Blackspotted Stickleback (*Gasterosteus wheatlandi*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, September 2011
Revised, November 2016
Web Version, 12/28/2017

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1 Native Range and Status in the United States

Native Range
From Froese and Pauly (2016):

"Western Atlantic: Newfoundland, Canada to Massachusetts, USA."

Status in the United States
No introductions have been reported outside the native range.

Means of Introduction into the United States
No introductions of this species have been reported.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing
From ITIS (2016):

"Kingdom Animalia
Subkingdom Bilateria

Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Acanthopterygii
Order Gasterosteiformes
Suborder Gasterosteoidei
Family Gasterosteidae
Genus *Gasterosteus*
Species *Gasterosteus wheatlandi*"

"Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 7.6 cm TL male/unsexed; [Scott and Scott 1988]; common length : 3.5 cm TL male/unsexed; [Hugg 1996]"

From Martins (2015):

"*Gasterosteus wheatlandi* live approximately for one year though they can live for two years should they delay breeding."

Environment

From Froese and Pauly (2016):

"Marine; brackish; benthopelagic."

Climate/Range

From Froese and Pauly (2016):

"Temperate, preferred ?; 52°N - 41°N"

Distribution Outside the United States

Native

From Froese and Pauly (2016):

"Western Atlantic: Newfoundland, Canada to Massachusetts, USA."

Introduced
No introductions of this species have been reported.

Means of Introduction Outside the United States
No introductions of this species have been reported.

Short Description
From Bigelow and Schroeder (2002):

"This stickleback is said to differ from the three-spined stickleback in having a deeper body, fewer fin rays (9 or 10 dorsal and 7 or 8 anal); fewer dermal plates (5 or 6 as against 28 to 33); a caudal peduncle without keels; and a strong cusp both above and below at the base of […] the ventral spine. […] Grass-green above in life, mottled and finely speckled with black on the top of the head and back; sides of head and body golden with dark blotches; breast silvery; ventral fins scarlet."

Biology
From Froese and Pauly (2016):

"Adults occur near shore in beds of vegetation, often around floating vegetation a short distance from shore. Rarely enter fresh water [Robins and Ray 1986]. Males build, guard and aerate the nest where the eggs are deposited [Breder and Rosen 1966]."

From Martins (2015):

"*Gasterosteus wheatlandi* is a marine fish that migrate into brackish inland waters to breed (Williams and Delbeek 1989), some rare populations are found to breed in freshwater (Cowen et al. 1991)."

"The breeding season for *G. wheatlandi* starts from early May until late June (Craig and FitzGerald 1982). Males build nests out of aquatic vegetation and sand where they attract females to lay their eggs (Cleveland 1994). During this time males are quite territorial, defending their home against other males (Cleveland 1994). The males provide care for the eggs and newly hatched offspring (Craig and FitzGerald 1982)."

"Females die after laying their eggs while males provide care for their eggs and offspring before dying a few weeks later."

"Young adults migrate from freshwater or littoral environments from where they hatched to around 10 km offshore though they have been found up to 55 km offshore where they dive and live deep below the surface (other related marine species have been found to live up to 200 m below the surface) (Cowen et al. 1991)."

"In its northern distribution *Gasterosteus wheatlandi* was found to be common, where up to 7% of the fish fauna found from sampling using a 10 m beach seine, minnow trap and a multi-

panelled gill net was *G. wheatlandi* (Drouin et al. 2011, Melanson 2011) while in its southern distribution the species is said to be more uncommon (Briggs and Waldman 2002)."

From Bailly (2015):

"Feeds on small fishes, small invertebrates and eggs"

Human Uses

From Martins (2015):

"No information of use or trade found."

Diseases

From Bailly (2015):

"*Argulus canadensis* Wilson C.B., 1916 (parasitic: ectoparasitic)
Ergasilus funduli Krøyer, 1863 (parasitic: ectoparasitic)
Ergasilus manicatus Wilson C.B., 1911 (parasitic: ectoparasitic)
Thersitina gasterostei (Pagenstecher, 1861) (parasitic: ectoparasitic)"

From Hanek and Threlfall (1971):

"Metazoan parasites belonging to five genera (one of Monogenea; one of Digenea; two of Cestoda; one of Copepoda parasitica) were recovered from 60 specimens of the twospine stickleback *Gasterosteus wheatlandi* Putnam, 1867, caught at three localities in Newfoundland during the period December 1968-June 1969."

Hanek and Threlfall (1971) report the following metazoan parasites of *G. wheatlandi*: *Gyrodactylus avalonia*, *Gyrodactylus lairdi*, *Gyrodactylus terranovae*, *Podocotyle atomon*, *Proteocephalus* sp., *Schistocephalus solidus*, and *Thersitina gasterostei*.

Threat to Humans

From Froese and Pauly (2016):

"Harmless"

3 Impacts of Introductions

No introductions of this species have been reported.

4 Global Distribution

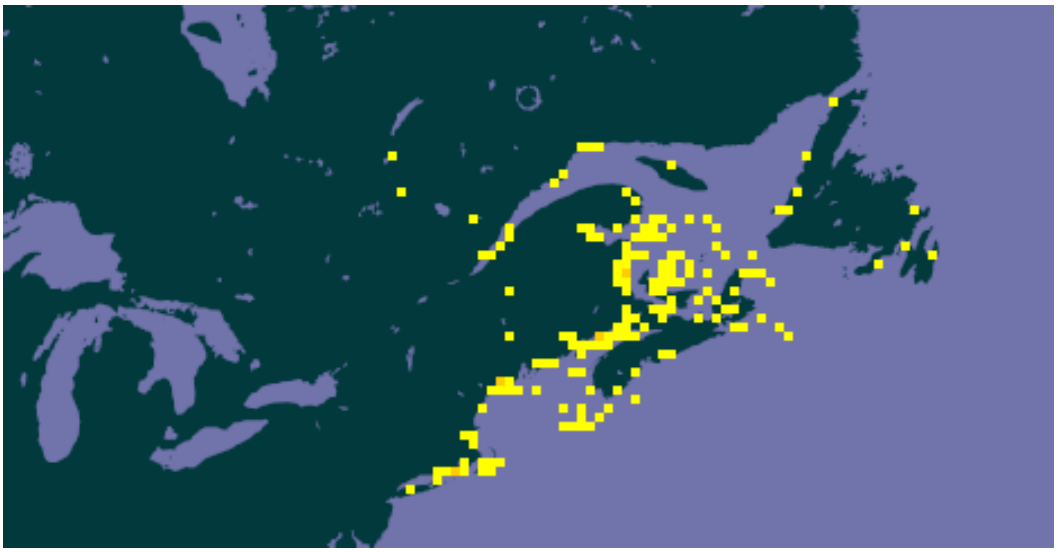

Figure 1. Known global established locations of *Gasterosteus wheatlandi* in the northeastern U.S. and southeastern Canada. Map from GBIF (2016). Points in the continental interior are incorrectly located and were not included in climate matching.

5 Distribution Within the United States

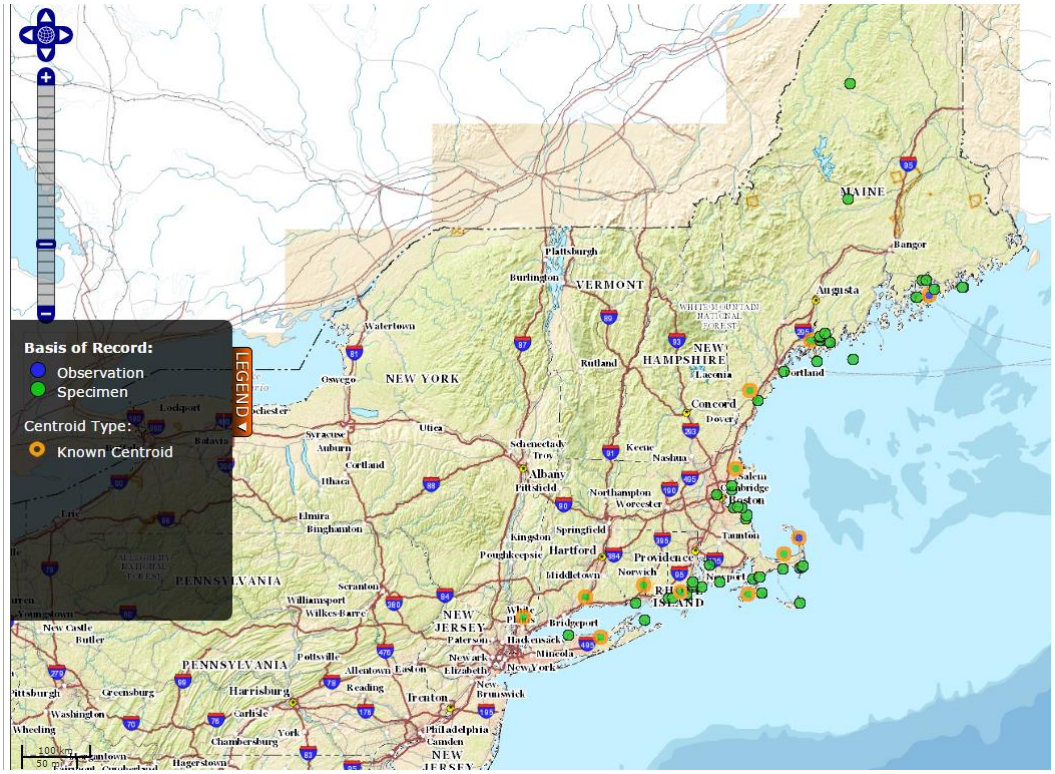

Figure 2. Known U.S. established locations of *Gasterosteus wheatlandi* (BISON 2017).

6 Climate Matching

Summary of Climate Matching Analysis

Gasterosteus wheatlandi is a brackish-water species, so it will generally be limited to marine coastlines. The climate match (Australian Bureau of Rural Sciences; 16 climate variables; Euclidean Distance) was high in the Northeast where the species is native. The climate match was medium along the coastline of the Mid-Atlantic states and near Seattle. Low matches occurred from the Atlantic Coast in North Carolina around to the Gulf Coast in Texas, and along the Pacific Coast of southern California to southern Washington. Climate 6 score indicated that overall, marine coastal regions of the contiguous U.S. show a high climate match. The range of scores indicating a high climate match is 0.103 and greater, and the climate match of *Gasterosteus wheatlandi* is 0.209.

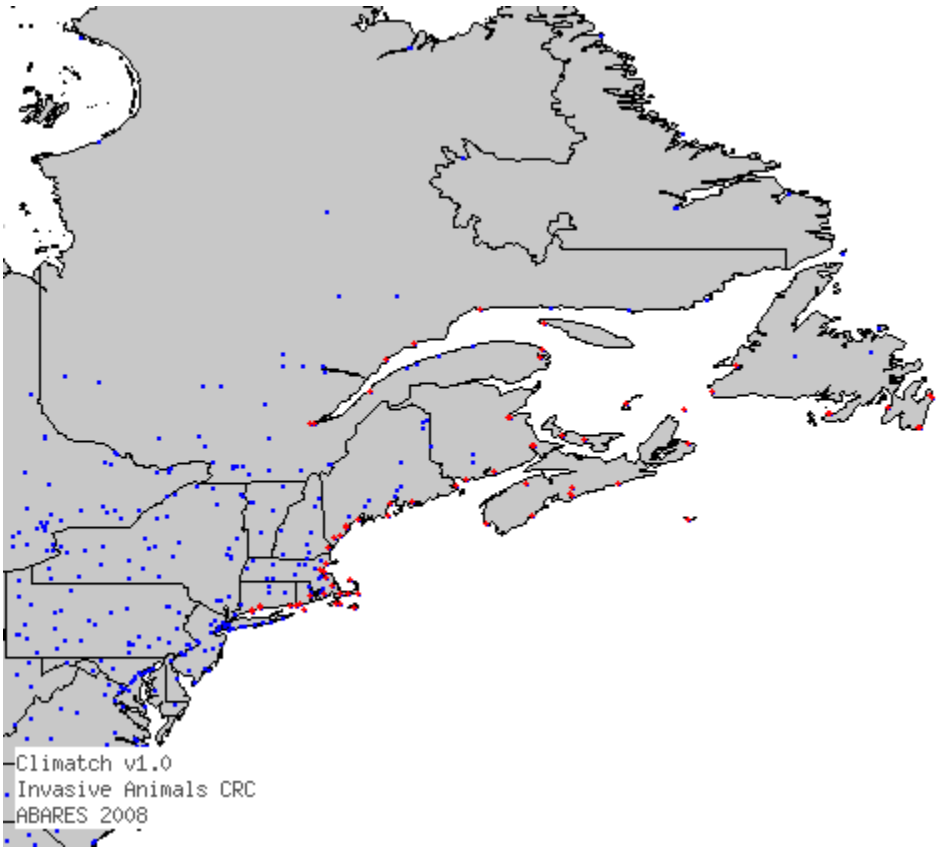

Figure 3. Climatch (Australian Bureau of Rural Sciences 2011) source map showing weather stations selected as source locations (red) and non-source locations (blue) for *Gasterosteus wheatlandi* climate matching. Source locations from GBIF (2016). Only locations representing established populations were used.

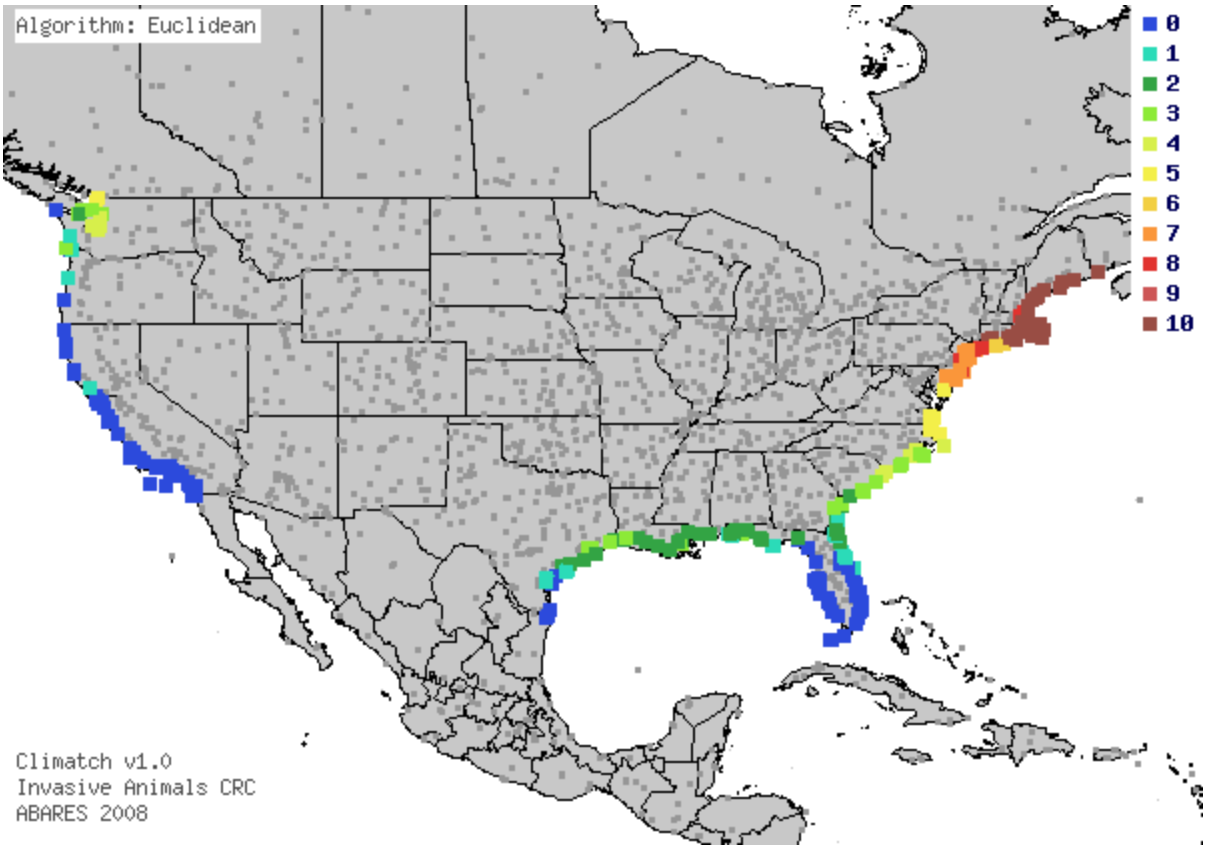

Figure 4. Map of Climatch (Australian Bureau of Rural Sciences 2011) climate matches for *Gasterosteus wheatlandi* in marine coastal areas of the contiguous United States based on source locations reported by GBIF (2016). 0= Lowest match, 10=Highest match.

Climatch (Australian Bureau of Rural Sciences 2011) climate match scores are shown in the following table:

Climate Match	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Count	117	23	40	23	13	11	4	10	8	3	35
Climate 6 Proportion = Sum of Climate Scores 6-10 / Sum of Total Climate Scores = 0.209											

The "High", "Medium", and "Low" climate match categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

Information is available on the biology and distribution of *G. wheatlandi*. The species has not been reported as introduced outside its native range, so potential impacts of introduction are unknown. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Gasterosteus wheatlandi is native to the Western North Atlantic Ocean, including the U.S. coastline from Maine to Massachusetts. It breeds in brackish (or occasionally fresh) water. It is not reported as being in trade or having human uses. No introductions of the species have been reported outside its native range. Climate match to marine coastal areas of the contiguous U.S. is high. Overall risk posed by this species is uncertain.

Assessment Elements

- **History of Invasiveness: Uncertain**
- **Climate Match: High**
- **Certainty of Assessment: Low**
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

Australian Bureau of Rural Sciences. 2011. Climatch. Available: data.daff.gov.au:8080/Climatch/. (November 2016).

Bailly, N. 2015. *Gasterosteus wheatlandi*. World Register of Marine Species. Available: http://marinespecies.org/aphia.php?p=taxdetails&id=159437. (November 2016).

Bigelow, H. B., and W. C. Schroeder. 2002. Two-spined stickleback. *In* Fishes of the Gulf of Maine, volume 53, online edition. United States Department of the Interior, Fish and Wildlife Service. Fishery Bulletin 74. Available: http://www.gma.org/fogm/Gasterosteus_wheatlandi.htm. (November 2016).

BISON. 2017. Biodiversity Information Serving Our Nation (BISON). U.S. Geological Survey. Available: https://bison.usgs.gov. (November 2016).

Froese, R., and D. Pauly, editors. 2016. *Gasterosteus wheatlandi* Putnam, 1867. FishBase. Available: http://www.fishbase.org/summary/Gasterosteus-wheatlandi.html. (November 2016).

GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Gasterosteus wheatlandi* Putnam, 1867. Global Biodiversity Information Facility, Copenhagen. Available: http://www.gbif.org/species/2356547. (November 2016).

Hanek, G., and W. Threlfall. 1971. Metazoan parasites of the twospine stickleback, *Gasterosteus wheatlandi* Putnam, 1867, in Newfoundland. The American Midland Naturalist 85(1):275-276.

ITIS (Integrated Taxonomic Information System). 2016. *Gasterosteus wheatlandi* Putnam, 1867. Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=166385#null. (November 2016).

Martins, J. 2015. *Gasterosteus wheatlandi*. The IUCN Red List of Threatened Species 2015: e.T19922686A19922760. Available: http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T19922686A19922760.en. (November 2016).

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

Breder, C. M., and D. E. Rosen. 1966. Modes of reproduction in fishes. T.F.H. Publications, Neptune City, New Jersey.

Briggs, P. T., and J. R. Waldman. 2002. Annotated list of fishes reported from the marine waters of New York. Northeastern Naturalist 9(1):47-80.

Cleveland, A. 1994. Nest site habitat preference and competition in *Gasterosteus aculeatus* and *G. wheatlandi*. Copeia 1994(3):698-704.

Cowen, R. K., L. A. Chiarella, C. J. Gomez, and M. A. Bell. 1991. Offshore distribution, size, age, and lateral plate variation of late larval/early juvenile sticklebacks (*Gasterosteus*) off the Atlantic coast of New Jersey and New York. Canadian Journal of Fisheries and Aquatic Sciences 48:1679-1684.

Craig, D., and G. J. FitzGerald. 1982. Reproductive tactics of four sympatric sticklebacks (Gasterosteidae). Environmental Biology of Fishes 7(4):369-375.

Drouin, A., C. W. McKindsey, and L. E. Johnson. 2011. Higher abundance and diversity in faunal assemblages with the invasion of *Codium fragile ssp. fragile* in eelgrass meadows. Marine Ecology Progress Series 424:105-117.

Hugg, D. O. 1996. MAPFISH georeferenced mapping database. Freshwater and estuarine fishes of North America. Life Science Software, Edgewater, Maryland, USA.

Melanson, R. L. 2011. Nearshore fish populations within St. Paul's Inlet, an estuarine system in western Newfoundland. Environmental Science, Grenfell Campus, Memorial University of Newfoundland.

Robins, C. R., and G. C. Ray. 1986. A field guide to Atlantic coast fishes of North America. Houghton Mifflin Company, Boston.

Scott, W. B., and M. G. Scott. 1988. Atlantic fishes of Canada. Canadian Bulletin of Fisheries and Aquatic Sciences 219:731.

Williams, D. D., and J. C. Delbeek. 1989. Biology of the threespine stickleback, *Gasterosteus aculeatus*, and the blackspotted stickleback, *G. wheatlandi*, during their marine pelagic phase in the Bay of Fundy, Canada. Environmental Biology of Fishes 24(1):33-41.