

Banded Jewelfish (*Hemichromis fasciatus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2011

Revised, September 2018

Web Version, 4/3/2019



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1 Native Range and Status in the United States

Native Range

From Azeroual et al. (2010):

“This species is recorded from Mauritania to Ethiopia.”

“Northern Africa: The species is recorded from Mauritania. It is rare in Egypt (Manzalah Lake).”

“Northeastern Africa: It is recorded in the Ghazal and Jebel systems, including Lake No, Sudan, and Baro River, Ethiopia”

“Western Africa: The species is known across the majority of the basins in Western Africa.”

“Angola; Benin; Burkina Faso; Cameroon; Central African Republic; Chad; Cocos (Keeling) Islands; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Equatorial Guinea; Ethiopia; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Liberia; Mali; Mauritania; Namibia; Niger; Nigeria; Senegal; Sierra Leone; South Sudan; Sudan; Togo; Zambia; Zimbabwe”

From Froese and Pauly (2018):

“Africa: widely distributed in West Africa, where it is known from most hydrographic basins [Teugels and Thys van den Audenaerde 2003]. Also in the Nile basin, Lake Chad basin and in the upper Zambezi [Daget and Teugels 1991]. Distribution of this species and overlap with *Hemichromis elongatus* unclear, but probably absent from the Congo basin (see also [Loiselle 1979, Lamboj 2004, Teugels and Thys van den Audenaerde 2003, Stiassny et al. 2008]).”

Status in the United States

Froese and Pauly (2018) report that *H. fasciatus* is “probably established” in Hawaii.

Wolff (2012) reports the presence of *H. fasciatus* at four sampling sites on O‘ahu (two in central O‘ahu and two in southeastern O‘ahu).

There is no indication that this species is in trade in the United States.

Means of Introductions in the United States

Froese and Pauly (2018) report that the introduction of *H. fasciatus* to Hawaii was accidental, but give no further information.

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 Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Hemichromis*
Species *Hemichromis fasciatus* Peters, 1857 – banded jewelfish”

From Fricke et al. (2018):

“Current status: Valid as *Hemichromis fasciatus* Peters 1857. Cichlidae: Pseudocrenilabrinae.”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Maturity: L_m 8.0 range ? - ? cm

Max length : 20.4 cm SL male/unsexed; [Teugels and Thys van den Audenaerde 2003]; max. published weight: 300.00 g [Ita 1984]”

“Maximum TL was recorded at 26.5 cm.”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; pH range: 7.0 - ? ; dH range: ? - 15; potamodromous [Riede 2004]. [...] 23°C - 25°C [Baensch and Riehl 1985; assumed to be recommended aquarium temperature range]”

Climate/Range

From Froese and Pauly (2018):

“Tropical; [...] 27°N - 29°S, 17°W - 47°E”

Distribution Outside the United States

Native

From Azeroual et al. (2010):

“This species is recorded from Mauritania to Ethiopia.”

“Northern Africa: The species is recorded from Mauritania. It is rare in Egypt (Manzalah Lake).”

“Northeastern Africa: It is recorded in the Ghazal and Jebel systems, including Lake No, Sudan, and Baro River, Ethiopia”

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“Angola; Benin; Burkina Faso; Cameroon; Central African Republic; Chad; Cocos (Keeling) Islands; Congo; Congo, The Democratic Republic of the; Côte d'Ivoire; Equatorial Guinea; Ethiopia; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Liberia; Mali; Mauritania; Namibia; Niger; Nigeria; Senegal; Sierra Leone; South Sudan; Sudan; Togo; Zambia; Zimbabwe”

From Froese and Pauly (2018):

“Africa: widely distributed in West Africa, where it is known from most hydrographic basins [Teugels and Thys van den Audenaerde 2003]. Also in the Nile basin, Lake Chad basin and in the upper Zambezi [Daget and Teugels 1991]. Distribution of this species and overlap with *Hemichromis elongatus* unclear, but probably absent from the Congo basin (see also [Loiselle 1979; Teugels and Thys van den Audenaerde 2003; Lamboj 2004; Stiassny et al. 2008]).”

Introduced

From FAO (2018):

“*Hemichromis fasciatus* introduced to Philippines [...]”

“Status of the introduced species in the wild : Unknown”

From Hanel et al. (2011):

“Two African species (*Hemichromis fasciatus*, *Hemichromis guttatus*) were established in a hot spring near Austrian Villach around 1970 [...]”

Means of Introduction Outside the United States

From FAO (2018):

“Reasons of Introduction [to Philippines] : 1) ornamental”

Short Description

From Boulenger (1898):

“Middle teeth distinctly enlarged, canine-like ; a regular series of very small premaxillary teeth some distance behind the marginal one. Depth of body equal to or a little greater than length of head, $2\frac{1}{2}$ to 3 times in total length. Snout with straight or concave upper profile, longer than the eye ; in the adult diameter of eye contained 4 to $5\frac{1}{2}$ times in length of head, and $1\frac{1}{3}$ to $1\frac{3}{4}$ in interorbital width ; maxillary not extending to below anterior border of eye ; 4 or 5 series of scales on the cheek ; large scales on the opercle. Gill-rakers short, some hammer-shaped, 6-10 on lower part of anterior arch. Dorsal XIII-XV 11-13; spines increasing in length to the last, which measures $\frac{1}{3}$ to $\frac{2}{5}$ length of head and $\frac{2}{5}$ to $\frac{3}{5}$ longest soft rays. Pectoral $\frac{3}{5}$ length of head. Outer ventral rays produced into filaments, reaching the vent or the anal spines. Anal III 8-10 ; third spine longest, $\frac{1}{3}$ to $\frac{2}{5}$ length of head, as long as middle dorsal spines. Caudal truncate or rounded. Caudal peduncle nearly as long as deep. Scales 29-32 $\frac{3-3\frac{1}{2}}{10}$; lat. l. $\frac{15-19}{10-14}$. Olive or brown, with a black or blue spot on the opercle and five more or less distinct dark vertical bars which may be reduced to a series of as many blackish blotches along the side, the last at base of caudal ; young with less distinct bars between the principal ones ; fins brown or blackish ; dorsal and anal sometimes with round whitish spots between the rays ; longitudinal series of pearl-colour or brown spots, one to each scale, may be present on the sides.”

Biology

From Froese and Pauly (2018):

“Occurs in both forest and savannah biotopes [Daget and Teugels 1991]; present in littoral riverine habitats and permanent floodplain lagoons with clear water. Feeds on shrimps, small fishes [Lamboj 2004] and insects. A nesting substrate spawner which breeds in the early summer. Pair-bonding well defined [Lamboj 2004].”

Human Uses

From Froese and Pauly (2018):

“Fisheries: subsistence fisheries; aquaculture: commercial; aquarium: commercial”

From Azeroual et al. (2010):

“This species is overfished, and is used for consumption and in the aquarium trade. It is also used for tilapia control.”

Diseases

Poelen et al. (2014) list the following as parasites of *Hemichromis fasciatus*: *Acanthogyrus tilapiae*, *Cichlidogyrus bychowskii*, *Cichlidogyrus dageti*, *Cichlidogyrus dionchus*, *Cichlidogyrus euzeti*, *Cichlidogyrus falcifer*, *Cichlidogyrus longicirrus*, *Cichlidogyrus tilapiae*, *Onchobdella aframae*, *Onchobdella bopeleti*, *Onchobdella voltensis*, *Gyrodactylus cichlidarum*, *Enterogyrus melenensis*, and *Posthodiplostomum* sp. (Strona et al. 2013, Smithsonian Institution no date).

No OIE-reportable diseases have been documented in this species.

Threat to Humans

From Froese and Pauly (2018)

“Harmless”

3 Impacts of Introductions

No information available.

4 Global Distribution

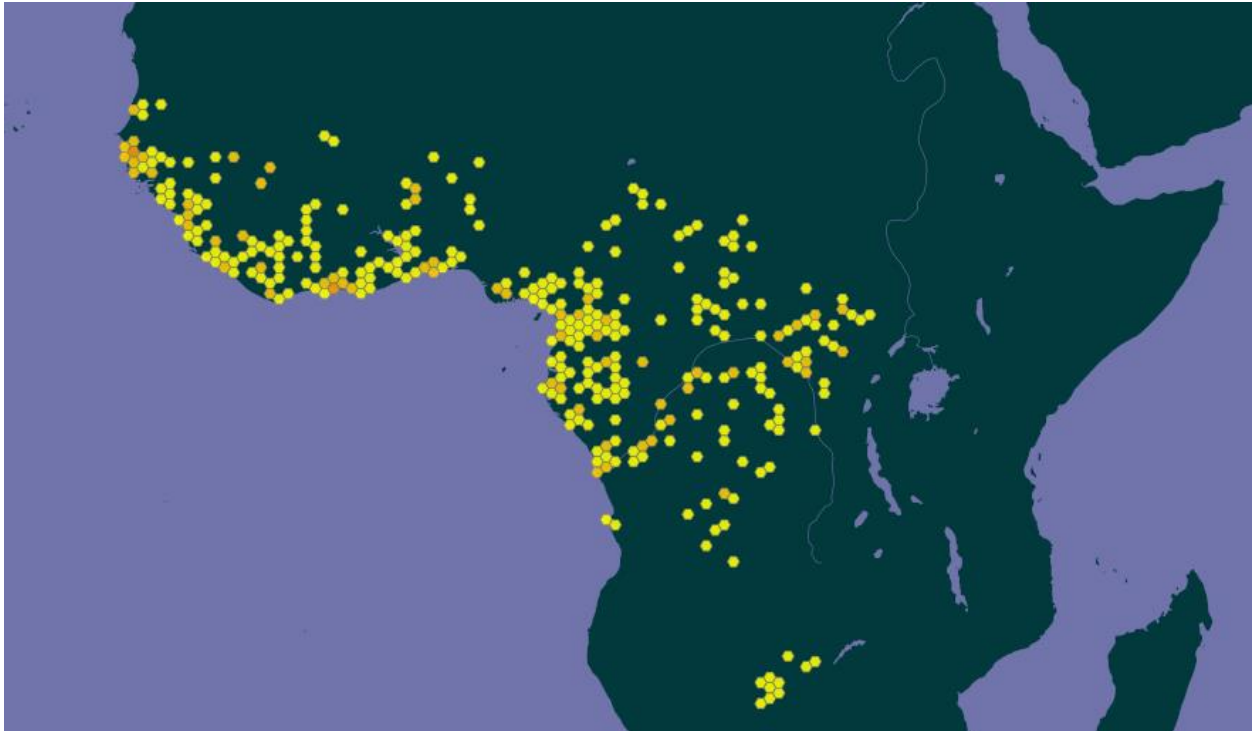


Figure 1. Known global distribution of *Hemichromis fasciatus*, reported from West Africa to the Upper Zambezi River basin in southern Africa. Map from GBIF Secretariat (2017). No georeferenced occurrences were available for the species distribution in the Nile River basin in northeastern Africa nor for the established introduced population in Austria.

5 Distribution Within the United States

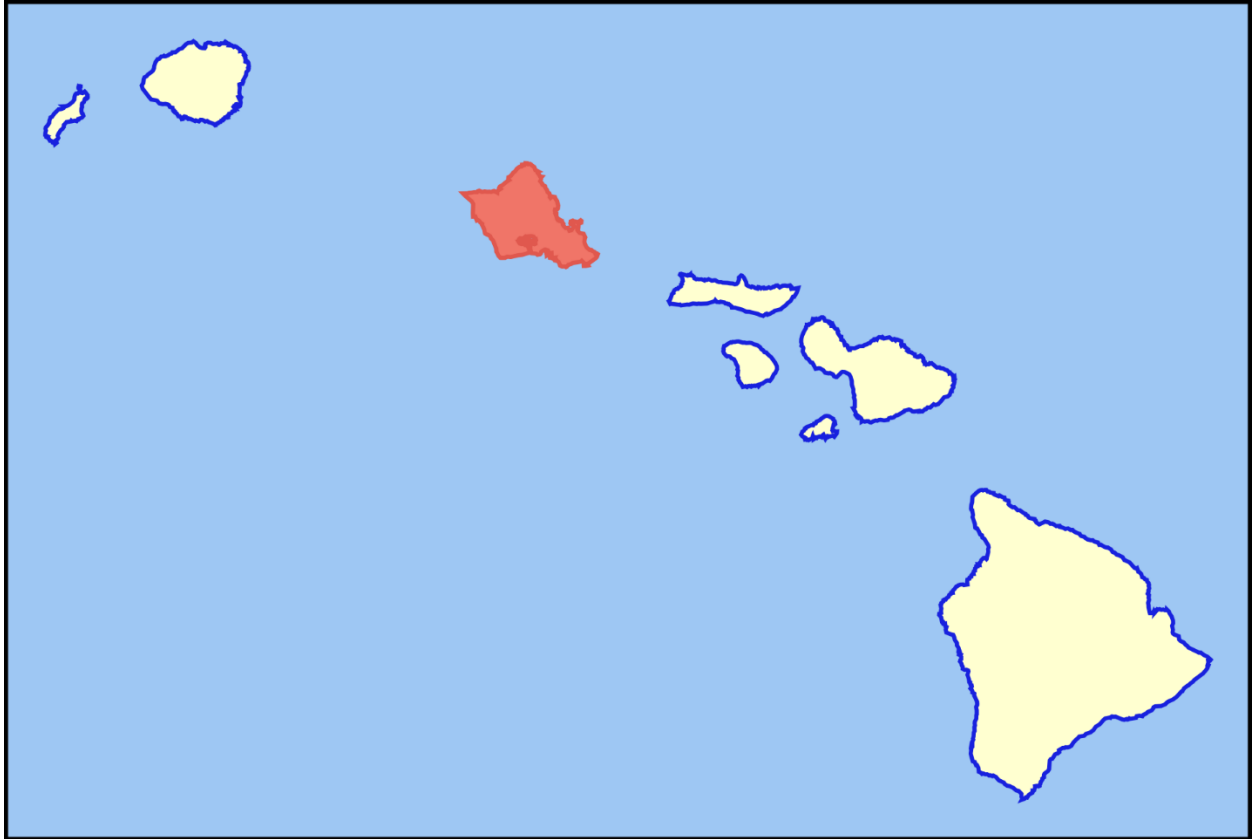


Figure 2. Map of the State of Hawaii showing the location of the island of Oahu, where *H. fasciatus* has been reported (Wolff 2012; Froese and Pauly 2018). No map of *H. fasciatus* occurrences in Hawaii is available. Map by MattWright. Public domain. Available: <https://commons.wikimedia.org/w/index.php?curid=2484433>. (April 2019). Occurrences in Oahu were not included in the climate matching analysis because species establishment has not been confirmed.

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 0.01, which is a medium climate match. A Climate 6 score of between 0.005 and 0.103 indicates a medium match. The climate score was high in Florida and medium in Arizona and Texas. All other states had a low climate score. In general, the climate match was medium to medium-low in the far southern United States, and low elsewhere.

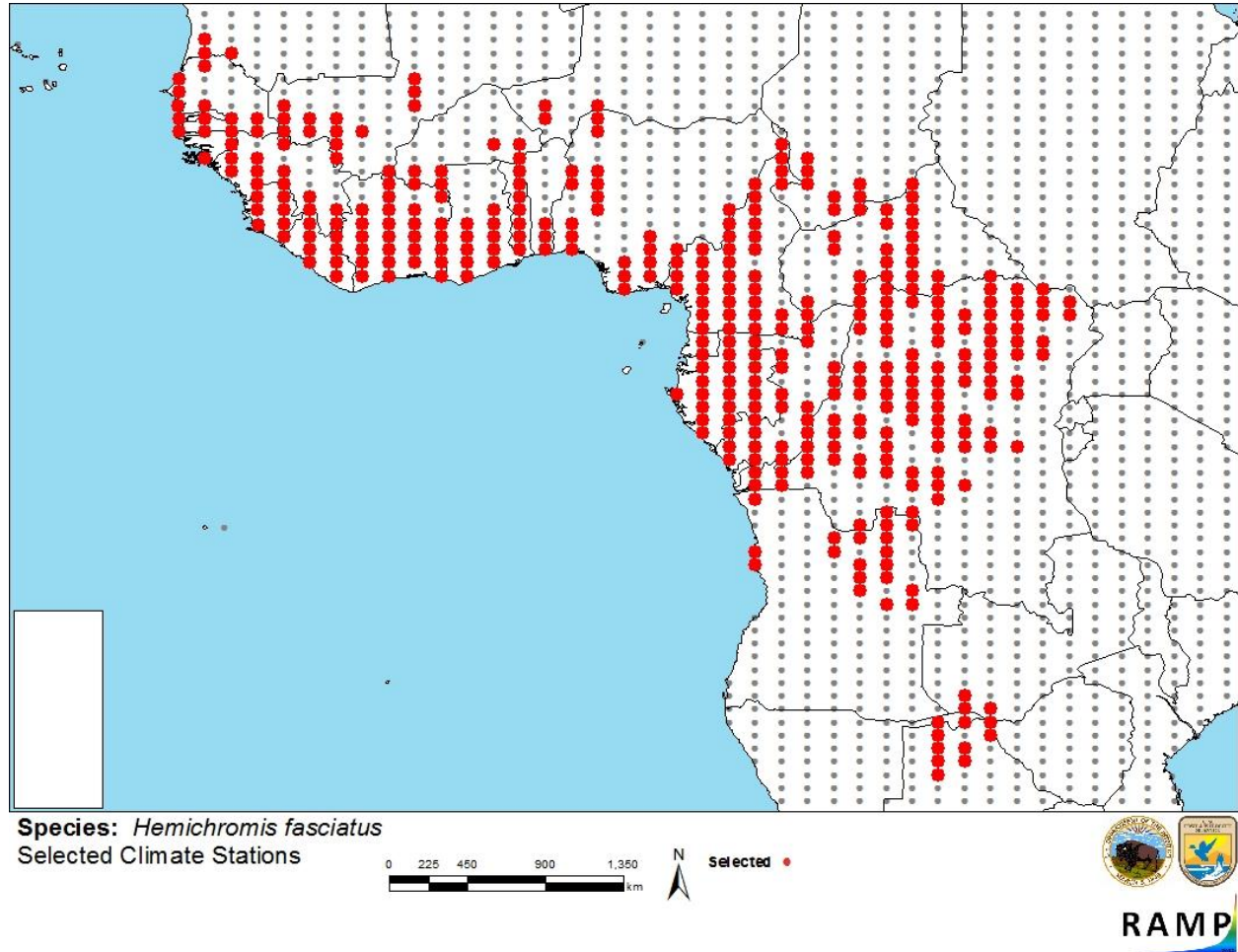


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Mauritania, Senegal, Gambia, Guinea-Bissau, Guinea, Sierra Leone, Mali, Liberia, Ivory Coast, Burkina Faso, Niger, Ghana, Togo, Benin, Nigeria, Chad, Cameroon, Central African Republic, Equatorial Guinea, Gabon, Republic of the Congo, Democratic Republic of the Congo, Angola, Zambia, Zimbabwe, and Botswana) and non-source locations (gray) for *Hemichromis fasciatus* climate matching. Source locations from GBIF Secretariat (2017).

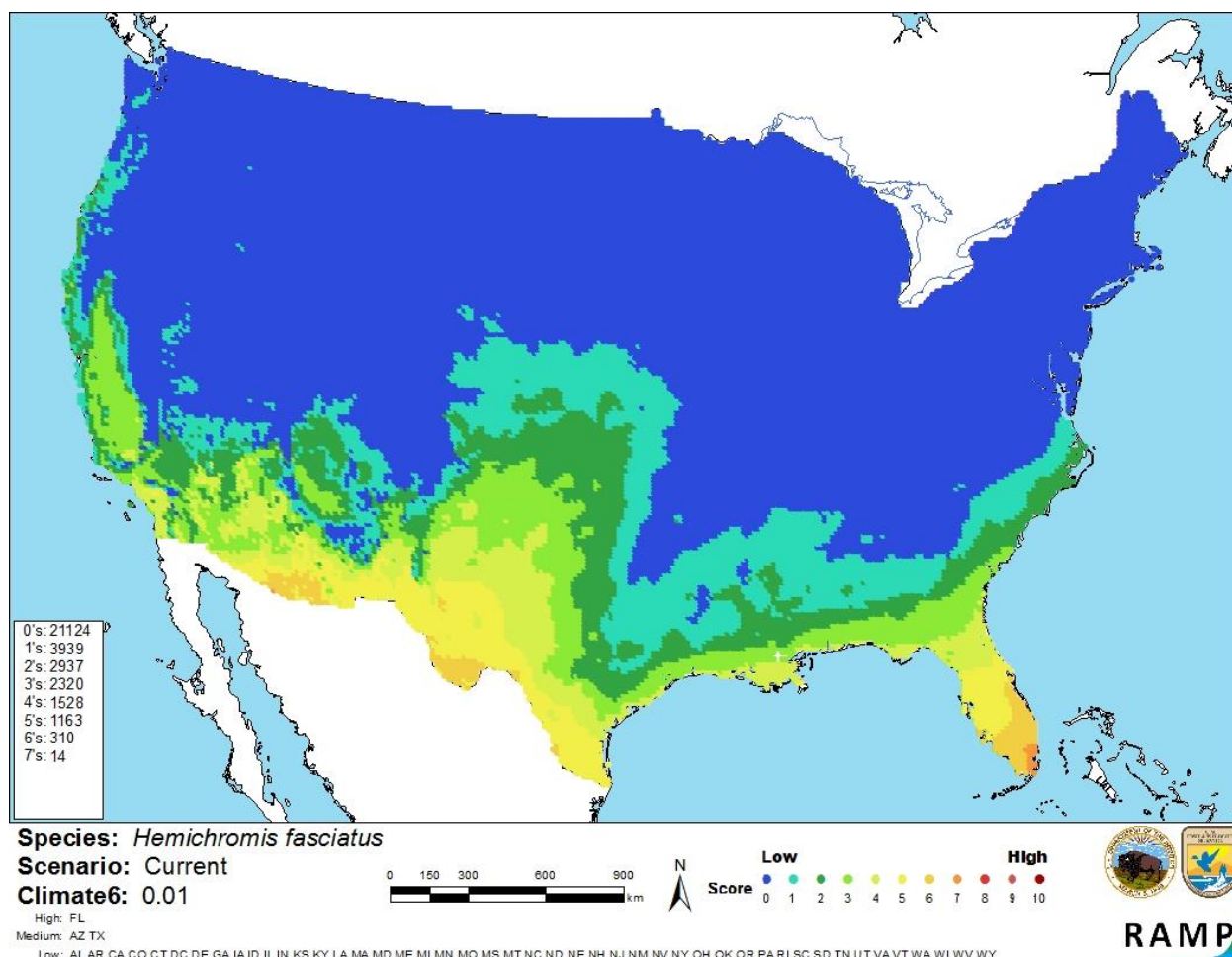


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Hemichromis fasciatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

There is adequate information available about the biology, ecology, and distribution of *Hemichromis fasciatus*. This species has been reported as introduced outside of its native range, but no information is available about impacts of this species’ introduction. Further information is needed to adequately assess the risk this species poses to the contiguous United States. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Hemichromis fasciatus, the Banded Jewelfish, is a freshwater cichlid species native to northern and western Africa. It is used commercially for human consumption, the aquarium trade, and in aquaculture, as well as for biocontrol of tilapia. It has a large native range in Africa. This species has been reported from multiple locations on the island of O‘ahu, where it is probably established. Its introduction to Hawaii was described as “accidental” (Froese and Pauly 2018), with no further information available. No indication could be found that *H. fasciatus* is in trade in the United States. *H. fasciatus* has been introduced to Austria, where it became established in a hot spring, and the Philippines, where its status is unknown. No impacts of these introductions have been documented. *H. fasciatus* has a medium climate match with the contiguous United States, with highest match in the far southern United States. Because there is inadequate information from which to assess the invasive potential of this species, the certainty of this assessment is low. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **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.

- Azeroual, A., T. Bousso, A. Getahun, and P. Lalèyè. 2010. *Hemichromis fasciatus*. The IUCN Red List of Threatened Species 2010: e.T182187A7826208. Available: <http://www.iucnredlist.org/details/182187/0>. (September 2018).
- Boulenger, G. A. 1898. A revision of the African and Syrian fishes of the family Cichlida, part I. *Proceedings of the Zoological Society of London* 1898(2):132-152.
- FAO (Fisheries and Agriculture Organization of the United Nations). 2018. Database on introductions of aquatic species. FAO, Rome. Available: <http://www.fao.org/fishery/introsp/search/en>. (September 2018).
- Fricke, R., W. N. Eschmeyer, and R. van der Laan, editors. 2018. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (September 2018).

- Froese, R., and D. Pauly, editors. 2018. *Hemichromis fasciatus* (Peters, 1857). FishBase. Available: <https://www.fishbase.de/summary/Hemichromis-fasciatus.html>. (September 2018).
- GBIF Secretariat. 2017. GBIF backbone taxonomy: *Hemichromis fasciatus*, Peters, 1857. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/2371377>. (September 2018).
- Hanel, L., J. Plesník, J. Andreska, S. Lusk, J. Novák, and J. Plíštil. 2011. Alien fishes in European waters. *Bulletin Lampetra* 7:148-185.
- ITIS (Integrated Taxonomic Information System). 2018. *Hemichromis fasciatus* (Peters, 1857). Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=169807#null. (September 2018).
- Poelen, J. H., J. D. Simons, and C. J. Mungall. 2014. Global Biotic Interactions: an open infrastructure to share and analyze species-interaction datasets. *Ecological Informatics* 24:148-159.
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- Wolff, R. H. 2012. Development of invertebrate community indexes of stream quality for the islands of Maui and O'ahu, Hawai'i. U.S. Geological Survey Scientific Investigations Report 2012-5055.

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.

- Baensch, H. A., and R. Riehl. 1985. *Aquarien Atlas*, volume 2. Mergus, Verlag für Natur-und Heimtierkunde GmbH, Melle, Germany.
- Daget, J., and G. G. Teugels. 1991. *Hemichromis*. Pages 187-194 in J. Daget, J.-P. Gosse, G. G. Teugels, and D. F. E. Thys van den Audenaerde, editors. Check-list of the freshwater fishes of Africa, volume 4. CLOFFA, ISNB, Brussels; MRAC, Tervuren, Belgium; ORSTOM, Paris.
- Ita, E. O. 1984. Kainji (Nigeria). Pages 43-103 in J. M. Kapetsky and T. Petr, editors. Status of African reservoir fisheries. CIFA Technical Paper 10.
- Kottelat, M., and J. Freyhof. 2007. *Handbook of European freshwater fishes*. Publications Kottelat, Cornol and Freyhof, Berlin.

- Lamboj, A. 2004. The cichlid fishes of Western Africa. Birgit Schmettkamp Verlag, Bornheim, Germany.
- Loiselle, P. V. 1979. A revision of the genus *Hemichromis* Peters 1858 (Teleostei: Cichlidae).
1. - The *Hemichromis fasciatus* species group 2. - The *Hemichromis bimaculatus* species group 3. - The *Hemichromis guttatus* species group 4. - The *Hemichromis letourneauxi* species group. Annales du Musée Royal de l'Afrique Centrale: Sciences Zoologiques 8(228):1-124.
- Riede, K. 2004. Global register of migratory species - from global to regional scales. Final Report of the R&D-Projekt 808 05 081. Federal Agency for Nature Conservation, Bonn, Germany.
- Smithsonian Institution. No date. U.S. National Parasite Collection Database. Available: <http://invertebrates.si.edu/parasites.htm>.
- Stiassny, M. L. J., A. Lamboj, D. De Weirtdt, and G. G. Teugels. 2008. Cichlidae. Pages 269-403 in M. L. J. Stiassny, G. G. Teugels, and C. D. Hopkins, editor. The fresh and brackish water fishes of Lower Guinea, West-Central Africa, volume 2. Collections faune et flore tropicales 42. Institut de recherche de développement, Paris, France, Muséum national d'histoire naturelle, Paris, France and Musée royal de l'Afrique Central, Tervuren, Belgium.
- Strona, G., M. Lourdes, D. Palomares, N. Bailly, P. Galli, and K. D. Lafferty. 2013. Host range, host ecology, and distribution of more than 11800 fish parasite species. Ecology 94:544.
- Teugels, G. G., and D. F. E. Thys van den Audenaerde. 2003. Cichlidae. Pages 521-600 in D. Paugy, C. Lévêque, and G. G. Teugels, editors. The fresh and brackish water fishes of West Africa, volume 2. Collections faune et flore tropicales 40. Institut de recherche de développement, Paris, France, Muséum national d'histoire naturelle, Paris, France and Musée royal de l'Afrique Central, Tervuren, Belgium.