Tigerfish (*Hoplias microlepis*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, August 2011
Revised, September 2018
Web Version, 1/28/2019

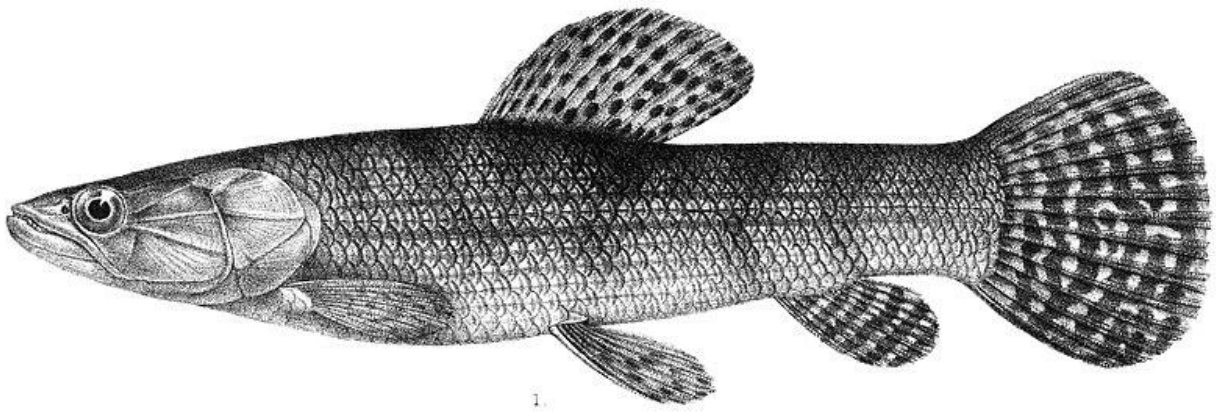

Image: J. Green *in* Regan (1908). Public Domain. Available: https://commons.wikimedia.org/w/index.php?curid=62931792. (September 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

"Central and South America: Pacific drainages of Panama; records in the Atlantic coast of Panama are restricted to the Canal Zone, suggesting dispersal through the Panama Canal; Puntarenas in southwestern Costa Rica; río Guayas basin in Ecuador and río Tumbes in northwestern Peru [Mattox et al. 2014]; and Colombia [Oyakawa 2003; Mattox et al. (2014) dispute Colombian occurrences, see Remarks]."

From Mattox et al. (2014):

"*Hoplias microlepis* has an intriguing disjoint distribution in trans-Andean South America […] It is so far known only from the Guayas drainage in Ecuador and its surroundings (i.e., río Tumbes, Northwestern Peru) and from the Pacific coast of Panama and Southwestern Costa Rica, leaving a large gap along the entire coast of Colombia […]"

Status in the United States

This species has not been reported as introduced or established in the United States.

Hoplias microlepis is mentioned occasionally on online aquarium forums, but it was not found for sale from U.S.-based online aquarium retailers.

The Florida Fish and Wildlife Conservation Commission has listed *H. microlepis* as a prohibited species. Prohibited nonnative species "are considered to be dangerous to the ecology and/or the health and welfare of the people of Florida. These species are not allowed to be personally possessed or used for commercial activities" (FFWCC 2018).

Means of Introduction into the United States

This species has not been reported as introduced or established in the United States.

Remarks

From Mattox et al. (2014):

"*Hoplias microlepis* has an intriguing disjoint distribution in trans-Andean South America […] It is so far known only from the Guayas drainage in Ecuador and its surroundings (i.e., río Tumbes, Northwestern Peru) and from the Pacific coast of Panama and Southwestern Costa Rica, leaving a large gap along the entire coast of Colombia […] There are a few species of freshwater fishes occurring in the Pacific slope from Panama to Equador (e.g., *Creagrutus affinis* Steindachner, *Roeboides occidentalis* Meek & Hildebrand, *Sciades dowii* (Gill)), a similar distribution to that of *H. microlepis*. However, all these species are also known from the Pacific slope of Colombia, a region where *H. microlepis* is apparently absent and substituted by *H. malabaricus* (e.g., Eigenmann, 1921: 508). There is a relatively small number of lots of *Hoplias* from the Pacific slope of Colombia, but interestingly, all specimens from coastal rivers of this region previously identified as *H. microlepis* that we had access to actually belong to *Hoplias malabaricus* (*e.g.*, FMNH 50596, five specimens from río Pizarro; FMNH 56735, one specimen from río Raspadura; FMNH 56740, one specimen from río Magui). We cannot affirm that *H. microlepis* is indeed absent from the Colombian Pacific drainages, and further evidence regarding to whether the species is truly absent in the wide Pacific slope of Colombia or has just not been found yet depends on more collecting efforts in the area."

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 Characiformes
Family Erythrinidae
Genus *Hoplias*
Species *Hoplias microlepis* (Günther, 1864)"

"Current Standing: valid"

From Fricke et al. (2019):

"**Current status:** Valid as *Hoplias microlepis* (Günther 1864)."

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 36.0 cm SL male/unsexed; [Oyakawa 2003]"

Environment

From Froese and Pauly (2018):

"Freshwater; benthopelagic. […] 26°C - 28°C [Bussing 1998; unknown if this temperature range refers to natural settings or aquarium settings]"

Climate/Range

From Froese and Pauly (2018):

"Tropical […]"

"Lives between 20 and 40 m elevation."

Distribution Outside the United States

Native

From Froese and Pauly (2018):

"Central and South America: Pacific drainages of Panama; records in the Atlantic coast of Panama are restricted to the Canal Zone, suggesting dispersal through the Panama Canal; Puntarenas in southwestern Costa Rica; río Guayas basin in Ecuador and río Tumbes in northwestern Peru [Mattox et al. 2014]; and Colombia [Oyakawa 2003]."

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 Froese and Pauly (2018):

"Dorsal soft rays (total): 13-15; Vertebrae: 42 - 45. *Hoplias microlepis* is distinguished from all congeners, except species of *H. malabaricus* group, by the the [*sic*] shape of the dentaries' abruptly converging towards the mandibular symphysis (vs. dentaries parallel and only gently converging towards the mandibular symphysis) and by having tooth plates on tongue (vs. absence of tooth plates on tongue). *H. microlepis* can be separated from *H. brasiliensis* and *H. curupira* by having 43-47 scales on lateral line (vs. 38-43 and 34-39, respectively), and from *H. australis* and *H. lacerdae* by having 4 pores of the laterosensory system along the ventral surface of dentary (vs. always 5 and 6-8 respectively). It differs from *H. aimara* by having accessory ectopterygoid and by lacking vertically elongate dark spot on the opercular membrane (vs. absence of accessory ectopterygoid and presence of dark spot). It can be diagnosed from the other members of the *H. malabaricus* species group by having more circumpeduncular scales (22-24, usually 24 vs. 18-20, usually 20) [Mattox et al. 2014]."

Biology

From Froese and Pauly (2018):

"Inhabits rivers [Mattox et al. 2014]. Collected in creeks and swamps in areas of little or no current on sand and mud bottoms. […] Piscivorous [Bussing 1998]."

Human Uses

From Froese and Pauly (2018):

"Fisheries: commercial"

Diseases

From Jiménez and Alava (2009):

"A total of 74 fish were collected from two localities (rice fields-wetlands and local fish market) of Samborondón County (Guayas Province [Ecuador]). Each was examined for the presence of *Gnathostoma* in muscle of *Hoplias microlepis*. […] The infection prevalence by *Gnathostoma* was 69% (95% CI: 57-78%). The overall abundance intensity of parasites averaging the 2 sites was 1.7 larvae per fish. The proportion of infected fish was higher in rice fields (77%) when compared to those from the local fish market (62%)."

Thatcher and Nickol (1972) report *H. microlepis* as host of the fish intestinal parasite *Quadrigyrus torquatus* Van Cleave, 1920.

Choudhury et al. (2017) report *H. microlepis* as host of the trematode parasite *Phyllodistomum* sp.

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

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

From Jiménez and Alava (2009):

"Human gnathostomiasis has been reported in Ecuador since the early 1980s, when natural infections by *Gnathostoma* third larval stages were found in muscles of the second intermediary host, *Hoplias microlepis* (tigerfish). In Ecuador, this zoonotic disease is occasionally detected in humans […]"

3 Impacts of Introductions

No information available. No introductions of this species have been reported.

The Florida Fish and Wildlife Conservation Commission (2018) has listed *H. microlepis* as a prohibited species.

4 Global Distribution

Figure 1. Known global distribution of *Hoplias microlepis*. Map from GBIF Secretariat (2017). Occurrence in central Colombia was excluded from the climate matching analysis because the species is not known to be established in the Orinoco River basin, where this occurrence was recorded.

5 Distribution within the United States

This species has not been reported as introduced or established in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) was medium in southern Florida, extreme southern Texas, and in the vicinity of Seattle, Washington. The climate match was low throughout the remainder of the contiguous United States. The Climate 6 score indicated that the contiguous United States has a low climate match overall. Scores of 0.005 and below are classified as low match; the Climate 6 score for *Hoplias microlepis* was 0.000. Individual state Climate 6 scores were low for the entire contiguous United States, except Florida, which had a medium score.

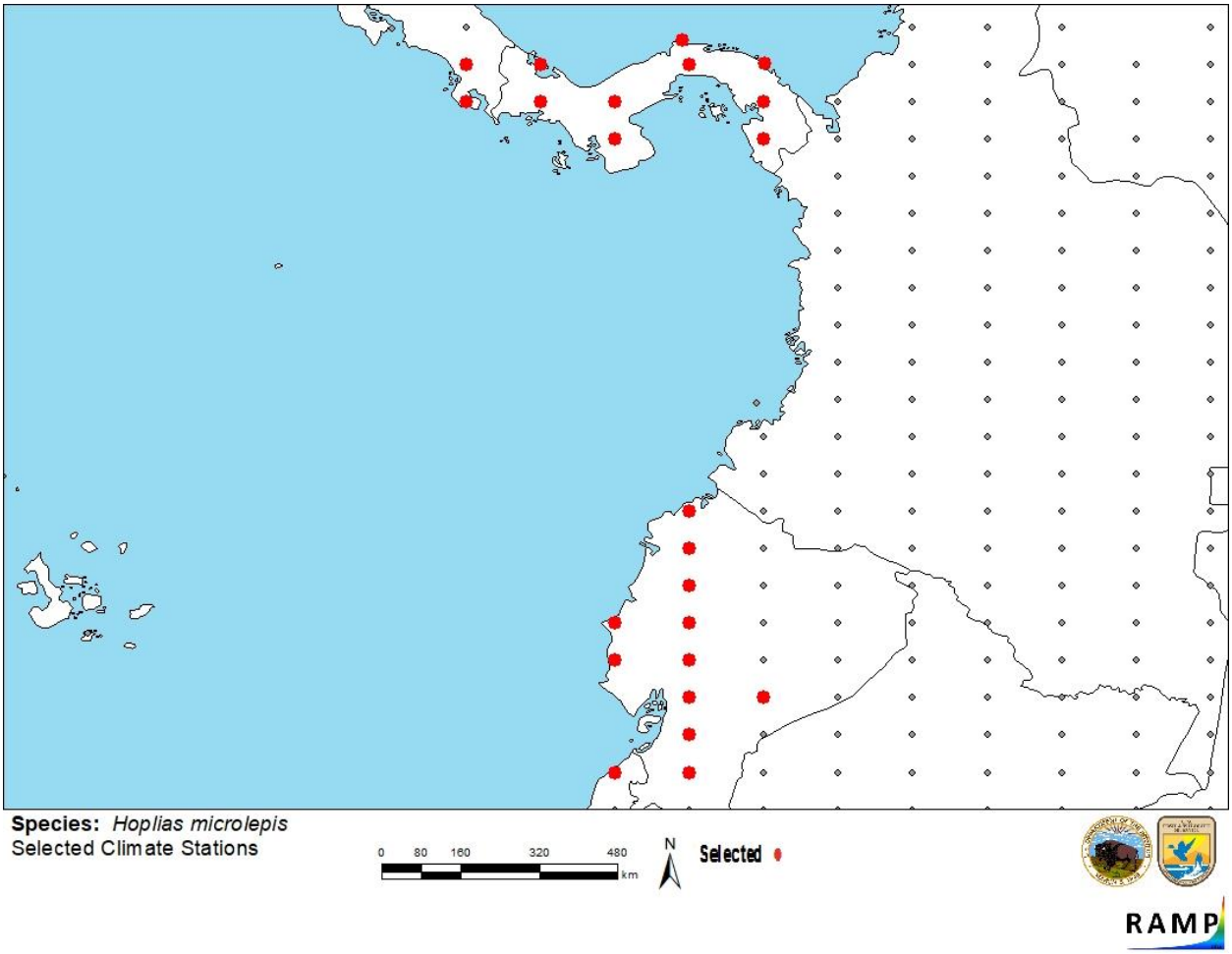

Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Costa Rica, Panama, Ecuador, Peru) and non-source locations (gray) for *H. microlepis* climate matching. Source locations from GBIF Secretariat (2017).

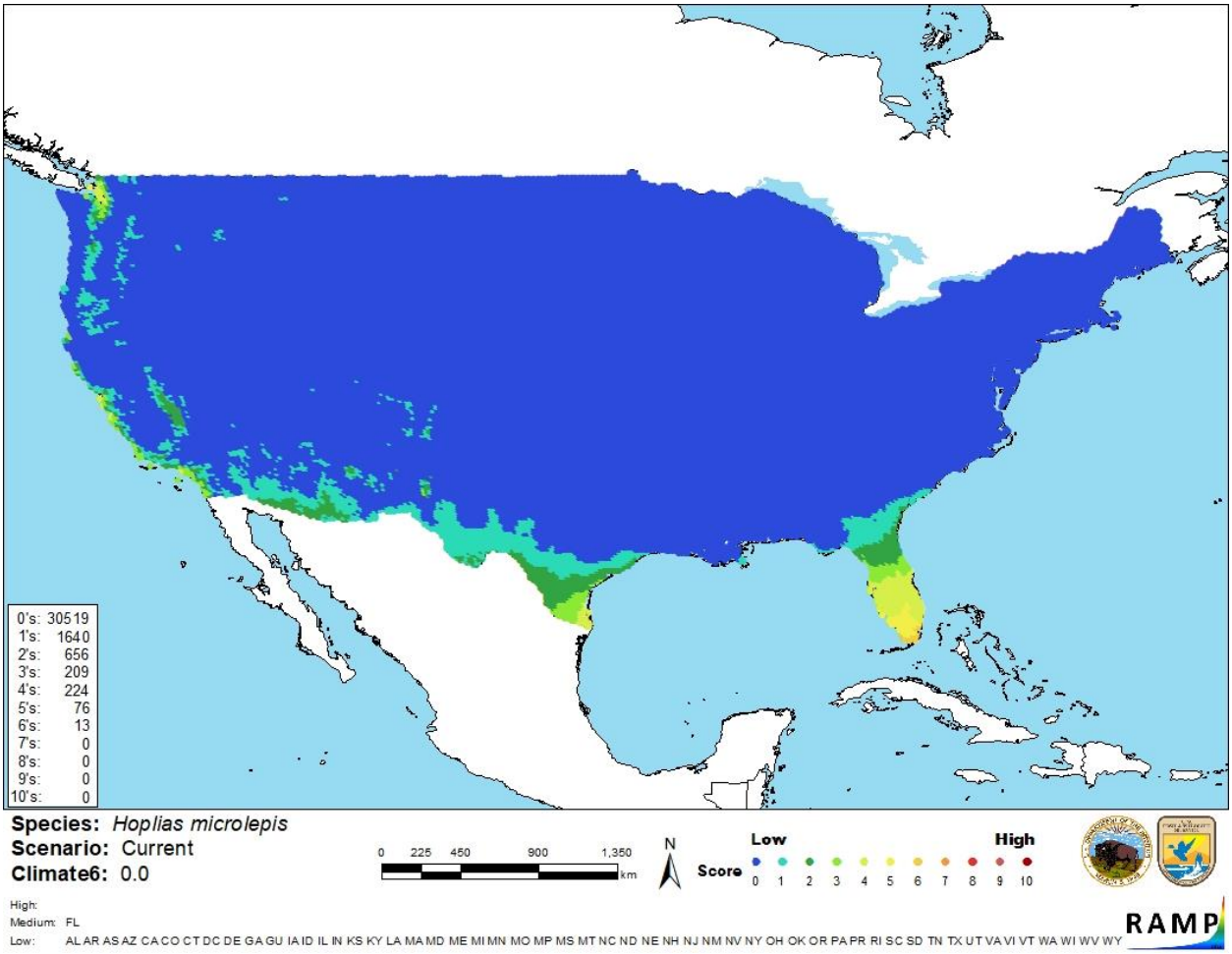

Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Hoplias microlepis* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0= Lowest match, 10= Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

Information is available on the biology and ecology of *H. microlepis*. The inclusion of Colombia within the native range of *H. microlepis* is disputed, although other parts of the native distribution are well described. No introductions of this species have been reported, so no information is available on impacts of introduction. Certainty of this assessment is low because of the lack of information on impacts and some uncertainty over the native distribution.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Tigerfish (*Hoplias microlepis*) is a species of characiform fish native to Costa Rica, Panama, Ecuador, Peru, and possibly Colombia. *H. microlepis* has commercial fishery value in its native range. *Gnathostoma* parasites, which can infect humans, have been reported in *H. microlepis* collected in Ecuador. *H. microlepis* is discussed occasionally on online aquarium forums, but appears not to be sold in the United States. It is listed as a prohibited species in the State of Florida. No introductions of *H. microlepis* have been reported, so no information is available on impacts of introduction. Therefore, history of invasiveness is uncertain. Climate match to the contiguous United States is low overall, with the State of Florida scoring as a medium match. Certainty of the assessment is low because of the lack of introduction history and, overall, the risk posed by *H. microlepis* to the contiguous United States is uncertain.

Assessment Elements

- **History of Invasiveness: Uncertain**
- **Climate Match: Low**
- **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.

Choudhury, A., M. García-Varela, and G. Pérez-Ponce de León. 2017. Parasites of freshwater fishes and the Great American Biotic Interchange: a bridge too far? Journal of Helminthology 91(2):174-196.

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Fricke, R., W. N. Eschmeyer, and R. van der Laan, editors. 2019. Catalog of fishes: genera, species, references. Available: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. (January 2019).

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Sanders, S., C. Castiglione, and M. Hoff. 2018. Risk Assessment Mapping Program: RAMP, version 3.1. U.S. Fish and Wildlife Service.

Thatcher, V. E., and B. B. Nickol. 1972. Some acanthocephalans from Panama and Colombia. Proceedings of the Helminthological Society of Washington 39(2):245-248.

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.

Bussing, W. A. 1998. Peces de las aguas continentales de Costa Rica [Freshwater fishes of Costa Rica], 2nd edition. Editorial de la Universidad de Costa Rica, San José, Costa Rica.

Eigenmann, C. H. 1921. The nature and origin of the fishes of the Pacific Slope of Ecuador, Peru and Chili [*sic*]. Proceedings of the American Philosophical Society 60:503-523.

Oyakawa, O. T. 2003. Erythrinidae (trahiras). Pages 238-240 *in* R. E. Reis, S. O. Kullander, and C. J. Ferraris, Jr., editors. Checklist of the freshwater fishes of South and Central America. EDIPUCRS, Porto Alegre, Brazil.