

# Surveys and Monitoring for the Hiawatha National Forest: FY 2011 Progress Report



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Cover photograph: Hiawatha National Forest, East Lake Area, Mackinac County, MI, 24 June 2010. Inset photo: green spleenwort (*Asplenium trichomanes-ramosum*). Photos by Michael R. Penskar.

## MNFI Progress Report FY2011

List of projects selected in consultation with Hiawatha National Forest Staff:

- 1) Raptor Nest Checks and Productivity Surveys
- 2) Hine's Emerald Dragonfly Site Visits/Counts
- 3) Snail Sampling, Sorting, and Identification – hold over from year FY10
- 4) Pitcher's Thistle/ Invasive Weevil Surveys
- 5) Niagara Habitat Monitoring - for rare snails and ferns and placement of data loggers

### 1. Raptor Nest Checks and Productivity Surveys

Both the Red-shouldered Hawk (*Buteo lineatus*, state threatened) and Northern Goshawk (*Accipiter gentilis*, special concern) are Regional Forester Sensitive Species (RFSS) with many known nesting occurrences within the east unit of the Hiawatha National Forest (HNF). During the 2011 surveys a total of 59 nests (Appendix 1) were checked for breeding use with a subset of those (active or possibly active nests) were visited a second time for nest productivity. Initial nesting surveys were conducted during early May 2011 (1-10) with productivity surveys during mid June 2011 (14 – 23). In addition, it was requested by HNF staff to visit all the active Red-shoulder and Northern Goshawk nests on the east unit of the HNF (n = 31) to determine productivity in early June 2011. All nesting information was provided to HNF at the completion of the surveys.



**Figure 1.** Red-shouldered Hawk nest site 274E. Inset photo showing 3 chicks in the nest as viewed through the handheld monitor of the wireless camera kit on June 15, 2011.



## 2. Hine's Emerald Dragonfly (HED) Site Visits/Counts

Breeding site surveys and counts were conducted at 9 sites within the HNF in early August 2011. Known Hine's emerald dragonfly (*Somatochlora hineana*, state endangered, federally endangered) sites were field checked for presence of HED during the summer period when adults are active and most easily observed.



Surveys were conducted from August 2-5, 2011 and involved meandering thorough HED sites while carrying a handheld GPS unit. This allows one to create a track polygon of the path covered while surveying. In addition, every HED and other *Somatochlora* species were marked with a waypoint. These maps are included in **Appendix II**.

HED were found at 7 of the 9 sites and at three sites (Summerby, Acklund, Brevort) new high counts were recorded (Table 1). This could be due to the amount of overall fen habitat surveyed and the generally good survey weather. Now that survey tracks have been established it may be easier to track the population levels at these sites. At a minimum, it was essential to re-visit these occurrences to help update the MNFI Biotics database as well as to inform the HNF. Maps are included in Appendix II.

**Table 1.** Sites surveyed for Hine's Emerald Dragonfly, August 2011 and survey results.

Site Name	Observer	Date	HED seen	Comments
Acklund Road Fen	D. Cuthrell	05-Aug-11	28	mostly along rivulet channels in fen
I-75 Marl Fens	D. Cuthrell	05-Aug-11	1	Along transmission line between I-75 and Mackinac Trail.
Summerby Swamp	D. Cuthrell	02-Aug-11	28	mostly males hover guarding pools of water throughout fen.
Hay Lake N	D. Cuthrell	04-Aug-11	0	very little habitat here
Hay Lake S	D. Cuthrell	04-Aug-11	0	<i>Somatochlora</i> sp., too small for HED, Canada Darners
Castle Rock Road	D. Cuthrell	03-Aug-11	1	7:15pm - 8:35 pm, lots of darners, 1 small <i>Somatochlora</i>
Brevort Lake Road	D. Cuthrell	04-Aug-11	37	mostly sunny, calm, 68-79 degrees F., mostly along stream and in small pools throughout fen.
Hay Lake Middle (new area)	D. Cuthrell	04-Aug-11	1	3:45-4:30, drove entire ORV trail, stopping and walking. 1 transient adult along trail
Foley Creek	D. Cuthrell	02-Aug-11	2	4:00-7:00 pm, cloudy, light rain shower later, darners also.

### 3. Snail Sampling, Sorting, and Identification

A random sampling scheme was created based on a grid provided by Hiawatha National Forest (HNF). Cells in the grid were numbered then randomized with a random sequence generator (<http://www.random.org/>). The first 19 cells in this random sequence were surveyed. Cells that were largely covered by water were excluded. Polygons designated high, medium, and low, were provided by HNF. Each of the polygons present in each randomly selected cell was sampled. Survey areas (designated by high, medium, and low polygons within each selected cell) were assessed in person for appropriate microhabitats as collections were made in each area. Targeted microhabitats included moss/organic litter/woody debris on, and at the base of limestone boulders, outcrops, cliffs and over shallow limestone bedrock. Samples of organic material were collected by hand, placed in paper bags (to facilitate drying), and labeled with date, collectors, latitude and longitude, collection cell-site number, bag number, and microhabitat type. Two samples were collected at each site, representing two microhabitat types. For boulder or cliff habitat types, one sample was taken from the top of the boulder or side of cliff, and one sample was taken at the base of the boulder/cliff. In cases where no boulders/cliffs were present, one sample was taken from the top or side of stump or downed log, and one sample was taken at the base. Latitude and longitude of each sample collection site was recorded with hand held GPS units. Photographs of each collection site were taken.

Samples taken from the top of boulders/cliffs/stumps/logs generally consisted of moss with some leaves and coarse organic debris. Samples taken from the bottom of these structures consisted primarily of leaves and coarse organic debris. Approximately 600-800 ml of organic material was collected with each sample. Collections were made from June 22-25, 2010. Weather conditions during this time were suitable for finding live individuals as well as empty shells (60-70 degrees with occasional rain showers). We collected 58 samples from 29 sites. Fourteen of these sites were located in areas designated as high priority by HNF, seven as medium priority, and eight as low priority.

Processing of samples began by drying for approximately 72hrs at 100-110°F. Samples were then gently sieved through standard wire mesh sieves, sized 8mm, 2mm, 1mm, and 0.25mm. Gastropod shells were picked from each fraction of sieved organic material with the aid of a stereo microscope at 10x power, and a high intensity fiber optic light source. Shells were identified to species using a stereo microscope and light source at 10x-50x power. Numbers of individuals of each species in each sample were recorded. Samples were placed in vials, labeled, and are stored at MNFI.

All 58 samples collected contained at least one species of gastropod. The number of each species found in each sample is given in **Table 2 (attached excel file)**. Rare/listed species found include delicate vertigo, *Vertigo bollesiana* (State Threatened) and eastern flat-whorl, *Planogyra asteriscus* (species of special concern). *Vertigo bollesiana* was found at five sites, and *Planogyra asteriscus* was found at four sites.

#### 4. Pitcher's thistle/ Invasive Weevil Surveys

Monitoring Pitcher's thistle (*Cirsium pitcheri*) for two invasive weevil species was conducted in 2011, both to begin the development of a sampling protocol as well as to initiate periodic assessments of Pitcher's thistle populations for possible infestations. This is now particularly important given the recent discovery of one of these two introduced biocontrol weevils (*Larinus planus*) in a Wisconsin Pitcher's thistle population. Both *L. planus* and *Rhinocyllus conicus*, introduced in multiple areas within and near the Lake Michigan basin as biocontrols for Canada thistle (*Cirsium arvense*) and musk or nodding thistle (*Carduus nutans*), represent significant threats to the health of Pitcher's thistle populations. It is especially important with respect to Lake Michigan, which contains the vast majority of the global population of Pitcher's thistle occurrences.

Monitoring was initiated by surveying Pitcher's thistle occurrences known in the Hiawatha Forest eastern unit as identified by polygons supplied by HNF staff. Sampling was conducted by accessing these occurrences and selecting and examining a minimum of 35 flowering plants per sampling site. For each individual selected, the number of flowering heads and height were recorded, as well as any observations related to plant damage, herbivory, insect/invertebrate presence or sign, and general vitality. Each flowering head was briefly inspected for weevil presence or damage (e.g. head mining) from weevils or other invertebrates. Selected flower heads were collected for dissection and examination for the presence of larvae or other sign. For the five discrete sampling sites within the identified polygons, we inspected a total of 189 plants and 3,153 flower heads (Table 3). There were no target weevils observed during the 2011 field season.

**Table 3.** Summary of the Pitcher's thistle/Invasive Weevil Surveys in the Hiawatha National Forest, June 2011.

Site	Sample Date	Surveyors	Number of plants inspected	Number of flower heads inspected
Campground - far west site	30-Jun-11	D.Cuthrell/M. Penskar	35	554
Brevort River West	30-Jun-11	DLC, MRP, SJB, JW	45	825
Brevort River East	30-Jun-11	DLC, MRP, SJB, JW	36	977
Point aux chenes North	30-Jun-11	D.Cuthrell/M. Penskar	36	377
Point aux chenes Bay	30-Jun-11	D.Cuthrell/M. Penskar	37	420
<b>5 sites sampled (2011)</b>	<b>30-Jun-11</b>	<b>TOTALS</b>	<b>189</b>	<b>3,153</b>

#### 5. Niagara Habitat Monitoring - for rare snails and ferns and placement of data loggers

Vegetation monitoring, as outlined in Alternative 2 of the Niagara EIS, was initiated to develop the methodology needed to understand the changes that may occur in karst feature habitat due to vegetation management. Specifically, this monitoring was designed to address microhabitat conditions within karst feature habitat and how those conditions

may be affected by vegetation management with respect to changes in light intensity, ground temperature, relative humidity, and moss cover between treated and untreated sites.

Plots were circular and 1/10 of an acre (11.3m radius) (James and Shugart 1970). Sampling included the collection of overall plot level and three 1m<sup>2</sup> plots along the cliff/boulder face where rare ferns grew or where rare landsnails were likely to occur (Figure 2). Overall plot level data, measurements focused on forest structure and species composition. Canopy heights for five canopy dominants were measured. Tree density and composition was measured in two categories tree (dbh  $\geq$  3.5 inches) and subcanopy (dbh < 3.5 inches). Other overall plot level measurements included percent canopy closure, plant species lists and coarse woody debris (CWD). Percent canopy closure was estimated along the cardinal directions from the plot center. Ocular tube readings of canopy conditions were taken at paced intervals five times in each cardinal direction. The ratio of hits to misses in the ocular tube gave the percentage canopy cover for that plot. No analyses have been completed at this time but data has been summarized (Table 4).

To address the differences that may occur we developed a preliminary sampling protocol in conjunction with the placement of data loggers in four sites known to contain rare snail species and four sites known to contain rare fern species. Two data loggers were placed at each site at the plot center. One data logger placed at the top of the cliff or boulder recorded temperature and light intensity while a second data logger placed at the base recorded both temperature and relative humidity. All data loggers were placed in the field in late June (24-26) and all were collected on September 20, 2011.



**Figure 2.** Typical frame placement for the micro-plot sampling, HNF 2011.

**Table 4.** Brief summary of data collected and locational information for the 8 plots sampling during the 2011 season.

Site Name	Lat	Long	Surveyors	Date	Slope	Aspect	Elevation in feet (plot center)	fissures	ledges	boulders	Mean Canopy height (feet)	Basal Area	Coarse Woody debris	% Canopy closure
Kenneth Road South	46.09764	-84.84325	Cuthrell/Penskar	06/28/11	9%	260	830	x	x	x	58.6	130	2	85
Kenneth Road North	46.0978	-84.84398	Cuthrell/Penskar	06/29/11	8%	234	826			x	54.8	100	1	80
50-2 Snail	46.10289	-84.83095	Cuthrell/Penskar	06/29/11	4%	335	892	x			56.6	120	1	80
Ledge Crop	46.10309	-84.79982	Cuthrell/Penskar	06/29/11	0%	65	900	x		x	73.0	120	1	85
East Lake	46.11618	-84.81773	Cuthrell/Penskar	06/29/11	2%	60	859	x		x	70.0	130	1	80
38 Walking Fern	46.11143	-84.82944	Cuthrell/Penskar	06/29/11	10%	351	940	x	x	x	70.8	100	1	75
38 Spleenwort	46.11165	-84.82908	Cuthrell/Penskar	06/29/11	6%	358	889	x		x	68.4	140	1	90
Gamble East	46.10671	-84.68903	Cuthrell/Penskar	06/29/11	3%	52	890			x	52.8	100	1	85



**Appendix 1.** Raptor nests checked by MNFI, 2011.

<b>Nest Number</b>	<b>Species</b>	<b>First visit date</b>	<b>A/I/R</b>	<b>tree spp</b>	<b>UTM</b>	<b>surveyor</b>
61E	RSHA	02-May-11	Inactive	beech		David Cuthrell
261E	RSHA	02-May-11	Inactive	beech		David Cuthrell
NEW	RSHA	02-May-11	<b>ACTIVE</b>	Oak	672433 5090387	David Cuthrell
112E	RSHA	02-May-11	Inactive			David Cuthrell
63E	RSHA	02-May-11	Inactive			David Cuthrell
67E	Crow	02-May-11	active			David Cuthrell
68E	RSHA	02-May-11	Inactive			David Cuthrell
184E	RSHA	02-May-11	<b>ACTIVE</b>	white birch		David Cuthrell
126E	NOGO	02-May-11	Inactive			David Cuthrell
105E	RSHA	02-May-11	<b>ACTIVE</b>			David Cuthrell
99E	RSHA	02-May-11	Inactive			David Cuthrell
60E	RSHA	02-May-11	Retire			David Cuthrell
262E	RSHA	02-May-11	Inactive			David Cuthrell
197E	NOGO	03-May-11	Inactive			David Cuthrell
114E	RTHA	03-May-11	Active			David Cuthrell
259E	NOGO	03-May-11	Inactive			David Cuthrell
191E	RSHA	03-May-11	Inactive			David Cuthrell
100E	NOGO	03-May-11	Inactive			David Cuthrell
256E	RSHA	03-May-11	Active			David Cuthrell
257E	RSHA	03-May-11	Inactive			David Cuthrell
40E	RSHA	03-May-11	Retire			David Cuthrell
NEW	RSHA	03-May-11	<b>ACTIVE</b>	beech	652549 5127127	David Cuthrell
71E	RSHA	04-May-11	Inactive			David Cuthrell
64E	RSHA	04-May-11	Inactive			David Cuthrell
NEW	RSHA	04-May-11	<b>ACTIVE??</b>	red maple	672694 5093790	David Cuthrell
186E	RSHA	04-May-11	Inactive			David Cuthrell
185E	RSHA	04-May-11	Inactive			David Cuthrell
140E	NOGO	04-May-11	Inactive			David Cuthrell
263E	NOGO	04-May-11	Inactive			David Cuthrell
107E	NOGO	04-May-11	Retire?			David Cuthrell
141E	NOGO	04-May-11	Retire			David Cuthrell
NEW	Broadwing	04-May-11	Active	white birch	665773 5124942	David Cuthrell
89E	RSHA	04-May-11	Inactive			David Cuthrell
118E	RSHA	04-May-11	<b>ACTIVE</b>			David Cuthrell
88E	RSHA	04-May-11	Inactive			David Cuthrell
NEW	Broadwing?	04-May-11	Inactive	beech	669708 5107058	David Cuthrell
NEW	Broadwing?	04-May-11	Inactive	maple	669462 5107416	David Cuthrell
31E	RSHA	04-May-11	Inactive			David Cuthrell
264E	RSHA	04-May-11	<b>ACTIVE</b>			David Cuthrell
39E	RSHA	05-May-11	<b>ACTIVE</b>			David Cuthrell
131E	NOGO	05-May-11	Inactive			David Cuthrell
36E	RSHA	05-May-11	Inactive			David Cuthrell
NEW	Broadwing?	05-May-11	Inactive?		676205 5106647	David Cuthrell
162E	RSHA	05-May-11	<b>ACTIVE??</b>			David Cuthrell
130E	Unknown	05-May-11	Retire			David Cuthrell

91E	Unknown	05-May-11	Inactive			David Cuthrell
133E	Unknown	05-May-11	Inactive			David Cuthrell
54E	RSHA	05-May-11	Retire			David Cuthrell
104E	RSHA	05-May-11	Inactive			David Cuthrell
9E	RSHA	05-May-11	Retire			David Cuthrell
142E	NOGO	04-May-11	Inactive			David Cuthrell
143E	NOGO	04-May-11	Retire			David Cuthrell
202E	NOGO	04-May-11	Inactive			David Cuthrell
258E	NOGO	03-May-11	Inactive			David Cuthrell
206E	RSHA	03-May	Inactive			David Cuthrell
137E	RSHA	03-May-11	<b>ACTIVE</b>			David Cuthrell
183E	RSHA	03-May-11	<b>ACTIVE</b>			David Cuthrell
182E	RSHA	03-May-11	Inactive			David Cuthrell
24E	RSHA	03-May-11	Inactive			David Cuthrell

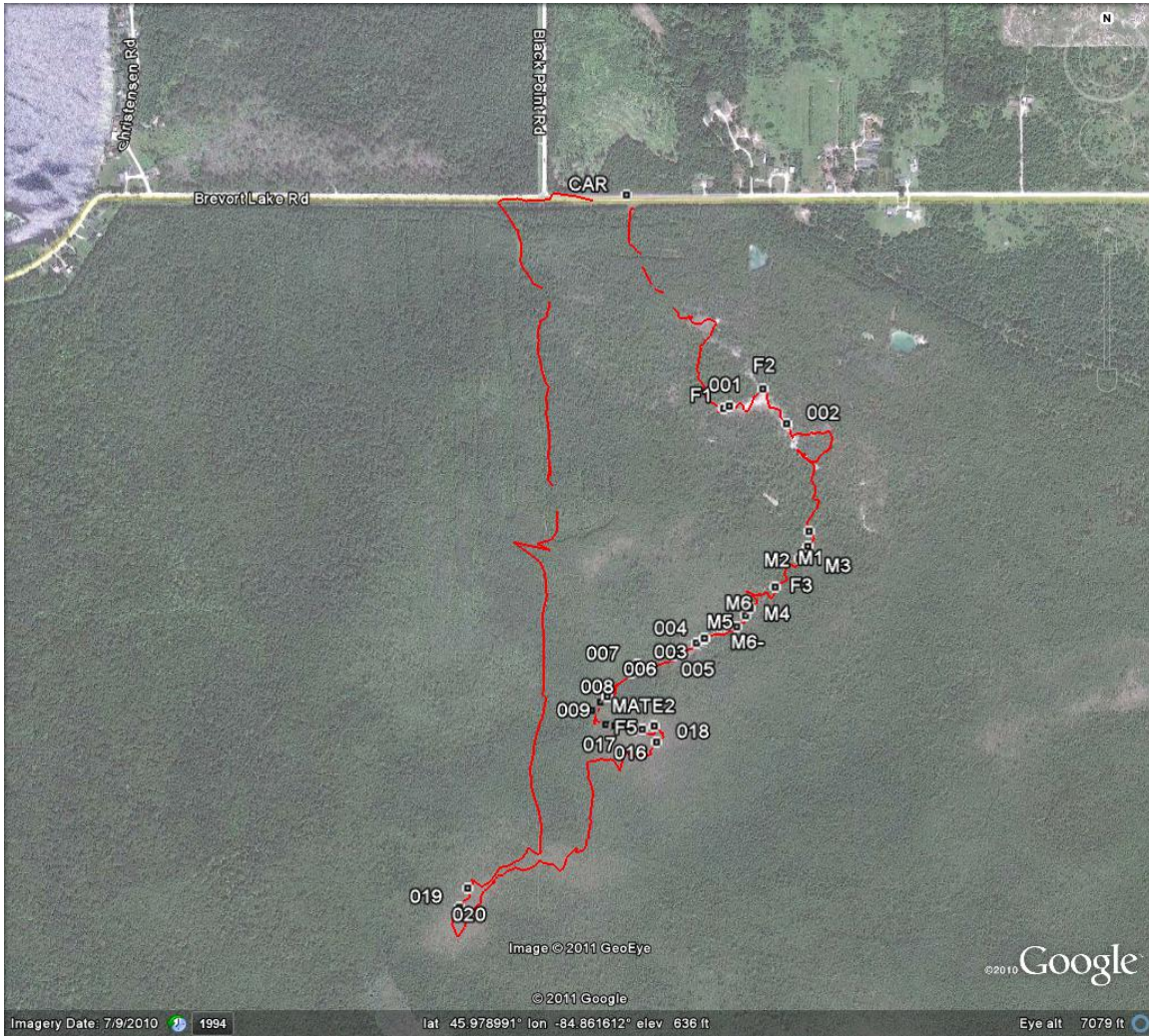
**Appendix II.** Maps of the Hine's Emerald Dragonfly surveys 2011.

**Map 1.** Summerby Swamp HED locations and route taken on 2 August 2011.





**Map 2.** HED locations and route taken at the Brevort Lake Road Site, 4 August 2011.





**Map 3.** HED locations and route taken at the Acklund Road Site, 5 August 2011.



**Map 4.** HED locations and route taken at the Foley Creek Site, 2 August 2011.



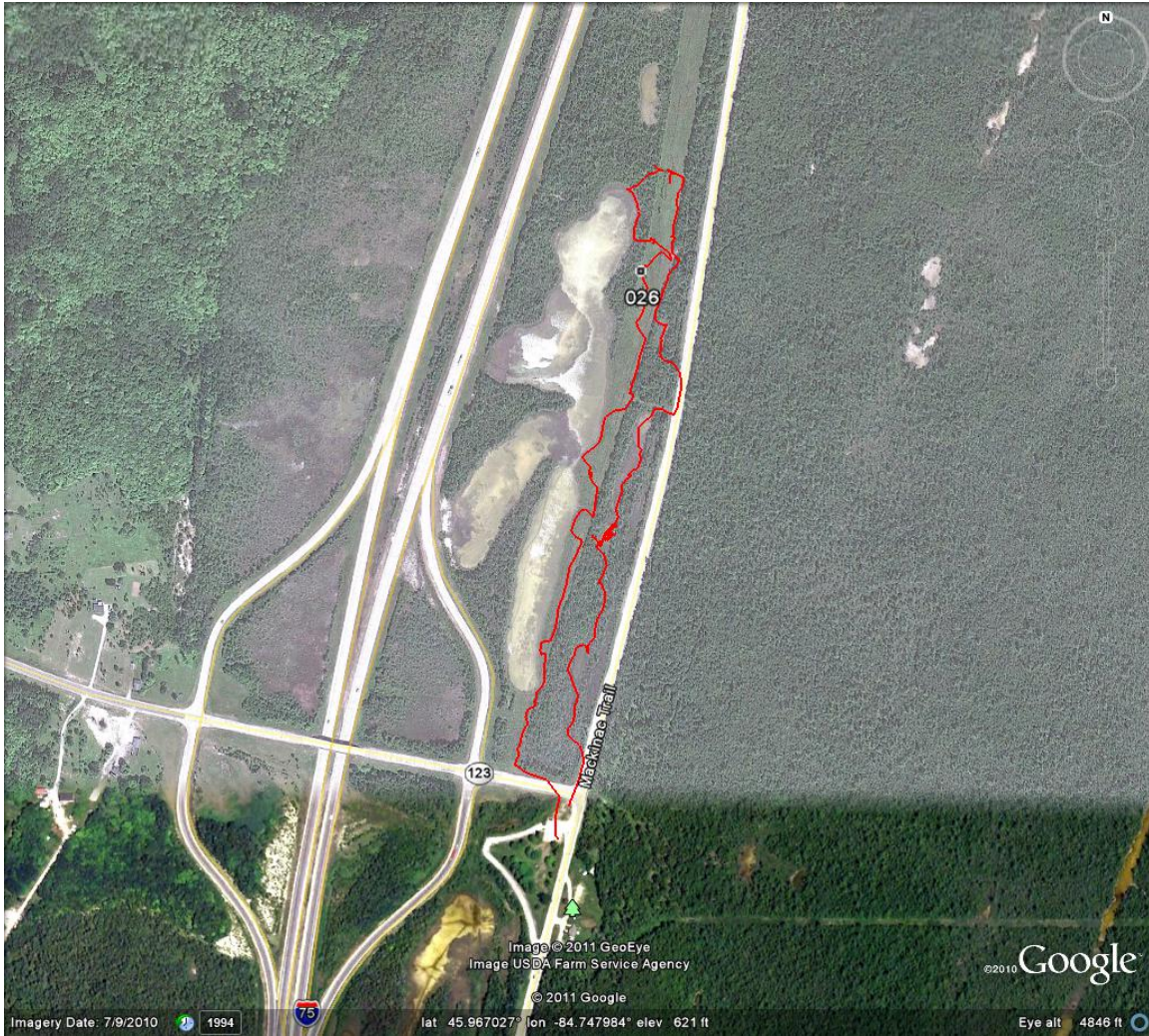


**Map 5.** HED locations and route taken at the Castle Road Road (WP001 – 3 August 2011) and the Hay Lake Middle (new location WP022 – 4 August 2011).





**Map 6.** HED locations and route taken at the I-75 Marl Fen, 5 August 2011.

















Site Name	Date Collected	Lat	Long	Photo Numbers	Description of site	Priority	OG	Collector(s)
4-1 (Bag 1)	06/24/10	46.14075	84.81934	151, 152	Alvar within maple stand, 8-10 square meter section with scattered rocks. Stand to W much younger regenerating maples. Moss and leaf litter on rock and back of rock.	H	OG	Badra/Cuthrell
4-1 (Bag 2)	06/24/10			153	Leaf litter in crevice.	H	OG	Badra/Cuthrell
7-1 (Bag 1)	06/24/2010	46.13439	84.83497	168	Base of basswood tree, 18" dia., within a forest composed of a Mackinaw mix. Wet with large dia. White birch, basswood, and ash. Moss at base of basswood.	M	OG	Badra/Cuthrell
7-1 (Bag 2)	06/24/2010			169-70	Leaf litter and some moss further down then bag one. Low shelf in old growth maple forest with ash, yellow birch, basswood. Leaf litter and moss at top of shelf.	M	OG	Badra/Cuthrell
9-1 (Bag 1)	06/24/10	46.13448	84.82076	137	Base of shelf, leaf litter and moss.	H	OG	Badra/Cuthrell
9-1 (Bag 2)	06/24/10			138-40	OG Maple woods, yellow birch, shrub layer, red raspberry, elder berry, Sample of leaf litter	H	OG	Badra/Cuthrell
10-1 (Bag 1)	06/24/10	46.13431	84.81942	131	on top of rock, SE exposure.	H	OG	Badra/Cuthrell
10-1 (Bag 2)	06/24/10			133	Base of rock, leaf litter. Old stump in swamp with large dia. Aspen, yellow birch and black ash. OG Maples. Sample from top and edge of stump, moss and debris.	H	OG	Badra/Cuthrell
10-2 (Bag 1)	06/24/10	46.13611	84.81964	134	Debris at base of stump	L	OG	Badra/Cuthrell
10-2 (Bag 2)	06/24/10			135-36		L	OG	Badra/Cuthrell
13-1 (Bag 1)	06/24/10	46.13319	84.83713	161	Cedar swamp with 1-30" dia. cedar, sample taken at base of balsam fir consisting of moss.	L	OG	Badra/Cuthrell
13-1 (Bag 2)	06/24/10			162-63	Leaf litter at base of tree. Mackinaw mix, large dia. White pine, white birch, pockets of standing water. Leaf litter and moss from fallen 14" cedar tree.	L	OG	Badra/Cuthrell
13-2 (Bag 1)	06/24/10	46.13375	84.83481	164	Moss and leaf litter at the base of a 18" dia. Balsam fir.	M	OG	Badra/Cuthrell
13-2 (Bag 2)	06/24/10			165-67	Alvar cracks within Maple/Basswood woods. Old trees but some harvesting apparent, although none recently, yellow birch also present. Moss and leaf litter in alvar crevice, 1/2 meter below surface.	M	OG	Badra/Cuthrell
14-1 (Bag 1)	06/24/10	46.13076	84.8299	154	Moss and leaf litter in rock crevice, 12" above the gorund.	M	OG	Badra/Cuthrell
14-1 (Bag 2)	06/24/10			155-56	Low shelf within mixed deciduous woods, maple, white birch, aspen, some large dia. OG Maples in the overstory. Shrub zone 1-3 m dominated by sugar maple. 5-10 meter square alvar area. Leaf litter and moss on top of rock, crevice at least a foot deep.	M	OG	Badra/Cuthrell
14-2 (Bag 1)	06/24/10	46.1317	84.83337	157	Leaf litter and moss at base of ledge.	M	OG	Badra/Cuthrell
14-2 (Bag 2)	06/24/10			158-159	Rocks within hardwood forest. S. Maple dominated stand 18-20" dbh. Top of rock, leaf litter and moss.	M	OG	Badra/Cuthrell
20-1 (Bag 1)	06/25/10	46.12448	84.82996	183	Base of rock, NW side.	H	OG	Badra/Cuthrell
20-1 (Bag 2)	06/25/10			185-86	Cedar swamp. Moss on hummock, next to base of dead standing cedar tree.	H	OG	Badra/Cuthrell
20-2 (Bag 1)	06/25/10	46.12763	84.83426	190	Leaf litter at base.	L	OG	Badra/Cuthrell
20-2 (Bag 2)	06/25/10			191-92	Fallen log within young black ash swamp with large dia. Super canopy cedars, some balsam fir, yellow birch, some red maple. Wet site with lots of standing water in stand. Moss up near the top of the log.	L	OG	Badra/Cuthrell
20-3 (Bag 1)	06/25/10	46.12697	84.83236	197	Leaf litter and moss at base of log.	M	OG	Badra/Cuthrell
20-3 (Bag 2)	06/25/10			198-99	Cedar swamp with white birch, yellow birch 10-14" dbh trees with super canopy of white birch. Fallen log. Clump of moss at base of cedar stump.	M	OG	Badra/Cuthrell
25-1 (Bag 1)	06/25/10	46.12357	84.8348	187	Moss at base of cedar stump.	L	OG	Badra/Cuthrell
25-1 (Bag 2)	06/25/10			188-89	Low limestone rock within S. Maple woods, few overstory white pine, some yellow birch, sparse ground cover. Leaf litter on top of rock.	L	OG	Badra/Cuthrell
26-1 (Bag 1)	06/23/2010	46.12259	84.82895	105	Base of rock, leaf litter.	H	OG	Badra/Cuthrell
26-1 (Bag 2)	06/23/2010			106, 107		H	OG	Badra/Cuthrell
26-2 (Bag 1)	06/23/2010	46.1214	84.83063	108	60' log, 10" dbh in aspen, ash, R. Maple, balsam fir, yellow birch, moist soil. Moss on log.	M	OG	Badra/Cuthrell
26-2 (Bag 2)	06/23/2010			109-10	Debris at base of log. Cedar stump within cedar swamp with few yellow birch. Debris from stump top and moss from N side.	M	OG	Badra/Cuthrell
26-3 (Bag 1)	06/23/2010	46.12008	84.83397	111	Debris at base of stump.	L	OG	Badra/Cuthrell
26-3 (Bag 2)	06/23/2010			112-13		L	OG	Badra/Cuthrell

27-1 (Bag 1)	06/23/10	46.1204	84.82458	102	Series of small limestone rocks within S. Maple forest with scattered balsam fir. Moss and leaf litter on cervice, top of 3 square meter rock.	H	OG	Badra/Cuthrell
27-1 (Bag 2)	06/23/10			103, 104	Leaf litter at base of rock.	H	OG	Badra/Cuthrell
32-1 (Bag 1)	06/23/2010	46.11844	84.83228	114	Base of live cedar 18-20" dbh. Cedar swamp with aspen, yellow birch. Moss on the tree trunk, SE side of tree.	L	OG	Badra/Cuthrell
32-1 (Bag 2)	06/23/2010			115-16	Leaf litter at base of tree, N side.	L	OG	Badra/Cuthrell
32-2 (Bag 1)	06/23/2010	46.11825	84.83173	117	OG aspen, cedar, balsam fir with lots of dead and down. Moss and leaf litter at base of aspen, WNW.	M	OG	Badra/Cuthrell
32-2 (Bag 2)	06/23/2010			118-124	SW, moss and leaf litter at base of tree, 22" dbh.	M	OG	Badra/Cuthrell
32-3 (Bag 1)	06/23/2010	46.118	84.82768	124	1/2 square meter limestone rock, 2 rocks, Maple forest with balsam fir, yellow birch. Leaf litter top of rocks.	H	OG	Badra/Cuthrell
32-3 (Bag 2)	06/23/2010			125-27	Moss and leaf litter top of and base of rock. 1 square meter rock with fractured, moss covered top.	H	OG	Badra/Cuthrell
33-1 (Bag 1)	06/23/2010	46.11812	84.82645	128	Scattered small rocks with balsam fir with a few overstory Maples. 1.5 meter square rock, moss covered. Moss top of rock.	H	OG	Badra/Cuthrell
33-1 (Bag 2)	06/23/2010			129	leaf litter at base of rock.	H	OG	Badra/Cuthrell
37-1 (Bag 1)	06/22/10	46.11435	84.83458	88-90	Moss in rocky crevice on S. side of 2 meter square limestone rock, sparse ground cover	L	OG	Badra/Cuthrell
37-1 (Bag 2)	06/22/10			91-91	Leaf litter, SE side of rock	L	OG	Badra/Cuthrell
38-1 (Bag 1)	06/22/10	46.11278	84.3362	94-95	Moss of rock, NW side, 2 meter square. Ground cover composed of bracken fern, Solidago sp., Cornus canadensis, maple seedlings	L	OG	Badra/Cuthrell
38-1 (Bag 2)	06/22/10			96-98	Leaf litter at base of rock, N side. Aspen stand 10-15 years old, balsam fir, small S. Maple, site quite open.	L	OG	Badra/Cuthrell
41-1 (Bag 1)	06/24/10	46.11238	84.8126	141	Rock in maple forest. Good ground cover with leeks, ferns, trout lily, maidenhair ferns.	H	OG	Badra/Cuthrell
41-1 (Bag 2)	06/24/10			142, 143	Sample from top of rock, leaf litter and moss.	H	OG	Badra/Cuthrell
42-1 (Bag 1)	06/22/10	46.11185	84.830369	80-83	West rock, 1/2 m square limestone rock, 95% moss covered. Ground layer included leeks, S. Maple seedlings, trout lily. Sample included moss from N side of rock, moss and leaf litter.	H	OG	Badra/Cuthrell
42-1 (Bag 2)	06/22/10			86-87	Moss and leaf litter, S side small rock 2m x 1/2 m. S. Maple dominated woods with some yellow birch, aspen, and beech. Maidenhair fern- photos 85-85?	H	OG	Badra/Cuthrell
43-1 (Bag 1)	06/24/10	46.10555	84.83665	144, 145	Leaf litter and moss on N exposure of 3 square meter rock 1/2 submerged. S. Maple dominated woods with shrub layer of young maples. Ground layer of leeks.	H	OG	Badra/Cuthrell
43-1 (Bag 2)	06/24/10			146, 147	Litter at base of rock. 1 of 2 rocks total in the stand.	H	OG	Badra/Cuthrell
47-1 (Bag 1)	06/24/10	46.10955	84.81334	148	Even aged stand of maples with scattered rocks. Pit and mounds fairly well developed with birch and beech 10-12" dbh. Leaf litter and moss, top of rock, N side, 3 square meter rock almost completely moss covered. Trillium and grass in the ground layer.	H	OG	Badra/Cuthrell
47-1 (Bag 2)	06/24/10			149, 150	Moss at base of rock, N side, leaves too.	H	OG	Badra/Cuthrell
50-1 (Bag 1)	06/22/10	46.10448	84.83137	60, 61	moss covered boulder, 4 square meter boulder w/in sugar maple dominated forest, scattered balsam fir. Good maple regen here, almost pure S. Maple stand. N. side of boulder, picked live snails for 1 minute	H	OG	Badra/Cuthrell
50-1 (Bag 2)	06/22/10			62-64	leaf litter at the base of the boulder, N. side, NE side, High Priority and Old Growth	H	OG	Badra/Cuthrell
50-2 (Bag 1)	06/22/10	46.16289	84.83095	67, 68	Collected off moss, N side of moss covered ledge, low shelf ~ 2m tall within S. Maple with scattered large Beech trees and small Hemlocks.	H	OG	Badra/Cuthrell
50-2 (Bag 2)	06/22/10			69-72	leaf litter at the base of the shelf just below (1m) the sample from bag 1.	H	OG	Badra/Cuthrell

**58 bags total**

28 - High Priority

14 - Medium Priority

16 - Low Priority