Species Status Assessment

Class: Insecta
Family: Corduliidae
Scientific Name: *Cordulegaster erronea*
Common Name: Tiger spiketail

Species synopsis:

The distributional center of the tiger spiketail (Cordulegaster erronea) is in northeastern Kentucky in the mixed mesophytic forest ecoregion, and extends south to Louisiana and north to western Michigan and northern New York. New York forms the northeastern range extent and an older, pre-1926, record from Keene Valley in Essex County is the northernmost known record for this species. Southeastern New York is the stronghold for this species within the lower Hudson River watershed in Orange, Rockland, Putnam and Westchester counties and is contiguous with New Jersey populations (Barlow 1995, Bangma and Barlow 2010). These populations were not discovered until the early 1990s and some have remained extant ever since, while additional sites were added during the New York State Dragonfly and Damselfly Survey (NYSDDS). A second occupied area in the Finger Lakes region of central New York has been known since the 1920s and was rediscovered at Excelsior Glen in Schuyler County in the late 1990s. During the NYDDS, a second Schuyler County record was reported in 2005 as well as one along a small tributary stream of Otisco Lake in southwestern Onondaga County in 2008 (White et al. 2010). The habitat in the Finger Lakes varies slightly from that in southeastern New York and lies more in accordance with habitat in Michigan (O'Brien 1998) and Ohio (Glotzhober and Riggs 1996, Glotzhober 2006)— exposed, silty streams flowing from deep wooded ravines into large lakes (White et al. 2010). The rarity of the species in this portion of the state is highlighted by the low rate of detections from over 16 surveys in 2004 and 2005 in suitable habitats by experienced observers during the first season who failed to find any additional sites. Nevertheless, Glotzhober (2006) reported that the acquisition of a positive search image and increased survey effort greatly expanded the number of known sites and overall range in Ohio. A single enigmatic record from Erie County was reported by Donnelly (2004).

Across their range, *C. erronea* are habitat specialists inhabiting tiny, forested, spring-fed coldwater streams, small spring trickles, or seeps in partial shade that are too small for fish but where there is a constant, slight water flow and a sandy or gravelly substrate (Barlow 1995, Donnelly 1999, Dunkle 2000). In northern New Jersey, the species is restricted to perennial low-to-medium-gradient forested cold water springs and trickles with a fine sand substrate that is relatively free of organic matter with a mix of skunk cabbage, jewelweed, sedges, and ferns (Barlow 1995). In Ohio, *C. erronea* use small headwater streamlets with persistent flow and good forest cover in steep ravinres and adults spend significant time in the forest canopy and flying the stream during the day (Glotzhober 2006). An informative distribution model found that environmental variables with topograhic position (slope, topographic index) and surficial geography were the most important parameters for defining suitable habitats for this species (New York Natural Heritage Program 2011). It has also been noted that geological areas conducive to the formation and maintenance of numerous permanent spring-fed seeps draining into deep, wooded glacial valleys were ideal locations.

I. Status

a. Current and Legal Protected Status

i. Federal ___Not listed_____ **Candidate?** __No_____

ii. New York ___Not listed; SGCN_____

b. Natural Heritage Program Rank

i. Global ____G4_____

ii. New York ____S1_____ **Tracked by NYNHP?** __Yes__

Status Discussion:
White *et al.* (2010) suggests that the status remain S1(5 or fewer occurrences, or few remaining acres or miles of stream, or factors demonstrably making it especially vulnerable to extinction rangewide or in New York State), although the number of records found during the New York Dragonfly and Damselfly Survey indicates that there are more than 5 occurrences and additional new locations can be expected.

II. Abundance and Distribution Trends

a. North America

i. Abundance

____ declining ____increasing ____stable __X__ unknown

ii. Distribution:

____ declining ____increasing ____stable __X__ unknown

Time frame considered: __Last assessment US 1985; Canada 2011_____

b. Regional

i. Abundance

____ declining ____increasing ____stable __X__ unknown

ii. Distribution:

____ declining ____increasing __X__stable _____ unknown

Regional Unit Considered:___Northeast_____

Time Frame Considered: ___Last assessment 1985_____

c. Adjacent States and Provinces

CONNECTICUT Not Present _____ No data _____

i. Abundance

____ declining ____increasing ____stable __X__ unknown

ii. Distribution:

____ declining ____increasing ____stable __X__ unknown

Time frame considered: _____
Listing Status: ____Threatened_____ SGCN? ___Yes_____

MASSACHUSETTS **Not Present __X___** **No data _____**

QUEBEC **Not Present __X___** **No data _____**

VERMONT **Not Present __X___** **No data _____**

NEW JERSEY **Not Present _____** **No data __X___**

i. **Abundance**

____ declining ____increasing ____stable __X__ unknown

ii. **Distribution:**

____ declining ____increasing ____stable __X__ unknown

Time frame considered: _____
Listing Status: _____Not Listed_____ SGCN? __No____

ONTARIO **Not Present _____** **No data __X____**

i. **Abundance**

____ declining ____increasing ____stable __X__ unknown

ii. **Distribution:**

____ declining ____increasing ____stable __X__ unknown

Time frame considered: _____
Listing Status: _____Not Listed_____

PENNSYLVANIA **Not Present _____** **No data __X___**

i. **Abundance**

____ declining ____increasing ____stable __X__ unknown

ii. **Distribution:**

____ declining ____increasing ____stable __X__ unknown

Time frame considered: _____
Listing Status: _____Not Listed_____ SGCN? __No_____

d. NEW YORK **No data __X____**

i. Abundance

____ declining ____increasing ____stable __X__ unknown

ii. Distribution:

____ declining ____increasing __X__stable _____ unknown

Time frame considered:____2005-2009_____

Monitoring in New York.

The New York State Dragonfly and Damselfly Survey (NYSDDS) was conducted from 2005-2009 but there are no organized, regular monitoring or survey activities directed toward this species or to sites where it has been documented.

Trends Discussion:

No estimate of population size for this species has been made based on observations from 10 locations in eight counties documented from 1993 through 2010 and documented by Ken Soltesz (Donnelly 1999), and participants in the NYDDS (White et al. 2010) and one 2010 record from Saratoga County (NY Natural Heritage Program 2013). The full extent and size of these populations have not been determined and most sites have not been revisited, so long-term trends are unclear.

New location information on *C. erronea* in New York in recent years may reflect heightened interest in surveying for this species rather than a population increase or a range expansion (White *et al.* 2010).

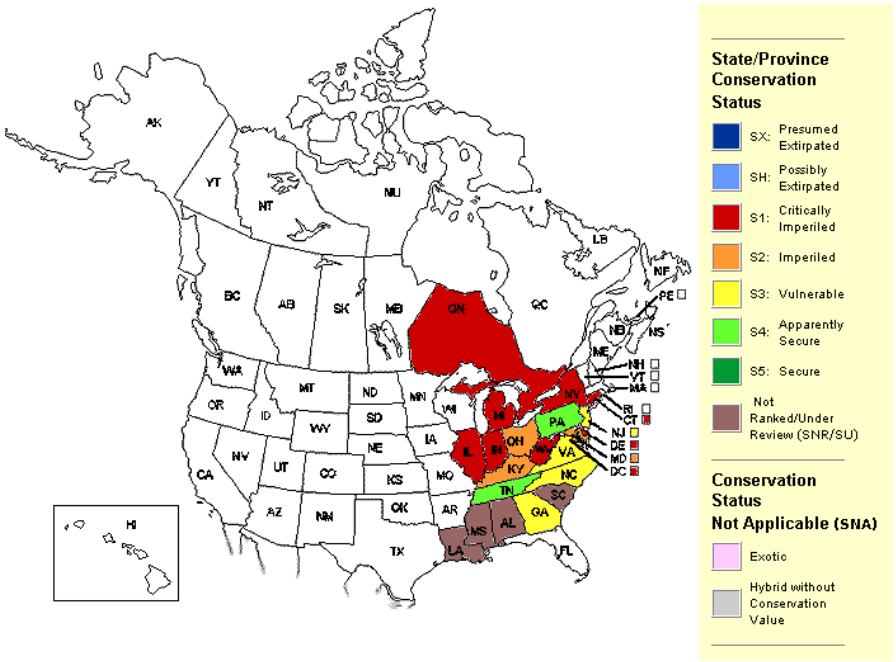

Figure 1. Conservation status of the tiger spiketail in North America (NatureServe 2012).

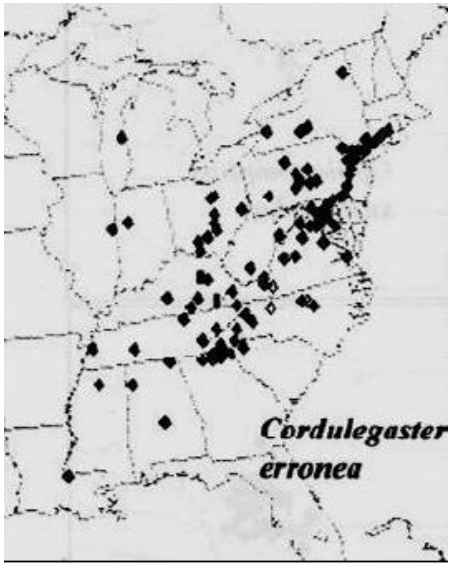

Figure 2. Distribution of the tiger spiketail in the United States (Donnelly 2004).

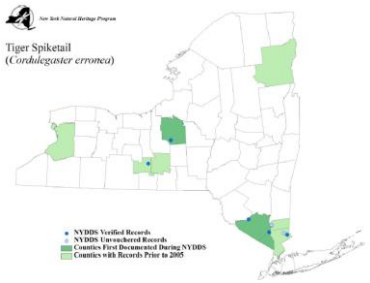

Figure 3. Occurrence records of the tiger spiketail in New York (White *et al.* 2010).

III. New York Rarity, if known:

Historic	# of Animals	# of Locations	% of State
prior to 1970	_____	2	_____
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

From Nature Serve Explorer (2009): Tompkins County — No date, historically confirmed

Current	# of Animals	# of Locations	% of State
	_____	10	10%

Details of current occurrence:

Number of occurrences obtained from the map by White *et al.* (2010) using data collected during The New York Dragonfly and Damselfly Survey 2005-2009 and information in Donnelly (1999) and the New York Natural Heritage Database (2013).

Erie County- No date (Donnelly 2004)

This is the same historical as below Putnam County — Highlands (2007)

Rockland County — Doodletown (2006)

Schuyler County — 2 locations: 1999 (Excelsior Glen), 2005 (Hector)

Westchester County — 2 locations: 1993 (Bedford), 1995 and 2006 (Ward Pound Ridge) Orange County – Prosperous Valley Road (2009)

Onondaga County – Otisco Lake (2008)

Saratoga County – Great Sacandaga Lake (2010)

New York's Contribution to Species North American Range:

Distribution (percent of NY where species occurs)

_X__ 0-5%

____ 6-10%

____ 11-25%

____ 26-50%

____ >50%

Abundance (within NY distribution)

___ abundant

___ common

___ fairly common

___ uncommon

_X_ rare

NY's Contribution to North American range

_X__ 0-5%

____ 6-10%

____ 11-25%

____ 26-50%

Classification of New York Range

____ Core

__X__ Peripheral

____ Disjunct

Distance to core population:

__~700 mi_____

Rarity Discussion:

C. erronea is an uncommon species distributed across the northeastern United States south to Tennessee and west to Missouri (Dunkle 2000). It has a total known range from New York, Connecticut, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Kentucky, Tennessee, Alabama, Louisiana, Georgia, Mississippi, Illinois, Michigan, and Ohio (Abbott 2007). It is known to occur in eight counties in New York State, with no population estimates determined. Further survey efforts may result in the identification of additional populations or range expansions, and may enable population sizes to be estimated.

IV. Primary Habitat or Community Type:

1. Headwater Creek, Low Gradient, cool to cold, sand and gravel bottom

2. Headwater Creek, Low-Moderate Gradient, cool to cold, sand and gravel bottom

Habitat or Community Type Trend in New York:

____ Declining ____Stable ____ Increasing __X__ Unknown

Time frame of decline/increase: _____

Habitat Specialist? __X__ Yes _____ No

Indicator Species? __X__ Yes _____ No

Habitat Discussion:

C. erronea inhabits coldwater streams, small spring trickles, or seeps in partial shade that are too small for fish where there is a constant, slight water flow and a non-silt substrate (Barlow 1995, Dunkle 2000, Nikula et al. 2003, Holst 2005). Larvae are aquatic and found in the water during this lifestage, whereas adults are terrestrial and are found in habitats surrounding streams, springs, and seeps.

V. New York Species Demographics and Life History

__X__ Breeder in New York

__X__ Summer Resident

__X__ Winter Resident

_____ Anadromous

_____ Non-breeder in New York

_____ Summer Resident

_____ Winter Resident

_____ Catadromous

_____ Migratory only

_____Unknown

Species Demographics and Life History Discussion:

C. erronea larvae are aquatic and burrow tail first into the substrate of waters where they are found. They then cover themselves with muck and wait for prey (Mead 2003). Adults are terrestrial and perch at an oblique (about a 45 degree) angle on vegetation on the edges of their water habitats and hunt in fields and forest clearings (Nikula *et al.* 2003). Females oviposit by hovering vertically over shallow water and plunging the tip of their abdomen into the mud in a sewing-machine like movement (Dunkle 2000, Nikula et at. 2003). *C. erronea* larvae feed on smaller aquatic invertebrates and adults feed on insects which they capture in flight (New York Natural Heritage Program 2009). In Ohio, larvae inhabit sandy (less often silt or muck) stretches of very shallow streamlets upstream of obstructions that exclude fish (Glotzhober 2006).

VI. Threats:

Since seepage areas are key areas for this species for oviposition, any activities that alter the groundwater seepages in an area would be a threat to tiger spiketails. Little published information is available citing specific cases of negative impacts to the various species of stream and seepage dwelling odonates, but any activities which degrade the sensitive hydrology of these habitats would threaten populations of these species. The most important likely negative impacts would come from changes in the natural hydrology such as nearby development, increases in the sediment load of the seepage or associated stream (such as might result should logging occur down to the stream edge), changes in dissolved oxygen content, direct effects of pesticides, and chemical contamination by runoff of agricultural or other discharge (Novak 2006).

Are there regulatory mechanisms that protect the species or its habitat in New York?

____ No ____ Unknown

__X__ Yes

Article 15 of Environmental Conservation Law provides protection of rivers, streams, lakes and ponds through the Protection of Waters Program.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Any measures to reduce water contamination, agricultural run-off, siltation, and damming that would affect flow of springs and small stream seepage areas should be considered when managing for this species (White *et al.* 2010).

Further research is needed to define the distribution and population size of the tiger spiketail. In addition, research is required to understand the habitat requirements and threats to this species, and to create appropriate management guidelines for its persistence in known locations (White *et al.* 2010).

A distributional model predicted that the tributaries feeding into the central Finger Lakes, especially Seneca, Cayuga, Keuka, and Canandaigua lakes, as well as along Eighteen Mile creek near North Evens in Erie county should have suitable habitat for this rare and elusive species (New York Natural Heritage Program 2011). These are areas that could be surveyed.

Conservation actions following IUCN taxonomy are categorized in the table.

Conservation Actions	
Action Category	**Action**
Law and Policy	Policies and Regulations
Education and Awareness	Training
Education and Awareness	Awareness & Communications

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for odonates of seeps and rivulets, and for tiger spiketail in particular.

Habitat monitoring:

___ Support and encourage habitat monitoring efforts that would complete the baseline assessment of habitat quality and threats.

Habitat research:

___ Support and encourage research projects that will help define preferred habitat in order to guide future monitoring, restoration and habitat protection efforts.

New regulation:

___ Recommendations for official state endangered, threatened, and special concern listing are an anticipated result of the statewide inventory. The gray petaltail is currently listed as Special Concern. It is possible that a change in this species listing status may be warranted following additional surveys or that one of the other two species may be recommended for listing and officially adding these species to the list would constitute a concrete action.

Population monitoring:

___ Conduct surveys to obtain repeatable, relative abundance estimates for these species at known sites and newly discovered sites where access permission to conduct surveys is obtained (as indicated in the State Wildlife Grant Odonate Inventory Project).

Statewide baseline survey:

___ All of these species are known from fewer than 15 locations in the state, but new populations undoubtedly remain to be discovered. A currently approved, but not yet begun State Wildlife Grant Statewide Odonate Inventory Project will utilize volunteers, Natural Heritage Program and other staff to conduct surveys for these species at potential sites throughout the state.

VII. References

Bangma J. and A. Barlow. 2010. NJODES; The dragonflies and damselflies of New Jersey [web application] <http://www.njodes.com/Speciesaccts/species.asp>. Accessed 10 August 2012.

Donnelly, T. W. 1999. The dragonflies and damselflies of New York. Prepared for the 1999 International Congress of Odonatology and 1st Symposium of the Worldwide Dragonfly Association. Colgate University, Hamilton, NY.

Donnelly, T. W. 2004. Distribution of North American Odonata. Part I: Aeshnidae, Petaluridae, Gomphidae, Cordulegastridae. Bulletin of American Odonatology 7:61-90.

Dunkle, S. W. 2000. Dragonflies through binoculars. A field guide to the dragonflies of North America. Oxford University Press, New York, New York, USA.

Glotzhober, B. and D. Riggs. 1996. *Cordulegaster erronea* finds in Ohio. ARGIA 8:4-5.

Glotzhober, B. 2006. Life history studies of *Cordulegaster erronea* Hagen (Odonata: Cordulegastridae) in the laboratory and the field. Bulletin of American Odonatology 10:1-18.

Mead, K. 2003. Dragonflies of the north woods. A comprehensive field reference to all 102 species of north woods dragonflies. Kollath and Stensaas Publishing, Duluth, Minnesota, USA.

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <http://www.natureserve.org/explorer>. Accessed 10 August 2012.

Needham, J. G. 1928. Odonata. Pp. 45-56, In M.D. Leonard. A List of the Insects of New York. Cornell University, Ithaca, New York, USA.

New York Natural Heritage Program. 2011. Online Conservation Guide for *Cordulegaster erronea*. < http://www.acris.nynhp.org/>. Accessed 10 August 2012.

New York Natural Heritage Program. 2013. Biotics database. New York Natural Heritage Program. New York State Department of Environmental Conservation. Albany, NY.

Nikula, B., J. L. Loose, and M. R. Burne. 2003. A field guide to the dragonflies and damselflies of Massachusetts. Massachusetts NHESP, Westborough, Massachusetts, USA.

Novak, P. 2006. Species Group Report for Odonates of small forest streams (pp. 66-70 of Appendix A5, Species Group Reports for Insects *in* New York State Comprehensive Wildlife Conservation Strategy. Albany, NY: New York State department of Environmental Conservation.

O'Brien, M. 1998. 1998 species search. Williamsonia, A Newsletter of the Michigan Odonata Survey 2:2-5.

White, Erin L., Jeffrey D. Corser, and Matthew D. Schlesinger. 2010. The New York dragonfly and damselfly survey 2005-2009: Distribution and status of the odonates of New York. New York Natural Heritage Program, Albany, New York, USA.

Date last revised: February 19, 2014