

Species Status Assessment

Class: Osteichthyes (bony fishes)
Family: Percidae (perch)
Scientific Name: *Etheostoma maculatum*
Common Name: Spotted darter

Species synopsis:

The spotted darter is extremely localized and uncommon in Indiana, Ohio, Pennsylvania, New York, West Virginia, and Kentucky. It resides in medium-sized streams with clean gravel and is found in only French Creek of the Allegheny watershed in New York. Its range is severely restricted but secure although changing land-use practices in the basin could affect in-stream habitat, distribution and abundance of this species in the future.

I. Status

a. Current and Legal Protected Status

- i. **Federal** Not Listed **Candidate:** Yes
- ii. **New York** Threatened, SGCN

b. Natural Heritage Program Rank

- i. **Global** G2
- ii. **New York** S1 **Tracked by NYNHP?** No

Other Rank:

Species of Northeast Regional Conservation Concern (Therres 1999)

IUCN Red List Category: Near Threatened

American Fisheries Society Status: Endangered (2008)

Status Discussion:

This species is globally ranked as Imperiled and state ranked as Critically Imperiled. There are small scattered populations over a wide range in the Ohio River basin. Its riverine habitat is widely degraded by pollution and siltation (Natureserve 2012).

II. Abundance and Distribution Trends

a. North America

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Time frame considered: Past 10 years or 3 generations (NatureServe 2012)

(See Grandmaison et al. 2004)

b. Regional

i. Abundance

declining increasing stable unknown

ii. Distribution:

declining increasing stable unknown

Regional Unit Considered: Northeast (Species of Concern)

Time Frame Considered: _____

Monitoring in New York.

There are monitoring programs carried out by the Rare Fish Unit, 1998-2012.

Trends Discussion:

In the short-term, the distribution and abundance of this species probably are declining throughout North America. The species is now scarce and highly localized in Ohio. The size of spotted darter populations in Ohio varied considerably and spotted darter populations fluctuate considerably within short time periods. In New York, only a few spotted darter individuals have been observed in recent years and the darter is absent from much of its historical range (NatureServe 2012).

In New York, spotted darter have historically been found in two waters and their range is not declining (or gone or dangerously sparse) in the one watershed. Population abundance is low and habitats are poorly understood. This trend causes imminent concern.

There has been a decrease in catches (as % frequency occurrence) in comprehensive stream surveys of this western sub-basin of the Allegheny watershed shifting from 2% in the 1930s to 0.5% in 2000s.

Statewide, the number of records for this species in the last 30 years has been 29, compared to 12 reports prior to 1977. The distribution of this species within this sub-basin as measured by hydrologic units (HUC 10) has changed very little, with records from one of the units prior to 1977 and from the same unit since 1976.

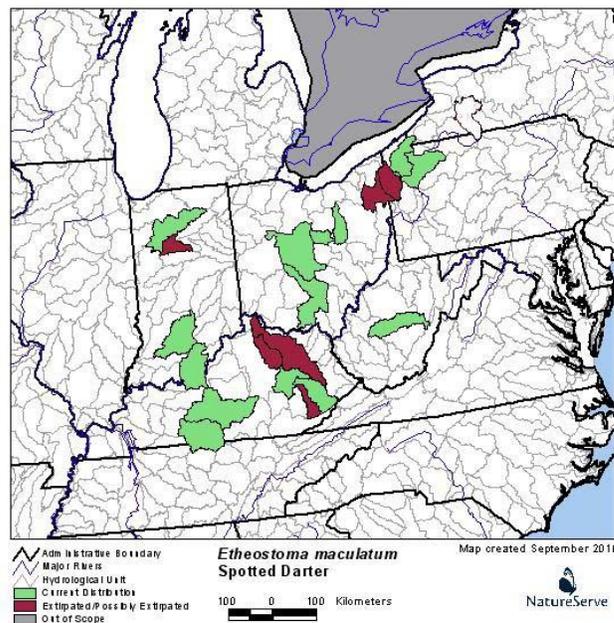


Figure 1. U.S. distribution of spotted darter by watershed (NatureServe, 2012, with correction for Genesee).

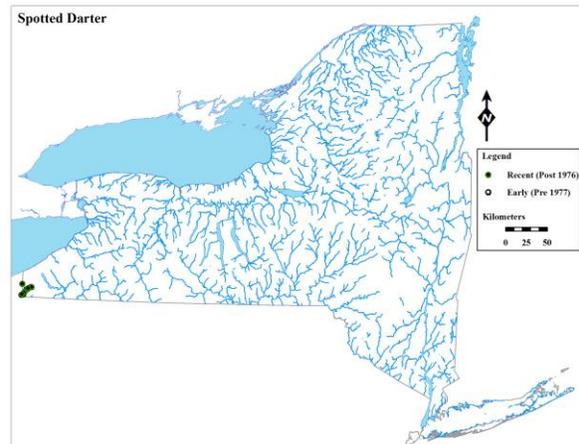
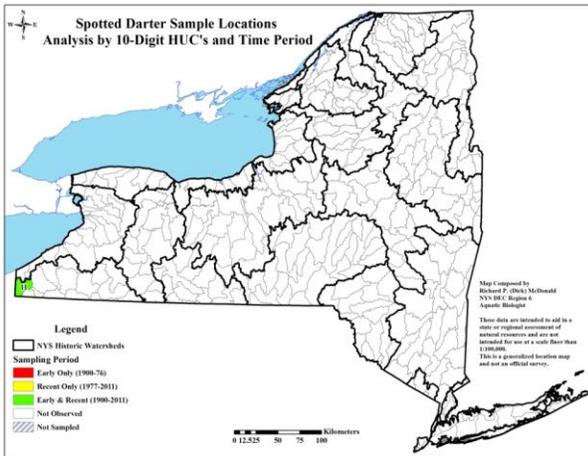


Figure 2. Spotted darter distribution in New York, depicting fish sampled before 1977 and from 1977 to current time, shown with the corresponding HUC-10 units where they were found along with the number of records.

Watershed name	Total # HUC10	Early only	Recent only	both
Allegheny	1	0	0	1

Table 1. Records of rare fish species in hydrological units (HUC-10) are shown according to their watersheds in early and recent time periods (before and after 1977) to consider loss and gains. Further explanations of details are found in Carlson (2012).

III. New York Rarity, if known:

Historic	# of Animals	# of Locations	% of State
prior to 1977	_____	<u>12 reports</u>	<u>1/18 watersheds</u>
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

Spotted darter has only been caught in French Creek. Collections in 1937 included this species at 29% of the French Creek sites.

Current	<u># of Animals</u>	<u># of Locations</u>	<u>% of State</u>
(since 1977)	_____	<u>29 reports</u>	<u>1/18 watersheds</u>

Details of current occurrence:

The most thorough studies available from 1991-92 found spotted darter at 5 sites in French Creek, and the abundance and age structure was judged as that of a healthy, self-supporting population (Bowers et al. 1992). Sampling in summer 2000 and 2010 confirmed the species at one site near the state line. Sampling in West Branch French Creek in 1992 found this species for the first and only time (letter from M. Gutowski, Penn. State Univ., to D. Bouton, Sept 30, 1992).

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
___ 100 (endemic)	___ Core
___ 76-99	<u>X</u> Peripheral
___ 51-75	<u>X</u> Disjunct
___ 26-50	Distance to core population:
<u>X</u> 1-25	<u>200 mi</u>

IV. Primary Habitat or Community Type:

1. Small River, Low Gradient, Moderately Buffered, Neutral, Warm
2. Confined River

Habitat or Community Type Trend in New York:

___ Declining ___ Stable ___ Increasing ___ Unknown

Time frame of decline/increase: _____

Habitat Specialist? X Yes ___ No

Indicator Species? X Yes ___ No

Habitat Discussion:

The spotted darter prefers fast, rocky riffles of small to medium-sized clear streams (Grandmaison et al. 2004). This substrate type of coarse cobble and gravel is distributed throughout the lower 6

miles of French Creek, and additional physical features were reported by Bowers et al. (1992), Hansen (1993) and Daniels (1989). Adults apparently spend the winter in areas somewhat deeper and with slower current. In the Elk River, West Virginia, spotted darters were observed primarily in glide habitats near large rocks and in moderate current velocities. Eggs are laid on undersides of stones in quiet water areas near heads of riffles in water 15-60 cm deep (NatureServe 2012).

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:

Spotted darter has a relatively short life span; individuals can live up to 5 years (Werner 2004). In Pennsylvania, females reach sexual maturity in 2 years (NatureServe 2012). Spawning takes place from late May to late June or July with the female spawning several times each season. Eggs are guarded by the male (NatureServe 2012).

VI. Threats:

According to The Nature Conservancy (1994), a number of potential threats to French Creek's water quality and aquatic fauna have been identified including: 1) siltation from overgrazing, row cropping, road construction, and land clearing, 2) elevated nutrients from dairy animals wastes, sewage plant failure and fertilizer spills and 3) pesticide threats from: catastrophic events and

agricultural applications. The species has been considered for listing by the USFWS (Grandmaison et al. 2004).

Because they are so limited, populations in New York, West Virginia, and Pennsylvania are probably most affected by agricultural, forestry, urbanization, and other land uses that result in silt deposition (NatureServe 2012). In New York, Bowers et al. (1992) noted that stream channel alterations and increased turbidity and siltation due to poor agricultural and silvicultural practices could have significant adverse effects. In West Virginia, stream sedimentation resulting from recent coal mining operations may be the biggest threat (Osier and Welsh 2007). Additional threats include damming of flowing waters and introduction of non-native predator species (NatureServe 2012).

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

No Unknown

Yes

The spotted darter is listed as a threatened 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 Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

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

Actions are needed to control sediment runoff from mining, row crop agriculture, forestry, and degradation of riparian zones and aquatic habitat by livestock. Restoring riparian vegetation, fencing livestock from streams and providing alternate water sources are recommended. In some areas, modifying dam releases and removal of small barriers might be considered (NatureServe 2012).

If water and habitat quality has improved in other areas where the species is currently believed to have been extirpated, consideration should be given to reintroducing the species. Captive propagation might be necessary to obtain enough individuals for these efforts. Techniques should be developed to propagate spotted darters in captivity (NatureServe 2012).

Bowers et al. (1992) indicates considerable annual variation in population size and density may occur. Therefore, critical populations should be monitored annually.

The most immediate research need is to determine the actual current abundance of spotted darters throughout their range, movement/dispersal patterns, and metapopulation dynamics. This information will be necessary before we can determine the watershed area appropriate for sustaining viable spotted darter populations (NatureServe 2012).

A more complete understanding of life history (more details on seasonal habitat preferences and larval or juvenile habitat requirements, documenting for example) will help ensure management activities are appropriate to protect habitats and other factors necessary to complete all life history stages (NatureServe 2012).

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

Conservation Actions	
Action Category	Action
Land/Water Protection	Resource/Habitat Protection
Land/Water Management	Habitat/Natural Process Restoration
Land/Water Management	Invasive/Problematic Species Control
Species Management	Species Reintroduction
Law/Policy	Policy/Regulation Change/Implementation
External Capacity Building	Alliance & Partnership Development

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for the spotted darter.

Habitat Research:

---- Inventory the habitat requirements of this species and protect critical areas, as in part of the State Wildlife Grants project in 2003 focusing on the Allegheny watershed. These efforts will be coordinated with similar programs in place by The Nature Conservancy.

Life History Research:

---- Data is needed on fish species interactions. Some of these interactions are described by Hansen (1983). Initial progress toward efforts at laboratory rearing was reported by Stauffer (1995).

Population Monitoring:

---- Data are needed on long term population trends.

VII. References

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