary maintenance on its access road. The remainder of the original Wire Bridge Farm parcel is still up for sale.

Roads/Trails
Once again the summer caretaking crew conducted substantial drainage remediation work on the trails, primarily the Taconic Crest trails in 2011. To this end they constructed about a dozen new waterbars and check-steps on that popular trail. In spring 2011, the entry road to the Rosenburg Center was resurfaced and graded by a contractor hired by the Williams College Facilities Department.

FACILITIES

Rosenburg Center/Moon Barn
The Rosenburg Center was again used for classes, lab set-ups, public events, workshops, and as an exhibit space for visitors. The information technology network, including the 'WiFi' installation, generally functioned well with the support of the Williams Information Technology Department and, in July, 2011, OIT upgraded two of the desktop computer workstations and outfitted the Rosenburg Center with a networked printer. Once again, the Moon Barn was used for public exhibit space during special events such as the Fall Festival. Due to a shortage of storage space, we continue to use this historic building in part for storage.

Canopy Walkway
This past year the canopy walkway was open for public visitation several times including during the Fall Festival. The rig passed its annual safety inspection in the spring.

Caretaking

As in the past, HMF relied on student caretakers for a major part of its maintenance, upkeep and outreach activities (Table VI). The fall and spring semesters had a regular crew of eight to ten students, each working about three to six hours per week under the leadership of head caretaker Stefan Ward-Wheten '11. The fall crew kept busy preparing for and hosting the Fall Festival, keeping up with trail maintenance, gardening and decommissioning the amphibian study trap site. In the spring, much time was devoted to the maple sugaring season and hosting *Maplefest*. An ad-hoc crew was assembled to assist with sugaring during spring break; this crew accounts for some of the disparity in the spring and fall hourly totals detailed in Table VII.

Tables VI. Student caretakers academic year 2010-11.

Abby Martin '11	Josh Blanco '11
Zoe Kline '12	David Nolan '13
Noah Wentzel '13	Helen Song '14
Nick Maschinot '11	Becky Eakins '13
Ben Keulthau '13	Gordon Bauer '13
Nancy Zhong '14	Sara Dorsey '12
May-Hunter Smith '11	Andrew Gaidus '11
Stefan Ward-Wheten '11	William Harron '11

A seasonal caretaking crew comprised of Steven Simalchik '13 and Claire Baecher '13 was employed throughout the summer months. The crew worked on many of the regular summer tasks—mowing, gardening, grounds-keeping, program facilitation, trail and water-bar maintenance and controlling invasive vegetation. Our crew did receive occasional assistance from the regional trail crew, consisting of Stephanie Durell '12 and Ian Nesbitt '12, who were employed by the Williamstown Rural Lands Foundation and Williams Outing Club respectively.

MEETINGS/COORDINATION

Affiliations

National Ecological Observatory Network (NEON): In 2010-11 we continued to hold a seat on the NEON governing board. Manuel Morales attended the annual meeting in Washington, D.C. on September 24th, 2010.

Organization of Biological Field Stations (OBFS): We continue to hold an institutional membership in OBFS, though we did not attend the 2010 annual meeting.
Taconic Crest Trail Consortium: This consortium, which promotes sustainable recreation and coordinates stewardship activities on the 35 mile trail, last met in June 2010 to discuss protection and enforcement issues.

Conferences/Meetings/Panels

In May 2011, I attended (and made a presentation at) the annual meeting of the Eastern Research Managers meeting in Durham, North Carolina. In addition to general discussions on station management, the workshop featured guided tours of research areas and experimental forestry sites.

ADMINISTRATIVE

HMF Users Committee

The Hopkins Forest Users Committee--charged with oversight and planning responsibilities for the Forest--is comprised of faculty and staff who have vested research or teaching interests in the Forest (Table VII). Though no formal meetings were conducted in 2010-11 committee members corresponded occasionally to discuss management and administrative matters. Beginning in 2011-2012 Manuel Morales will take over as Committee Chair.

Table VII. HMF Users Committee--2010-11.

Faculty	Department	Ex-officio	Affiliation
David Dethier, Chair	Geosciences	Jennifer French	CES Director
Hank Art	Biology	Scott Lewis	WOC Director
Joan Edwards	Biology	Jay Racela	CES, Envi. Analysis Lab
David Smith	Biology	Drew Jones	HMF Manager
Manuel Morales	Biology		

FUTURE – What's in store for 2011-12?

The coming year will feature the initial baseline surveys and mowing treatments for the new aster and goldenrod diversity study. Most other research and educational activities will continue. Additionally, we will continue to implement the NRCS supported conservation measures on the Vermont parcel in 2012. This will include work on early successional patch cuts near the Taconic Crest and timber stand improvements on the lower slopes.

Thanks to Kate Fletcher for her help in the preparation of this report.

APPENDIX I – Outside Organizational Users of HMF 2010-11.

Organization	Location	Department/Program	Type of Use
Berkshire Community College	Pittsfield	Environmental Science	owl banding
Massachusetts College of Liberal Arts	North Adams	Biology, Environmental Science	field trip; owl banding, spring wildflowers
Texas Tech University	Lubbock, TX	Biology	Owl Banding
Tufts University	Boston, MA	Biology	Plant Research
Museum Institute for Teaching Science	Statewide	Teacher Training	Inquiry based learning workshop
Hoosic River Watershed Association	Williamstown	Monitoring	Monitoring lab
C. T. Plunkett Elementary	Adams	School Classes	Maple Sugaring
Williamstown Elementary	Williamstown	General	Outreach Programs
Mount Greylock High School	Williamstown	11th grade	Workshop; guest lecture
Buxton School	Williamstown	Science Class	Maple Sugaring
Home School Association	Berkshire Co.	Students/Parents	Owl banding