

Species Status Assessment

Class: Insecta
Family: Gomphidae
Scientific Name: *Ophiogomphus howei*
Common Name: Pygmy snaketail

Species synopsis:

The pygmy snaketail (*Ophiogomphus howei*) is the smallest of a group of species that are characteristic of fast moving water. Even the largest species in this group are of only medium size for North American dragonflies (Anisoptera). The genus is in the clubtail family (Gomphidae). There are no proposed subspecies or forms.

O. howei has a disjunct range that includes populations in both the eastern and north-central United States. The eastern range extends from Maine and Massachusetts into eastern New York, south in the Appalachians through eastern Pennsylvania into Tennessee, Virginia, and Kentucky. A smaller, western range includes northern Wisconsin, the western part of Michigan's Upper Peninsula, and eastern Minnesota (Needham *et al.* 2000, Mead 2003).

Habitat restrictions of *O. howei* appear to be more rigid than other snaketails, as *O. howei* has only been found in large, clear rivers with gravel or sandy substrates that are bordered by forested habitats. The section of the upper Hudson River where it occurs in its greatest New York abundance is particularly sandy in nature. The common sanddragon (*Progomphus obscurus*) as well as five other snaketail species, also co-occur here.

According to both Mead (2003) and Dunkle (2000), *O. howei* does not breed in sections of river immediately downstream of dams. However, exuviae in emergence posture/attachment were found in the upper Hudson River immediately downstream of the Spier Falls Dam at Corinth in 1999 (New York Natural Heritage Program 2010). This section of river is clear with sandy/gravel substrate and although possible that the larvae floated down from upstream and emerged there, it is also equally possible that individuals are ovipositing in this section of river below the dam.

I. Status

a. Current and Legal Protected Status

- i. Federal Not listed Candidate? No
- ii. New York Special Concern; SGCN

b. Natural Heritage Program Rank

- i. Global G3
- ii. New York S1 Tracked by NYNHP? Yes

Other Rank:

IUCN Red List— Least concern

Status Discussion:

White *et al.* (2010) suggests that the status remain S1.

II. Abundance and Distribution Trends

a. North America

i. Abundance

X declining ___ increasing ___ stable ___ unknown

ii. Distribution:

X declining ___ increasing ___ stable ___ unknown

Time frame considered: Last assessment US 1998; Canada 2011

Moderate decline

b. Regional

i. Abundance

___ declining ___ increasing ___ stable X unknown

ii. Distribution:

X declining ___ increasing ___ stable ___ unknown

Regional Unit Considered: Northeast

Time Frame Considered: Last assessment 2011

Moderate decline

c. Adjacent States and Provinces

CONNECTICUT Not Present X No data ___

NEW JERSEY Not Present X No data ___

QUEBEC Not Present X No data ___

VERMONT Not Present X No data ___

MASSACHUSETTS Not Present X* No data ___

i. Abundance

___ declining ___ increasing ___ stable X unknown

ii. Distribution:

___ declining ___ increasing ___ stable X unknown

Time frame considered: _____

Listing Status: Not listed (SX*) SGCN? No

Specify any monitoring activities or regular surveys that are conducted in New York.

The New York State Dragonfly and Damselfly Survey (NYSDDS) was conducted from 2005-2009.

Trends Discussion:

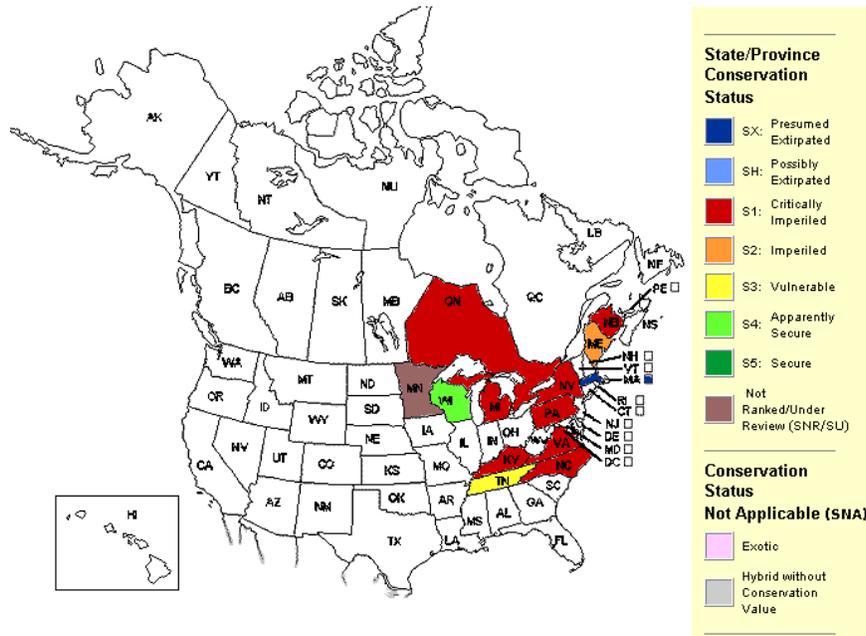


Figure 1. Conservation status of pygmy snaketail in North America (NatureServe 2012).

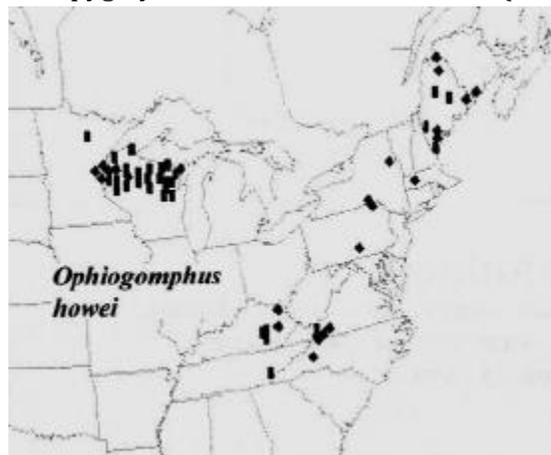


Figure 2. Known occurrences of pygmy snaketail (Donnelly 2004).



Pygmy Snaketail
(*Ophiogomphus howei*)

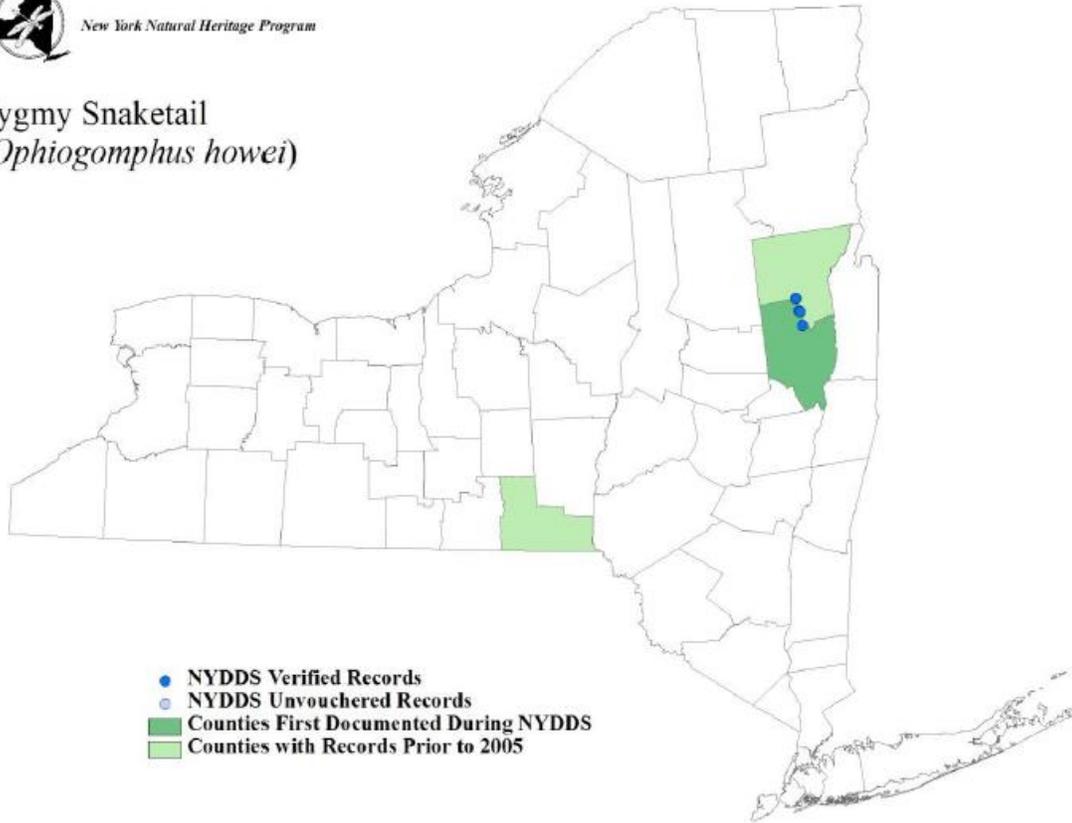


Figure 3. Known occurrences of pygmy snaketail in New York (White et al. 2010).

III. New York Rarity, if known:

| Historic | <u># of Animals</u> | <u># of Locations</u> | <u>% of State</u> |
|----------------------|----------------------------|------------------------------|--------------------------|
| prior to 1970 | _____ | _____ | _____ |
| prior to 1980 | _____ | _____ | _____ |
| prior to 1990 | _____ | _____ | _____ |

Details of historic occurrence:

O. howei was originally described from specimens collected on the Susquehanna River in Pennsylvania. However, an earlier record from Broome County, New York had been overlooked. Although the year is not included with the label data, the New York Susquehanna River specimen is approximated to be circa 1890s based on when the collector, Nathan Banks, was most active (Soltesz 1995a). In 1967, Donnelly found *O. howei* on the Susquehanna River upstream of Binghamton, just inside Pennsylvania and not far from the New York State line (Soltesz 1995b, Donnelly 1999).

| Current | <u># of Animals</u> | <u># of Locations</u> | <u>% of State</u> |
|----------------|----------------------------|------------------------------|--------------------------|
| | _____ | <u>8</u> | <u><5%</u> |

Details of current occurrence:

Saratoga County — 2007; Warren County — 2007

A number of surveys were conducted on the Susquehanna in 1996 but the species was not located in the New York side of the river (New York Natural Heritage Program 2010). It was rediscovered in New York in 1995 when exuviae were collected from two sites on the upper Hudson River just north of Warrensburg (White *et al.* 2010).

Subsequent surveys on the Hudson indicated *O. howei* occurs for a stretch of approximately 27 miles from Lake Luzerne north to The Glen (Novak 1998). In 1999, it was found on the upper Hudson south of Lake Luzerne, downstream of Spier Falls Dam, and on the Schroon River which flows into the Upper Hudson at Warrensburg. Results from the NYDDS re-confirm the presence of *O. howei* in the Lake Luzerne area and add a new location between the Lake Luzerne and Spier Falls at Corinth (White *et al.* 2010).

Limited surveys on the Schroon River failed to re-confirm the species there, and widespread survey efforts on other southern tier and Adirondack rivers did not produce any new locations. It is important to note, however, that not all of these surveys included the early summer collection of exuviae, yet all current records of this species are of exuviae (White *et al.* 2010).

New York's Contribution to Species North American Range:

Distribution (percent of NY where species occurs)

Abundance (within NY distribution)

0-5%

abundant

6-10%

common

11-25%

fairly common

26-50%

uncommon

>50%

rare

NY's Contribution to North American range

0-5%

6-10%

11-25%

26-50%

>50%

Classification of New York Range

Core

Peripheral

Disjunct

Distance to core population:

~ 960 mi to stable core

V. New York Species Demographics and Life History

- Breeder in New York**
 - Summer Resident**
 - Winter Resident**
 - Anadromous**
- Non-breeder in New York**
 - Summer Resident**
 - Winter Resident**
 - Catadromous**
- Migratory only**
- Unknown**

Species Demographics and Life History Discussion:

The pygmy snaketail has been observed laying eggs in smooth-flowing reaches of otherwise tumultuous rivers, and the larval skins from which the adults emerge are commonly found on the erosional banks. This suggests that the larvae live on or within fine sand or pea gravel substrate where the current is strong (COSEWIC 2008).

Larvae take at least two years, possibly longer, to develop to emergence (Kennedy and White 1979). Larvae of *O. howei* were discovered by William Kennedy (1979) to be deep burrowers during the day, coming to the surface and drifting with the current at night, with peak abundance of drift at about 14:00.

O. howei emergence is largely associated with the synchronous emergence of other members of its genus. It is likely that the adults fly for six to eight weeks following emergence, although some individuals survive for a few more weeks. The adults are rarely encountered at water and are usually difficult to identify in flight. It is likely that they spend much of their flight in the canopy of the forest, which is the case with most snaketails (COSEWIC 2008).

Exuviae are usually found on erosional banks near where the current is strong, suggesting that they either live in the fast but even current adjacent to those banks, or that they drift prior to emerging. generally emerge close to the water's edge. Following emergence, the teneral fly from the river for an extended period of maturation. While most Odonata species return frequently to rivers to establish territories and breed, *O. howei* seems to spend little time at its larval waters. It is likely that it spends the bulk of its adult life in the surrounding forest, usually in high canopy (COSEWIC 2008).

O. howei flies in early to mid-summer. After emergence, adults will live until taken by a predator. Usually with dragonflies the bulk of the individuals will be gone in a month or so, but rare individuals of the early summer emerging species may last as long as three months. It is a reasonable assumption that few if any of the earlier emerging species survive long enough to be killed by the first frosts. Due to the very small number of encounters with adults of *O. howei*, there is not enough data to speculate on the reproduction period (COSEWIC 2008).

As with other stream gomphids, *O. howei* Snaketail larvae likely eat whatever small creatures are also present in their substrate habitat, potentially including larval fish and conspecifics, and other invertebrates. Kennedy and White (1979) recorded water mites (Arachnida), mayflies (Ephemeroptera), and midge larvae ((Diptera) from the foregut of *O. howei* larvae. The burrowing behavior of the larvae suggests that there may be some specialization in prey. Little is known of the food preferences of *O. howei* adults. Presumably they feed on whatever flying insect species is present, as do most Odonata species. They have not been reported to glean from solid surfaces (COSEWIC 2008).

O. howei is not a migratory species. Although dispersal is more likely along the river corridors and small running waters of its catchments, the forest-dwelling nature of the species suggests that it is capable of crossing the intervals between catchments. In general it is considered a localized species that does not wander more than a few km from the larval habitat (COSEWIC 2008).

VI. Threats:

With its apparent ecological limitation and association with pristine conditions, it seems unlikely that *O. howei* is capable of making sufficient and timely adjustment to enable it to survive substantial habitat alteration. Anthropogenic habitat change represents the greatest potential threat to the species, and larger rivers are especially susceptible to environmental damage despite regulations (COSEWIC 2008).

Road-kill, which can be very significant in some dragonfly species, seems unlikely to be a serious factor for *O. howei* due to its adult behavior. However, interference with emergence by recreational use of waters and construction is a greater threat. Even landing canoes, wading and shore-walking at the emergence site is potentially damaging to the emerging population during the short (~4-day) emergence period (COSEWIC 2008).

The greatest perceived threat to populations is the impoundment of running waters. Kennedy and White (1979) noted that *O. howei* "apparently cannot breed in conditions found below dams." Damming likely had a profound influence on the distribution and abundance of the species in the 1800s and early 1900s when that practice was in vogue throughout northeast North America for industrial and hydroelectric purposes. Dams constructed by beavers also represent a threat Odonata (COSEWIC 2008).

Pollution is another threat, particularly by broadcast pesticides used in agriculture or forestry management; and most particularly by those used for the control of aquatic larvae of biting insects. As Odonata rank very high in the invertebrate food chain, they will take up persistent insecticides, potentially to a debilitating or lethal level. Toxic chemical spills are a distinct threat, particularly where road and rail corridors are adjacent to the river (COSEWIC 2008).

Eutrophication due to excessive nutrient input from sewage, or sedimentation due to agricultural or forestry run-off are distinct threats to larval habitat. Clearing of forests surrounding their rivers may exert a negative impact on adult populations, which are thought to spend much of their time in the forest canopy (COSEWIC 2008).

Invasive species may represent a threat either directly to *O. howei*, or indirectly by alteration of the biotic composition of the habitat. Invasive aquatic plants are currently a concern; they will invade a water body and grow to a density which seriously influences the water quality, followed by a die-off which can yield lethal water quality characteristics (COSEWIC 2008).

The pygmy snaketail was classified as “not vulnerable/presumed stable” (PS) to predicted climate change in an assessment of vulnerability conducted by the New York Natural Heritage Program. Available evidence does not suggest that abundance and/or range extent within the geographical area assessed with change (increase/decrease) substantially by 2050. Actual range boundaries may change (Schlesinger et al. 2011).

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

No Unknown
 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:

Additional surveys to gain better knowledge of species distribution are needed. Surveys downstream of Spier Falls Dam to determine if *O. howei* is ovipositing in that area, as well as complete surveys of the Schroon River, are also needed.

Further definition of habitat is also needed. Searches for larval skins at many seemingly appropriate waters, and at the appropriate time of the year, have generally yielded no results for the species. It is believed to be absent from these waters; suggesting that the habitat, including factors influencing larval success and emergence locale, could be more narrowly defined than currently understood.

Conservation actions following IUCN taxonomy are categorized in the table below.

| Conservation Actions | |
|----------------------|--------------------------|
| Action Category | Action |
| Law and Policy | Policies and Regulations |

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for odonates of rivers and streams, and for pygmy snaketail 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. It is expected that at least a few species will be recommended for listing and officially adding these species to the list would constitute a concrete action. Four of the species are currently listed as Special Concern, but it is possible a change in their listing status may be warranted following additional surveys.

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:

— Most of these species are known from fewer than 10 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

Abbott, J.C. & Donnelly, N. 2007. *Ophiogomphus howei*. IUCN 2011. IUCN Red List of Threatened Species. Version 2011.2. <www.iucnredlist.org>. Accessed 25 May 2012.

COSEWIC. 2008. COSEWIC assessment and status report on the Pygmy Snaketail *Ophiogomphus howei* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. .

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

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.

- Kennedy, C.H., and H.B. White III. 1979. Description of the nymph of *Ophiogomphus howei* (Odonata: Gomphidae). Proceedings of the Entomological Society of Washington 81: 6469.
- 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, MN.
- NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Accessed 25 May 2012.
- Nikula, B., J. L. Loose, and M. R. Burne. 2003. A field guide to the dragonflies and damselflies of Massachusetts. Massachusetts NHESP, Westborough, MA.
- Needham, J. G. 1928. Odonata. Pp. 45-56, In M.D. Leonard. A List of the Insects of New York. Cornell University, Ithaca, NY.
- New York Natural Heritage Program. 2010. Element Occurrence Database. New York State Department of Environmental Conservation. Albany, NY.
- New York Natural Heritage Program. 2011. Online Conservation Guide for *Ophiogomphus howei*. <<http://www.acris.nynhp.org/>>. Accessed 25 May 2012.
- Novak, P.G. 1998. Large river Odonate surveys: Surveys for the extra-striped snaketail (*Ophiogomphus anomalus*) and the pygmy snaketail (*Ophiogomphus howei*) in New York State, 1997. A report prepared for New York State Department of Environmental Conservation, Endangered Species Unit.
- Soltész, K. 1995a. A preliminary survey of the dragonfly *Ophiogomphus howei* on the Susquehanna River in New York. A report prepared for New York Natural Heritage Program. Albany, NY.
- Soltész, K. 1995b. *Ophiogomphus anomalus* on the Delaware River. Results of 1994 field research. A report prepared for New York Natural Heritage Program. Albany, NY.

Date last revised: February 19, 2014