# Species Status Assessment

**Class:** Lepidoptera
**Family:** Lycaenidae
**Scientific Name:** *Callophrys hesseli*
**Common Name:** Hessel's hairstreak

**Species synopsis**:

The Hessel's hairstreak (*Callophrys hesseli*) is closely associated with its host plant, which is patchily distributed overall, but common in a few states, especially coastal southern New England, New Jersey, and eastern North Carolina. The individuals that occur along the Atlantic Coast, from southern Maine to North Carolina, are sometimes identified as a subspecies *Callophrys hesseli hessel.* Populations are absent from most of Connecticut and northern New jersey, and there may be only one population between New Jersey and southeastern Virginia, on the Delaware-Maryland border. Hessel's hairstreak is still fairly widespread in suitable habitats in the Pine Barrens and Delaware Bayshore regions of New Jersey where the food plant is common. Populations are fairly frequently encountered from southeastern Massachusetts across southern Rhode Island to southeastern Connecticut. Many seemingly suitable habitats are unoccupied (Schweitzer and Wagner 2011).

Although the Hessel's hairstreak is one of just a handful of butterflies on the state endangered species list, nothing is known of its current status in New York; however, there is reason to believe that this species is extirpated from the state. All of the few known occurrences on Long Island were first discovered around 1980, and since then only one was subsequently found to harbor butterflies. At this site only 12 butterflies were collected during seven surveys from 1983-1989, and surveys in the early and mid-1990s failed to produce butterflies at any of the formerly occupied sites (NatureServe 2012).

Since the 1980s, only one of the known populations was found to be inhabited, and no butterflies have been seen at this site since the 1990s (NYSDEC SGCN Experts Meeting).

## I. Status

### a. Current and Legal Protected Status

**i. Federal** ___Not listed___ **Candidate?** ___No___

**ii. New York** ___Endangered; SGCN___

### b. Natural Heritage Program Rank

**i. Global** ___G3G4___

**ii. New York** ___S1___ **Tracked by NYNHP?** ___Yes___

**Other Rank:**

None

**Status Discussion:**

Since the 1980s, only one of the known populations was found to be inhabited, and no butterflies have been seen at this site since the 1990s, despite targeted searching by experts. The other known Long Island sites were also searched by experts in the late 1980s and early 1990s without success. One remote inland Atlantic white cedar swamp in Orange County where the species was found in the late 1970s still contains suitable habitat, and might be the most likely place to still harbor this butterfly in New York (NYNHP 2011a).

## II. Abundance and Distribution Trends

### a. North America

**i. Abundance**

**____ declining ____increasing __X__stable ____ unknown**

**ii. Distribution:**

**____ declining ____increasing __X__stable ____ unknown**

**Time frame considered: _____**

**b. Regional**

**i. Abundance**

**____ declining ____increasing __X__stable _____ unknown**

**ii. Distribution:**

**____ declining ____increasing __X__stable _____ unknown**

**Regional Unit Considered:**_____Northeast_____
**Time Frame Considered:** _____

**c. Adjacent States and Provinces**

**CONNECTICUT 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____

**MASSACHUSETTS Not Present _____ No data _____**

**i. Abundance**

**____ declining ____increasing __X__stable ____ unknown**

**ii. Distribution:**

**____ declining ____increasing __X__stable ____ unknown**

Time frame considered: _____
Listing Status: _____Special Concern_____SGCN? __Yes____

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

i. **Abundance**

**____ declining ____increasing __X__stable _____unknown**

ii. **Distribution:**

**____ declining ____increasing __X__stable ____ unknown**

Time frame considered: _____
Listing Status: _____Special Concern_____SGCN? __Yes_____

**ONTARIO** **Not Present __X___** **No data _____**

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

**QUEBEC** **Not Present __X____** **No data _____**

**VERMONT** **Not Present __X____** **No data _____**

**d. NEW YORK** **No data __X____**

i. **Abundance**

**____ declining ____increasing ____stable __X__unknown**

ii. **Distribution:**

**____ declining ____increasing ____stable __X__unknown**

Time frame considered: _____

***** Possibly extirpated

**Monitoring in New York.**

None

**Trends Discussion:**

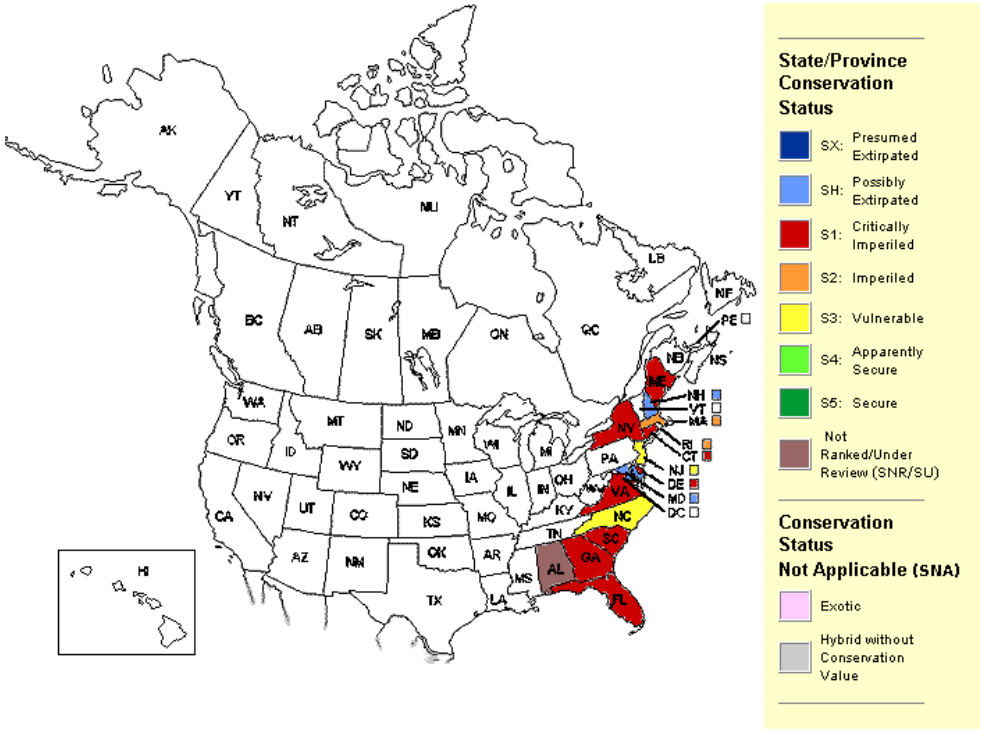


**Figure 1**. Conservation status of Hessel's hairstreak in North America (NatureServe 2012).

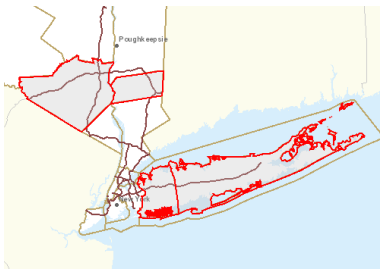


**Figure 2**. Occurrence of Hessel's hairstreak in New York (New York Nature Explorer 2009).

**III. New York Rarity, if known:**

| **Historic** (select one) | **# of Animals** | **# of Locations** | **% of State** |
|---|---|---|---|
| **prior to 1970** | _____ | _____ | _____ |
| **prior to 1980** | _____ | _____ | _____ |
| **prior to 1990** | _____ | 2 counties | _____ |

**Details of historic occurrence:**

Nassau County – No date; extirpated; Orange County – Historically confirmed; no date; Putnam County – Possible but not confirmed; Suffolk County – 1986

| **Current** | **# of Animals** | **# of Locations** | **% of State** |
|---|---|---|---|
| | _____ | _____ | _____ |

**Details of current occurrence:**

There are no current occurrences and this species is thought to be extirpated in New York.

**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%

____ >50%

**Classification of New York Range**

**__X__ Core**

**____ Peripheral**

**____ Disjunct**

**Distance to core population:**

**_____**

## IV. Primary Habitat or Community Type:

**1.** Atlantic white cedar swamp

**Habitat or Community Type Trend in New York:**

**__X__ Declining ____Stable ____ Increasing ____Unknown**

**Time frame of decline/increase:** ____Steep decline 1970s to present_____

**Habitat Specialist?** **__X__ Yes** **_____ No**

**Indicator Species?** **_____ Yes** **__X___ No**

**Habitat Discussion:**

This species occurs exclusively in coastal and inland Atlantic white cedar swamps. Sunny glades with flowers within the swamp are favored locations. Adults stray at times up to 1/2 mile to nearby flowers (NatureServe 2012).

## 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:**

The Hessel's hairstreak usually has one brood per year, with a partial second brood in some years in New Jersey and Rhode Island. Adults are present mostly from late April to mid- or late May, and a few in late July. In the Boston area and northward, the first brood is up to a month later and no second brood has been reported (Schweitzer and Wagner 2011).

Eggs are laid singly on the tips of the host twigs and hatch in in about a week. The larvae feed mostly on the new growth, at least in spring, and mature in about a month. Pupation probably occurs in the leaf litter, but this has not been confirmed in the wild. The pupae overwinter. Caterpillars eat the foliage of Atlantic white cedar (*Chamaecyparis thyoides*) (Schweitzer and Wagner 2011).

Adults spend most of their time in the tops of the cedars, although they descend to visit the damp soil at the edges of puddles, as well as flowers. It is hypothesized that they sip moist soil after ecolosion before moving to the canopy (Schweitzer and Wagner 2011).

Flower visits have been reported at mid-day in hot weather (>32$^0$C), but are otherwise typically in the morning or after 4:00 pm (Schweitzer and Wagner 2011).

Although they usually remain within the cedar swamp and nectar at highbush blueberry (*Vaccinium corymbosum*) or chokeberry (*Aronia*), late in the flight period butterflies may disperse out of the habitat into nearby fields, yards, and roadsides to nectar at other flowers. Usually no more than one to a few Hessel's hairstreaks are encountered, though dozens of individuals may be seen in exceptional circumstances (Beck and Garnett 1983).

## VI. Threats:

The major issue with Hessel's hairstreak is maintaining an abundance of white cedar. Nectar plants may also be important. Logging, fires, beaver dams, and changes in water level due to road construction all affect the food plant directly, but in the long term, sapling death caused by browsing deer could be a greater threat. Overly abundance deer seriously affect, and sometimes prevent, cedar regeneration. White cedars are killed by fire, but with lower deer populations, can regenerate readily from seed. Deer can also virtually eliminate chokeberry, a favorite nectar flower (Schweitzer and Wagner 2011).

The threats to the species' habitat are numerous and both the Atlantic white cedar swamp community (S1) and tree itself are imperiled (S2) in New York. Only an estimated 5% of the historical coastal plain white cedar swamps remain in the state (NYNHP 2011b) and over 15,000 acres of inland Atlantic white cedar were converted to agriculture in the Wallkill Valley alone by the 1970s (Karlin 1997).

Other, less serve threats may include collecting pressure, and possibly bird predation, invasion by exotic plants, and introduced generalist parasitoids (Nelson 2007, NatureServe 2012).

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

**_____ No ____ Unknown**

**__X__ Yes**

Hessel's hairstreak is listed as an endangered species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species.

The Freshwater Wetlands Act provides protection for wetlands greater than 12.4 acres in size under Article 24 of the NYS Conservation Law. The Tidal Wetlands Act protects all tidal wetland habitats and adjacent areas under Article 25 of the NYS Conservation Law. This is not sufficient to protect the habitat sufficiently for the species.

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

First it is imperative to ascertain whether this endangered species remains extant in New York. All occurrences of Coastal Plain Atlantic white cedar swamps on Long Island as well as Inland Atlantic white cedar swamps in Putnam and Orange Counties should be surveyed during May to early June to determine whether this species remains a part of New York's Lepidopteran fauna, and if it does, recognize that the major issue with Hessel's hairstreak is maintaining an abundance of white cedar (Schweitzer and Wagner 2011).

The ecology of this tree is fairly well understood, and with proper management, the butterfly can persist with timber harvest. Generally, silviculture practices that maintain white cedar stands should perpetuate populations as long as there are substantial reservoirs of uncut cedars. Distances between stands should be relatively small (less than 1 km) and logging rotations should allow the cedar to regenerate and mature between cuts. Deer fences can be installed to protect against over-browsing and permit regeneration of white cedar in areas with high deer populations (Schweitzer and Wagner 2011). Regardless of whether this hairstreak still occurs in New York, all occurrences of Atlantic white cedar swamps, both coastal and inland, should be protected and managed.

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 |
| Land/Water Protection | Site/Area Protection |
| Land/Water Protection | Resource/Habitat Protection |
| Land/Water Management | Site/Area Management |
| Land/Water Management | Invasive/Problematic Species Control |
| Land/Water Protection | Site/Area Protection |

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for other butterflies, and for Hessel's hairstreak in particular.

**Fact sheet:**

___ Develop fact sheets and other outreach material to educate the public about species at risk Lepidoptera.

**Habitat management:**

___ Determine best management regimes for species in each locality.

**Habitat research:**

___ Determine precise habitat needs of all life stages.

___ Ascertain food plants.

___ Determine the relationship between food availability and species numbers.

**Invasive species control:**

___ Identify species which impact negatively on butterfly populations.

___ Determine the best control method for those exotic species with minimal repercussions for butterfly populations.

**Life history research:**

___ Investigate the metapopulation dynamics of those species which appear to have distinct populations.

___ Establish the duration of all life stages.

___ Taxonomic research for related species.

**Other action:**

___ Determine the actual sensitivity of species to chemical formulations, particularly diflubenzuron and other commonly used agricultural pesticides.

___ Determine the effect of Bacillus thuringiensis kurstaki (BTK) used in Gypsy moth sprayings on various species.

**Population monitoring:**

___ Inventory of species within historical range.

**Statewide baseline survey:**

___ Survey all species to more adequately define the list of species that need to be addressed.

## VII. References


Beck, A.F. and W.J. Garnett. 1983. Distribution and notes on the Great Dismal Swamp population of Mitoura hesseli Rawson and Ziegler (Lycaenidae). Journal of the Lepidopterist's Society 37(4): 289-300.

Cryan, J. 1985. Hessel's Hairstreak: endangered cedar swamp butterfly. The Heath Hen 2:22-25.

Karlin, Eric F. 1997. The Drowned Lands' Last Stand: An inland Atlantic white cedar swamp in Orange County, New York. Journal of the Torrey Botanical Society. 124(1):89-97.

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <http://www.natureserve.org/explorer>. Accessed 7 January2013.

New York Natural Heritage Program (NYNHP). 2011a. Online Conservation Guide for *Callophrys hesseli*. <http://www.acris.nynhp.org/guide.php?id=7857>. Accessed 7 January 2013.

New York Natural Heritage Program (NHNHP). 2011b. Online Conservation Guide for Coastal Plain Atlantic White Cedar Swamp. Albany, NY. <http://www.acris.nynhp.org/guide.php?id=XXX>.

New York Natural Heritage Program (NYNHP). 2011c. Online Conservation Guide for Inland Atlantic White Cedar Swamp. Albany, NY. <http://www.acris.nynhp.org/guide.php?id=XXX>.

New York Natural Heritage Program (NYNHP). 2011d. Online Conservation Guide for Atlantic White Cedar. Albany, NY. <http://www.acris.nynhp.org/guide.php?id=XXX>.

New York State Department of Environmental Conservation (NYSDEC). 2009. New York Nature Explorer. <http://www.dec.ny.gov/natureexplorer/app/>. Accessed 7 January 2013.

Shapiro, A.M. 1974. Butterflies and skippers of New York State. Search 4:1-60.

Shapiro, A.M., and A.R. Shapiro. 1973. The ecological associations of the Butterflies of Staten Island. Journal of Research on the Lepidoptera 12:65-128.

Schweitzer, D.F., M.C. Minno, and D.L. Wagner. 2011. Rare, declining, and poorly known butterflies and moths (Lepidoptera) of forests and woodlands in the Eastern United States. USDA Forest Health Technology Enterprise Team FHTET-2011-01.


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