

Banded Jewel Cichlid (*Hemichromis elongatus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2013

Revised, January 2018

Web Version, 8/16/2018



Photo: *Hemichromis elongatus* by H.T. Cheng (altered). Licensed under CC-BY-NC 4.0.
Available: <https://www.inaturalist.org/taxa/102479-Hemichromis-elongatus>. (January 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2017):

“Africa: Cameroon to the Republic of Congo, and the entire Congo River, Okavango and Zambezi system (Stiassny 2008). Also reported from west Africa (Guinea, Sierra Leone, Liberia, Togo, Benin, Nigeria) (Loiselle 1979, Stiassny et al. 2008), but this needs confirmation (Teugels and Thys van den Audenaerde 2003). Upper Zambezi and (some) Congo populations may represent a different species (Stiassny et al. 2008).”

Status in the United States

From Nico (2018):

“Nonindigenous Occurrences: Established in Wahiawa Reservoir, Oahu, Hawaii, as of 1994 (A. Tagawa, personal communication).

Status: Established in Hawaii.

Impact of Introduction: Unknown.”

Means of Introductions in the United States

From Nico (2018):

“Probable aquarium release.”

Remarks

From Nico (2018):

“*Hemichromis elongatus* is found in the aquarium trade. This species has a reputation as an aggressive predator that preys on smaller fishes, shrimps, and insects (Skelton 1993).”

This species is also commonly called the banded jewelfish (Froese and Pauly 2017) or the five star general (Seriously Fish 2018).

From Marshall et al. (2010):

“Taxonomic Notes: Loiselle (1979) comments on the presence of dwarfed populations of an “*elongatus*-like” fish in Lakes Barombi Kotto and Mboandong, Cameroon and these may represent a distinct species. With the availability of live specimens from the Congo basin and Upper Zambezi there are indications that these populations may also represent distinct species (Stiassny et al. 2007).”

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 elongatus* (Guichenot in Duméril, 1861)”

“Taxonomic Status: valid”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Maturity: Lm 10.7, range 10 - 11.5 cm. Max length : 18.7 cm SL male/unsexed (Stiassny et al. 2008).”

From Nico (2018):

“19 cm (Skelton 1993).”

Environment

From Froese and Pauly (2017):

“Freshwater; benthopelagic; pH range: ? - 7.0; dH range: ? – 15.”

“[...] 23°C - 25°C [Baensch and Riehl 1985; assumed to represent recommended aquarium water temperatures]”

From Marshall et al. (2010):

“[*Hemichromis elongatus*] is closely associated with aquatic and emergent vegetation in the main rivers and large lagoons, also occurring in pools left by floodwaters (Tweddle et al. 2004).”

Climate/Range

From Froese and Pauly (2017):

“Tropical [...]”

Distribution Outside the United States

Native

From Froese and Pauly (2017):

“Africa: Cameroon to the Republic of Congo, and the entire Congo River, Okavango and Zambesi system (Stiassny et al. 2008). Also reported from west Africa (Guinea, Sierra Leone, Liberia, Togo, Benin, Nigeria) (Loiselle 1979, Stiassny et al. 2008), but this needs confirmation

(Teugels and Thys van den Audenaerde 2003). Upper Zambezi and (some) Congo populations may represent a different species (Stiassny et al. 2008).”

From Nico (2018):

“Western Africa. Widespread in Zaire basin to tropical West Africa, and in Okavango and upper Zambezi systems (Skelton 1993; Linke and Staeck 1994).”

Introduced

From Froese and Pauly (2017):

“Introductions of *Hemichromis elongatus*: Year/Period: Unknown. From: Unknown. To: Cirata Reservoir, West Java [Indonesia]. Established: established (Hedianto and Purnamaningtyas 2011).”

From GBIF (2017):

“Country Or Area: Hong Kong. Occurrence Remarks: Introduced species. Recorded by: H.T. Cheng.”

Means of Introduction Outside the United States

From Froese and Pauly (2017):

“Reason: unknown. Other reason: accidental (Hedianto and Purnamaningtyas 2011).”

Short Description

From Froese and Pauly (2017):

“Dorsal spines (total): 13 - 15; Dorsal soft rays (total): 11-12; Anal spines: 3; Anal soft rays: 8 - 10. Diagnosis: 4-5 distinct blotches or ovoid bars along lateral mid-line (Yamamoto and Tagawa, 2000, Stiassny et al. 2008), but bands not obvious in large males which assume a very dark to almost black coloration (Yamamoto and Tagawa, 2000). Scales olive to yellow; series of thin red dots often forming horizontal lines along the mid-portion of flanks; normally 2 rows of teeth on upper jaw (Stiassny et al. 2008). Magenta spot on gill cover (Yamamoto and Tagawa 2000).”

Biology

From Froese and Pauly (2013):

“Found in shallow lakes and streams (Mundy 2005). Highly predaceous and thus used in some areas for tilapia control; feeds on fish, shrimp and aquatic insects; very aggressive and territorial (Yamamoto and Tagawa 2000); the parents guard the nest and larvae (Skelton 1993). Pair-bonding, substrate brooder (Stiassny et al. 2008). Oviparous (Breder and Rosen 1966).”

Human Uses

From Nico (2018):

“*Hemichromis elongatus* is found in the aquarium trade.”

From Marshall et al. (2010):

“Use and Trade: This species is harvested for human consumption.”

Diseases

From Van As and Basson (1992):

“This paper reports on the parasites of the genera *Trichodina* and *Hemitrichodina* of the eastern Caprivi. A total of 15 species of parasites were recorded of which 9 are described as new species. The parasites found were: [...] *T. linyanta* sp. nov. (*Oreochromis andersoni* (type host) and *Hemichromis elongatus*) [...].”

Threat to Humans

From Froese and Pauly (2013):

“Harmless.”

3 Impacts of Introductions

From Firda (2013):

“The study found 16 fish species, with nine indigenous species [...] as well as seven non-indigenous species are; *Cyprinus carpio*, *Oreochromis niloticus*, *Hemichromis elongatus*, *Amphilopus citrinellus*, *Chanos chanos*, *Colossoma macropomum*, *Hypostomus plecostomus*. [...] The reduced number of individuals and species of indigenous fish species associated with be [sic] lost of food sources, cause alteration [sic] of habitat. Although, competition with the non-indigenous species benefit [sic] the same food.”

From Nico (2018):

“Status: Established in Hawaii.

Impact of Introduction: Unknown.

Remarks: *Hemichromis elongatus* is found in the aquarium trade. This species has a reputation as an aggressive predator that preys on smaller fishes, shrimps, and insects (Skelton 1993).”

From Hawaii Department of Land and Natural Resources (2018):

“Impacts: Aggressive predator that feeds on smaller fishes, shrimps, and aquatic insects; therefore this species feeds on and competes for resources with native freshwater fauna (Marshall et al. 2010).”

From Englund et al. (2007):

“While the indicator species concept has received considerable criticism because it is both difficult to determine which species are the best indicators, or even what a species should indicate (Simberloff 1998), we feel the indicator concept still has value for Hawaiian streams, especially in light of our findings from the present study indicating certain native aquatic insect taxa are sensitive to physical disturbance and alien species [including *H. elongatus*].”

4 Global Distribution

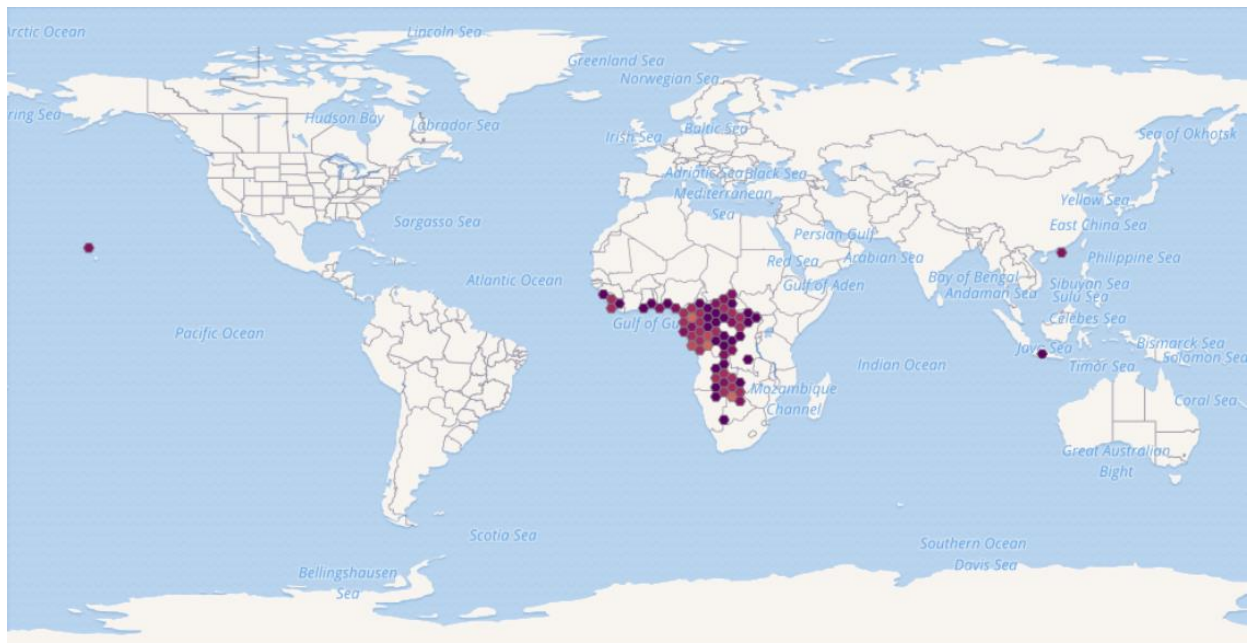


Figure 1. Known global distribution of *Hemichromis elongatus*, reported from Hawaii, western and central Africa, Hong Kong, and Indonesia. Map from GBIF (2017). Point in West Java, Indonesia added based on information from Froese and Pauly (2017).

5 Distribution Within the United States

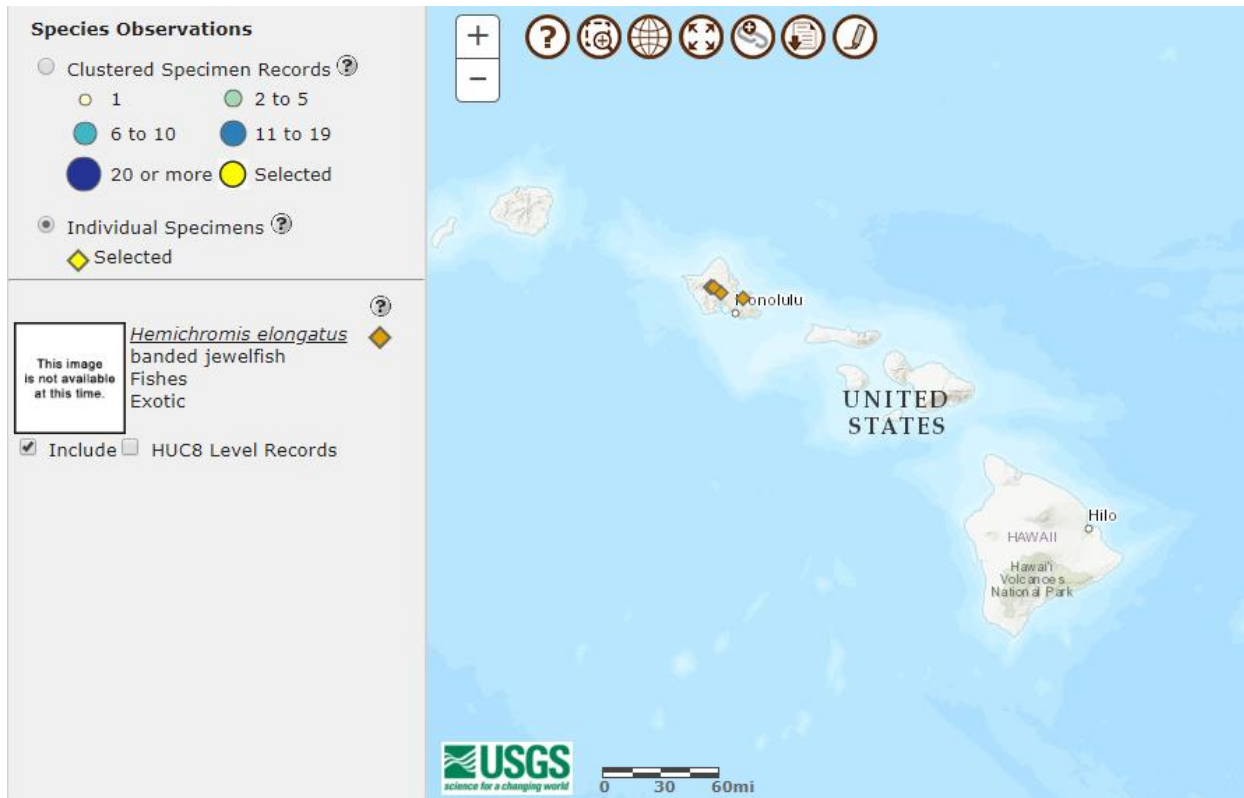


Figure 2. Known distribution of *Hemichromis elongatus* in the United States, where it has been reported from Hawaii only. Map from Nico (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was 0.053, which is medium. Match was highest in the desert southwest and peninsular Florida.

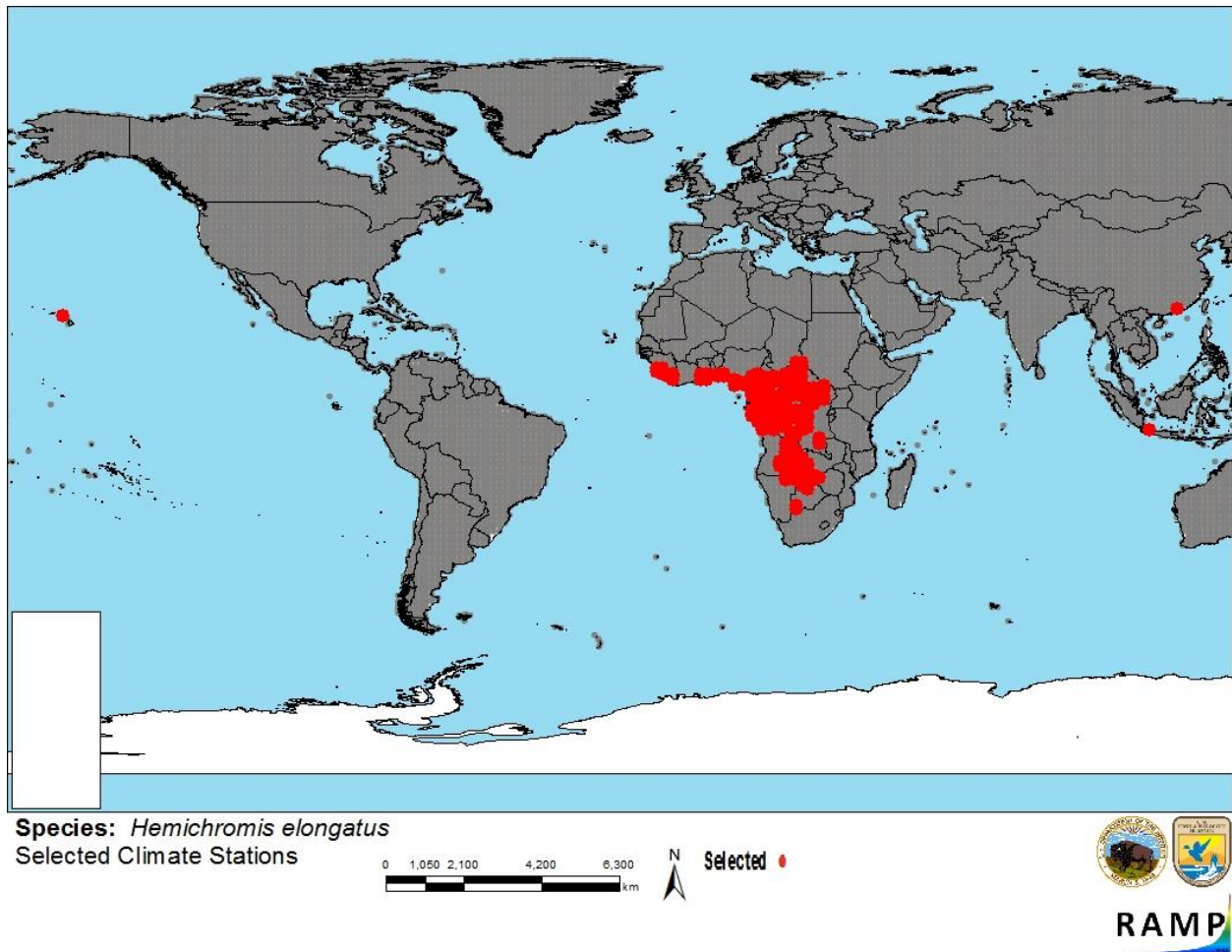


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Hawaii (United States), Sierra Leone, Liberia, Ghana, Togo, Benin, Nigeria, Cameroon, Central African Republic, Equatorial Guinea, Gabon, Republic of the Congo, Democratic Republic of the Congo, Angola, Zambia, Zimbabwe, Botswana, Namibia, China, Indonesia) and non-source locations (gray) for *Hemichromis elongatus* climate matching. Source locations from GBIF (2017) and Froese and Pauly (2017).

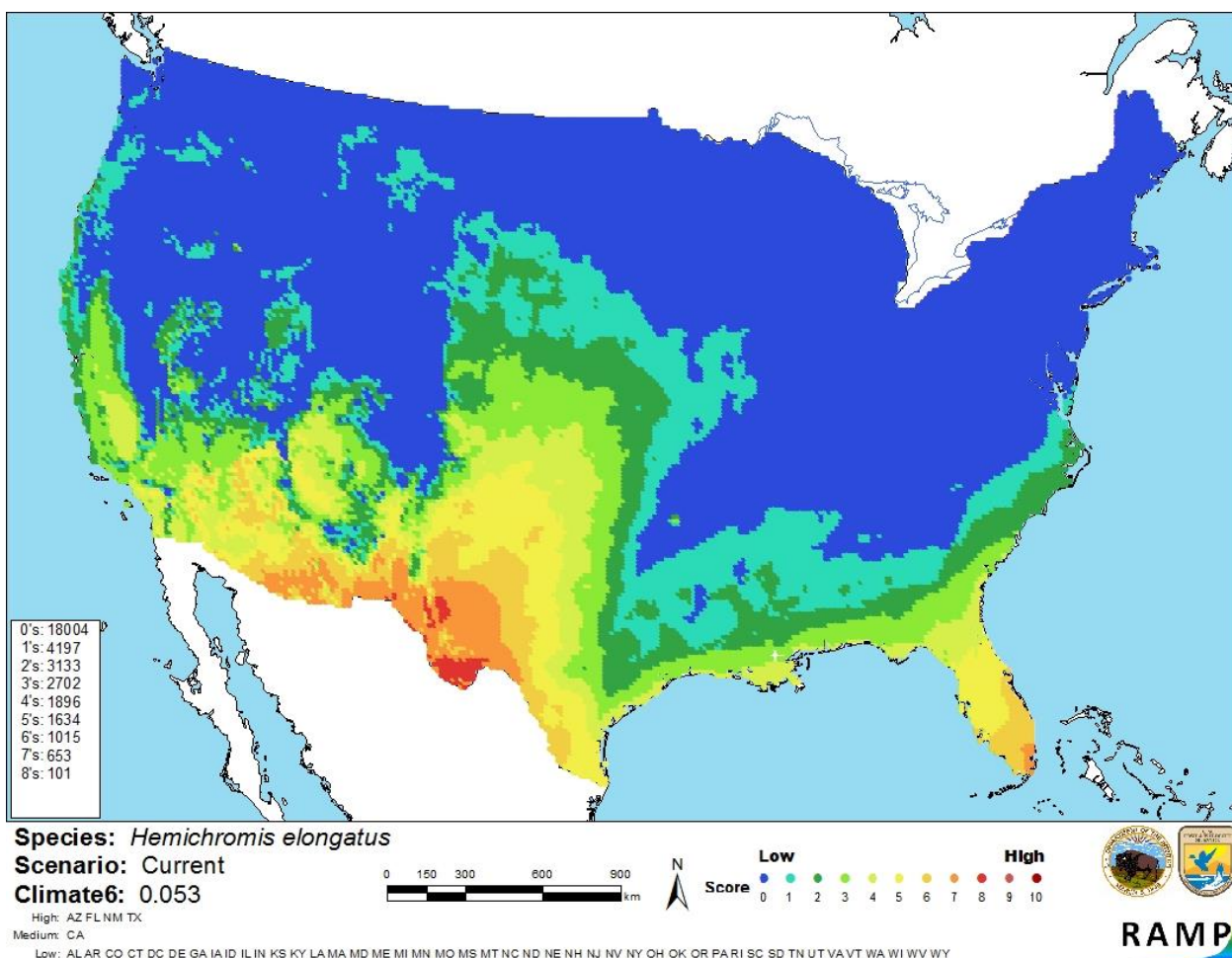


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Hemichromis elongatus* in the contiguous United States based on source locations reported by GBIF (2017) and Froese and Pauly (2017). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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

Peer reviewed literature on *Hemichromis elongatus* is available, although it is somewhat limited and sometimes unavailable in the English language. Information from other sources has also been used as part of this risk summary. Distribution of this species is fairly well-documented.

Impacts of introduction have been documented, although little has been done to prove that *H. elongatus* is the cause of the impacts. Certainty of this assessment is medium.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Hemichromis elongatus is a cichlid native to southwestern Africa. It has established outside of its native range in Indonesia, Hong Kong, and Hawaii. This fish is in the aquarium trade. Climate match with the contiguous United States is medium, with highest matches in the desert southwest and peninsular Florida. There is information suggesting a history of invasiveness, including one peer-reviewed scientific study and one graduate thesis suggesting impacts on native invertebrate communities. However, these studies have only demonstrated impacts in situations where *H. elongatus* was part of a group of nonnative species present, and the extent to which *H. elongatus* specifically contributed to impacts is unclear. Certainty of this assessment is low due to much of the information on impacts being broad or speculative. Overall risk for *Hemichromis elongatus* 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.

Englund, R. A., M. G. Wright, and D. A. Polhemus. 2007. Aquatic insect taxa as indicators of aquatic species richness, habitat disturbance, and invasive species impacts in Hawaiian streams. *Bishop Museum Bulletin in Cultural and Environmental Studies* 3: 207-232.

Firda, A. 2013. Diversity, abundance and distribution of fish in Cirata Reservoir, West Java. Thesis. Bogor Agricultural University, Bogor, West Java, Indonesia.

Froese, R., and D. Pauly, editors. 2017. *Hemichromis elongatus* (Guichenot, 1861). FishBase. Available: <http://www.fishbase.us/summary/Hemichromis-elongatus.html>. (January 2018).

GBIF (Global Biodiversity Information Facility). 2017. GBIF backbone taxonomy: *Hemichromis elongatus* (Guichenot, 1861). GBIF Secretariat, Copenhagen. Available: <https://www.gbif.org/species/2371378>. (January 2018).

- Hawaii Department of Land and Natural Resources. 2018. Banded jewel cichlid. Aquatic Invasive Species Page. Available: <http://dlnr.hawaii.gov/ais/other-ais/banded-jewel-cichlid/>. (January 2018).
- ITIS (Integrated Taxonomic Information System). 2018. *Hemichromis elongatus*. Integrated Taxonomic Information System Online Database (<http://www.itis.gov>). Available: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=553307. (January 2018).
- Marshall, B., T. Moelants, and D. Tweddle. 2010. *Hemichromis elongatus*. The IUCN Red List of Threatened Species 2010. Available: <http://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T181750A7724336.en>. (January 2018).
- Nico, L. 2018. *Hemichromis elongatus*. USGS Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=456>. (January 2018).
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- Seriously Fish. 2018. *Hemichromis elongatus*: five star general. Available: <http://www.seriouslyfish.com/species/hemichromis-elongatus/>. (January 2018).
- Van As, J. G., and L. Basson. 1992. Trichodinid ectoparasites (Ciliophora: Peritrichida) of freshwater fishes of the Zambesi River System, with a reappraisal of host specificity. *Systematic Parasitology* 22(2): 81-109.

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.
- Breder, C. M., and D. E. Rosen. 1966. *Modes of reproduction in fishes*. T. F. H. Publications, Neptune City, New Jersey.
- Hedianto, D. A., and S. E. Purnamaningtyas. 2011. Aspek biologi reproduksi ikan golsom (*Hemichromis elongatus*, Guichenot 1861) di Waduk Cirata, Jawa Barat. BAWAL (in press).
- Linke, H., and W. Staeck. 1994. *African cichlids I: cichlids from West Africa*. Tetra Press, Melle, 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* 228:1-124.
- Mundy, B. C. 2005. Checklist of the fishes of the Hawaiian Archipelago. *Bishop Museum Bulletins in Zoology* 6:1-704.
- Simberloff, D. 1998. Flagships, umbrellas, and keystones: is single-species management passé in the landscape era? *Biological Conservation* 93: 247–257.
- Skelton, P. H. 1993. A complete guide to the freshwater fishes of southern Africa. Southern Book Publishers.
- Stiassny et al 2007. [*Source did not provide complete citation for this reference.*]
- 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, editors. *The fresh and brackish water fishes of Lower Guinea, West-Central Africa, volume 2. Collection 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.
- 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. Collection 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.
- Tweddle et al 2004. [*Source did not provide complete citation for this reference.*]
- Yamamoto, M. N., and A. W. Tagawa. 2000. *Hawai'i's native and exotic freshwater animals.* Mutual Publishing, Honolulu, Hawaii.