

Building Local Capacity to Protect and Restore Hine's Emerald Dragonfly Habitat in Northeast Michigan: Final Report



Photo: David Cuthrell, Michigan Natural Features Inventory



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Cover: Photo Credits: Misery Bay and crayfish burrow. Photos by Daria A. Hyde, Hines’ Emerald Dragonfly. Photo by David L. Cuthrell, Learning about dragonflies. Photo by Brandon C. Schroeder, Sea Grant, MSU Extension

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Abstract

This project tested an approach of training local volunteers to assist partner organizations in conducting surveys for Hine's emerald dragonfly (*Somatochlora hineana*), (HED) while simultaneously mapping and treating invasive plants. We were successful in documenting adult HED at Negwegon State Park, Thompson's Harbor State Park and two sites in Misery Bay. We received confirmation that larvae collected from two sites were "probable" or "likely" HED. Volunteers working in teams with MNFI, Huron Pines and State Park staff contributed 825 hours of time and mapped 548 locations of invasive plants, treating 463 of these occurrences. Volunteers were recruited by Friends of Negwegon and Friends of Thompson Harbor. Staff at the Northeast Michigan Great Lakes Stewardship Initiative hub were instrumental in reaching out to local middle schools and organizing work days for the students. Our results demonstrate that with proper coordination, this approach can be very effective and can help to conserve scarce resources while educating the local community and promoting long term stewardship values. Although treatment of invasive species by professional contractors is appropriate much of the time, it is useful to learn that there are other options for conservation of HED habitat.

Background and Purpose

The Hine's emerald dragonfly (*Somatochlora hineana*), (HED), is among the most endangered of North America dragonflies. In Michigan it has been documented at only 8 sites in the Upper Peninsula, 4 island sites and 4 sites in the Lower Peninsula (MNFI 2007) Degradation of critical habitat is threatening remaining populations. A key recovery action identified in the Hine's Emerald Dragonfly Recovery Plan (USFWS, 2001) is to search for larval habitat within existing sites, since the dragonfly spends most of its life in the larval stage and is vulnerable to negative impacts to these critical areas.

This project was initiated to conduct badly needed follow up surveys to reconfirm adult HED at the four known locations in northeast Michigan and to attempt to identify larvae and larval habitat at these sites so they can be adequately protected. In addition, invasive plants are a primary threat to coastal communities, and more specifically, HED habitat. Mapping, prioritization and treatment of non-native invasive plants is a critical component of cost effective restoration of these unique coastal habitats and assists in directing treatment to areas where they pose the most significant threat. With scarce conservation resources as well as limited individuals who can identify HED, we thought it prudent to engage and train local State Park and Huron Pines staff, volunteers and environmental science students in the identification of this endangered dragonfly and its habitat as well as invasive plants so that they can report occurrences and contribute to HED conservation.

Surveys of HED, its larval habitat and invasive species were focused within potential HED habitat at the four known sites in the Lower Peninsula: 1) Negwegon S.P, 2) Thompson's Harbor S.P., 3) Misery Bay and 4) North Point Road - Section 9 Fen. (Figure 1). We enlisted the expertise of Huron Pines staff to treat invasive species that were encountered. Project objectives were crafted to build capacity among local stakeholders by: 1) providing training in identification of five rare species known from this region, with a special focus on the HED; 2) providing training in the identification of five invasive plants and standard mapping protocol; 3) mapping potential HED larval habitat and invasive species at four known HED sites; 4) treating small occurrences of invasive plants found and identifying larger infestations in high priority areas for future treatment; and 5) developing a plan for continued engagement of local stakeholders in habitat protection efforts.

Figure1. Distribution of Hine's Emerald Dragonfly Sites in Northeast Michigan



Methods

Community Outreach, Volunteer Recruitment and Training

Project Promotion: We promoted the project in the local community and recruited park staff and volunteers by collaborating with Sue Keller and Jim Larson, Friends of Negwegon State Park; Bill Grigg, Friends of Thompson Harbor State Park; Eric Ostrander, Unit Supervisor, Negwegon State Park; Blake Gingrich, Unit Supervisor, Thompson's Harbor State Park; and Brandon Schroeder, MSUE Sea Grant, Northeast Michigan Great Lakes Stewardship Initiative Hub. These partners submitted press releases, were interviewed by local media, coordinated communication with potential volunteers and provided logistical support for the scheduled trainings. Sue Keller was successful in her grant application to the Northeast Michigan Community Foundation to purchase GPS equipment for the project. Brandon made arrangements with middle school teachers from Alcona and Rogers City Schools to have their classes participate in the project and invited a 4H youth leader to bring her students to the training and participate in the surveys.

Community Outreach: In the first year of the project a workshop was provided on June 12, 2014 at Alcona Township Hall to 30 community members and potential volunteers. In the second year, a workshop was conducted on July 23, 2015 at the Presque Isle District Library in Roger's City for 15 people who were interested in learning more about this effort. We provided an overview of the project and discussed the Hine's emerald dragonfly and other unique plants and animals at Negwegon and Thompson's Harbor State Park. We also highlighted the threat posed by invasive species. Presenters represented a diversity of organizations including MNFI, USFWS, Huron Pines, Northeast Michigan Great Lakes Stewardship Initiative, Friends of Negwegon and Friends of Thompson's Harbor.

Training: A three-hour on-site training was provided in the first year of the project on August 4, 2014 to 25 people at Negwegon State Park, including 2 State Park staff, and again on September 22 to 15 people at Negwegon State Park. A similar training was conducted in the second year of the project on August 10, 2015 for 10 staff and volunteers at Thompson's Harbor State Park. We provided participants with laminated identification cards that we created that could be clipped to their belts depicting 7 rare plants and animals which occur or have potential to occur in the parks, (Hine's emerald dragonfly, Lake Huron locust, eastern massasauga, piping plover, dwarf lake iris, pitcher's thistle and prairie Indian plantain) as well as 10 invasive species (phragmites, glossy buckthorn, narrow-leaved cattail, reed canary grass, Japanese knotweed, Japanese barberry, spotted knapweed, Eurasian swamp thistle, bull thistle and Canada thistle) (See Appendix 1.). Information about the life history of these plants and animals was discussed and participants were shown invasive plants so they could identify key characteristics. Participants were also trained in the standard protocol for mapping and recording invasive points using "drop down" menus on hand held tablets or paper forms to be used with Garmin GPS devices.



Volunteers learning about the Lake Huron locust from Dave Cuthrell
Photo: Brandon Schroeder

Hine's Emerald Dragonfly Surveys

Project Planning: We worked with Christie Deloria, USFWS, Coastal Program; Jennifer Muladore, Huron Pines; and Glenn Palmgren, MI Parks and Recreation, Stewardship Unit to develop conservation measures to protect listed species and critical habitat during treatment for invasive species (Appendix 2.) All Huron Pines staff conducting invasive species treatment were provided with these guidelines and were given appropriate training. We coordinated with Glenn Palmgren and Alicia Ihnken, Stewardship Unit, MI Parks and Recreation; to identify priority areas for surveys of invasive plants at the parks. They provided maps of the parks (Figure 4. and 5.) that were divided into grids that we loaded onto the tablets and used to navigate and record GPS locations of potential HED habitat, other rare species or invasive plants. We also identified areas with historical records of adult HED as well as potential larval habitat. We focused our survey efforts at Negwegon State Park during the first year of the project to make the best use of project resources and to test the survey methodology at one location. We used the website "Volunteer Spot" to facilitate volunteers signing up online for 3 hour shifts prior to the scheduled survey week. Sue Keller and Bill Grigg also helped to coordinate this process.

Surveys and Treatment 2014: Surveys were conducted in the south portion of Negwegon State Park (Figure 2.) by MNFI, Huron Pines and State Park staff and volunteers between August 4-9, and September 22-26. Fifty 8th grade students from Alcona Middle School and a field biology class from Alpena Community College also assisted with surveys. Volunteers signed in for their shifts and were assigned to a team led by MNFI and Huron Pines staff. Each team systematically meandered through their assigned habitat block searching for HED potential habitat as well as invasive plants. One team member recorded a GPS track (to show the area that was surveyed) and recorded points on a Garmin hand held GPS unit. Another person helped navigate and record GPS locations using the Avenza pdf maps application on a Samsung tablet. Finally, someone placed orange wire flags in potential HED burrows (crayfish burrows) when they were sighted.

When potential HED larval burrows were spotted they were flagged and a GPS point was taken. Later, Dave Cuthrell (MNFI entomologist) accompanied by volunteers extracted contents from crayfish burrows utilizing a manual bilge pump. Water and contents were filtered through a 1.0 mm mesh aquatic net. All material collected in the net was then dumped into a white enamel pan and sorted for dragonfly larvae. Sampling of burrows proceeded until the number of larvae specified in the permit had been collected at a site, or until about 10% of the presumed habitat had been sampled. All voucher larval specimens were placed in 4 dram vials which contained 95% ethyl alcohol. They were sent to the HED specialist, Daniel Soluk at the Missouri River Institute, University of South Dakota for identification.



Crayfish burrow sampling for larval Hine's emerald dragonfly.
Photo: Brandon Schroeder.

Invasive Species Surveys

As invasive plants were spotted, a GPS point was taken and information about the species, population estimate and density were recorded on a standard form for recording invasive plants. (Appendix 3.) This form was loaded on the Samsung tablet in a drop down menu so that information could be entered directly without requiring paper forms. Invasive plants were hand pulled (when only a few plants were found) or treated with herbicide. Huron Pines staff who had received their pesticide applicator certification used a back pack sprayer to apply an aquatic approved herbicide (Glyphosate) which contained a blue dye to help delineate plants that were treated. If the size of the area was too large to treat with a backpack sprayer, or if a chainsaw was needed, then a GPS point was recorded so that the plants could be treated at a later time with more appropriate methods.

Surveys and Treatment 2015:

MNFI staff conducted surveys at Thompson's Harbor State Park on July 23 to identify potential areas of HED habitat and to identify areas with invasive species. We later worked with park staff and volunteers on August 10, 2015 to look for HED habitat and to pump crayfish burrows with potential for HED larvae. On September 24, 46 seventh graders from Rogers City Middle School spent a day at the park assisting with burrow pumping, looking for invasive species and learning about native plants, birds and outdoor photography. We resumed work in the northern portion of Negwegon State Park (Figure 3.) with volunteers and State Park and Huron Pines staff on August 12 -13th and September 22 -23rd and continued to identify and treat invasive species and search for HED. Large trees near the main parking lot were cut by DNR Parks staff and the stumps were treated by Huron Pines Americorp staff. GPS locations of all invasive plants both treated and untreated were provided to the Stewardship Unit, DNR Parks and Recreation Division as well as the Huron Pines Project Coordinator.



Huron Pines staff treating invasive plants with herbicide. Photo: Daria Hyde

MNFI staff conducted meander surveys for adult HED in suitable habitat at all four sites between August 6-13, 2015. Locations of invasive species were recorded but not treated. Adult dragonflies of the *Somatochlora* genus were netted, identified when possible, and photographed with a digital camera and released if they were determined to be HED. Dragonflies that were not HED were placed in glassine envelopes and vouchered pending further identification. Samsung tablets were used and spatial locations were recorded using the BackCountry Navigator Pro GPS Application (CrittterMap Software LLC) for Android. Location information was recorded for each adult observed. Standard MNFI special animal field forms (Appendix 4.) were completed for each site.

Figure 2. Negwegon State Park South with Survey Grids: 2014



Figure 3. Negwegon State Park North with Survey Grids: 2015

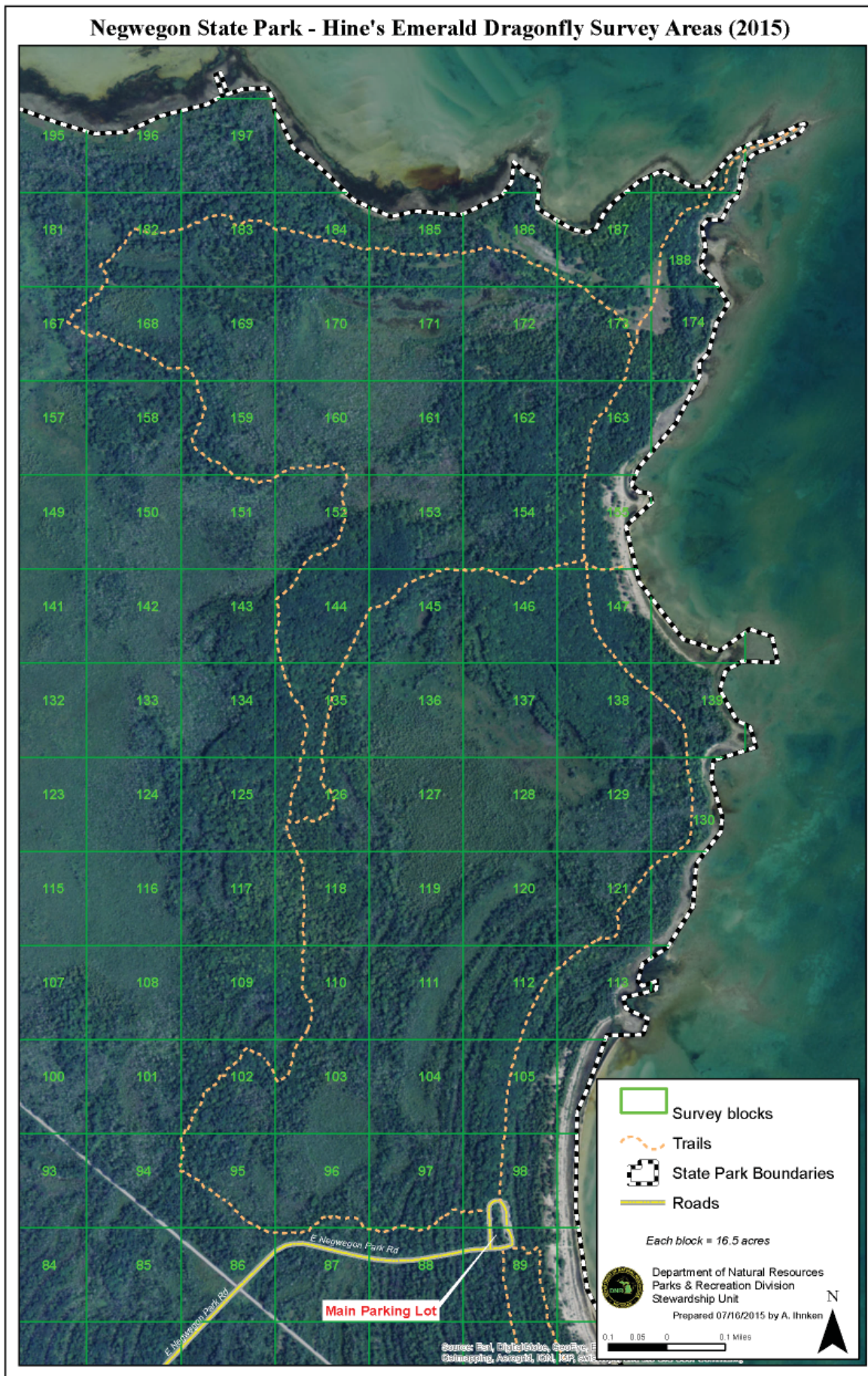


Figure 4. Thompson's Harbor State Park: Survey Grids 2015

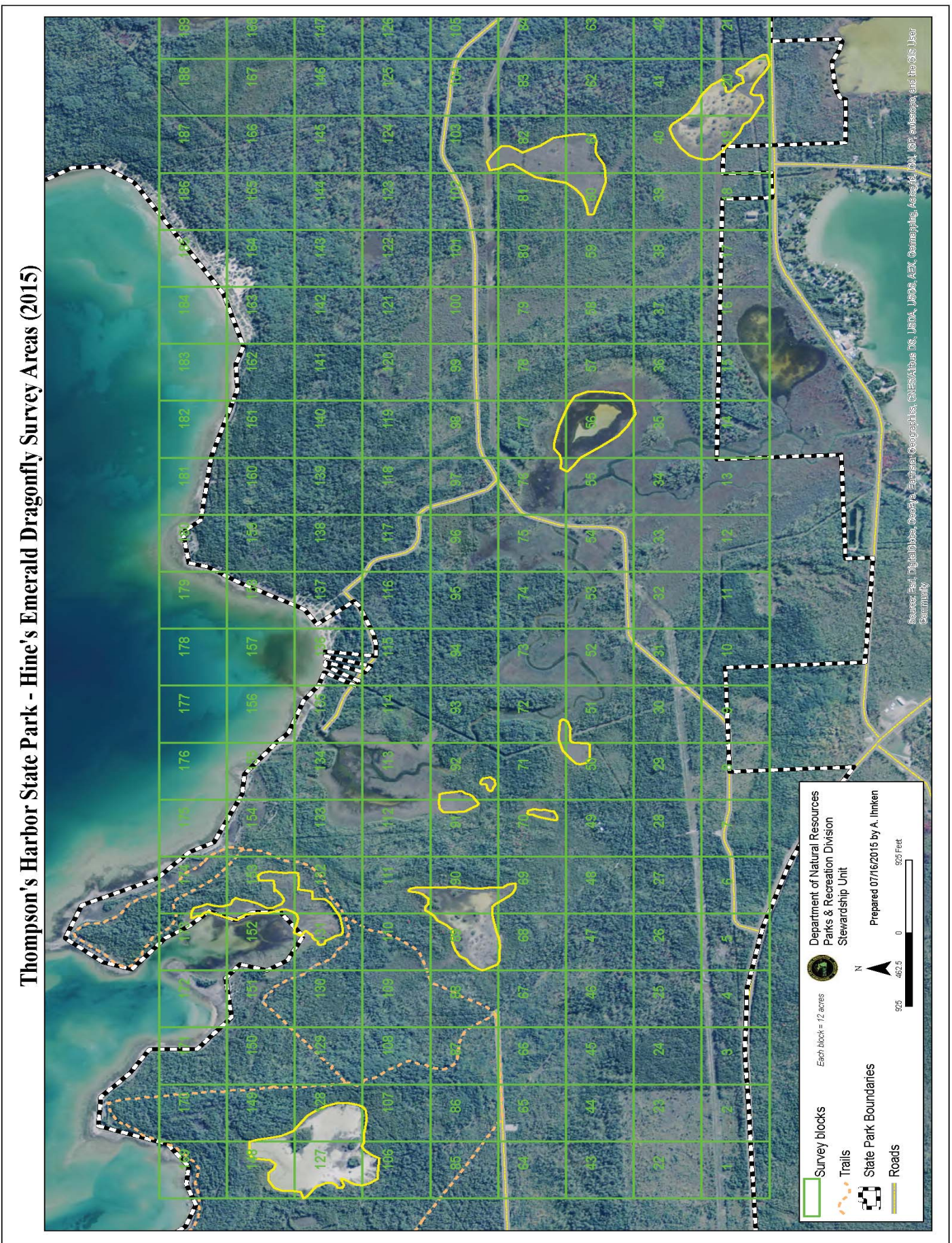


Figure 5. North Point Road and Misery Bay



Results

Community Outreach, Volunteer Recruitment and Training

Workshops: Thirty community members and potential volunteers attended the workshop held at the Alcona Township Hall on June 12, 2014. Fifteen people attended a similar workshop held in 2015 at the Presque Isle District Library (Table 1.).

On-Site Training and Volunteer Surveys: In 2014, 25 people attended the 3 hour training held at Negwegon S.P. on August 4 and 15 people attended the training on September 22. In addition, 12 students from Alpena Community College conducted surveys on September 23, and 48 students from Alcona Middle School assisted with surveys on September 24. The following year, 10 people participated in the training provided at Thompson’s Harbor S.P. on August 10, 2015 and 46 students from Roger’s City Middle School assisted with surveys at the park on September 24. A total of 825 hours were contributed by volunteers conducting surveys at the parks in 2014 and 2015 (Table 1.).

Report Project Results to the Community: Information about the project was shared with the local community through articles in: “The Guide”, September 2014 and January 2015 issues and Mid-Michigan’s Second Wave, October 2014. Articles were posted each year on the MSU Extension website and the NEMI GLSI website. A talk summarizing project results was presented at the Place Based Education Conference in Grand Rapids, MI in November, 2014. A program about the project was aired on the Sunrise Cable Network (Channel 6 in Onaway, MI) in August 2015. Finally presentations about the impact of invasive species on natural features was presented in 2014 and 2015 by Sue Keller, project volunteer, to the Harrisville City Council, a garden club and a neighborhood association.

Table 1: Community Participation in HED Project 2014 - 2015	
Workshop Attendees	45
On-Site Training Participants	50
Middle School Student Volunteers	94
Community College Students	20
Total Volunteer Hours	825



Volunteers with MNFI and Huron Pines staff after a long day of surveys at Negwegon S.P. Photo: Daria Hyde

Negwegon State Park

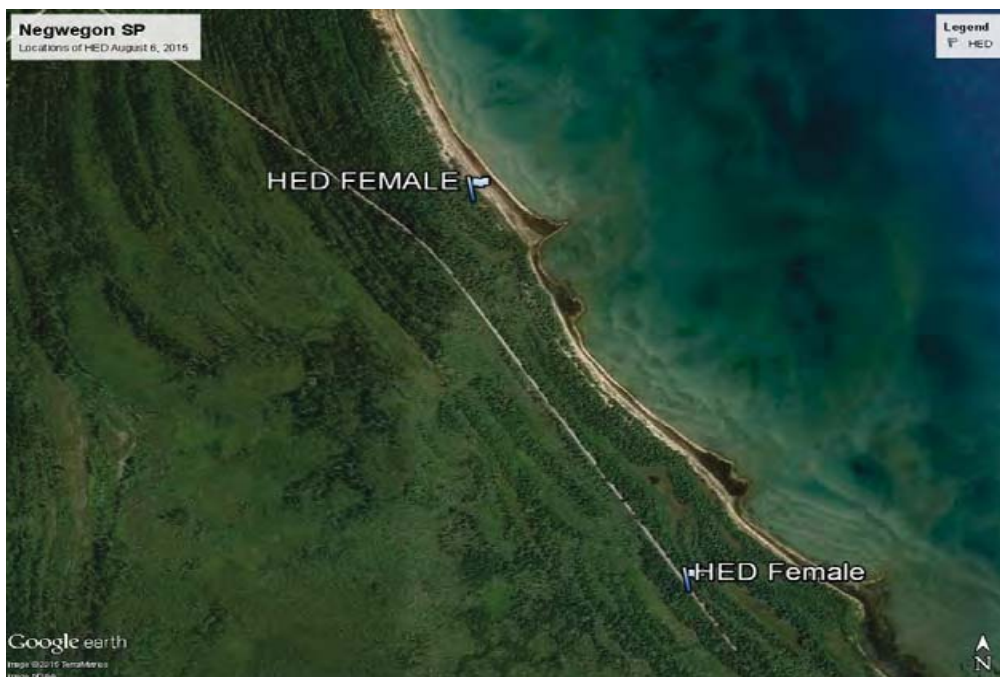
Adult and Larval HED Surveys: In 2015 two adult female HED were observed on the hiking trail, one south of the main parking area and the other along the hiking trail where it meets the railroad ROW close to the southern parking lot. These locations are very near where they were last documented in 2007. Considerable time was spent in several wetlands throughout the park but adult HEDs were only seen on the hiking trail (Table 2 and Figure.6). Over 400 acres of potential HED habitat was surveyed in 2014- 2015. Surveyors documented 23 locations of potential HED habitat and flagged and mapped 77 crayfish burrows in low swales within the wooded dune and swale complex, open sedge meadows and interdunal swales adjacent to the beach (Figure 6). No HED or *Somatachlora* larvae were discovered despite pumping over 30 burrows at multiple locations



Interdunal swale at Negwegon State Park. Photo: David Cuthrell

Table 2: Survey Results for HED at Negwegon S.P.	
Potential HED Larval Habitat	23 locations
Burrows	77 (30 pumped)
HED Adults	2 females

Figure 6. Documented HED at Negwegon S.P. in 2015



Invasive Species Surveys: In 2014 and 2015 approximately 400 acres at Negwegon State Park was surveyed for HED habitat and invasive species. The most commonly documented invasive plant at Negwegon State Park was glossy buckthorn (*Frangula alnus*). We documented 482 locations of this plant in the park and over 90% of occurrences were treated with herbicide, hand pulled or cut and treated with herbicide (Table 3.). Over 200 of these occurrences were mature fruiting glossy buckthorn trees that were discovered along a 0.6 mile stretch of the entrance road leading into the park. These trees were cut down, removed, hauled off site and burned. The branches with berries were bagged to prevent further spread of seed by birds. Park staff provided both labor and equipment which contributed to the success of this effort. Japanese barberry (*Berberis thunbergii*) was documented in 25 locations and 16 of these trees were cut down and treated with herbicide. Less commonly encountered invasive plants included various thistles, narrow leaved/hybrid cattails, non-native phragmites, reed canary grass and tartarian honeysuckle. Spotted knapweed is prevalent in the park and is especially dense near the beach. We decided not to expend efforts mapping and treating this invasive plant as it is often the target of volunteer work days with local schools. During surveys we discovered a new location for the federally endangered pitcher's thistle (*Cirsium pitcheri*) as well as two locations for the state threatened Lake Huron Locust (*Trimeritropis huroniana*).

Table 3. Invasive Species Recorded at Negwegon S.P. in 2014 and 2015			
Species	Treated	Untreated	Total Mapped
Bull thistle		1	1
Canada thistle	1		1
Eurasian swamp thistle	1		1
Glossy buckthorn	440	42	482
Hybrid cattail		3	3
Japanese barberry	16	9	25
Narrow leaved cattail	1	4	5
Invasive phragmites		4	4
Reed canary grass	3	14	17
Spotted knapweed		8	8
Tartarian honeysuckle	1		1
TOTAL	463	85	548



Top: Pitcher's thistle. Photo Phyllis Higman



Right: Sue Keller, Friends of Negwegon volunteer maps a new location of the Pitcher's thistle. Photo: Daria Hyde



A 4H volunteer catches a meadowhawk dragonfly. Photo: Brandon Schroeder



Top: Glossy buckthorn seedling

Left: State Park staff Ernie Nahgahgwon cutting down a glossy buckthorn tree. Photos: Daria Hyde

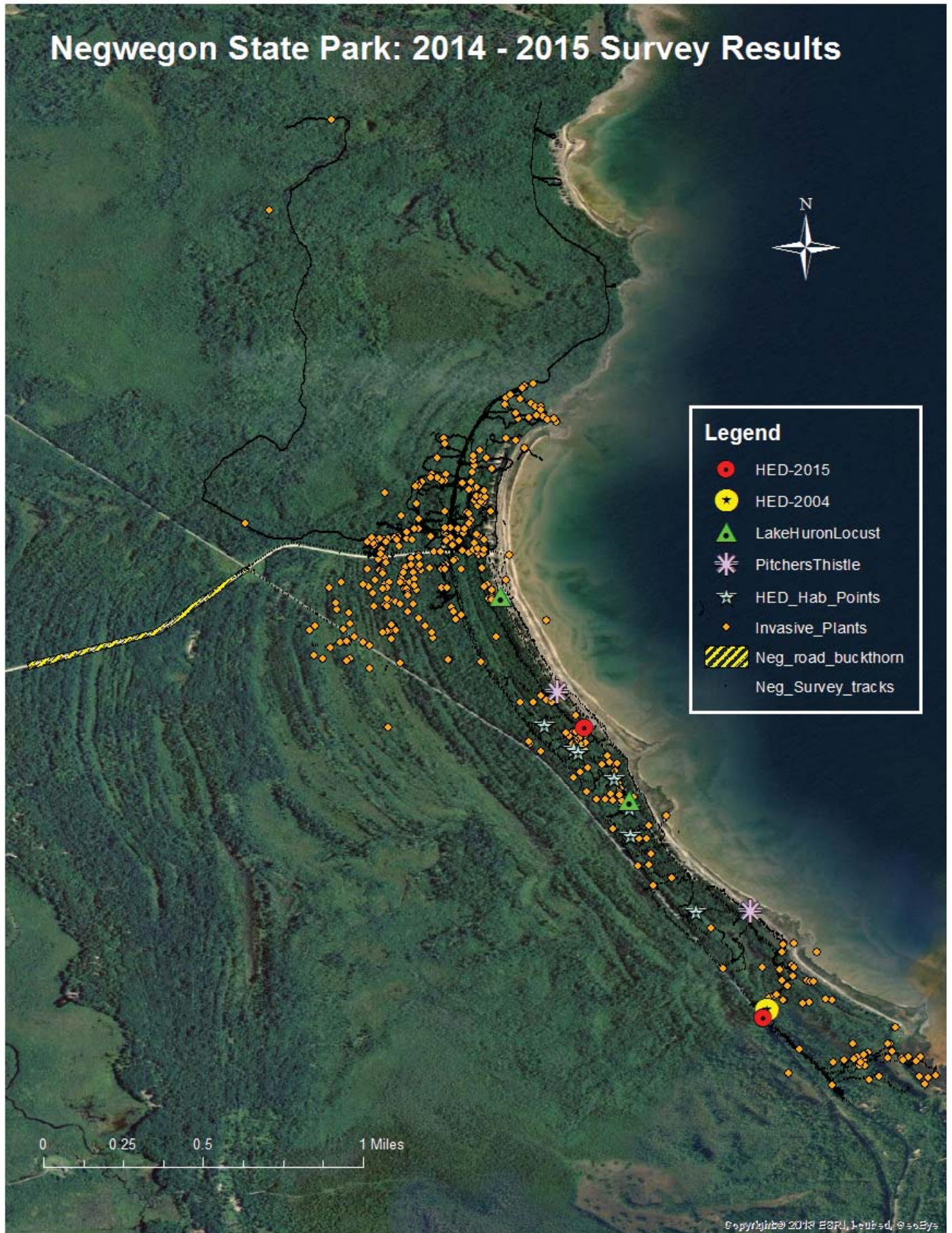


Top: Lake Huron locust.

Right: Confering over maps.
Photos: Brandon Schroeder



Figure 7. Negwegon State Park Survey Results



Thompson's Harbor State Park

Adult and Larval HED Surveys: We conducted surveys for adult HED in approximately 80 acres of habitat in 2015. One adult *Somatochlora* dragonfly was observed flying in a small northern fen opening at the park just southeast of the main trail where HED had been documented in 2004, but we were unable to net the dragonfly for positive identification. Pumping of crayfish burrows was conducted in this fen on August 10 and several dragonfly larvae were extracted from 26 crayfish burrows including one potential HED larvae. This larvae was sent to Daniel Soluk at University of South Dakota for identification. He determined that the larvae was a "probable" HED but without genetic tests he is unable to make a definitive verification. Once e-DNA markers are developed for the HED (hopefully within a year) then he will be able to test this specimen (Table 4.). Three small crayfish were also extracted during pumping and were preserved at MSU for future identification. In addition, we spent a day pumping numerous crayfish burrows with students from Roger's City Middle School in the coastal fen located near Lake Michigan on September 24th but did not find any potential *Somatochlora* larvae.

Invasive Species Surveys: All areas of potential HED habitat were surveyed in 2015. Invasive plants were only found in disturbed area such as the main hiking trail (abundant spotted knapweed, bladder campion and two wild parsnip plants) and at the entrance to the sandy beach (sweet clover). The federally endangered dwarf lake iris (*Iris lacustris*) was growing densely along the path.

Table 4. Survey Results for HED at Thompson's Harbor S.P.

Burrows pumped for larvae	26 northern fen, 20 coastal fen
HED larvae	1 "probable"
HED Adults	1 "possible"

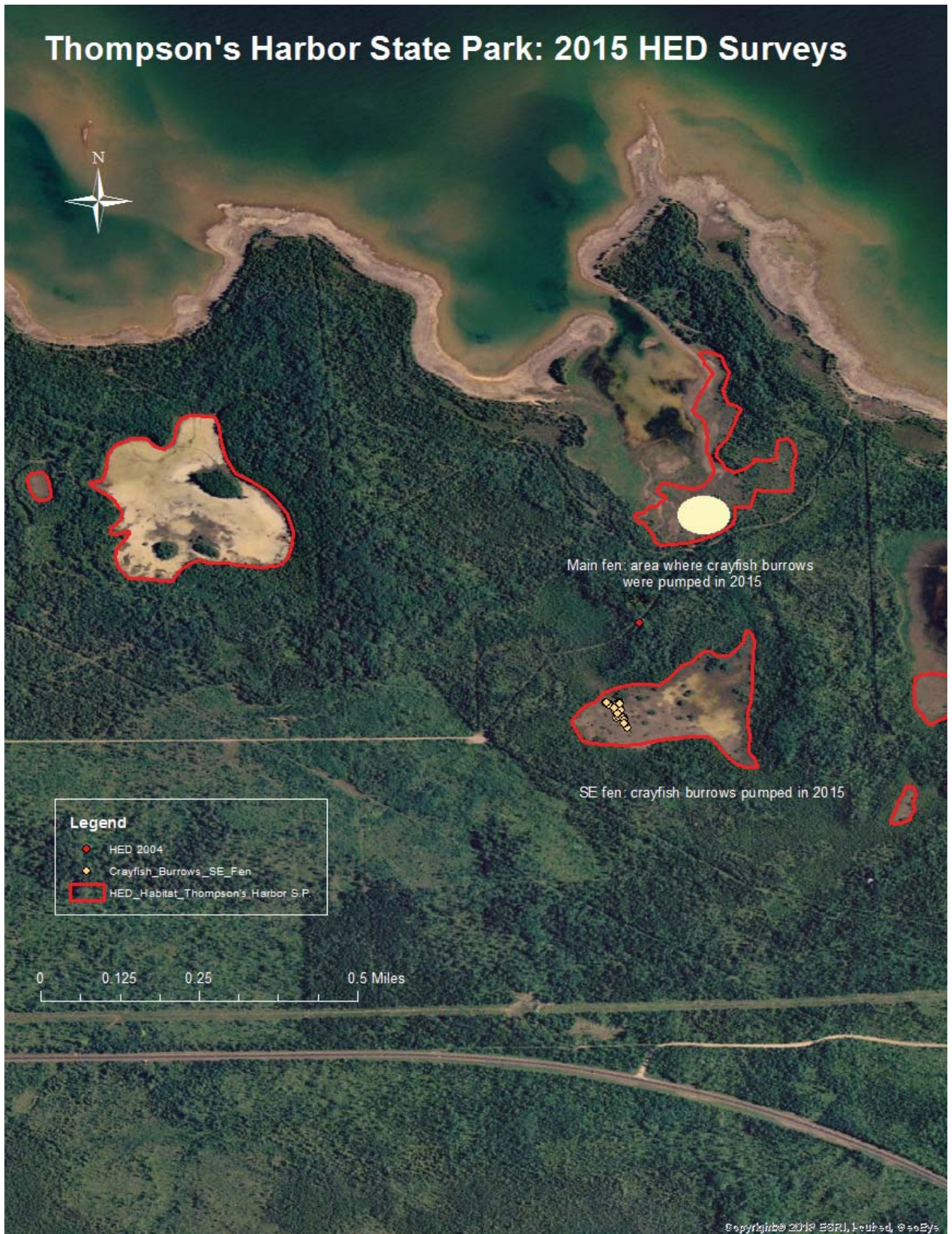


Top: HED habitat in northern fen at Thompson's Harbor S.P. Photo: Daria Hyde

Top Right: Dwarf lake iris growing on trail leading to fen. Photo: FWS.gov

Bottom Right: Crayfish burrow pumped during surveys for HED larvae. Photo: Daria Hyde

Figure 8. Thompson Harbor State Park Survey Results



Misery Bay

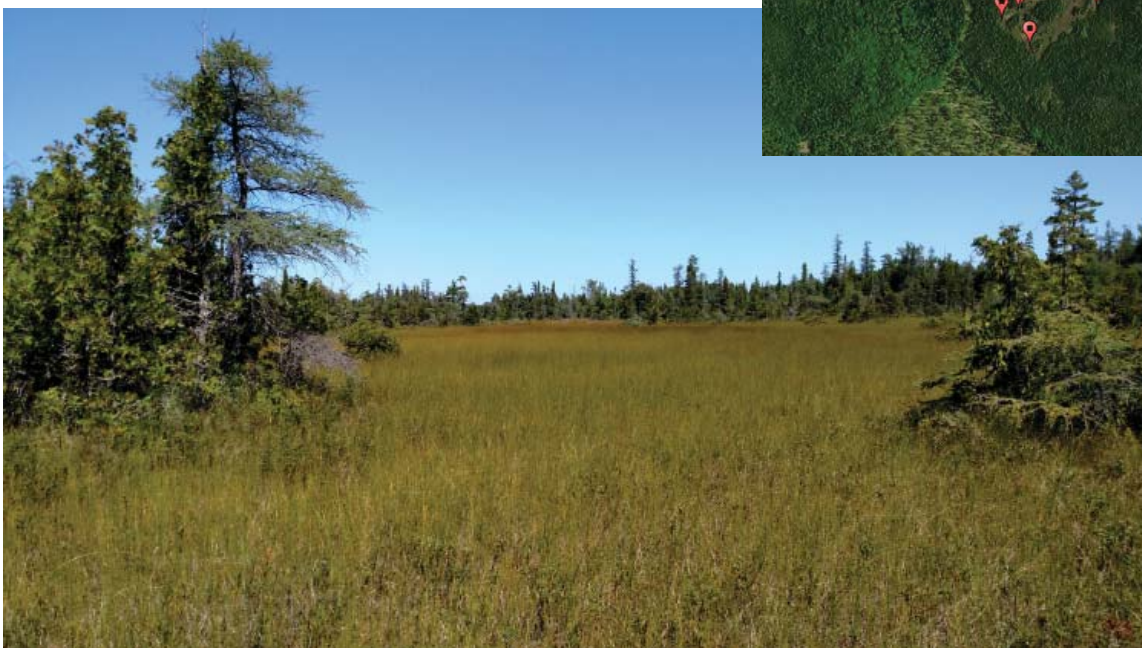
Adult and Larval HED Surveys: Surveys for adult HED were conducted in approximately 25 acres of habitat on August 12-13, 2015. Twenty adult HED dragonfly (mostly male) were documented flying in a large high quality coastal fen at Misery Bay (Figure 9.). Two females were observed ovipositing with males hover guarding. HED were last documented at this site in 1999. Pumping of crayfish burrows was also conducted and one larger specimen and 5 smaller specimens that were potential *Soma-tochlora* larvae were extracted from numerous burrows. These larvae were sent to Daniel Soluk at University of South Dakota for identification. As suspected, the smaller larvae were too tiny to identify. He determined that the largest larvae is “likely” a HED but without genetic tests he is unable to make a definitive verification (Table 5.). Once e-DNA markers are developed for the HED (hopefully within a year) he will be able to test this specimen. A few crayfish were extracted during pumping and were collected and preserved at MSU for future identification. We also surveyed other wetlands in the vicinity of this site on the La Farge Corporation and the B.P. Hunt Club properties but did not find additional areas of potential HED habitat.

Invasive Species Surveys: Spotted knapweed, purple loosestrife and narrow leaved cattail were documented in the vicinity of the coastal fen but have not invaded the fen. Non-native phragmites is currently confined to places along the shoreline. Numerous glossy buckthorn trees were recorded along the two track access at the edge of the forest approximately 0.5 miles from the fen.

Table 5. Survey Results for HED at Misery Bay

Burrows pumped for larvae	45 - 50
HED larvae	1 “likely” HED
HED Adults	20

Right: Locations of adult HED at Misery Bay in 2015.
Map: Dave Cuthrell
Bottom: Coastal fen habitat occupied by HED at Misery Bay.
Photo: Daria Hyde



North Point Road - Section 9 Fen

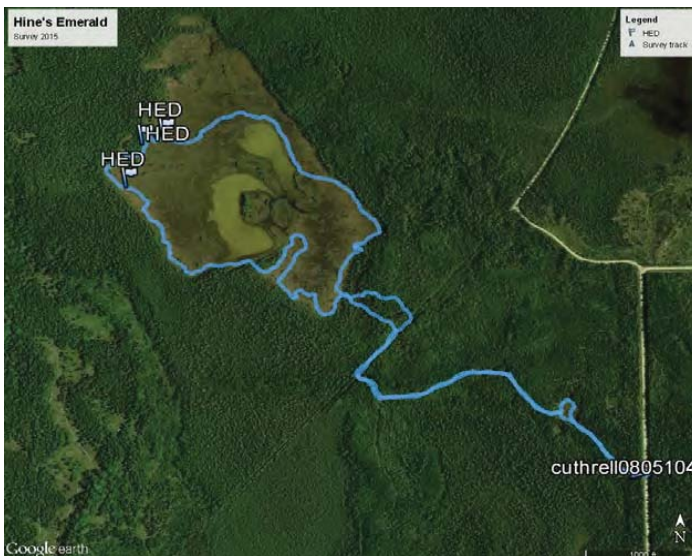
Adult and Larval HED Surveys: Surveys for adult HED were conducted in approximately 5 acres of northern fen habitat on August 12, 2015. Three adult male HED dragonfly were seen flying along the edge of the fen and cedar/spruce swamp, although survey conditions were not ideal as it was very windy. The area contained small rivulets or tiny pools of water with no perceptible flow, and was dominated by spike rush, Pitcher’s plant, and sedges. HED were last documented at this site in 2002. Larval surveys were not conducted at this site as crayfish burrows were not found (Table 6.)

Invasive Species Surveys: No invasive plants were noted during HED surveys of this site.

The Alpena Township Nature Preserve: In 2015 we visited this 133 acre tract of land located on Misery Bay, and adjacent to El Cajon Bay. It is located less than 0.5 miles from the North Point Road site. A survey revealed a high quality coastal fen with potential habitat for HED, although we were unable to conduct a focused survey for adult or larval HED. The preserve contains an extensive population of the federally endangered dwarf lake iris (*Iris lacustris*) as well as a newly documented occurrence of state special concern tuberous Indian plantain (*Arnoglossum plantagineum*). Non-native phragmites was noted nearby and an infestation of spotted knapweed was hand pulled.

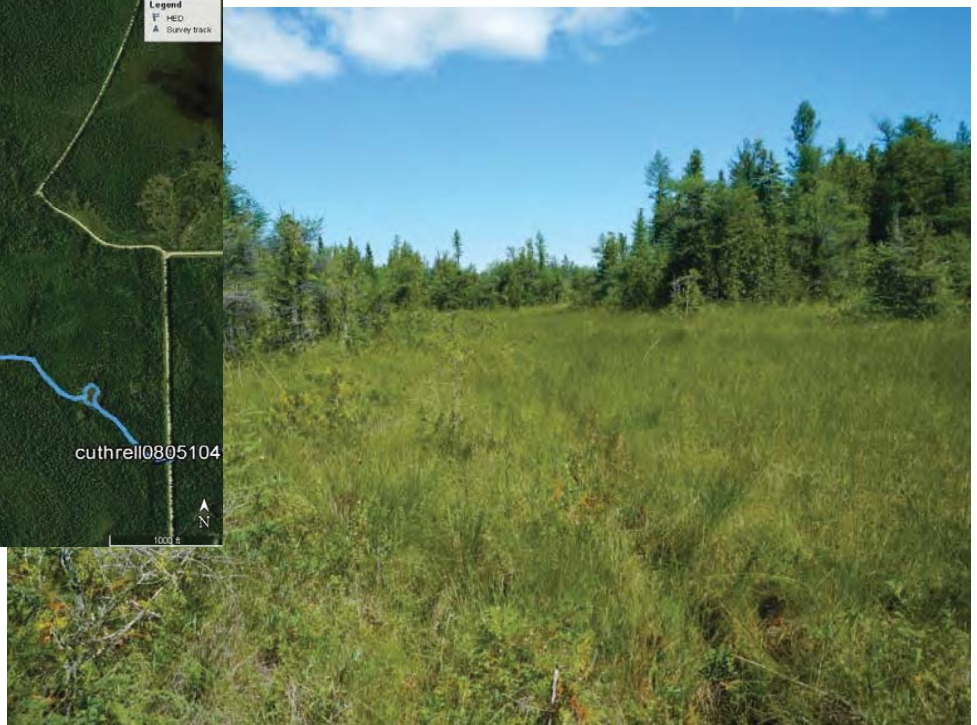
Table 6. Survey Results for HED at North Point Road.

Burrows pumped for larvae	0
HED larvae	0
HED Adults	3



Top: Locations of adult HED at North Point. Road. in 2015. Map: Dave Cuthrell

Right: Northern fen habitat occupied by HED at North Point. Road.
Photo: Dave Cuthrell



Discussion and Recommendations

The primary goal of this project was to recruit, train and work with local stakeholders to conduct surveys for the Hine's emerald dragonfly, and to map and treat invasive plants at four sites where Hine's emerald dragonfly occurs to protect this critical habitat. As a result of this project we were able to conduct much needed monitoring of HED at the four sites, identify potential larval habitat, implement invasive species treatment where it was most needed and engage and train people in the local community to continue to promote protection and stewardship of the HED.

Community Outreach, Volunteer Recruitment and Training: We were successful in raising awareness within the local communities located in Alcona, Alpena and Presque Isle counties about the unique natural communities that occur along the coastline as well as the rare plants and animals that occur here. In particular we were able to raise awareness about the HED and the vulnerability of this species to habitat degradation. We worked with our partner Huron Pines to teach people to identify the most common invasive plants that occur in this region and emphasized the importance of reporting new occurrences so they can be treated before they are well established. The local "Friends" groups, State Park staff, and the Northeast Michigan Great Lakes Stewardship Network helped us to successfully promote the project, recruit a large number of volunteers and to connect with students in local schools. Volunteers ranged in age from 12 to 82 and contributed their diverse skills, energy and experience. The youngsters were especially observant and readily found tiny buckthorn seedlings. They were also quick to master the technology of tablets, phone apps and GPS navigation. Elders, many of whom were retired teachers, shared their knowledge of the natural world with younger volunteers as well as the pleasure of a long hike in the woods.

Working with large groups of middle school students was a logistical challenge. Careful coordination with their teachers and GLSI staff prior to the field trip helped us to deliver a focused learning experience and an opportunity for students to make a contribution while having fun in the process. The numerous illustrated thank you notes that we received from the students affirmed that the field trip had a big impact on these kids and helped to nurture a stewardship ethic that hopefully will continue to ma-



Students from Alcona Middle School find a salamander. Photo: Brandon Schroeder

ture. In the same way, raising awareness in a local community takes time and will need to be nurtured by our local partners who will continue to promote and support local stewardship actions.

Negwegon State Park

Unfortunately, after two years of working at this park, we were unable to find HED larvae or observe females ovipositing in order to identify important breeding and larval habitat. We did find many areas that appeared suitable that should be monitored during future surveys. Two adult HED were documented, one near the southern park entrance near the railroad track at the same location as it was found in 2007, and the other closer to the main parking lot. Further surveys are needed to better understand the distribution and population ecology of the HED at this site.



Time to empty out the boots!
Photo: Daria Hyde

We encountered several challenges working at this park due to its size, difficult terrain and lack of an extensive trail system. Volunteers and staff found it hard to navigate the wooded dune and swale habitat with dead and downed logs, unstable mucky soils and deep pools of water. We had to revise our original plan and focus our efforts in the survey grids adjacent to trails as we did not want anyone to get lost or to jeopardize the safety of those who had volunteered their time to help. It would be prudent for Parks staff to

contract invasive species treatment in the less accessible areas to professional consultants. The approach of working in teams to identify invasive plants and to have Huron Pines AmeriCorp staff treat with herbicide at the same time was very successful and resulted in a large number of invasive plants treated and an extensive area surveyed (Appendix 5). This model could be used successfully in other areas if the appropriate partners were in place. Volunteers will not likely continue extensive surveys at Negwegon but will likely schedule occasional work days in the future to inventory new areas and report occurrences of invasive species.

We were surprised by the extent of invasion by glossy buckthorn at the park. Glenn Palmgren, Parks Stewardship Unit, had identified this as a key threat in the Stewardship Plan for the park (Palmgren 2011). He predicted that this invasive plant may move into the wooded dune and swale habitat after the massive die off of ash trees. He was 100% correct and the pervasiveness of buckthorn seedlings as well as large trees that we documented is sobering. We were very shocked to discover in September 2015 that the main entrance road to the park was lined with mature glossy buckthorn trees that were in fruit. We revised our survey plans and focused 2 days to cutting and treating the stumps of over 200 trees with herbicide. Locating and treating these “mother trees” is a priority to prevent the spread of seed by birds. Given limited resources, Glenn’s strategy of focusing treatment adjacent to potential HED habitat to “hold the line” and protect critical habitat makes good sense.

The Unit Supervisor, Eric Ostrander, at Negwegon S.P. was very supportive of this effort and provided staff to work with us mapping and treating invasive plants. He has committed to having staff trained and certified in pesticide application so they can implement an early detection and rapid response effort for invasive plants in the park. This commitment coupled with continued guidance and support from the MI Parks and Rec. Stewardship Unit staff will help to address this threat while it is still manageable. The GPS equipment and Samsung tablets that were purchased through a grant submitted to the Northeast MI Community Foundation by Friends of Negwegon worked very well. They will be housed at the park office to be used by staff or volunteers conducting surveys in the future.

Thompson's Harbor State Park: We were very pleased to discover that invasive plants at Thompson's Harbor State Park were primarily confined to disturbed areas such as the crushed limestone trail (spotted knapweed) and access points to the beach (sweet clover) and have not invaded the northern and coastal fen communities. Blake Gingrich, Unit Supervisor has also committed to having one of his staff member trained and certified as a pesticide applicator to assist with management of invasive plants at the park. Volunteers that were trained will have the knowledge to report new occurrences of invasive plants if discovered during their visits to the park.

Although we were unable to receive a definite confirmation of the *Somatochlora* larvae that we extracted from a crayfish burrow in the northern fen, it is encouraging that expert professional opinion is that this larvae is "probably" a HED. Hopefully genetic testing in the future will resolve this question conclusively. Continued monitoring of this fen to insure that invasive species do not move in and degrade this critical habitat is of utmost importance.



Top: Marking crayfish burrows in northern fen at Thompson's Harbor S.P.
Center: "Probable" HED larvae extracted from crayfish burrow!!!
Right: Huron Pines AmeriCorp staff using a bilge pump to extract contents of burrow.
Bottom: Crayfish (unidentified) extracted from burrow during pumping. Photos: Daria Hyde.

Misery Bay



Hine's emerald dragonfly
Photo: Dave Cuthrell

This site is the highest quality coastal fen that we surveyed during the project. It was gratifying to document 20 HED, to observe breeding behavior and to collect what is considered to be a “likely” HED larva by the species expert. Further verification through genetic analysis is recommended when it becomes available. We also surveyed other wetlands in the vicinity of this site on the La Farge and the hunt club properties but did not find additional areas of potential HED habitat. There were signs of previous ORV use adjacent to the fen but it was not extensive. Non-native phragmites was noted along the shore and a dense stand of mature glossy buckthorn trees was documented ap-

proximately 0.5 miles to the west along the two-track leading to the fen. Spotted knapweed, purple loosestrife and narrow leaved cattail were found but these do not occur in the fen. There are signs of past logging particularly to the west in the uplands and conifer forest/cedar swamp. Although the site is fairly well protected and is within a gated area owned by LaFarge, increased limestone production could threaten this site. Other potential threats that need to be regularly monitored include changes to hydrology, increased ORV use and invasion of habitat by phragmites and buckthorn. We had positive interactions with the Environmental Manager at the LaFarge Limestone Plant who provided us access with a gate key. We also were able to receive permission from the private hunt club who owns the site occupied by HED. It would be very important to follow up with these landowners and show them the habitat and the HED if possible and emphasize the importance of protecting it through compatible land use and management activities. Huron Pines, who conduct invasive species treatment and restoration in northeast Michigan were made aware of these survey results and are in contact with La Farge to plan future treatment of invasive species on their property.

North Point Road – Section 9 Fen.

This site which occurs within the Atlanta State Forest consists of a large northern fen complex with areas of deeper water surrounded by cedar swamp on all sides. There are also several cedar/tamarack islands. Three adult HED were observed flying around the edges near the woods margin, as noted in previous surveys. No invasive plants were documented but potential threats include changes to hydrology and ORV use. It will be important to protect the entire wetland complex including portions of the adjacent cedar swamps, and the entire open northern fen to sustain this critical HED habitat

This project tested the model of engaging local volunteers to assist partner organizations in conducting surveys for HED while simultaneously mapping and treating invasive plants. Despite challenges, our results demonstrate that with proper coordination, this approach can be very effective and helps to conserve scarce resources while educating the local community to promote long term stewardship. Although treatment of invasive species by professional contractors is appropriate much of the time, it is useful to learn that there are other options for conservation of HED habitat.

Acknowledgements

This project was made possible through funding provided by the U.S. Fish and Wildlife Coastal Program as well as the Northeast Michigan Community Foundation. The initial project idea was conceived by Jim Larson and Sue Keller, Friends of Negwegon S.P who assisted with development of the grant proposal. Throughout the project Sue generously contributed countless hours to promoting and coordinating education events, recruiting volunteers, organizing work days, preparing training materials and providing healthy snacks to hard working volunteers. Bill Grigg, Friends of Thompson's Harbor also assisted with project promotion, volunteer recruitment and educational events and even led a well-received photography workshop for Roger's City middle school students. Brandon Schroeder, Sea Grant, MSU Extension, along with Heather Rawlings, USFWS working through the Northeast Michigan GLSI were instrumental in reaching out to Christie Thomas, Alcona Middle School, Holly 'Wirgau and Matt Barsen, Rogers City Middle School and Tracy D'Augustino, 4H Group leader and coordinating educational work days for the students at Negwegon and Thompson's Harbor State Parks. A word of gratitude to Brenda Kelly, Field Biology instructor at Alpena Community College for bringing her students to help in 2014 and 2015.

Huron Pines, a key project partner assisted with educational events and provided trained AmeriCorp staff during both years who heroically trudged through wetlands carrying a 40 pound backpack of herbicide and a ready smile. Thanks to Jennifer Muladore and Melissa Buzzard who coordinated the AmeriCorp staff (Claire Wood, Amanda Zwagerman, Gina Zanarini, Josh Ryan, Leighton King, Ryan Cass, Deanna Staton and Holden Branch). Thanks also to Laurel Hill, a USFWS intern from the Coastal Program office who volunteered her time and fun-loving nature to our efforts at Negwegon.

This project would not have been possible without the leadership and guidance from Glenn Palmgren and Alicia Ihnken, Stewardship Unit, Michigan Parks and Recreation Division. They provided very helpful advice, created survey maps and coordinated additional invasive species treatment at the parks. Eric Ostrander, Negwegon State Park, provided valuable resources and support in 2014 and 2015. He provided dedicated staff time and expertise and much needed equipment (chainsaws and ATV's) contributing greatly to our success at Negwegon. Thanks to Ernie Nahgahgwon, Allan Baldwin, Mike Signorello and Eric Braun for their hard work and good natured resourcefulness. Thanks as well to Blake Gingrich, Unit Supervisor, Thompson's Harbor State Park for his generous support and commitment to this project. His assistance at the fieldtrip/work day for the middle school students was much appreciated as was the help of his staff, James and Terry.

We appreciate the assistance of Travis Weide, Environmental Manager, La Farge Corporation who provided directions and access to the Misery Bay site. We also appreciate the members of the Beaumont Point Holdings Hunt Club for providing permission for us to conduct surveys on their property.

Finally we would like to thank MNFI staff who contributed behind the scenes to the success of this project. Helen Enander, GIS specialist and map maker extraordinaire, Nancy Toben, Financial Administrator and grant specialist, and Sue Ridge, our previous Administrative Assistant.

Citations

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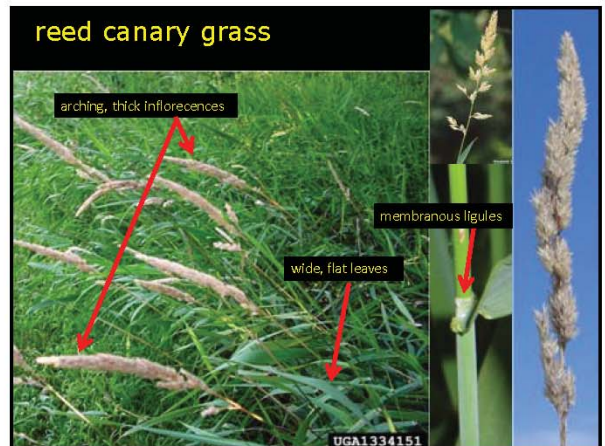
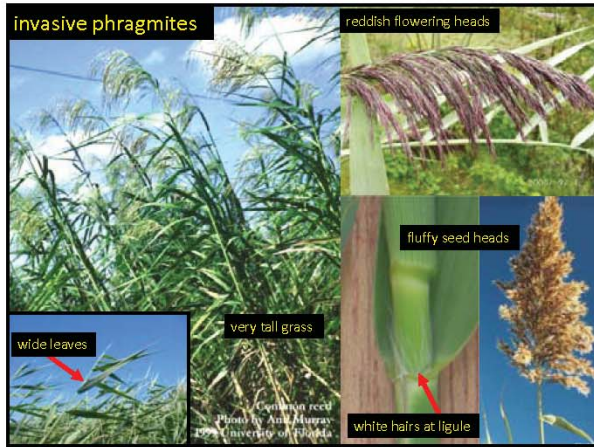
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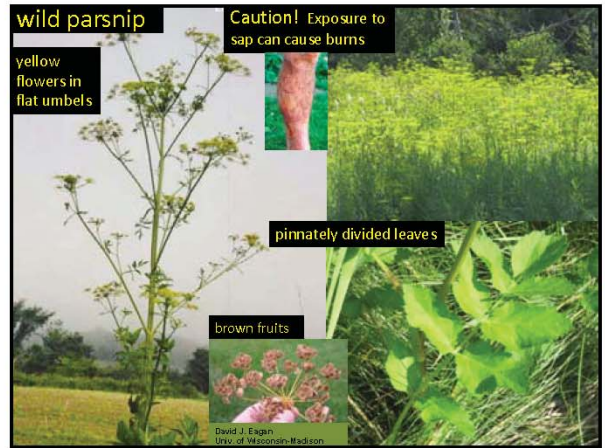
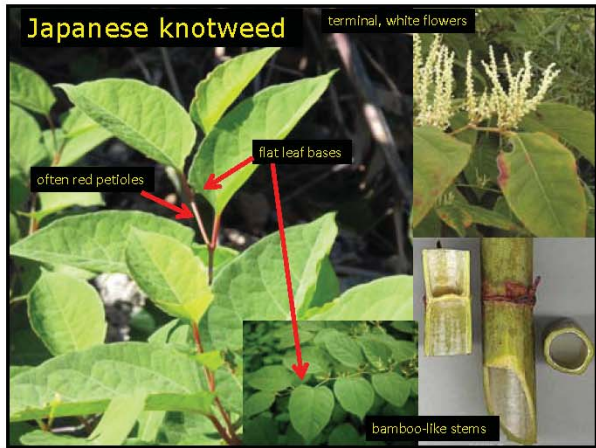
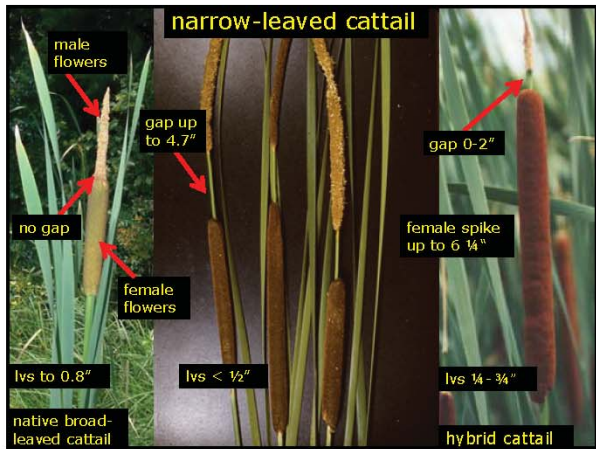
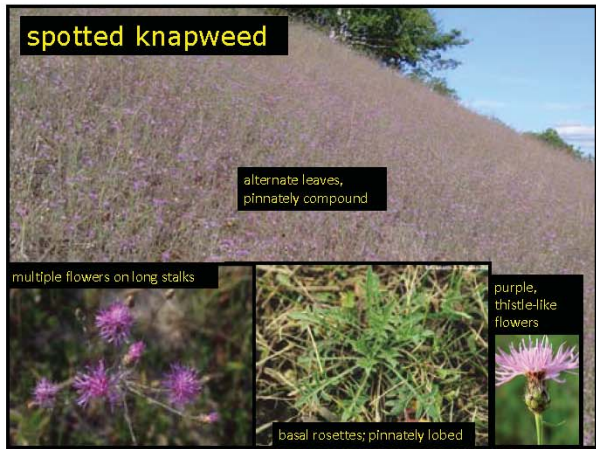
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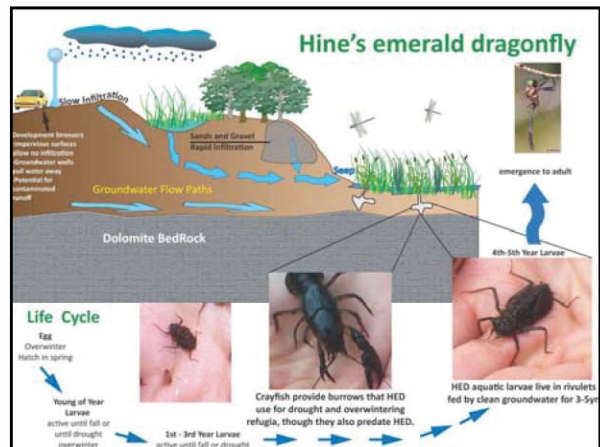
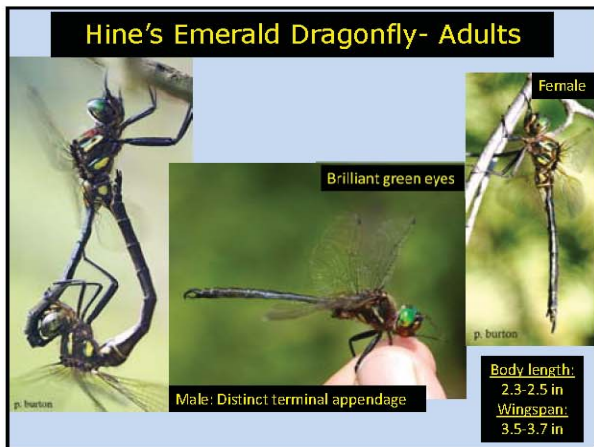
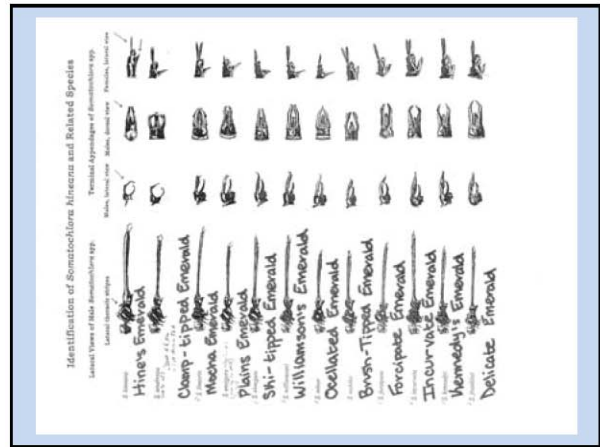
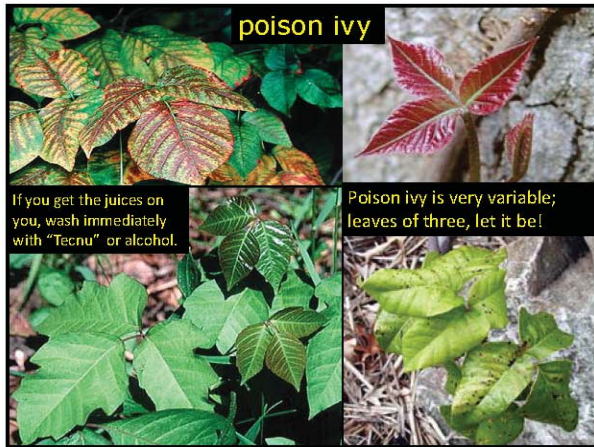
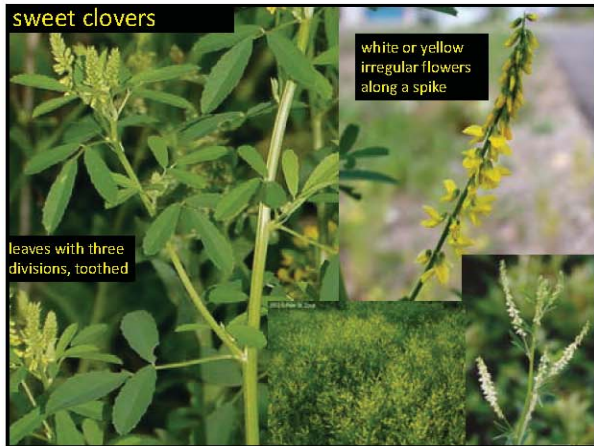
1. Laminated I.D. Cards for Rare Plants and Animals and Invasive Species.
2. Conservation Measures to Protect Listed Species and Critical Habitat
3. Invasive Species Mapping/Treatment Field Data Form
4. MNFI Special Animal Field Form
5. Huron Pines 2015 Work Summary

Appendix 1

Identification Cards Provided to Volunteers Conducting Surveys at Negwegon & Thompson's Harbor State Parks







Eastern Massasauga Rattlesnake




Triangular shaped head
Vertical slit shaped pupils

Med. Thick bodied
Avg. length: 18-30 in
Gray or brown
(sometimes black) with
saddle-shaped spots

Blunt tail with
segmented rattle



Photo by Joseph Sage

Pitcher's Thistle




- Blue-green stem/leaves with fine white wooly hairs
- Leaves pinnately divided
- Large creamy flower heads (can have pinkish tint)
- Immature plants: basal rosettes
- Status: Fed/St. threatened

Piping Plover



White rump seen in flight



Well-camouflaged eggs


- Small sand-colored, shorebird
- Orange legs and bill (with black tip)
- Single black band across chest & forehead
 - 2 noted "peep lo" whistle
- Status- Fed/St. Endangered

Prairie Indian plantain


- Tall perennial forb up to 1.5 m
- Elliptical leaves with distinct parallel veins
- White flowers in flat-topped cluster
- Status: State Special Concern

Lake Huron Locust




Male
photo by D. Cuthrell

- Small band-winged grasshopper
- Silvery to ash gray also red, orange and ochre
- Males: noisy (crackling) flight
- Adults fly mid-July - mid-Oct
- Status: State threatened





Male



Female

Dwarf Lake Iris

- Miniature iris with leaves up to 15 cm tall
- Yellow, slender ribbed rhizomes
- Flowers mid-May through early June
- Endemic to Lakes Huron and Michigan
- Status: State, Federal threatened

Avoiding Rattlesnake Bites

1. Learn to identify Michigan snakes to distinguish rattlesnakes from other snakes
2. Wear ankle high hiking boots or rubber boots, thick socks and long pants – especially when hiking in open rocky areas or where vision may be obscured.
3. DO NOT pick up snakes or wild animals. This is the most common cause of bites!
4. DO NOT harass, chase or threaten a snake. It is the second most common cause of bites. Never kill a rattlesnake – it's unnecessary, dangerous and AGAINST THE LAW.
5. Watch where you are putting your feet and hands. Poke around with a stick before reaching into brush, under rocks, or into dark places where snakes may be hiding.
6. If you hear a rattlesnake, STAY CALM! Stop walking and determine the snake's location, slowly move away and give it room to slither away. Never make sudden moves. A fast motion can easily be mis-interpreted by the snake as a threat.
7. Keep pets on leashes. If you suspect that your pet has been bitten, take it immediately to the veterinarian.
8. If you come across a snake, the best advice is to simply leave it alone!

Thank You!

- Your skills and time are much appreciated!
- Report Invasive Species to Park Manager
- Report Rare Species to MNFI – 517-284-6200
- Your efforts will help preserve the wild and pristine beauty of Thompson Harbor State Park for now and for future generations of plants, animals, and people.



MICHIGAN STATE UNIVERSITY

Extension

Huron Pines
Conserving the Forests, Lakes and Streams of Northeast Michigan

Safety

Emergency Numbers:

Ambulance/Police- 911

Presque Isle County Sheriff's Office- (989) 734-2156

P.H. Hoeft/Thompson's Harbor State Parks - (989)-734-2543

Preventing Accidents and Injuries:

- Take your time and walk carefully on uneven surfaces.
- Use a long stick to test areas in wetlands that appear soft.
- **Do not** walk in areas filled with deep water or muck.
- Watch out for branches at eye level that can poke you.



What about ticks?

- Ticks are small arachnids (spider family) that require blood to complete life cycle.
- Michigan has 5 different types of ticks. The black legged tick, transmits Lyme disease.
- **Wear light colored clothing** to spot ticks easier and **tuck your pant legs in your socks**.
- **Check often for ticks and brush them off** before they bite, which usually takes a while.
- If you think you have been bitten, try to capture the tick in a zip lock bag, for I.D.
- If you **feel sick** or develop a **red circular rash**, check in with your doctor immediately
- Early treatment is essential for preventing Lyme disease.

What to do if Bit by a Rattlesnake

1. Remain calm. Move away from the snake to avoid further bites.
 2. If possible, sit down and wait for help to arrive. Try to move as little as possible because venom spreads more rapidly if you walk fast or run.
 3. Remove rings, watches, bracelets.
 4. Go to the nearest hospital immediately. Doctors will decide if anti-venom or other treatments are needed.
1. DO NOT cut or use ice on the wounds.
 2. DO NOT place a tight-fitting tourniquet around the affected arm or leg.
 3. Remember that there have been no recorded fatalities in Michigan from massasauga bites in over 50 years.

For more information about snakebite contact:

Michigan Poison Control Center (800) 222-1222

Detroit Zoo-Jeff Jundt (248) 541-5717 X 3159

Appendix 2.

Conservation Measures to Protect Listed Species and Critical Habitat

1. Follow guidelines as specified in Endangered Species Act section 10a1A permit for Hine's emerald dragonfly survey efforts (Appendix A).
2. Clean boots, clothing, and equipment between sites to avoid transfer of invasive plant seeds.
3. Train all staff, contractors, or volunteers involved in the project to identify and avoid trampling federally listed Pitcher's thistle and dwarf lake iris.
4. Train all staff, contractors, or volunteers involved in the project to identify and avoid Eastern massasauga rattlesnake.
5. Access into Hine's emerald dragonfly sites will be limited to foot travel only. Vehicles or ATV's will remain on roads and trails.
6. Train all staff, contractors, or volunteers involved in the project to identify potential Hine's emerald dragonfly habitat including rivulets and crayfish burrows so that trampling of these sensitive habitats can be avoided.
7. Only aquatic approved herbicides and surfactants will be used in treating invasive plant species in the project area.
8. The type of herbicide application used will vary depending on the following:
 - a. Broadcast spraying can be used in wetland areas dominated by phragmites (phragmites monoculture). Phragmites monocultures do not contain crayfish burrows and do not provide suitable habitat for Hine's emerald dragonfly larvae.
 - b. Hand swiping, spot spraying and other selective application techniques will be used when applying herbicides in all other wetland areas (where phragmites does not dominate the site). All other wetland areas could provide habitat for larval Hine's emerald dragonfly. Selective herbicide treatment should minimize the amount of chemical used, minimize impacts to desirable vegetation, and therefore avoid impacts to Hine's emerald dragonfly larvae.
 - c. Broadcast spraying in non-phragmites areas will only occur after confirmation from Dave Cuthrell or another Hine's emerald dragonfly expert that habitat conditions for larvae does not exist in the vicinity.
9. Staging and filling of fuel, herbicides and other chemicals will not occur in upland areas immediately adjacent to or immediately up gradient from Hine's emerald dragonfly larval habitat.

Appendix 4.



Special Animal Survey Form



ELEMENT IDENTIFICATION

Data sensitive? Yes No

Name (scientific and/or common): EO Rank: EOID: EO #:

SURVEY INFORMATION

Survey date: Time: from AM PM to AM PM Sourcecode:

Surveyors (principal surveyor first, include first & last name):

Weather conditions:

Revisit needed? Yes No Why?

LOCATIONAL INFORMATION

Survey site: Site name:

Quadcode: Quad name:

Township/Range/Section: County: Managed area:

DIRECTIONS: Provide detailed directions to the observation (rather than the survey site). Include landmarks, roads, towns, distances, compass directions.

Landowner type: Public Private Other:

Landowner Name - Contact Information:

Notes:

Was a GPS used? Yes No Type of unit: Unit number:

Waypoint name/#: File name and location:

Latitude: Longitude:

Feature Information: (mandatory) Conceptual feature type: Point: < 9 m in both dimensions Line: > 9 m in one dimension Polygon: > 9 m in both dimensions

Source feature: Single Source EO Multiple Source EO

MAP (mandatory)

- Attach appropriate part of a USGS topographic map or map showing exact locations of species. Image can be uploaded into the Map Insert field located at the end of this form or clearly associated with this form once completed.
- Indicate on the map the exact location of the observation(s):
 - When the observation area is **no larger than a pen point** on the map (i.e., only a small number of individuals or extremely small patches), place small points on the map indicating the location(s) of the individuals or patches, and label each point with an arrow so they are more easily seen.
 - When the observed area is **larger than a pen point** on the map (e.g., a population of plants, foraging birds):
 - Draw a thin solid boundary line showing the extent of the observed area occupied by the individuals.
 - Indicate disjunct patches (polygons) by drawing the boundary for each patch separately.
 - If the boundary follows the edge of a lake, stream, road, marsh or other feature, draw the boundary precisely on the edge of the feature.
 - When needed, add notes to the map with instruction on where the boundary line is located or if the boundary is shared with other observations.
- A hand drawn sketch may be included for finer details.

LOCATIONAL CERTAINTY

Is your depiction of the observed area on the map within 4.5 m (approx. 15ft) of its actual location on the ground? Yes No

If No, complete the following:

a. Estimate of uncertainty distance: based on landmarks, elevation, etc., the location of the observed area on the map is accurate to within

meters kilometers feet miles of its actual location on the ground.

b. Is the observed area known to be located within some feature(s) on the map (e.g., wetland boundary, lake, road, trail, highway, contour lines)? Yes No

If Yes, indicate the boundary within which the observed area is known to be located on the map line, and if applicable, identify the feature (e.g., marsh).

IDENTIFICATION

Photo/slide taken? Yes No Name and location of photo? _____

Specimen collected? Yes No Collection # and repository: _____

Identification problems? Yes No

If necessary, describe the important animal characteristics you used for identification:

SIZE OF ELEMENT OCCURRENCE

Size is a quantitative measure of the area and/or abundance of an occurrence. Components of this factor are 1) area of occupancy, 2) population abundance, 3) population density and 4) population fluctuation.

Type of observation: sight song/vocalization road kill trapped other (explain): _____

Abundance (number of pairs, chicks, nests, adults, juveniles, hatchlings, behavior, sex, size of each individual, etc):

Actual number observed:

Number estimated and basis for estimate:

Population density (if practical): number: _____ per area unit: meters² kilometers² feet² miles²

Does population fluctuate? (May be particularly relevant to invertebrates):
 Yes No unknown Explain: _____

Area of occupancy (fill in one): _____ meters _____ acres _____ miles Type of measurement (check one): precise estimate

ASSOCIATED SPECIES

List other species observed at this site. Note especially listed species and potential competitors, predators, and prey. Mark appropriate columns.

Species	ID +	ID ?	Number Observed	Notes, observations, etc.
	<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/>	<input type="checkbox"/>		
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	<input type="checkbox"/>	<input type="checkbox"/>		

CONDITION:

Condition is an integrated measure of the quality of biotic and abiotic factors, structures and processes within the occurrence, and the degree to which they affect the continued existence of the occurrence. Components of condition for species are: 1) reproduction and health, 2) ecological processes, 3) species composition and biological structure, 4) abiotic physical/chemical factors. Factors to consider: evidence of regular successful reproduction, habitat degradation, disturbance, presence of exotic species, the degree to which ecological processes are sustaining the habitat. Where possible include a comparison to other occurrences.

EVIDENCE OF REPRODUCTION:

EVIDENCE OF DISEASE/PREDATION:

CONDITION (continued):

HABITAT DESCRIPTION: Describe the specific habitat or micro habitat where this animal occurs. Convey a mental image of the habitat and its features including: land forms, aquatic features, vegetation, slope, aspect, soils, natural disturbances.

LANDSCAPE CONDITION: Describe the condition of the landscape surrounding the elements habitat (i.e., farmland, residential area, pristine forest)

CURRENT THREATS to this occurrence: (i.e., grazing, logging, mining, plantation, ATVs, dumping, etc.) Discuss exotics in the next section.

POTENTIAL THREATS to this occurrence:

EXOTICS PRESENT? yes no If yes, describe their impacts to the occurrence.

PAST IMPACTS to this occurrence: (i.e., logging, etc.)

TOPOGRAPHY

Elevation: ft.

If elevation is a range:

Minimum: ft.

Maximum: ft.

Aspect (down slope):

Measured Aspect: ° (N = 0°)

- Flat
- Variable
- N 338 - 22°
- NE 23 - 67°
- E 68 - 112°
- SE 113 - 157°
- S 158 - 202°
- SW 203 - 247°
- W 248 - 292°
- NW 293 - 337°

Slope:

Measured Slope: ° %

- Flat 0° 0%
- Gentle 0 - 5° 0 - 9%
- Moderate 6 - 14° 10 - 25%
- Somewhat steep 15 - 25° 26 - 49%
- Steep 26 - 45° 50 - 100%
- Very Steep 45 - 69° 101 - 275%
- Abrupt 70 - 100° 276 - 300%
- Overhanging/sheltered > 100° > 300%

Light:

- Open
- Partial
- Filtered
- Shade

Topographic position:

- Ridge, summit, or crest
- High slope (upper slope, convex slope)
- Midslope (middle slope)
- Low slope (lower slope, footslope)
- Toeslope (alluvial toeslope)
- Low level (terrace lakeplain, outwash plain, lake bed, etc)
- Channel
- Other:

Hydrologic Regime:

Wetlands:

- Intermittently flooded
- Permanently flooded
- Semipermanently flooded
- Temporarily flooded (e.g., floodplains)
- Seasonally flooded (e.g., seasonal ponds)
- Saturated (e.g., bogs, perennial seeps)
- Unknown

Non-Wetlands:

- Wet Mesic
- Mesic (moist)
- Dry-Mesic
- Xeric (dry)

MANAGEMENT AND PROTECTION

Management (stewardship and restoration), **Monitoring and Research Needs** for the Element at this location (e.g., burn periodically, open the canopy, control invasives, ban ORV's, remove drainage ditches, clear blocked culvert, break drain tile, reduce deer densities, study effects of herbivore impacts)

Protection Needs for the Element at this location (e.g., protect the entire marsh, the slope and crest of slope)

IMAGE INSERT: **click** on space below and navigate to saved photo, supported formats include BMP, JPG, GIF, PNG, TIF

MAP INSERT: **click** on space below and navigate to saved map file, supported formats include BMP, JPG, GIF, PNG, TIF



Huron Pines

Contact Us:
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Jennifer@huronpines.org
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Huron Pines 2015 Hine’s Emerald Dragonfly Work Summary

Huron Pines staff and AmeriCorps members assisted Michigan Natural Features Inventory (MNFI) staff during two separate weeks (August 10-14) and (September 21-25) of the summer of 2015. Work was completed at both Negwegon and Thompsons Harbor State Park and ranged from dragonfly burrow pumping, manual pulling of invasive species to chemical treatment of glossy buckthorn. Huron Pines followed the collection and treatment protocols outlined by the Michigan Department of Natural Resources (DNR) in fulfillment of the deliverables for the MNFI Purchase Order Agreement.



In July in Rogers City, Huron Pines presented at the Hine’s Emerald Dragonfly Training and outlined the invasive species that were to be inventoried and treated, along with the proper procedures that were to be used on state land. Staff provided samples of the invasive plants and the equipment used to help aid discussion and to answer questions by the public.

The inventory and schedule was arranged by the principle investigator (PI), Daria Hyde and Huron Pines provided two or more staff members per day to assist and lead fieldwork depending on the task. The first week was spent at Thompson’s Harbor State Park and Negwegon State Park and consisted of manual pulling of spotted knapweed, and larval burrow pumping at Thompson’s Harbor and inventory and treatment at Negwegon State Park. Huron Pine staff and AmeriCorps treated past occurrences as well as newly inventoried glossy buckthorn.

The second week consisted of treatment as well educating local 7th graders at Thompson’s Harbor. Topics varied from Invasive Species to Nature Photography and were extremely beneficial to the local school group. Inventorying was recorded with handheld tablets provide by MNFI and track progress at both State parks. Huron Pines will be providing a treatment report to the Michigan DNR for the work done this summer as well as with the maps generated by the P.I.

Conserving the Forests, Lakes and Streams of Northeast Michigan

