Survey Site Identification for Hine's Emerald Dragonfly (Somatochlora hineana) in Illinois: Final Report

Submitted to:

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INTRODUCTION

Hine's emerald dragonfly (*Somatochlora hineana*) presently is known from the eastern upper peninsula of Michigan, eastern Wisconsin, northeastern Illinois, and southern Missouri. Single specimens have been documented from northwestern Indiana and northeastern Alabama. It has apparently been extirpated from three historical localities in Ohio (Vogt and Cashatt 1994, Cashatt and Vogt 2001, U. S. Fish and Wildlife Service 2001).

The first known Illinois specimen was collected in 1983 by Ron Panzer at Lockport Prairie Nature Preserve, Will County. This specimen was later identified by the authors in 1987. A field investigation by the authors and Jim Wiker confirmed the presence of a population there in 1988 (Vogt and Cashatt 1994). *Somatochlora hineana* presently is known from Cook, DuPage, and Will counties (Vogt and Cashatt 1994, Cashatt and Vogt 2001). To date, the presence of *S. hineana* larvae has been documented at six of these ten known sites.

Larvae for this species appear to have narrow habitat requirements (Vogt and Cashatt 1994, Cashatt and Vogt 2001, U. S. Fish and Wildlife Service 2001). Larval habitat for S. hineana was described by Cashatt and Vogt (2001) as follows: "Most of the known sites have some notable unifying features. These include: shallow, organic soils (usually muck) overlying dolomitic bedrock; calcareous water from intermittent seeps; shallow, small channels and/or sheetflow. These seepage wetlands often dry out for a few weeks during the summer, but otherwise have thermal regimes that are relatively moderate (warmer in winter and cooler in summer) compared to nearby sites without groundwater influence. Vegetation is predominantly herbaceous; natural communities include marshes, sedge meadows, and fens. These communities usually are dominated by graminoid plants such as cattails (Typha spp.) and sweetflag (Acorus calamus) in marshes or by sedges (*Carex* spp.) in sedge meadows and fens. Larvae are found in cool, shallow, slow moving (sometimes barely detectible) water flowing between hummocks of sedges or in shallow streamlets in spring-fed cattail marshes. The microhabitat usually contains decaying vegetation, such as cattail or sedge leaves."

All known *S. hineana* sites in which larvae have been documented (Wisconsin, Illinois, and Missouri) have the burrowing crayfish *Cambarus diogenes* present (Soluk et al. 1999, Landwer and Vogt 2002). Larvae of *S. hineana* utilize burrows of *C. diogenes* at sites in northeastern Wisconsin and northeastern Illinois during times of drought and when overwintering (Soluk et al. 1999).

MATERIALS AND METHODS

Resources utilized for developing a list of potential survey sites include the Illinois Department of Natural Resources Natural Heritage Database, Illinois State Geological Survey (ISGS) GIS Data, Illinois Natural History Survey (INHS) Herbarium Database, National Wetlands Inventory maps, topographic maps, and knowledgeable individuals. Wetland communities analyzed from the Illinois Natural Heritage database included graminoid fens and sedge meadows. The ISGS layers were a nested series of subsets as follows (Figure 1): dolomitic bedrock, shallow depth to bedrock (excluding sandy areas), and National Wetland Inventory (NWI) wetlands including all those designated as palustrine emergent (PEMa – temporarily flooded, PEMb – saturated or nearly saturated, and PEMc – seasonally flooded). The potential indicator plants utilized from the INHS database included *Carex interior, Carex hystericina, Carex pellita, Carex stricta, Lysimachia quadriflora*, and *Rumex orbiculatus*. Topographic maps were examined to seek out regions of river valleys similar to that of the Des Plaines River (all known extant Illinois sites are within the valley or its immediate vicinity. Rivers examined included the Des Plaines, Fox, Kankakee, and Rock. Potential sites were then checked against NWI maps.

RESULTS

The number of potential survey sites for examination and analysis were as follows: Illinois Natural Heritage Database -75; ISGS data query -3,437; and INHS botanical query -438. Other potential sites examined were not tabulated as they were not easily quantified.

Potential *S. hineana* survey sites are alphabetized by county, USGS quadrangle and site name. The survey site names are, when present, identical to those of the Natural Heritage Program. Latitude and longitude are given for each potential site along with a portion of a topographic map and a NWI map. Not all sites were mapped as wetlands on their respective maps, but are included to facilitate site recognition in the field. A GPS hand held unit is also advisable.

Future surveyors will need to have the appropriate federal, state, and in some instances, county permits. Many of the potential sites listed in this report occur on private property. Respect of the private landowner's wishes should be given due respect.

A total of 40 potential *S. hineana* sites within 15 counties were developed. The distribution of potential sites is as follows: Carroll – 1; Jo Daviess – 7; Kane – 3; Kendall – 2; Knox – 3; LaSalle – 1; McHenry – 4; McDonough – 1; Monroe – 1; Ogle – 3; Stephenson – 5; Vermillion – 4; Whiteside – 2; Will – 2; and Winnebago – 1.



Figure 1. Distribution of PEM (palustrine emergent) wetlands overlying dolomite with shallow depth (< 25 ft.) to bedrock. (courtesy of ISGS)

Potential Sites

County: Carroll Quadrangle: Blackhawk (IA/IL) Lat/Long: 42° 11' 23''N, 90° 10' 21''W Site Name: Sand Ridge Road Fen





County: Jo Daviess Quadrangle: Bellevue (IL) Lat/Long: 42° 21' 37"N, 90° 24' 08"W Site Name: Smallpox Meadow





County: Jo Daviess Quadrangle: Blackhawk (IA/IL) Lat/Long: 42° 14' 56''N, 90° 11' 40''W Site Name: Derinda Center Meadow





County: Jo Daviess Quadrangle: Blackhawk (IL) Lat/Long: 42° 14' 16''N, 90° 12' 10''W; 42° 14' 03''N, 90° 12' 11''W; 42° 13' 56''N, 90° 12' 11''W Site Name: Little Rush Creek Wetlands





County: Jo Daviess Quadrangle: Elizabeth NE (IL) Lat/Long: 42° 29' 06''N, 90° 01' 59''W Site Name: Clear Creek Meadow





County: Jo Daviess Quadrangle: Hanover (IL) Lat/Long: 42° 18' 21''N, 90° 17' 47''W Site Name: Irish Hollow Wetlands Note: Linear wetland between railroad and stream.





County: Jo Daviess Quadrangle: Pleasant Valley (IL) Lat/Long: 42° 09' 41''N, 90° 07' 24''W Site Name: Camp Creek Meadow





County: Jo Daviess Quadrangle: Stockton (IL) Lat/Long: 42° 20' 54''N, 90° 04' 30''W Site Name: Rush Creek Meadow





County: Kane Quadrangle: Elgin (IL) Lat/Long: 42° 04' 33''N, 88° 16' 20''W Site Name: Fox River Fen Nature Preserve





County: Kane Quadrangle: Geneva (IL) Lat/Long: 41° 58' 44''N, 88° 16' 59''W Site Name: Elgin Sedge Meadow





County: Kane Quadrangle: Geneva (IL) Lat/Long: 41° 56' 00''N, 88° 19' 08''W Site Name: Ferson Creek Fen Nature Preserve





County: Kendall Quadrangle: Newark (IL) Lat/Long: 41° 35' 36''N, 88° 34' 36''W Site Name: Dixon Valley Sedge Meadow





County: Kendall Quadrangle: Plano (IL) Lat/Long: 41° 37' 58''N, 88° 30' 37''W Site Name: Silver Springs Fen Notes: PEMa - 41° 38' 10''N, 88° 30' 17''W and PEMc - 41° 37' 58''N, 88° 31' 12''W, also should be investigated.





County: Knox Quadrangle: Yates City (IL) Lat/Long: 40° 48' 17''N, 90° 04' 46''W Site Name: County Highway 19 Wetland





County: Knox Quadrangle: Yates City (IL) Lat/Long: 40° 47' 27''N, 90° 06' 42''W Site Name: Douglas Meadows





County: Knox Quadrangle: Yates City (IL) Lat/Long: 40° 49' 21''N, 90° 07' 05''W Site Name: Haw Creek Sedge Meadow



County: LaSalle Quadrangle: Sheridan (IL) Lat/Long: 41° 32' 21''N, 88° 39' 32''W Site Name: Sheridan Fen





County: McDonough Quadrangle: Bushnell West (IL) Lat/Long: 40° 33' 34''N, 90° 37' 00''W Site Name: Short Fork Seep Nature Preserve





County: McHenry Quadrangle: Harvard (IL) Lat/Long: 42° 28' 02''N, 88° 30' 52''W Site Name: Alden Sedge Meadow



County: McHenry Quadrangle: Hebron (IL/WI) Lat/Long: 42° 29' 10''N, 88° 23' 59''W Site Name: Kaskel Fen





County: McHenry Quadrangle: McHenry (IL) Lat/Long: 42° 18' 40''N, 88° 22' 05''W Site Name: Boone Creek Fen Nature Preserve





County: McHenry Quadrangle: Richmond (IL/WI) Lat/Long: 42° 29' 31''N, 88° 19' 33''W Site Name: North Branch Meadow





County: Monroe Quadrangle: Renault (IL) Lat/Long: 38° 11' 00''N, 90° 13' 45''W Site Name: Morrison Hollow Meadow





County: Ogle Quadrangle: Chana (IL) Lat/Long: 41° 57' 31''N, 89° 12' 37''W Site Name: Piros Prairie Nature Preserve





County: Ogle Quadrangle: Mount Morris (IL) Lat/Long: 42° 04' 56''N, 89° 23' 19''W Site Name: Silver Creek Meadows





County: Ogle Quadrangle: Oregon (IL) Lat/Long: 42° 02' 23''N, 89° 20' 29''W Site Name: Oregon Meadow





County: Stephenson Quadrangle: Dakota (IL) Lat/Long: 42° 25' 21''N, 89° 34' 16''W Site Name: Afolkey Meadow





County: Stephenson Quadrangle: Forreston North (IL) Lat/Long: 42° 14' 48''N, 89° 33' 18''W Site Name: Fricke Fen and Sedge Meadow





County: Stephenson Quadrangle: Freeport East (IL) Lat/Long: 42° 21' 46''N, 89° 32' 38''W Site Name: Brick School Road Meadow





County: Stephenson Quadrangle: Orangeville (IL) Lat/Long: 42° 25' 52''N, 89° 40' 55''W Site Name: Buena Vista Marsh





County: Stephenson Quadrangle: Pearl City (IL) Lat/Long: 42° 19' 58''N, 89° 46' 03''W Site Name: Eleroy Meadow





County: Vermilion Quadrangle: Collison (IL) Lat/Long: 40° 14' 35''N, 87° 47' 08''W Site Name: Collison Seep





County: Vermilion Quadrangle: Collison (IL) Lat/Long: <u>A</u> - 40° 14' 18.0''N, 87° 47' 11.2''W; <u>B</u> - 40° 14' 18.8''N, 87° 46' 56.4''W; <u>C</u> - 40° 14' 21.7''N, 87° 46' 52.2''W; <u>D</u> - 40° 14' 25.28''N, 87° 46' 44.53''W; <u>E</u> - 40° 14' 26.68''N, 87° 46' 43.19''W; <u>F</u> - 40° 14' 17.6''N, 87° 46' 30.1''W; <u>G</u> - 40° 14' 07.7''N, 87° 46' 28.9''W Site Name: Kinney's Ford Seep Complex





County: Vermilion Quadrangle: Danville SE (IL) Lat/Long: 40° 01' 45''N, 87° 33' 30''W Site Name: Forest Glen Nature Preserve





County: Vermilion Quadrangle: Danville SE (IL) Lat/Long: 40° 01' 14''N, 87° 34' 34''W Site Name: Howard's Hollow Nature Preserve





County: Whiteside Quadrangle: Spring Hill (IL) Lat/Long: 41° 36' 02''N, 90° 06' 04''W Site Name: Hurd Road Wetland





County: Whiteside Quadrangle: Union Grove (IL) Lat/Long: 41° 51' 09''N, 90° 05' 00''W; 41° 50' 57''N, 90° 04' 56''W Site Name: Fulton Sedge Meadow





County: Will Quadrangle: Channahon (IL) Lat/Long: 41° 22' 50''N, 88° 12' 30''W Site Name: Grant Creek





County: Will Quadrangle: Joliet (IL) Lat/Long: 41° 31' 31''N, 88° 00' 05''W Site Name: Hickory Creek Sedge Meadow





County: Winnebago Quadrangle: Belvidere NW (IL) Lat/Long: 42° 22' 48''N, 88° 57' 35''W; 42° 22' 45''N, 88° 57' 35''W Site Name: Argyle Fens Notes: PEMb's occur on each side of unnamed stream.





DISCUSSION

The sites with the greatest potential may be Hickory Creek Sedge Meadow and Grant Creek. This is largely due to their proximity to extant sites. Portions of the Fox River Valley have topography reminiscent of the Des Plaines River Valley. If the hydraulic regime is sufficiently similar, the following sites may be a high priority. These include Ferson Creek Fen, Fox River Fen, Elgin Sedge Meadow, Dixon Valley Sedge Meadow, Silver Springs Fen, and Sheridan Fen. Other wetlands noted in this study also apparently issue from seeps at the toeslope of a valley wall. These include Hurd Road Wetland (Rock River) and Fulton Sedge Meadow (Mississippi River). The driftless ecoregion (Wisconsin Driftless Natural Division) sites in Jo Daviess and Carroll counties have sedge meadows and fens topographically similar to most Ozark fens, including those that have *S. hineana*. They are numerous, generally small, but may be degraded. Nonetheless, should *S. hineana* occur in this ecoregion, it could be significant relative to recovery efforts, especially in Illinois.

We also included some seeps as potential sites in Vermilion County. None of these "fit" the classic parameters for most known *S. hineana* sites (Vogt and Cashatt 1994, Cashatt and Vogt 2001). However, there is a diverse array of herbaceous seeps in a relatively small area (15 km radius) associated with the Vermilion and the Middle Fork of the Vermilion rivers. There are three rare (for Illinois) seepage obligate dragonflies known from some of these sites. Two of these, *Cordulegaster bilineata* and *C. erronea*, presently only are known from single Illinois localities. The other noteworthy seepage obligate is *Tachopteryx thoreyi*. The only other Illinois county from which this species presently is known is Pope. *Tachopteryx thoreyi* is a common cohort of *S. hineana* at Missouri sites (Walker and Smentowski 2003, McKenzie and Vogt 2005). McKenzie and Vogt (2005) discuss the need for repeated visits to promising sites. False negatives may be expected for sites with comparatively small populations.

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