

Tiger Barb (*Puntigrus tetrazona*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, February 2018
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[https://commons.wikimedia.org/wiki/File:Puntius_tetrazona_\(aka\).jpg](https://commons.wikimedia.org/wiki/File:Puntius_tetrazona_(aka).jpg). (February 2018).

1 Native Range and Status in the United States

Native Range

There are discrepancies among sources as to the native range of *P. tetrazona*.

From Froese and Pauly (2017):

“Asia: Sumatra [Indonesia] and Borneo [Malaysia and Indonesia].”

From Eschmeyer et al. (2018):

“Distribution: Southeastern Asia [...]”

From Tamaru et al. (1997):

“The natural geographic range of *C. [Puntigrus] tetrazona* reportedly extends throughout Sumatra, Borneo, Thailand, and Malaysia, [...] with unsubstantiated sightings reported in Cambodia (Desilva and Kortmulder, 1977; Furtado and Mori, 1982; Mohsin and Ambak, 1982).”

From Tan (2012):

“[...] *Systemus [Puntigrus] tetrazona* (Bleeker, 1855) from Sumatra; [...]”

From Seriously Fish (2018):

“Probably endemic to central and southern Sumatra, with records from Borneo corresponding to congeners. Additional records exist from the Indragiri, Batang Hari, and Musi river systems in Riau, Jambi, and South Sumatra provinces, respectively.”

Status in the United States

From Nico et al. (2018):

“Two specimens, a sexually mature pair, were taken from a small stream flowing from Warm Springs Sanctuary in Owens Valley, Inyo County, California in July 1973 (Naiman and Pister 1974; Dill and Cordone 1997). A single large specimen was collected at Perrine Wayside Park in Perrine, Dade County, Florida, prior to 1979 (Courtenay and Hensley 1979). Probably a reference to the same record, the species was reported from a small roadside borrow pit south of Miami (Shafland 1976). Found in eastern Puerto Rico since 2005 (F. Grana, personal communication). Several specimens were collected from Cy Miller Pond, Brazos Co. Texas in June 1995 (Howells 2001). This species was collected from Kelly Warm Springs, Wyoming, in 1990 (M. Stone, personal communication).”

“Failed in California, Florida, Texas, and Wyoming. Shapovalov et al. (1981) stated that no additional specimens had been taken from the California site since 1961, despite repeated collecting efforts; Hubbs et al. (1979) did not consider this fish established in that state. Repeated collecting at the Texas site offered no more specimens. Established in Puerto Rico since at least 2005 (F. Grana, pers. comm.).”

This species is in trade in the United States. According to Chapman et al. (1997), over 200,000 individual *P. tetrazona* were imported into the United States in 1992, representing 1.3% of ornamental fish imports that year.

From Nico et al. (2018):

“This species is a popular ornamental aquarium fish found for sale in every pet store.”

Means of Introductions in the United States

From Nico et al. (2018):

“Probably aquarium releases. Dill and Cordone (1997) concluded that the California fish were presumably introduced by an aquarist or fish dealer wishing to use the spring as a brood pond.”

Remarks

From Nico et al. (2018):

“Synonyms and Other Names: Sumatra barb, partbelt barb, *Barbodes tetrazona*, *Barbus tetrazona*, *Capoeta tetrazona*, *C. sumatranus*, *Puntius tetrazona*.”

“Rainboth (1996) provided the first usages of *Systemus* as a valid genus, and several recent works have assigned tiger barbs to this genus (e.g., Pethiyagoda et al. 2012).”

All of the above scientific name synonyms were used in searching for information on this species.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Puntius*
Species *Puntius tetrazona* (Bleeker, 1855) – tiger barb”

From Eschmeyer et al. (2018):

“Current status: Valid as *Puntigrus tetrazona* (Bleeker 1855). Cyprinidae: Cyprininae.”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 7.0 cm TL male/unsexed; [Kottelat et al. 1993]”

Environment

From Froese and Pauly (2017):

“Freshwater; benthopelagic; pH range: 6.0 - 8.0; dH range: 5 - 19. [...] 20°C - 26°C [Riehl and Baensch 1996; assumed to represent recommended aquarium water temperatures]”

Climate/Range

From Froese and Pauly (2017):

“Tropical; [...] 6°N - 3°S, 95°E - 118°E”

Distribution Outside the United States

Native

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From Froese and Pauly (2017):

“Asia: Sumatra [Indonesia] and Borneo [Malaysia and Indonesia].”

From Eschmeyer et al. (2018):

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From Seriously Fish (2018):

“Probably endemic to central and southern Sumatra, with records from Borneo corresponding to congeners. Additional records exist from the Indragiri, Batang Hari, and Musi river systems in Riau, Jambi, and South Sumatra provinces, respectively.”

Introduced

From Froese and Pauly (2017):

“Introduced widely and has been reared in several countries in facilities for breeding aquarium fishes [Welcomme 1988].”

Froese and Pauly (2019) report that *P. tetrazona* is established in Colombia (Magdalena and Orinoco watersheds), the Philippines (Lapad River, Laguna), and Singapore; probably established in Australia; and probably not established in India or Suriname. Establishment status is unknown for Canada.

From Li et al. (2016):

“Status in Singapore. Introduced, common, widespread.”

“Singapore: Nee Soon Swamp Forest, Lower Seletar Reservoir, Upper Seletar Reservoir, Lower Peirce Reservoir, Upper Peirce Reservoir, MacRitchie Reservoir, Murai Reservoir, Pulau Tekong Reservoir and Tengeh Reservoir (Ng & Tan, 2010).”

From Hammer et al. (2019):

“Individuals observed [in a waterway in urban Darwin, Australia]”

“Current status [...] Extirpated”

Means of Introduction Outside the United States

From Froese and Pauly (2019):

“ornamental”

“Species widespread in fish rearing facilities [in Colombia] and has presumably escaped into local waters.”

“Introduced through escapes from aquaria in Enoggera Creek, Brisbane [Australia].”

From Lim et al. (2016):

“A number of these alien fishes (*Puntigrus tetrazona*, *Geophagus altifrons*, *Oreochromis mossambicus*, *Clarias gariepinus*, *Oxyeleotris marmorata*) were introduced to the [Pulau Tekong] reservoir [in Singapore] apparently by the authorities.”

Short Description

From Seriously Fish (2018):

“*P. tetrazona* is distinguished from congeners by the following combination of characters: lateral line incomplete; 12 circumpeduncular scales; 19-21+2 scales in the lateral row; dorsal fin mostly black with paler outer margin; pelvic fins black in middle, hyaline at base and tip; dark body bars relatively wide, covering up to 2.5 scales.”

“This assemblage [genus *Puntigrus*] is diagnosed by possession of a unique colour pattern comprising 4 black bars on a pale body, and black pigmentation on at least the basal half of the dorsal-fin. The anteriormost body bar passes through the eye, the second is anterior to the pelvic-fin base, the third is above the anal-fin and continues onto it, and the posteriormost is at the caudal-fin base.”

“The following combination of characters also aid in identification, although individually they are not unique to the genus: body rhomboid, deep; last simple dorsal-fin ray serrated posteriorly; rostral barbels absent; maxillary barbels present; lips smooth and thin, postlabial groove interrupted medially; lateral line complete or incomplete; 18–23 lateral line scales; 9½–10½ [5½/1/3–4½] scale rows between dorsal-fin origin and ventral midline anterior to pelvic-fin base; 12–14 circumpeduncular scale rows; 8–9 rakers on first gill arch.”

Biology

From Froese and Pauly (2017):

“Feeds on worms, small crustaceans and plant matter [Mills and Vevers 1989].”

From Nico et al. (2018):

“Tiger barbs are generally omnivorous, consuming phytoplankton, aquatic and terrestrial insects, and other aquatic invertebrates (Shiraishi et al. 1972). They are a schooling fish, but will form temporary pair bonds during spawning. Eggs are deposited on submerged aquatic vegetation, with up to 500 eggs released per spawning event (Tamaru et al. 1997)”

“Tiger barbs are aggressive fish [...]”

From Seriously Fish (2018):

“This species is notoriously aggressive with a reputation for biting the fins of other fishes, although this behaviour only seems to be pronounced when insufficient numbers are purchased or space is limited.”

“That said, it is relatively boisterous and does not make an ideal companion for timid, slow-moving, or long-finned species such as many livebearers, cichlids, and anabantoids.”

“It is a gregarious species forming loose hierarchies, with rival males continually battling with each other for female attention and hierarchical position within the group.”

Human Uses

From Nico et al. (2018):

“This species is a popular ornamental aquarium fish found for sale in every pet store.”

From Eşanu et al. (2015):

“Aquarium fish genetically modified to fluoresce in different bright colours under white or ultraviolet light are now available commercially worldwide, under the trade name GloFish. Initially only zebrafish (*Brachydanio rerio*) was involved (Gavriloaie 2007), but some other species as *Puntigrus tetrazona* and *Gymnocorymbus ternetzi* followed (Curry 2012; Roberts 2013) [...] These fish are just as hardy and healthy as the regular varieties.”

From Seriously Fish (2018):

“A number of selectively-bred, ornamental strains are available. The albino, ‘green’ (aka ‘moss’), and ‘golden’ (leucistic) variants are particularly popular, but there also exist ‘platinum’, ‘blushing’, ‘black marble’, and ‘coral red’ strains.”

This species is in trade in the United States. According to Chapman et al. (1997), over 200,000 individual *P. tetrazona* were imported into the United States in 1992, representing 1.3% of ornamental fish imports that year.

Diseases

No OIE-listed diseases (OIE 2019) have been documented for this species. Information cited below on diseases and parasites refers to individuals in the ornamental trade; it is unclear whether *P. tetrazona* carries the same diseases and parasites in the wild.

From Řehulka et al. (2006):

“In the period from 1995 to 2004, the following mycobacterial species were isolated during the examination of the state of health of aquarium fish from the Moravian-Silesian region of the Czech Republic: [...] [*Mycobacterium*] *chelonae* (*P. axelrodi*, *Betta splendens*, *Xiphophorus helleri*, *Puntius tetrazona*), [...]”

From Wanlop et al. (2017):

“Total 150 ornamental fish, including 30 *Carassius auratus*, 30 *Cyprinus carpio*, 30 *Poecilia latipinna*, 30 *Danio rerio*, and 30 *Puntigrus tetrazona*, were collected from a pet shop in the Mueang District, Chiang Mai Province, northern Thailand during May-June 2016. The metacercariae were investigated on the gill of fish under a stereomicroscope, [...]”

“[...] [*Centrocestus*] *formosanus* metacercariae were found for the first time in *C. carpio*, *D. rerio*, *P. latipinna* and *P. tetrazona* in Thailand.”

From Walczak et al. (2017):

“Bacteria were isolated from infected ornamental fish from pet shops and private aquariums in the Lublin [Poland] region in 2015 [...]”

“In our study, bacterial infections associated with motile *Aeromonas hydrophila* were reported in 14 species of fish (*D. rerio*, *X. helleri*, *X. maculatus*, *A. leuconosticus*, *P. gibbiceps*, *C. auratus*, *G. ternetzi*, *P. tetrazona*, *P. sphenops*, *P. reticulata*, *P. innessi*, *T. lalius*, *P. saulosi*, and *M. ramirezi*). Infections caused by *A. veronii* were reported in 15 species (*D. rerio*, *X. helleri*, *P. reticulata*, *L. ceruleus*, *X. maculatus*, *P. kahli*, *A. leuconosticus*, *P. gibbiceps*, *T. trichopterus*, *C. auratus*, *G. ternetzi*, *P. tetrazona*, *P. sphenops*, *P. innessi*, and *P. saulosi*.)”

“Inappetence, skin ulcers, darkening of the skin, exophthalmia, and ascites were reported in outbreaks of [*Shewanella*] *putrefaciens* infection [Altun et al. 2014, Korun et al. 2009, Kozińska and Pękala 2004]. [...] in this study, 26 strains of *Shewanella* were isolated from 11 fresh water fish species (*D. rerio*, *P. reticulata*, *X. maculatus*, *A. leuconosticus*, *T. trichopterus*, *C. auratus*, *P. tetrazona*, *C. macracanthus*, *M. opercularis*, *P. saulosi*, and *M. ramirezi*) with symptoms as mentioned above.”

Threat to Humans

From Froese and Pauly (2017):

“Harmless”

3 Impacts of Introductions

From Nico et al. (2018):

“Unknown.”

4 Global Distribution



Figure 1. Known global distribution of *Puntigrus tetrazona*. Map from GBIF Secretariat (2018). A point in India was excluded from this map because it represented specimens for sale. A point in Florida was excluded because it does not represent an established population. Both points were excluded from climate match analysis. All Southeast Asian occurrences were treated as established populations and included in the climate matching analysis to provide the most conservative risk assessment, recognizing that some sources recognize only Sumatra, Indonesia, populations as native.

5 Distribution Within the United States

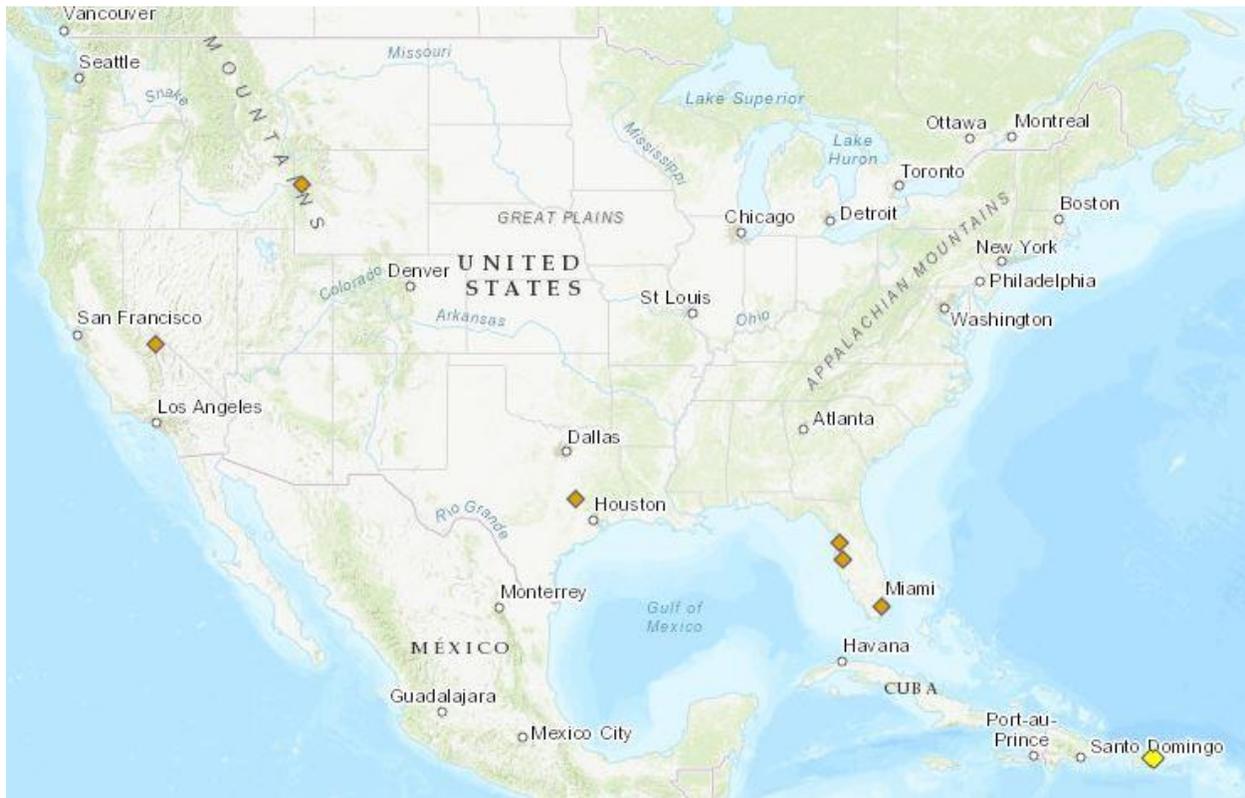


Figure 2. Known distribution of *Puntigrus tetrazona* in the United States. Map from Nico et al. (2018). Yellow diamonds (Puerto Rico) represent established populations. Orange diamonds represented failed populations (California, Wyoming, Texas and Florida) and were excluded from climate match analysis.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.0, which is a low climate match. Scores between 0.000 and 0.005, inclusive, are classified as low. There were scattered areas of medium match along the Gulf Coast and across much of peninsular Florida; the remainder of the country had a low match. Florida has a medium climate score; all other states have a low climate score.

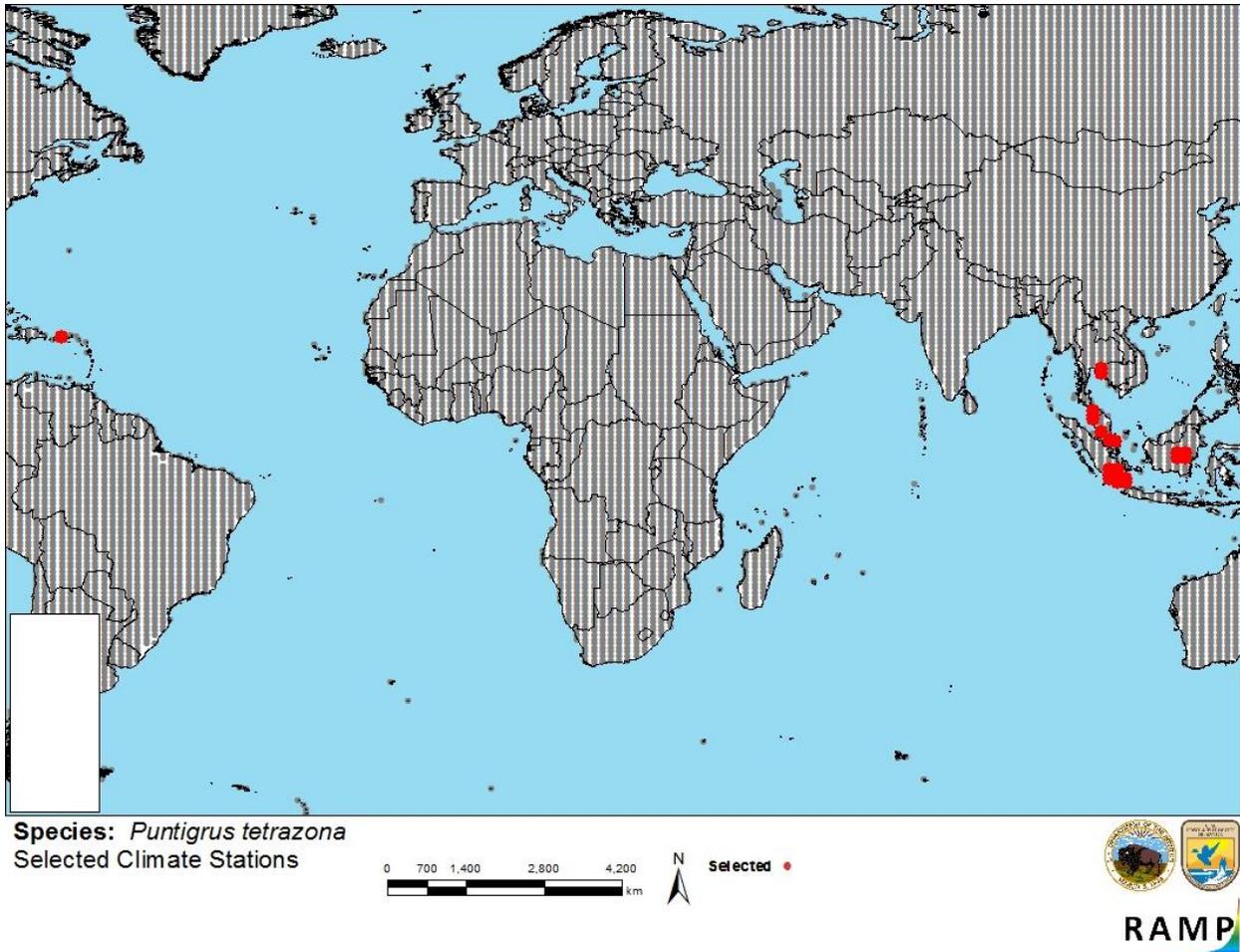


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Indonesia, Malaysia, Thailand; Puerto Rico) and non-source locations (gray) for *Puntigrus tetrazona* climate matching. Source locations from GBIF Secretariat (2018) and Nico et al. (2018).

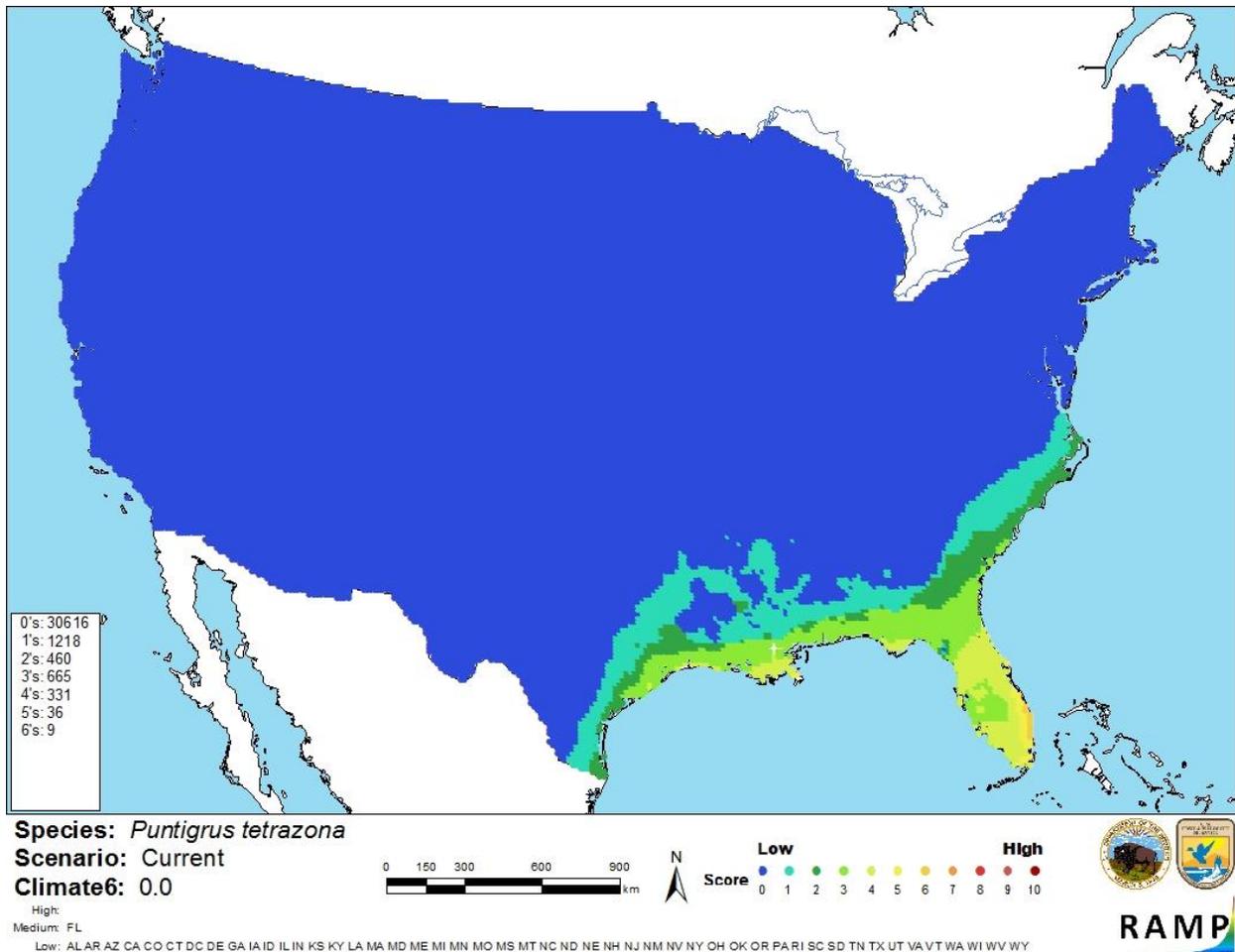


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Puntigrus tetrazona* in the contiguous United States based on source locations reported by GBIF Secretariat (2018) and Nico et al. (2018). 0= Lowest match, 10=Highest match.

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
$0.000 \leq X < 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

There is adequate information available about the biology and distribution of *Puntigrus tetrazona*, including information on areas where it has been introduced. Despite introductions outside of its native range, there is no information available on any impacts of these introductions. Further information is necessary to adequately assess the risk this species poses to the United States. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Puntigrus tetrazona, the Tiger Barb, is a small freshwater fish native to Southeast Asia. The species is widely used in the aquarium trade. *P. tetrazona* has a low climate match with the contiguous United States overall, and Florida was the only State with a medium climate score. *P. tetrazona* has been introduced to numerous countries outside of its native range and has become established in some of those countries, but no impacts of introduction have been documented. This species has been introduced to the contiguous United States, but all documented populations have failed. It is established in Puerto Rico, a U.S. territory. History of invasiveness is “none documented” due to a lack of information on impacts. Further information is needed to adequately assess the risk this species poses, so certainty of this assessment is low, and the overall risk assessment category is “Uncertain.”

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): 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.

- Chapman, F. A., S. A. Fitz-Coy, E. M. Thunberg, and C. M. Adams. 1997. United States of America trade in ornamental fish. *Journal of the World Aquaculture Society* 28:1-10.
- Eşanu, V. O., C. Gavriiloaie, I. G. Oroian, and P. Burny. 2015. Some considerations concerning the artificially colored aquarium fish trade. *Aquaculture, Aquarium, Conservation and Legislation* 8(1):116-121.
- Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2018. *Catalog of fishes: genera, species, references*. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (February 2018).
- Froese, R., and D. Pauly, editors. 2017. *Puntigrus tetrazona* (Bleeker, 1855). FishBase. Available: <http://www.fishbase.org/summary/Puntigrus-tetrazona.html>. (February 2018).
- GBIF Secretariat. 2018. GBIF backbone taxonomy: *Puntigrus tetrazona* (Bleeker, 1855). Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/8214163>. (February 2018).

- Hammer, M. P., M. N. Skarlatos Simoes, E. W. Needham, D. N. Wilson, M. A. Barton, and D. Lonza. 2019. Establishment of Siamese fighting fish on the Adelaide River floodplain: the first serious invasive fish in the Northern Territory, Australia. *Biological Invasions* 21:2269-2279.
- ITIS (Integrated Taxonomic Information System). 2018. *Puntius tetrazona* (Bleeker, 1855). Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=163712#null. (February 2018).
- Li, T., C. K. Chay, W. H. Lim, and Y. Cai. 2016. The fish fauna of Nee Soon Swamp Forest, Singapore. *Raffles Bulletin of Zoology* 32:56-84.
- Lim, K. K. P., M. A. H. Chua, and N. T. L. Lim. 2016. Freshwater fishes, terrestrial herpetofauna and mammals of Pulau Tekong, Singapore. *Nature in Singapore* 9:165-198.
- Nico, L., P. Fuller, M. Neilson, and B. Loftus. 2018. *Puntigrus tetrazona* (Bleeker, 1855). U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: <https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=635>. (February 2018).
- OIE (World Organisation for Animal Health). 2019. OIE-listed diseases, infections and infestations in force in 2019. World Organisation for Animal Health, Paris. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/>.
- Řehulka, J., J. Kaustová, and E. Řehulková. 2006. Causal agents of mycobacterial diseases in freshwater ornamental fish and their importance for human health in the Czech Republic. *Acta Veterinaria Brno* 75(2):251-258.
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- Seriously Fish. 2018. *Puntigrus tetrazona* – Tiger Barb. Available: <http://www.seriouslyfish.com/species/puntigrus-tetrazona/>. (February 2018).
- Tamaru, C. S., B. Cole, R. Bailey, and C. Brown. 1997. A manual for commercial production of the tiger barb, *Capoeta tetrazona*, a temporary paired tank spawner. Center for Tropical and Subtropical Aquaculture Publication Number 129.
- Tan, H. H. 2012. *Systomus navjotsodnii*, a new cyprinid fish from Central Kalimantan, Borneo. *The Raffles Bulletin of Zoology (Supplement 25)*:285-289.
- Walczak, N., K. Puk, and L. Guz. 2017. Bacterial flora associated with diseased freshwater ornamental fish. *Journal of Veterinary Research* 61(4):445-449.

Wanlop, A., C. Wongsawad, P. Prattapong, P. Wongsawad, T. Chontanarith, and J.-Y. Chai. 2017. Prevalence of *Centrocestus formosanus* Metacercariae in ornamental fish from Chiang Mai, Thailand, with molecular approach using ITS2. Korean Journal of Parasitology 55(4):445-449.

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.

Altun S., A. G. Büyükekiz, M. Duman, Ö. Özyiğit, S. Karatas, E. Turgay. 2014. Isolation of *Shewanella putrefaciens* from goldfish (*Carassius auratus auratus*). Israeli Journal of Aquaculture - Bamidgeh 66:956-962.

Courtenay, W. R., Jr., and D. A. Hensley. 1979. Survey of introduced non-native fishes. Phase I report. Introduced exotic fishes in North America: status 1979. Report submitted to National Fishery Research Laboratory, U.S. Fish and Wildlife Service, Gainesville, Florida.

Curry, C. 2012. Genetically modified neon ‘GloFish’ could threaten natural species: report. Available: <http://abcnews.go.com/blogs/technology/2012/09/neon-geneticallymodified-glofish-could-threaten-natural-species/>.

Desilva, S. S., and K. Kortmulder. 1977. Some aspects of the biology of three species of *Puntius* (Barbus) (Pisces Cyprinidae), endemic to Sri Lanka. Netherlands Journal of Zoology 27(2):182-194.

Dill, W. A., and A. J. Cordone. 1997. History and status of introduced fishes in California, 1871-1996. California Department of Fish and Game Fish Bulletin, volume 178.

Furtado, J. I., and S. Mori. 1982. The ecology of a tropical freshwater swamp, the Tasek Bera, Malaysia. Dr. W. Junk Publishers, Hague, Netherlands.

Gavriloaie, I. C. 2007. [Fishes as bioindicators]. Ecoterra 14:16-17. [In Romanian.]

Howells, R. G. 2001. Introduced non-native fishes and shellfishes in Texas waters: an updated list and discussion. Texas Parks and Wildlife Management Data Series 188, Austin, Texas.

Hubbs, C. L., W. I. Follett, and L. J. Dempster. 1979. List of the fishes of California. Occasional Papers of the California Academy of Sciences 133:1-51.

Korun, J., K. Akgun-Dar, and M. Yazici. 2009. Isolation of *Shewanella putrefaciens* from cultured European sea bass, (*Dicentrarchus labrax*) in Turkey. Revue de Médecine Vétérinaire 160:532-536.

- Kottelat, M., A. J. Whitten, S. N. Kartikasari and S. Wirjoatmodjo. 1993. Freshwater fishes of Western Indonesia and Sulawesi. Periplus Editions, Hong Kong.
- Kozińska, A., and A. Pe̋kala. 2004. First isolation of *Shewanella putrefaciens* from freshwater fish – a potential new pathogen of fish. Bulletin of the European Association of Fish Pathologists 24:199-203.
- Mills, D., and G. Vevers. 1989. The Tetra encyclopedia of freshwater tropical aquarium fishes. Tetra Press, New Jersey.
- Mohsin, A. K. M., and M. A. Ambak. 1982. Cyprinoid fishes of the Subfamily Cyprinoid in Selangor. Malayan Nature Journal 35:29-55.
- Naiman, R. J., and E. P. Pister. 1974. Occurrence of the tiger barb, *Barbus tetrazona*, in the Owens Valley, California. California Fish and Game 60:100-101.
- Ng, H. H., and H. H. Tan. 2010. An annotated checklist of the nonnative freshwater fish species in the reservoirs of Singapore. COSMOS 6(1):95-116.
- Pethiyagoda, R., M. Meegaskumbura, and K. Maduwage. 2012. A synopsis of the South Asian fishes referred to *Puntius* (Pisces: Cyprinidae). Ichthyological Exploration of Freshwaters 23(1):69-95.
- Rainboth, W. J. 1996. Fishes of the Cambodian Mekong. FAO Species Identification Field Guide for Fishery Purposes. Food and Agriculture Organization of the United Nations, Rome. Available: <http://www.fao.org/docrep/010/v8731e/v8731e00.htm>.
- Riehl, R., and H. A. Baensch. 1996. Aquarien Atlas, volume 1, 10th edition. Mergus Verlag GmbH, Melle, Germany.
- Roberts, D. 2013. Electric green barb GloFish: an introduction. Available: <http://blog.petsolutions.com/live-fish/electric-green-barb-glofish-an-introduction/>.
- Shafland, P. L. 1976. The continuing problem of non-native fishes in Florida. Fisheries 1(6):25.
- Shapovalov, L., A. J. Cordone, and W. A. Dill. 1981. A list of freshwater and anadromous fishes of California. California Fish and Game 67(1):4-38.
- Shiraishi, Y., N. Mizuno, M. Nagai, M. Yoshimi, and K. Nishiyama. 1972. Studies on the diel activity and feeding habit of fishes at Lake Bera, Malaysia. Japanese Journal of Ichthyology 19(4):295-306.
- Welcomme, R. L. 1988. International introductions of inland aquatic species. FAO Fisheries Technical Paper 294.