

Species Status Assessment

Class:	Actinopterygii
Family:	Gasterosteidae
Scientific Name:	<i>Gasterosteus aculeatus</i>
Common Name:	Threespine stickleback

Species synopsis:

The threespine stickleback is treated as a species complex, with many unique and reproductively isolated populations, subspecies or species. Existing populations are either strictly marine, anadromous, or freshwater resident. Several subspecies have been identified by differences in lateral plate morphs. Current subspecies include *Gasterosteus aculeatus aculeatus*; *G. a. williamsoni*, the unarmored threespine stickleback, which is federally endangered and restricted to CA; and *G. a. santaeannae*, the Santa Ana stickleback. Some taxonomists would classify the sticklebacks inhabiting isolated lakes in British Columbia into many more subspecies (Hammerson et al. 2012). Although the species is abundant and in no threat of extinction, several populations that represent specific diversity are in danger of local extirpation in British Columbia and California. In New York, the threespine stickleback is historically known to be in Lake Ontario, Cayuga Lake, lower Hudson and Long Island bays area. Non-indigenous populations had been introduced into Lake Erie and into other Great Lakes through the Nipissing Canal from the Ottawa River (Smith 1985, D. Carlson, personal communication). This species inhabits brackish and freshwater habitats. Currently, native populations can be found along the shore of Lake Ontario, in the St. Lawrence River, and Long Island (Smith 1985). In freshwater, this species inhabits weedy pools and backwaters. In marine and brackish waters, this species is associated with seaweed rafts (Page and Burr 2011). Threats known to affect this species are human disturbances to spawning habitat and water quality, and predation by lake trout (*Salvelinus namaycush*) (NatureServe 2012).

I. Status

a. Current and Legal Protected Status

i. Federal Not listed Candidate? No

ii. New York Not listed; SGCN

b. Natural Heritage Program Rank

i. Global G5

ii. New York S4 Tracked by NYNHP? No

Other Rank:

United States National Status: N5 (5 December 1991)

Canada National Status: N5 (9 September 2011)

IUCN Red List: Least concern

Status Discussion:

This species is still abundant throughout its range, but some unique, isolated populations have declined to very low levels and require protection. Other populations have increased or have been created as the result of accidental or purposeful introductions to habitats where this species was not native. Non-indigenous populations have increased in size and distribution in the upper Great Lakes area (Moyle 1976, Fuller 2005).

II. Abundance and Distribution Trends

a. North America

i. Abundance

 declining increasing X stable unknown

ii. Distribution:

 declining X increasing stable unknown

Time frame considered: 1980s-present

b. Regional

i. Abundance

___ declining ___ increasing X stable ___ unknown

ii. Distribution:

___ declining X increasing ___ stable ___ unknown

Regional Unit Considered: Northeast

Time Frame Considered: 1980s-present

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: Not specified

Listing Status: Not listed (SNR) SGCN? Yes

MASSACHUSETTS Not Present ___ No data ___

i. Abundance

___ declining ___ increasing X stable ___ unknown

ii. Distribution:

___ declining ___ increasing X stable ___ unknown

Time frame considered: Not specified

Listing Status: Threatened (freshwater population only) (S4) SGCN? Yes

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

i. Abundance

____ declining ____ increasing ____ stable X unknown

ii. Distribution:

____ declining ____ increasing ____ stable X unknown

Time frame considered: Not specified

Listing Status: Not listed (S4) SGCN? No

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

i. Abundance

____ declining ____ increasing ____ stable X unknown

ii. Distribution:

____ declining ____ increasing ____ stable X unknown

Time frame considered: Not specified

Listing Status: Not listed (S4)

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

i. Abundance

 X declining ____ increasing ____ stable ____ unknown

ii. Distribution:

 X declining ____ increasing ____ stable ____ unknown

Time frame considered: Moderate decline from 1969-present

Listing Status: Endangered (S1) SGCN? Yes

The native range of threespine sticklebacks spans the Arctic and Atlantic drainages from Baffin Island to Cape Fear Estuary, North Carolina. Indigenous inland populations reached as far east as Lake Ontario (Schwartz et al. 1981, Page and Burr 1991). On the Pacific Coast, this species ranges from Alaska to Baja, California. Threespine sticklebacks had been introduced into the other Great Lakes (Smith 1985). Globally this species is found in Europe, Iceland, Greenland and Asia (Page and Burr 1991). The short-term population trend is relatively stable, declining less than 10%, over the last 10 years. The long-term trend for this species is not fully known.

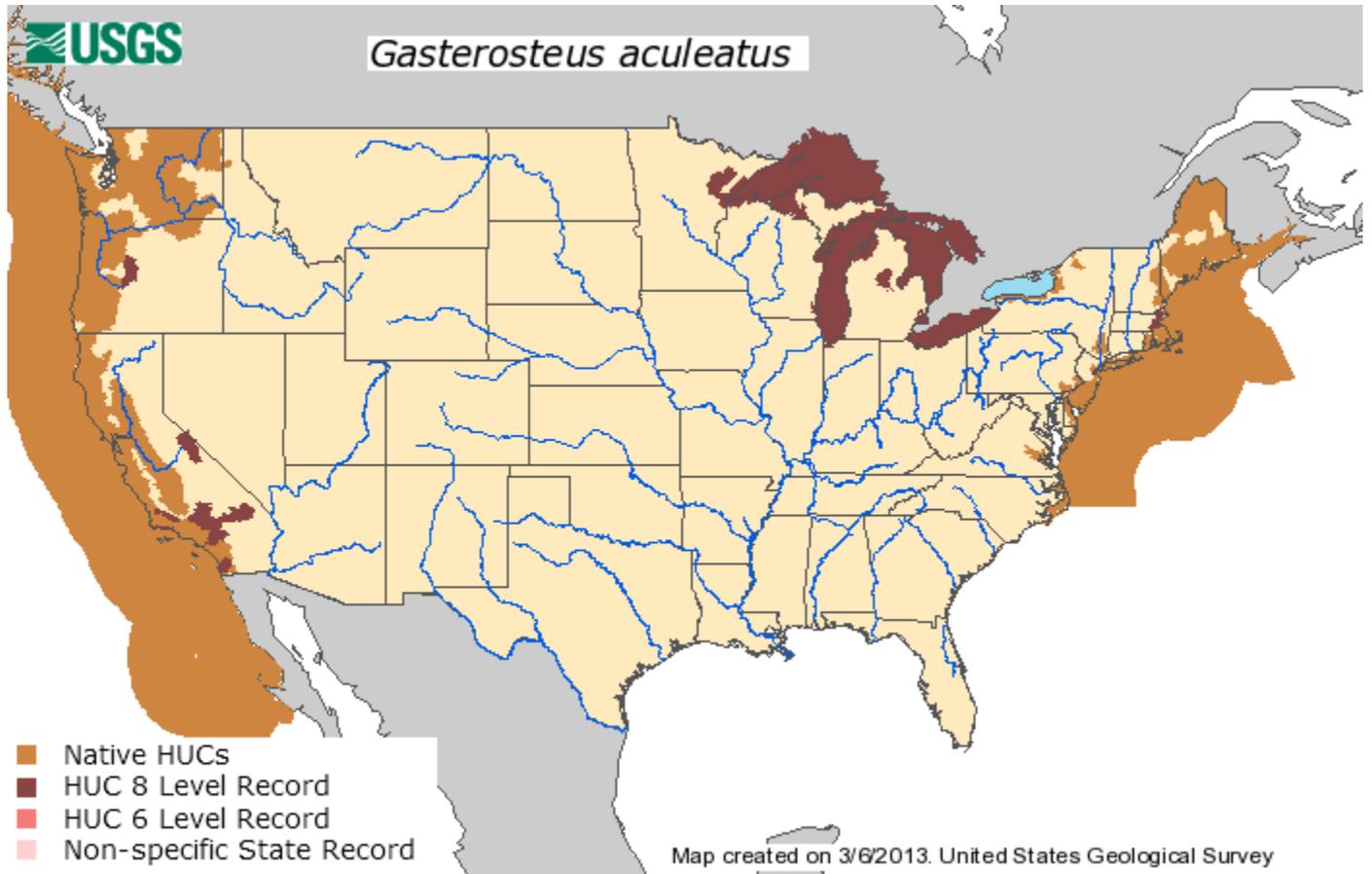


Figure 1. Native range of *Gasterosteus aculeatus* in North America (Fuller 2013).

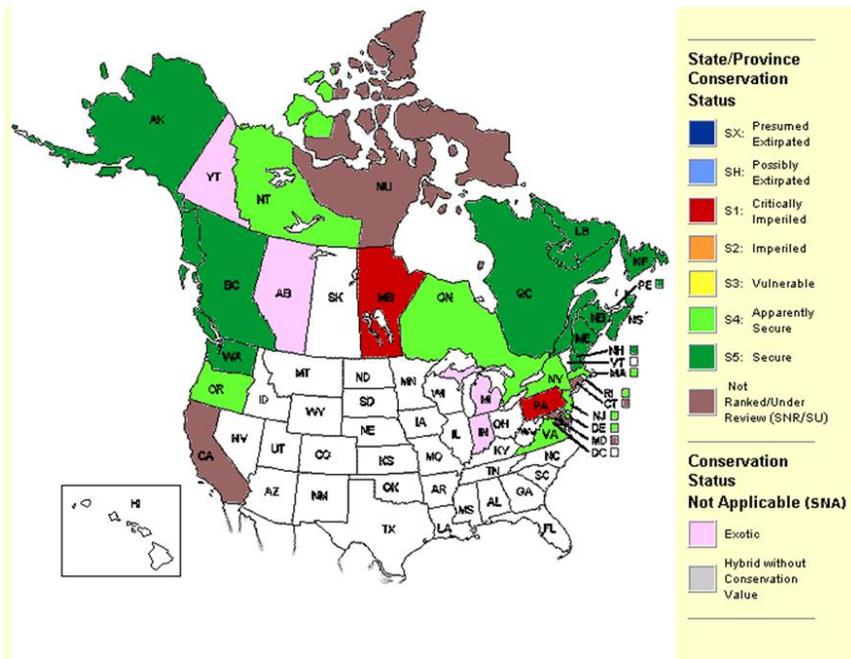


Figure 2. Conservation statues of the threespine stickleback (NatureServe 2012).

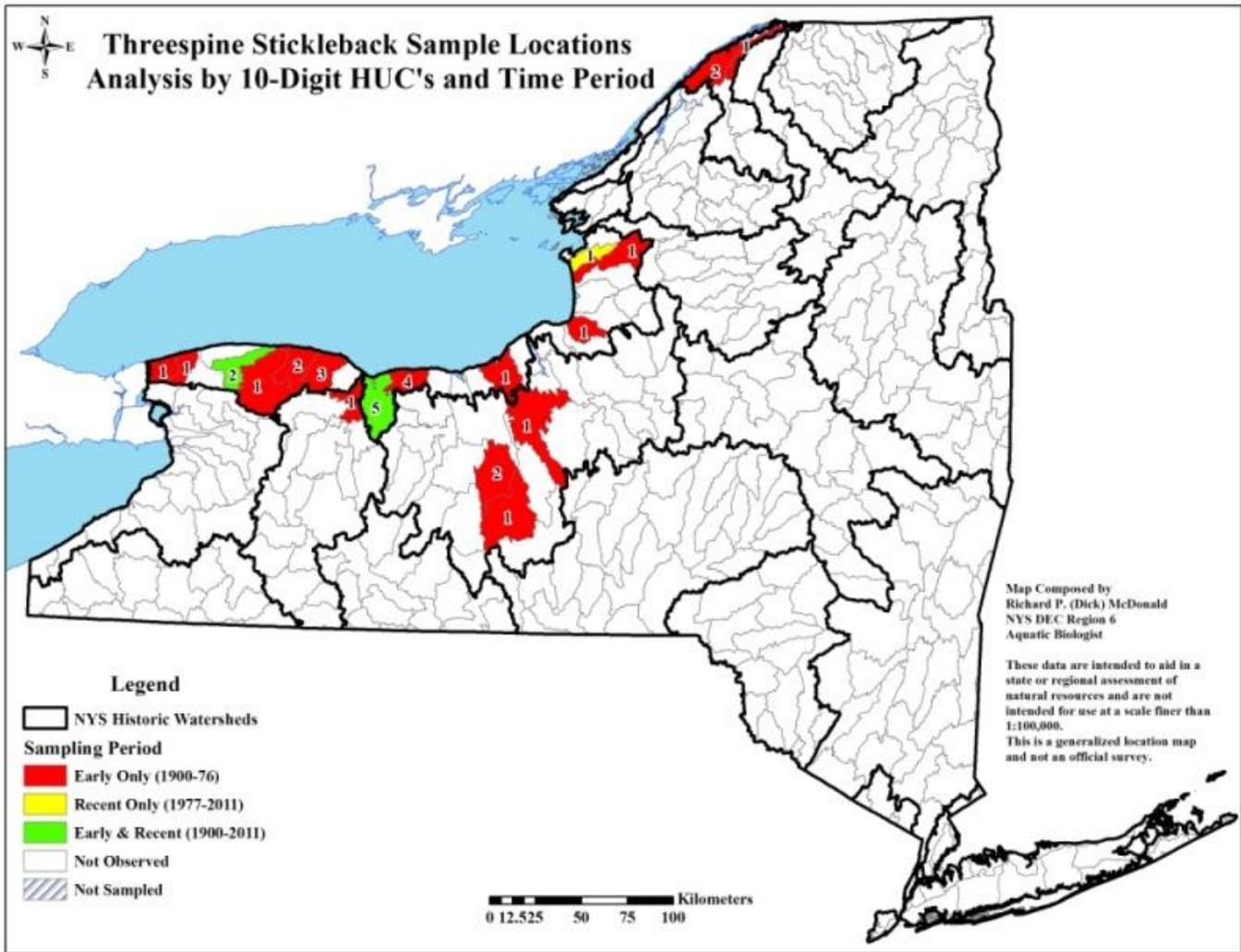


Figure 3. Inland distribution of threespine stickleback in New York. Depicting fish sampled before prior to 1977 and from 1977-2011. Regions represent HUC-10 units and the number of specimens collected (Richard McDonald, NYSDEC 2013).

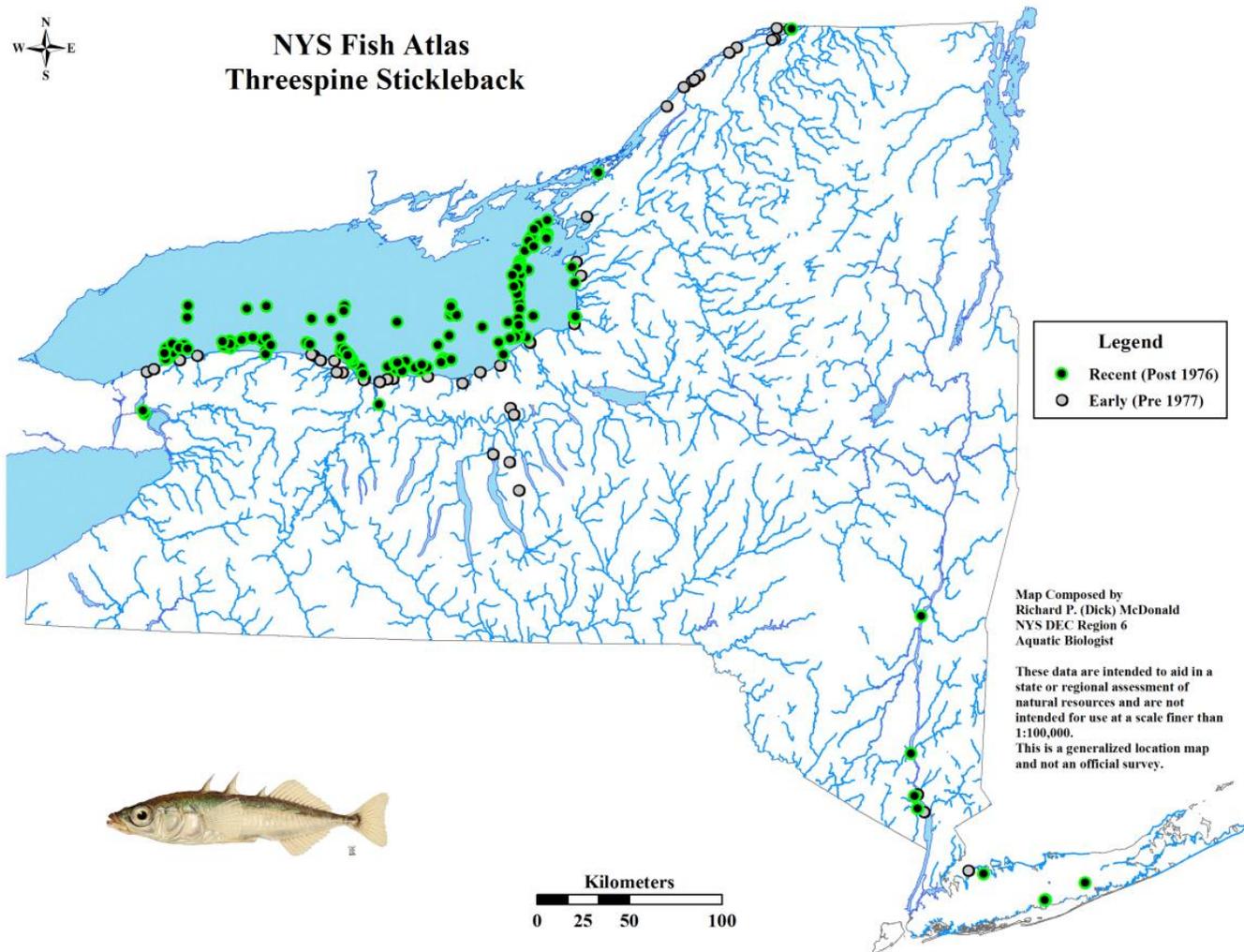


Figure 4. Locations in New York where threespine stickleback have been collected in New York (D. Carlson, personal communication) Map created by Carlson and Daniels, NYSDEC

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:

The threespine stickleback historically was found in Cayuga Lake (1956-1966). Records of this species in Lake Ontario and the St. Lawrence River were first collected in the 1930s. This species was first collected around Long Island in 1938. The earlier record of this species in the Lower Hudson River was in 1936 (D. Carlson, personal communication). See locations around Long Island in Table 1.

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

Details of current occurrence:

This species is present in Lake Ontario, the St. Lawrence River, and Lower Hudson River and around Long Island (D. Carlson, personal communication). There are current records of this species in Lake Erie (Mandrak and Crossman 1992). See locations around Long Island in Table 1.

Table 1: Data from the Western Long Island Seine Survey (1984-2011), and the Peconic Bay Small Mesh Trawl Survey (2006-2007). Years listed below only represent years with threespine stickleback occurrences, not necessarily the total duration of the surveys.

Waterbody	Years
Carmans River	1985,1989,1991
Great Peconic Bay	1987,1989,2006-2007
Great South Bay Brookhaven	1989
Hempstead Harbor	1987
Jamaica Bay	1987-1991,1999-2000,2004,2011
Little Neck Bay	1985-1989,1996
Manhasset Bay	1984-1988,1993,1999-204,2007,2009-2011
Oyster Bay Harbor	2007
Port Jefferson Harbor	1988,1994,1997
Shinnecock Bay	1987
South Oyster Bay	1984-1985,1987-1989
Staten Island	1984,1988

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
<input type="checkbox"/> 100 (endemic)	<input type="checkbox"/> Core
<input type="checkbox"/> 76-99	<input checked="" type="checkbox"/> Peripheral
<input type="checkbox"/> 51-75	<input type="checkbox"/> Disjunct
<input type="checkbox"/> 26-50	Distance to core population:
<input checked="" type="checkbox"/> 1-25	_____

IV. Primary Habitat or Community Type:

1. Summer-stratified Monomictic Lake
2. Large/Great River
3. Estuarine, Brackish Intertidal, Benthic Geomorphology, Tidal Creek
4. Backwater Slough
5. Estuarine, Brackish Shallow Subtidal

Habitat or Community Type Trend in New York:

Declining Stable Increasing Unknown

Time frame of decline/increase: Not specified

Habitat Specialist? Yes No

Indicator Species? Yes No

Habitat Discussion:

The threespine stickleback occurs in salt, brackish and freshwater habitats. This species inhabits quiet weedy pools and backwaters, or occurs among emergent plants at stream edges, over bottoms of sand and mud (Lee et al. 1980, Page and Burr 2011). Marine populations apparently are pelagic, usually staying close to shore. In some lakes, two morphologically and ecologically distinct forms may occur, one being littoral and one being limnetic (Hammerson et al. 2010).

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:

In some lakes, two morphologically and ecologically distinct forms may occur, one littoral and the other limnetic. Marine populations are pelagic, usually found inshore along the coast, in estuaries and coastal lagoons. Marine populations spawn March-April in lower parts of rivers. Males construct nests out of vegetation. Females typically lay a few hundred eggs in several nests over a period of several days. Males guard and fan the nest to provide oxygen. Eggs hatch in 7-8 days. Juveniles mature during the 1st summer and spawn during the following spring. Few individuals live past 3+ years (New York Natural Heritage Program 2013). Anadromous individuals usually die after spawning. Juveniles move to sea or deeper, larger water bodies in July-August, forming large feeding schools. Threespine sticklebacks are voracious feeders. They feed on worms, aquatic insects, plants, fish eggs and fry (Morrow 1980, Hammerson et al. 2010).

VI. Threats:

Threats affecting the threespine stickleback include recreational activities within spawning habitat, human impacts on water quality and predation by lake trout (NatureServe 2012). Threats that have affected the decline of populations in Cayuga Lake are unknown and require further study (D. Carlson, personal communication).

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

No Unknown

Yes

The Freshwater Wetlands Act provides protection for wetlands greater than 12.4 acres in size under Article 24 of the NYS Conservation Law. The Army Corps of Engineers has the authority to regulate smaller wetlands in New York State, and the DEC has the authority to regulate smaller wetlands that are of unusual local importance. The Protection of Waters Program provides protection for rivers, streams, lakes, and ponds under Article 15 of the NYS Conservation Law.

The Tidal Wetlands Act provides protection for all tidal wetlands under Article 25 of the NYS Conservation Law.

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:

Management/conservation actions have not been identified for this species.

VII. References

Carlson, D. 2013. E-mail and excel file about the population distribution of threespine stickleback in New York. Personal communication.

Connerton, M.J. and T. Schaner 2008. Acoustic assessment of pelagic planktivores, 2007. In 2007 Annual report, Bureau of Fisheries Lake Ontario Unit and St. Lawrence River Unit to the GLFC's Lake Ontario Committee.

Fuller, P. 2005. *Gasterosteus aculeatus*. USGS Nonindigenous Aquatic Species Database. Gainesville, Florida. <http://nas.er.usgs.gov/queries/FaceSheet.asp?SpeciesID=702>. Accessed 29 March 2013.

- Hammerson, G., Freyhof, J., Kottelat, M. & Lukey, J.R. 2010. *Gasterosteus aculeatus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. www.iucnredlist.org. Accessed 29 March 2013.
- Hatfield, T. 2001a. Status of the stickleback species pair, *Gasterosteus* spp. in Hadley Lake, Lasqueti Island, British Columbia. *Canadian Field-Naturalist* 115:579-583.
- Hatfield, T. 2001b. Status of the stickleback species pair, *Gasterosteus* spp. in the Vanadana Creek watershed of Texada Island, British Columbia. *Canadian Field-Naturalist* 115:594-590.
- Mandrak, N.E. and E.J. Crossman 1992. A checklist of Ontario freshwater fishes annotated with distribution maps. Royal Ontario Museum Life Sciences Miscellaneous Publication. Toronto, Ontario. v+176 pp.
- McDonald, R. 2012. Factors to consider species classification: Threespine stickleback *Gasterosteus aculeatus*. NYSDEC, Albany, NY. Accessed 29 March 2013.
- Morrow, J.E. 1980. *The freshwater fishes of Alaska*. Alaska Northwest Publishing Company, Anchorage.
- Moyle, P.B. 1976. Fish introduction in California: history and impact on native fishes. *Biological Conservation* 9:101-118.
- NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 1 April 2013.
- New York Natural Heritage Program. 2013. Biodiversity Explorer. Albany, New York. Accessed 29 March 2013.
- Owens, R.W., R. O’Gorman, T.H. Eckert and B.F. Lantry. 2003. The offshore fish community in southern Lake Ontario, 1972-1998. . Pp 407-442. in *State of Lake Ontario (SOLO): Past, present and future*. Edited by M. Munawar. Backhuys Publishers, the Netherlands.
- Page, L.M., and B.M. Burr. 2011. Peterson field guide to freshwater fishes of North America north of Mexico. Second edition. Houghton Mifflin Company, Boston, Massachusetts.
- Page, L. M., and B. M. Burr. 1991. Peterson field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin Company, Boston, Massachusetts.
- Smith, C.L. 1985. The inland fishes of New York State, New York State Department of Environmental Conservation. Albany, New York. xi + 522 pp.

Date last revised: January 28, 2014