

Species Status Assessment

Class: Insecta
Family: Nymphalidae
Scientific Name: *Speyeria idalia*
Common Name: Regal fritillary

Species synopsis:

The regal fritillary was once commonly found throughout prairies and open grasslands of the U.S. from southeastern Montana to Maine in the north, with scattered records just across the border in Canada, and from eastern Colorado to northwestern North Carolina in the south. In recent years, the regal fritillary has experienced dramatic large-scale population declines and range contractions and is subsequently rare or absent from its historical range east of the Appalachians (NatureServe 2013). The last record in New York was from 1988 and Pennsylvania contains the only extant population in its historical eastern range (NYNHP 2013). Recent morphological and DNA analysis from museum specimens and live western populations indicate that separate eastern (*Speyeria idalia idalia*) and western (*Speyeria idalia occidentalis*) subspecies should be recognized, although there is still some uncertainty about the taxonomic status of some extant and historic populations at the interface between the eastern and western subspecies (Selby 2007).

This species is now extirpated in New York (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 G3

ii. New York SH Tracked by NYNHP? Yes

Other Rank:

USFWS: species of concern, regions 1, 3, 8, and 9

Xerces Red List: vulnerable

Status Discussion:

The G3 ranking states that despite the relatively large number of extant populations (>100) in the western portion of its range, the regal fritillary “cannot be considered secure because of its very recent large scale decline and range contraction, resulting in a recent loss of approximately 30% of its historic range, and on-going decline in some or possibly all other parts of its range” (Selby 2007). There is no evidence that this species is stable anywhere and there are probably very few strong metapopulations. Historical records for this species are from 33 states and 5 Canadian provinces, however, it is presumed extirpated in 7 states, possibly extirpated in 10 states, critically imperiled in 6, imperiled in 3, vulnerable in 4, and apparently secure in only 1 state, Kansas (Selby 2007). The regal fritillary is also listed as endangered in 5 states: Indiana, Michigan, New York, Ohio, and Wisconsin, threatened in 1: Illinois, and special concern in 4: Connecticut, Iowa, Minnesota, and Vermont. The USDA has designated this species as sensitive in regions 1, 2, 8, and 9 due to the dramatic reduction in range and numbers, and the insecurity of most populations due to fragmentation and isolation of populations and suitable habitat (Selby 2007). It was also listed as a category II species (possible candidate for listing) under the Endangered Species Act until 1996, when this category was eliminated.

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: 1950 - present

b. Regional

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Region 5 - northeast

Time Frame Considered: 1950 - present

c. Adjacent States and Provinces

CONNECTICUT Not Present No data

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: late 1940s - present

Listing Status: SCX* SGCN? Yes

*extirpated species of concern

MASSACHUSETTS Not Present No data

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: 1950 - present

Listing Status: Not Listed SGCN? No

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

i. Abundance

_____ declining _____ increasing _____ stable X unknown

ii. Distribution:

_____ declining _____ increasing _____ stable X unknown

Time frame considered: 1950 - present

Listing Status: _____ Not Listed SGCN? No

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

i. Abundance

_____ declining _____ increasing X stable _____ unknown

ii. Distribution:

_____ declining _____ increasing X stable _____ unknown

Time frame considered: 1990 - present

Listing Status: _____ Not Listed SGCN? Yes

VERMONT **Not Present** _____ **No data** X

i. Abundance

_____ declining _____ increasing _____ stable X unknown

ii. Distribution:

_____ declining _____ increasing _____ stable X unknown

Time frame considered: 1950 - present

Listing Status: _____ Special concern SGCN? Yes

QUEBEC **Not Present** X **No data** _____

ONTARIO **Not Present** X **No data** _____

d. NEW YORK

No data _____

i. Abundance

___ declining ___ increasing ___ stable ___ unknown

ii. Distribution:

___ declining ___ increasing ___ stable ___ unknown

Time frame considered: _____ 1950 – present _____

Extirpated

Monitoring in New York.

There are no current monitoring activities for this species.

Trends Discussion:

The decline of the regal fritillary in the eastern portion of its range occurred mainly from the 1940s to early 1990s. Viable colonies in the extreme northeastern portion of their range (Maine, Massachusetts, and Connecticut) started to disappear by the late 1940s and the disappearance of populations in other New England states was apparent by the 1950s (Selby 2007). Habitat fragmentation was probably the major factor responsible for the New England population declines, but collecting, housing development, gypsy moth spraying, and severe storms were the final factors of extirpation for many populations (Selby 2007). A north to south disappearance was reported for New York and seems to be a general pattern of extirpation across the range (Selby 2007, NatureServe 2013). The eastern populations crashed to near extinction from the 1960s to early 1990s with populations on Nantucket Island, Block Island, and Long Island persisting until 1991 (NatureServe 2013). Long term decline trends are estimated at >90% based on habitat loss and range contraction alone, resulting in scattered, mostly isolated remnant colonies (NatureServe 2013). Short term declines are estimated at 30-70% due to severe declines in more than half of its range, although it may be holding its own in some western prairie regions for now (NatureServe 2013). Approximately 100-200 viable breeding or metapopulations remain and many more individual colonies, but most of these seem to contain less than 200 adults (NatureServe 2013).

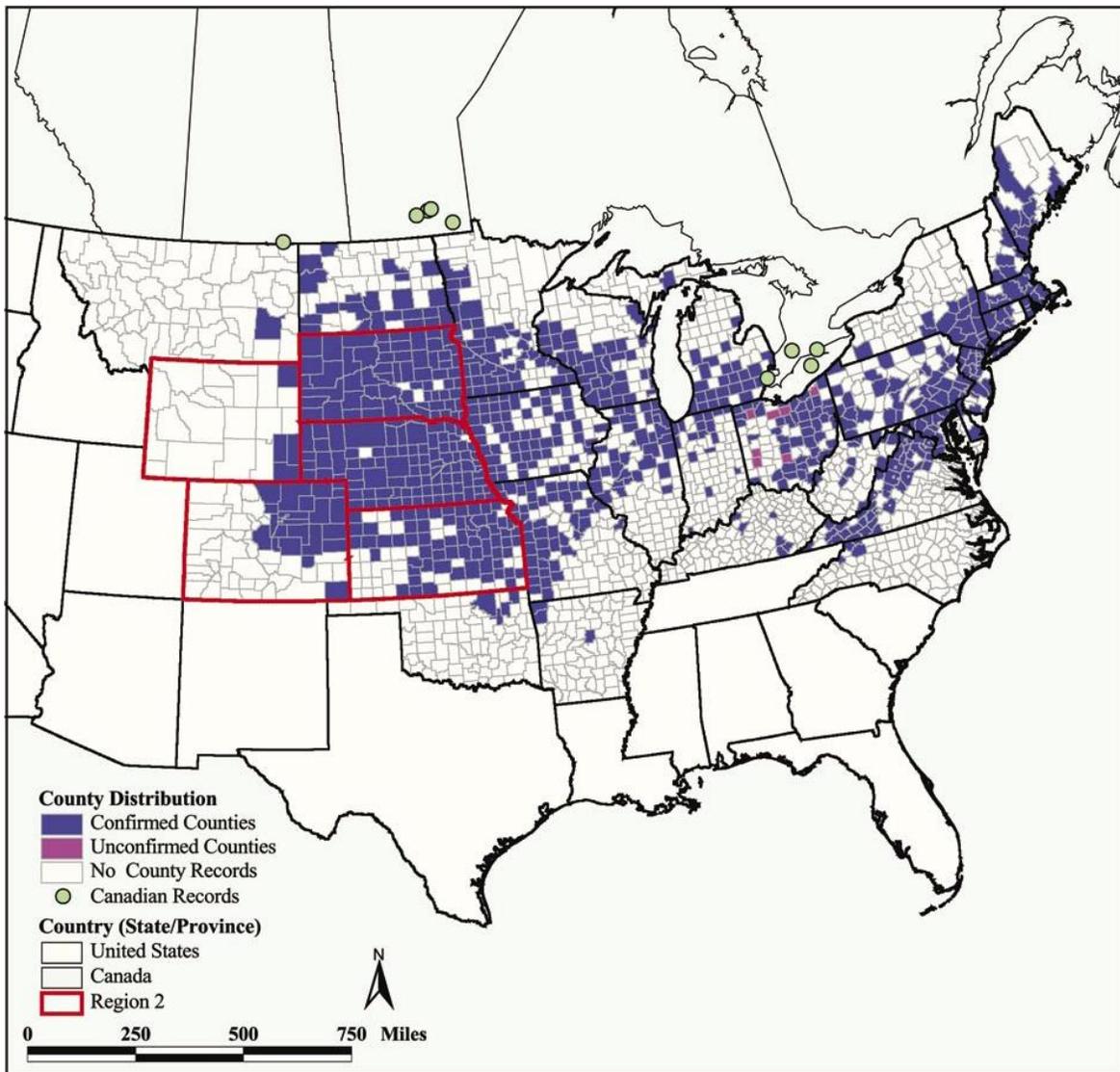


Figure 1. Historic county distribution for the regal fritillary throughout its range in North America (Selby 2007).

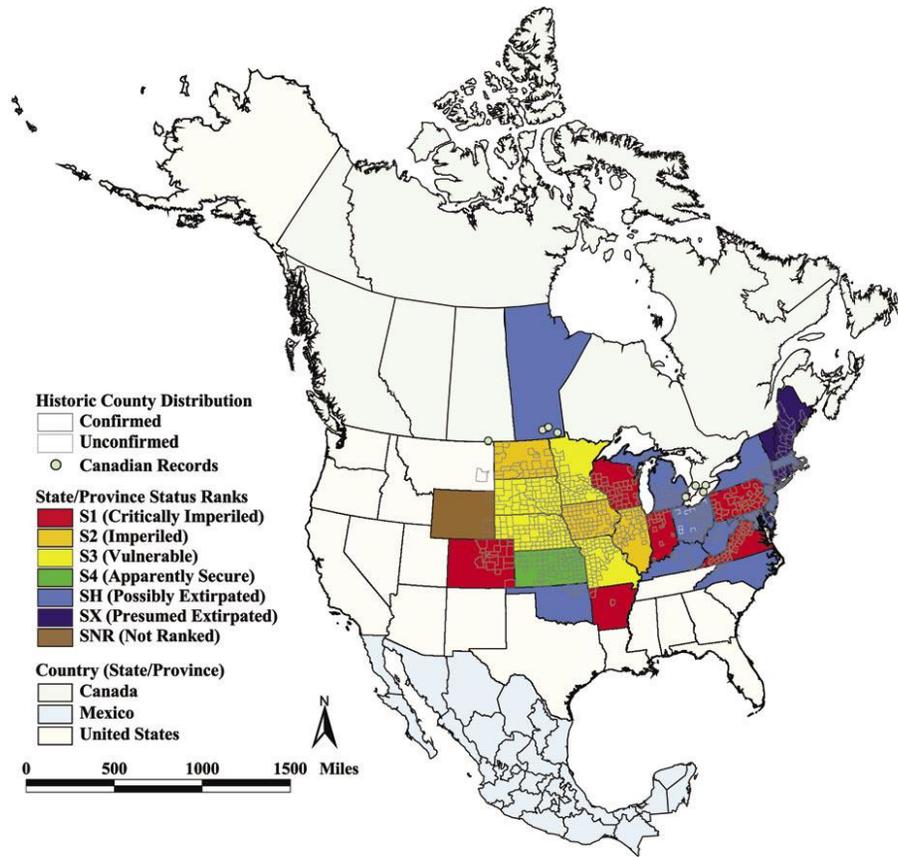


Figure 2. National Heritage Program State/Province status ranks and historic county distribution for regal fritillary in North America (NatureServe 2013).

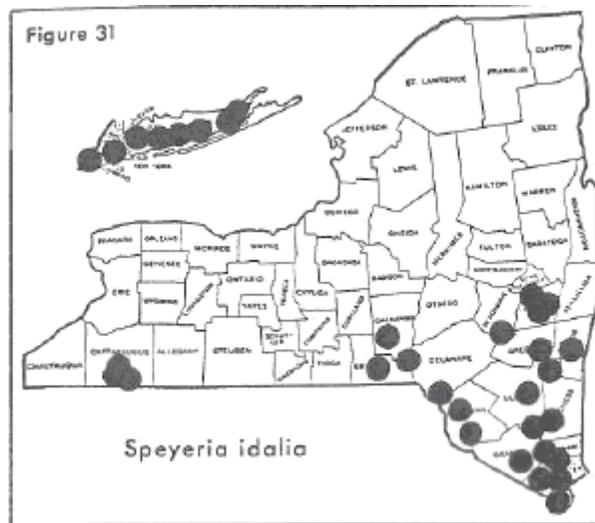


Figure 3. Historical distribution of the regal fritillary by county (NYNHP 2013).

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 | <u>100-200</u> | _____ | _____ |

Details of historic occurrence:

This species is historically known from Long Island, the Hudson Valley, and Allegheny State Park (NYNHP 2013). The last known record of occurrence is from Prospect Hill and Montauk, Long Island in 1988 when one individual was observed at each location (NYNHP 2013)

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

Details of current occurrence:

There have been no recent collections or occurrences, but several sightings of strays on Long Island (NYNHP 2013).

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
- ___ 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:

II. 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:

Regal fritillaries have a single generation per year and exhibit extraordinarily high potential fecundity per female (Selby 2007). Mating occurs soon after females emerge in late June to early July, but females do not begin laying eggs until late August – early September (Selby 2007). Females tend to emerge one to two weeks later than males due to a disproportionate larval development rate (NYNHP 2013). As the number of males decreases in late summer, females become more active and lay over 1000 eggs per individual on dead leaves and pebbles as they walk through vegetation (generally from late August to mid-September)(NYNHP 2013). Usually oviposition occurs near but not on *Viola* spp. Eggs hatch in three to four weeks and newly hatched larvae seek shelter beneath leaves, immediately going into diapause without feeding (Selby 2007). The following spring, larvae feed on violets and seek shelter during the day. After five molts, they form a chrysalis from which they emerge in approximately 17 days (Selby 2007). Mortality is high for newly hatched larvae as they must survive the harsh winter conditions then immediately locate emerging violet leaves, and are extremely susceptible to disease, parasitoids, and direct and indirect mortality from fires (Selby 2007). Because regal fritillaries do not migrate and are unable to survive in altered landscapes surrounding fragmented prairie remnants, the odds of successfully repopulating distant habitat fragments are low (Selby 2007).

III. Threats:

Loss and fragmentation of open habitat to agriculture (other than pasture or hayfield) and development, conversion of fields to plowed croplands, reforestation, pesticides, herbicides, and inappropriate and/or overuse of fire have been the primary factors of decline and vulnerability to this species in New England (NatureServe 2013). Invasive species and encroachment of native woody vegetation are threatening habitat quality and availability of critical resources. Exotic plants such as brome grass (*Bromus* spp.) have degraded or destroyed much western prairie habitat and other invasives may have had an impact eastward (NatureServe 2013).

The absence of fire, grazing and haying can constitute a threat as these activities play an important role in maintaining and shaping prairie habitat. Depending on the timing and intensity, however, they may also pose a threat to the species. For example, violets, which are an important component of the habitat, become less frequent with fire, and high larval mortality rates have been observed in burned areas (NatureServe 2013).

Gypsy moth control must be considered a threat in the northeast and spraying of *Bacillus thuringiensis*, a bacterium commonly used as a pesticide, was strongly implicated for the extirpation of a population in Pennsylvania in the early 1980s (NatureServe 2013).

A reduction in fitness resulting from genetic isolation poses a long-term threat to the viability of the regal fritillary throughout its range. Extremely harsh winters, late hard frosts following a spring thaw, severe storms, or cool damp conditions can all affect survival of larvae and may be consequences of climate change (Selby 2007). Severe storms are thought to have wiped out a few remnant New England island populations and possibly the Long Island population (NatureServe 2013). Overcollecting is a threat to small populations or concentrated occurrences and has been reported to have eradicated at least one population in the past, but this is not a major factor in the overall decline (NatureServe 2013).

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

No Unknown
 Yes

The regal fritillary 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.

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

The first action needed is to determine if the species is present in New York; historical populations occurred on Long Island and strays have been sighted here so it would be a good place to survey (NYNHP 2013). There is extensive information on management plans and requirements available in the literature that may be referenced if populations in the state are discovered (Selby 2007).

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 the regal fritillary 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.

IV. References

NatureServe. 2013. NatureServe Explorer: an online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. Accessed: May 1, 2013.

New York Natural Heritage Program. 2013. Element Occurrence Database. Albany, NY.

Selby, G. 2007. Regal fritillary (*Speyeria idalia* Drury): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. 53p.

Vaughan, D.M. and M.D. Shepherd. 2005. Species profile: *Speyeria idalia*. In Shepherd, M.D., D.M. Vaughan, and S.H. Black. (eds). Red list of pollinator insects of North America. CD-ROM Verison 1 (May 2005). Portland, OR. The Xerces Society for Invertebrate Conservation.

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