Species Listing PROPOSAL Form:
Listing Endangered, Threatened, and Special Concern Species in Massachusetts

Scientific name: _Nuerocordulia obsoleta_

Current Listed Status (if any): Special Concern

Common name: Umber Shadowdragon

Proposed Action:
_____Add the species, with the status of: _____
__X__Remove the species
_____Change the species' status to: _____

Change the scientific name to: _____
Change the common name to: _____
(Please justify proposed name change.)

Proponent's Name and Address:
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Association, Institution or Business represented by proponent: Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife

Proponent's Signature:

Date Submitted:

02/26/2018

Please submit to: Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, 1 Rabbit Hill Road, Westborough, MA 01581

Justification

Justify the proposed change in legal status of the species by addressing each of the criteria below, as listed in the Massachusetts Endangered Species Act (MGL c. 131A) and its implementing regulations (321 CMR 10.00), and provide literature citations or other documentation wherever possible. Expand onto additional pages as needed but make sure you address all of the questions below. The burden of proof is on the proponent for a listing, delisting, or status change.

(1) Taxonomic status. Is the species a valid taxonomic entity? Please cite scientific literature.

Yes, _Neurocordulia obsoleta_ – Say 1839 (Paulson & Dunkle, 2009).

(2) Recentness of records. How recently has the species been conclusively documented within Massachusetts?

There are 15 current Element Occurrences in Massachusetts, and four historic (> 25 years old). Most of the current EOs have been observed since 2004, and several have been observed within the last four years. There are also four historic EOs, with observation dates as old as 1904, and as recent as 1968.

(3) Native species status. Is the species indigenous to Massachusetts?

Yes, the species is native, but not endemic to Massachusetts.

(4) Habitat in Massachusetts. Is a population of the species supported by habitat within the state of Massachusetts?

Yes, over 8,000 acres of Species Habitat are mapped in Massachusetts for current EOs, following MA NHESP Species Habitat mapping guidelines.

(5) Federal Endangered Species Act status. Is the species listed under the federal Endangered Species Act? If so, what is its federal status (Endangered or Threatened)

No, Species is not listed under USESA.

(6) Rarity and geographic distribution.

(a) Does the species have a small number of occurrences (populations) and/or small size of populations in the state? Are there potentially undocumented occurrences in the state, and if so, is it possible to estimate the potential number of undocumented occurrences?

The species is represented by 15 extant populations (Element Occurrences, or EOs) throughout the Commonwealth ((e)). Approximately half of the extant Element Occurrences occur within lacustrine habitat, and the other half occur within riverine habitats. Of the historic locations, one is located on the Charles River in Dover, MA. This observation is only 15 river km upstream of a currently extant EO on the Charles, and could be thought of as the same EO. The remaining three historic EOs were last observed prior to 1917 and have no habitat or location identified (Howe, 1917).

There are likely significant numbers of undocumented occurrences in the state, but the generalist habitat requirements of the species make it difficult to evaluate the accuracy of habitat based projections (see further discussion in section 8.e.below). Adults of the species are largely crepuscular, which may have contributed to their presumed rarity. Incorporation of exuvial surveys and greater confidence in identification between *N. obsoleta* and *N. yamaskanensis* has allowed further data collection and confidence in distribution.
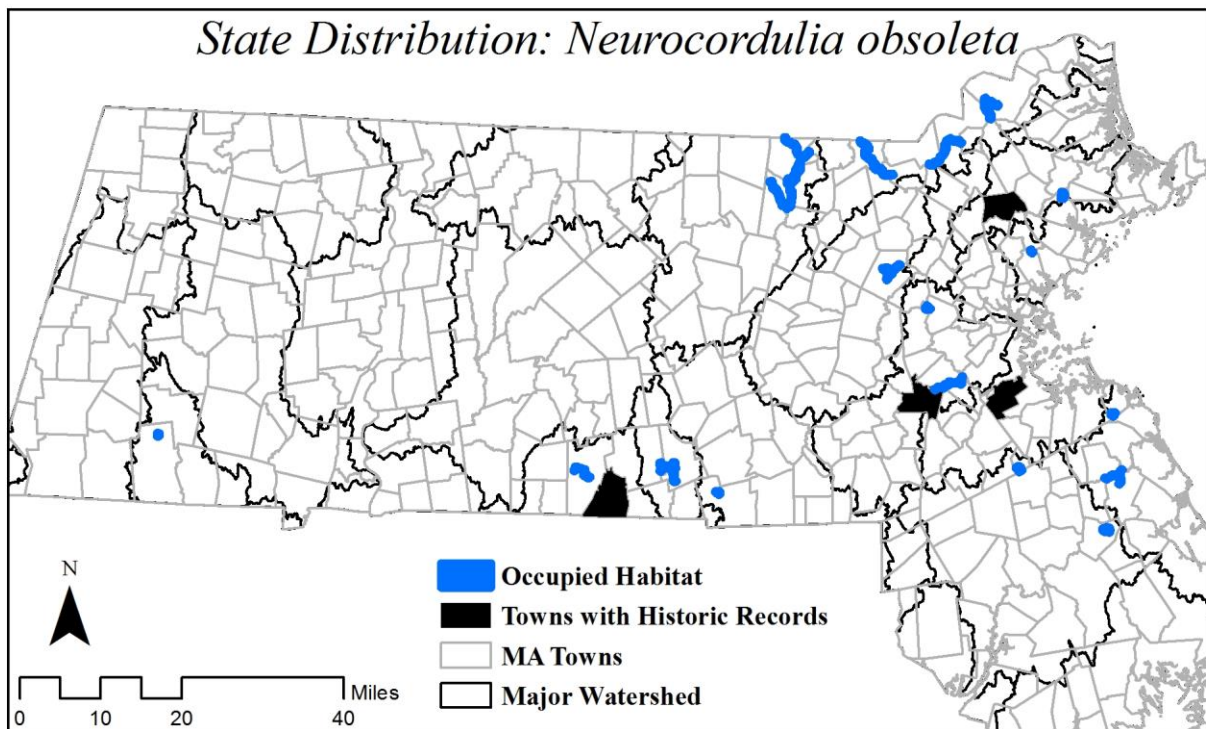

Figure 1: Distribution of *Neurocordulia obsoleta* in Massachusetts. Occupied Habitat reflects NHESP mapped Species Habitat.

(b) What is the extent of the species' entire geographic range, and where within this range are Massachusetts populations (center or edge of range, or peripherally isolated)? Is the species a state or regional endemic?

Neurocordulia obsoleta is native, but not endemic to the northeastern United States. In North America, it is present from as far west and south as Louisiana, east to Florida, and north to Illinois, Maine and New Brunswick (Figure 2). The northeastern states hold a significant responsibility of the range of this species, and Massachusetts is considered within the core of this species range.
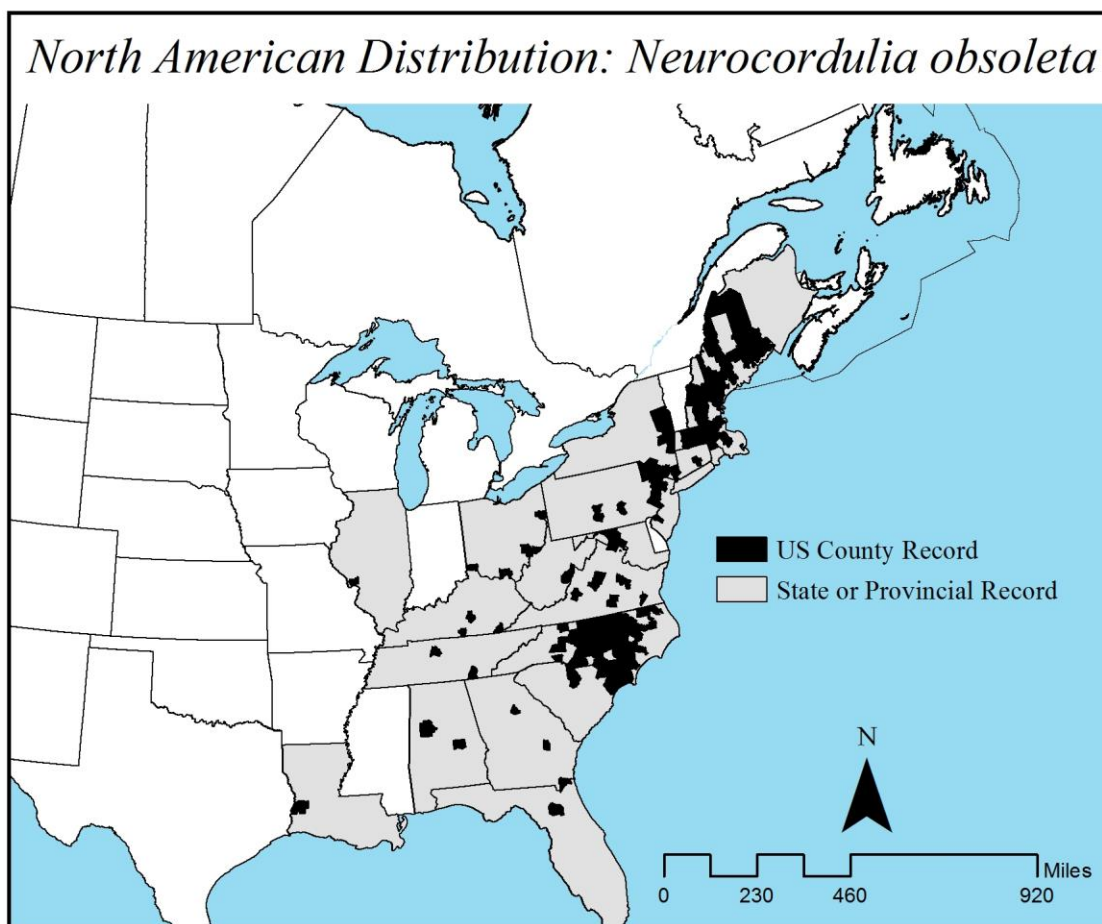
Figure 2: Distribution of *Neurocordulia obsoleta* in Canadian Provinces and US States and Counties. Data from Odonata Central (Abbot 2008-2018). Provincial region and county scale data was not available

(7) Trends.

(c) Is the species decreasing (or increasing) in state distribution, number of occurrences, and/or population size? What is the reproductive status of populations? Is reproductive capacity naturally low? Has any long-term trend in these factors been documented?

There is no discernable increasing or decreasing trend in the species since it was first listed in 1993 and most records within the NHESP database were collected since 1998 (Figure 3). There are currently four historic locations in MA (Figure 1) and for three of these there are no site location data with the observations, and no recent effort has been made to find the species again. The fourth record (from 1968), on the Charles River in Dover, MA, and an extant population occurs 15 river km downstream. It is very possible that these two records represent the same EO and that further effort in the Dover site may find that population extant.

During an evaluation of all Odonates native to the northeastern US states (VA- ME), White et al. (2014) found a slight decrease in relative range when comparing records pre-post 2000; however neither the species nor its habitats were considered relatively rare or vulnerable (White et al., 2014; 2015).

Currently NatureServe ranks *N. obsoleta* as globally and nationally secure (G5N5- NatureServe 2017). State rank was updated in 2017 to "Vulnerable/Apparently Secure" (S3/S4), from "Vulnerable" in 2011 (S3) and "Imperiled" (S2) in 2004.
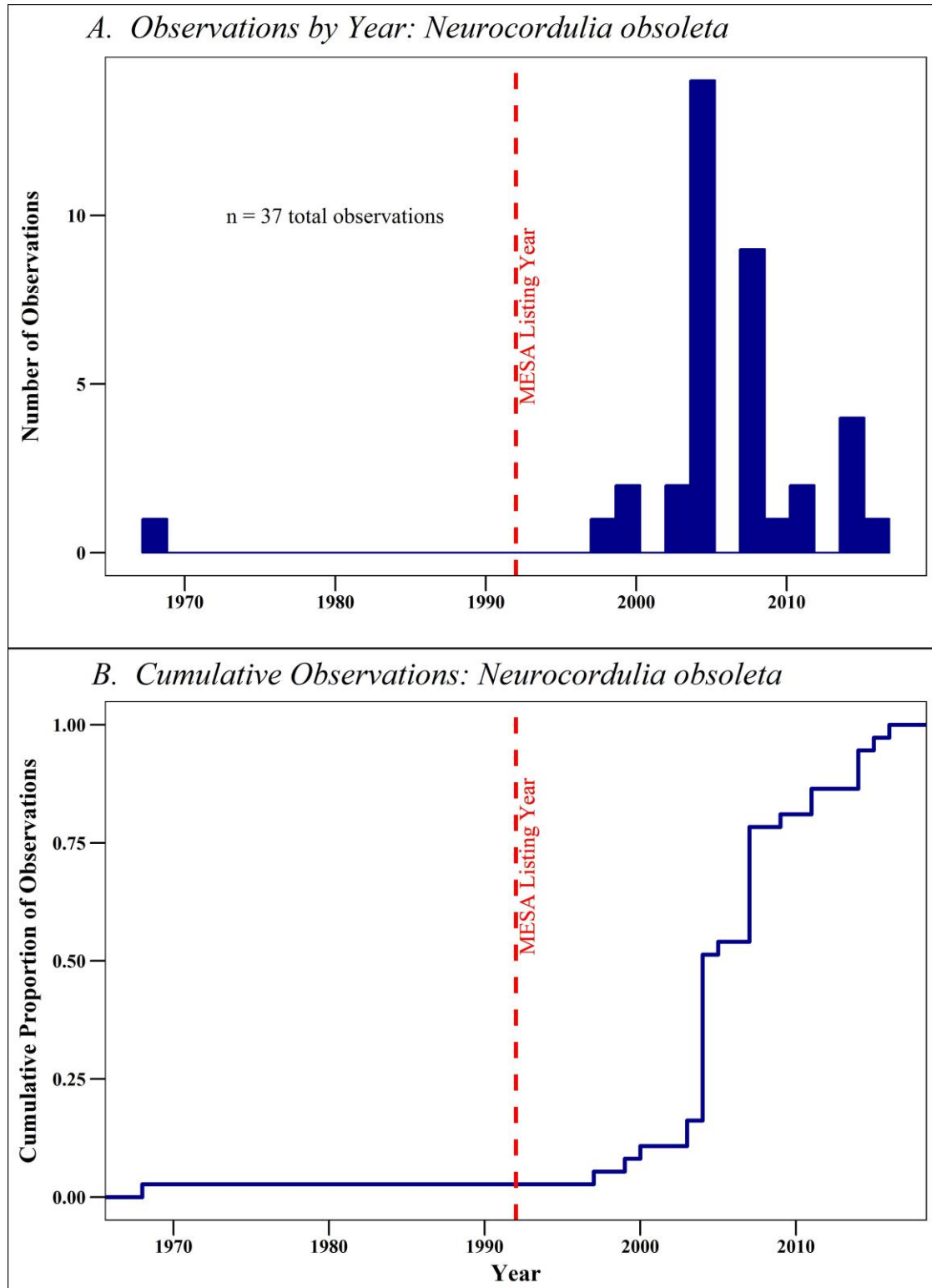

Figure 3: Total Observations (A) and Cumulative Observations (B) through time for *Neurocordulia obsoleta* **in the NHESP database.** Only the first year of a given Source feature is included. Red dashed line represents year *N. obsoleta* was listed under MESA.

(8) Threats and vulnerability.
(d) What factors are driving a decreasing trend, or threatening reproductive status in the state? Please identify and describe any of the following threats, if present: habitat loss or degradation; predators, parasites, or competitors; species-targeted taking of individual organisms or disruption of breeding activity.

A threats assessment was conducted by NHESP in 2017 using the *NatureServe Conservation Status Assessments: Rank Calculator (v.3.186)*. Identified threats included residential & commercial development, and associated pollution to highly developed waterbodies. However, *N. obsoleta* is often found in significantly altered aquatic habitats or those with significant development around them. Eight of the 15 extant EOs occur in eastern Massachusetts in a significantly developed landscape. Because of this, the impact of the assessed threats was ranked as low.

(e) Does the species have highly specialized habitat, resource needs, or other ecological requirements? Is dispersal ability poor?

Neurocordulia obsoleta occurs within lakes and ponds, as well as medium to large rivers with high to moderate gradients, and these habitats were considered among the least rare or vulnerable in an assessment of all odonates and habitats in the northeastern states (White et al., 2015). In Massachusetts the species is often associated with human altered aquatic habitat. Of the 15 extant EOs in the state, nine occur in lacustrine habitats and only one EO occurs on a Great Pond. The remaining 8 populations occur on constructed or significantly enhanced reservoirs. Further, half of the riverine populations are found within riverine impoundments or their tailraces. Considering the species generalist habitat requirements, and that a significant proportion of the known occupied habitat in the state is highly altered or developed, it is difficult to evaluate further habitat availability within the state or to establish habitat conservation goals.

Conservation goals.

What specific conservation goals should be met in order to change the conservation status or to remove the species from the state list? Please address goals for any or all of the following:

NHESP does not recommend further conservation goals are needed prior to delisting. NHESP will continue to track occurrences of this species, but will no longer target this species or its habitat for surveys in the absence of sympatric species interests.

(a) State distribution, number of occurrences (populations), population levels, and/or reproductive rates

Currently there are 15 extant populations within the Commonwealth.

(b) Amount of protected habitat and/or number of protected occurrences

Approximately 8,000 acres are currently included in mapped Species Habitat for *N. obsoleta* in the Commonwealth, 6,700 of which is upland habitat (excluding open water). Approximately 35% of this upland habitat is protected in perpetuity as either State, municipal or other conservation land.

Rates of land protection required for conservation of aquatic species are difficult to identify as the entire watershed upstream of the population should be considered as influencing the aquatic habitat. Approximately 21% of upland within all sub-basins occupied by *N. obsoleta* is currently protected. Continued land protection within sub-basins occupied by *N. obsoleta* will add to its conservation; however, land and watershed conservation for this species should not be targeted at the expense of other MESA listed species.

(c) Management of protected habitat and/or occurrences

Approximately 43% of *N. obsoleta* habitat in Massachusetts overlaps with Regulatory Habitat (including Priority and Estimated Habitat) of other species listed under MESA. Priority and Estimated Habitat allow environmental regulatory review of projects that may affect the conservation of MESA listed species. This considerable overlap may aid in the conservation of *N. obsoleta* as conservation outcomes of regulatory review will likely be focused on conserving habitat for sympatric aquatic species.

Literature cited, additional documentation, and comments.

Abbott, J.C. 2006-2018. OdonataCentral: An online resource for the distribution and identification of Odonata. Available at . (Accessed: January 17, 2018).

Howe, R. H. J. (1917). Manual of the Odonata of New England. In *Memoir of the Thoreau Museum of Natural History: II* (p. 102). Concord, Massachusetts. https://doi.org/https://archive.org/details/manualofodonatao00howe

NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: January 31, 2018).

Paulson, D. R., & Dunkle, S. W. (2009). *A Checklist of North American Odonata: Including English Name, Etymology, Type Locality, and Distribution* (2009th ed.). Seattle, WA: Jim Johnson. Retrieved from https://www.odonatacentral.org/docs/NA_Odonata_Checklist_2009.pdf

White, E. L., Hunt, P. D., Schlesinger, M. D., & Corser, J. D. (2014). *A Conservation Status Assessment of Odonata for the Northeastern United States*. Albayn, NY.

White, E. L., Hunt, P. D., Schlesinger, M. D., Corser, J. D., & Phillip, G. (2015). Prioritizing Odonata for conservation action in the northeastern USA. *Freshwater Science*, *34*(June), 1079–1093. https://doi.org/10.1086/682287.