Trahira (*Hoplias malabaricus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, January 2018
Web Version, 9/10/2018

Photo: Vassil. Public domain. Available: https://commons.wikimedia.org/wiki/File:Hoplias_Aquarium_tropical_du_Palais_de_la_Porte_Dor%C3%A9e_10_04_2016_1.jpg. (January 2018).

1 Native Range and Status in the United States

Native Range

From Nico et al. (2018):

"Tropical and subtropical America from Costa Rica to Argentina, including the island of Trinidad (Taphorn 1992; Planquette et al. 1996)."

From Froese and Pauly (2017):

"Central and South America: Costa Rica to Argentina in most rivers basins."

Status in the United States

From Nico et al. (2018):

"All records are from the Little Manatee River drainage in the lower southeastern Tampa Bay area of Hillsborough County, Florida. Approximately 60 specimens were collected from a small system of drainage ditches and ponds 1.9 km south of the Little Manatee River on U.S. Highway 301, between December 1974 and February 1975 (Hensley and Moody 1975). Postlarvae and juveniles were taken at the same site in August and September 1975 (Hensley 1976)."

"Formerly established in Hillsborough County, Florida. No specimens have been collected since January 1977; presumably species was extirpated by extremely cold temperatures during that month (Courtenay and Hensley 1979). Shafland et al. (2008) recently surveyed for this species and found no specimens."

Means of Introductions in the United States

From Nico et al. (2018):

"This introduction represented either releases or escapes from a fish farm (Courtenay, personal communication)."

Remarks

From Blanco et al. (2010):

"According to Bertollo et al. (2000), *H. malabaricus* constitutes a species complex due to its conspicuous karyotype diversity. Seven karyotype forms—or karyomorphs (A through G)—are clearly identified based on the diploid number, chromosome morphology and sex chromosome systems. While some karyomorphs have wide geographic distribution in different hydrographic basins throughout South America, others are endemic, even occurring in sympatric conditions without detection of hybrid forms […]"

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 malabaricus*"

From Eschmeyer et al. (2018):

"Current status: Valid as *Hoplias malabaricus* (Bloch 1794). Erythrinidae."

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Max length : 65.0 cm TL male/unsexed; [Giarrizzo et al. 2015]; max. published weight: 3.8 kg [Giarrizzo et al. 2015]"

"Reaches more than 3 kg (Mark Fitzgerald, pers. comm., 2001)."

Environment

From Froese and Pauly (2017):

"Freshwater; benthopelagic; pH range: 6.0 - 8.0; dH range: 4 - 25; potamodromous [Riede 2004]. […] 20°C - 26°C [Baensch and Riehl 1985; assumed to be recommended aquarium temperatures]"

Climate/Range

From Froese and Pauly (2017):

"Tropical;[…] 11°N - 35°S, 85°W - 35°W"

Distribution Outside the United States

Native

From Nico et al. (2018):

"Tropical and subtropical America from Costa Rica to Argentina, including the island of Trinidad (Taphorn 1992; Planquette et al. 1996)."

Introduced

This species has not been reported as introduced or established outside of its native range except for the United States.

Means of Introduction Outside the United States

This species has not been reported as introduced or established outside of its native range except for the United States.

Short Description

From Taphorn (1990):

"Eigenmann (1912) characterized the genus Hoplias as follows: Caudal rounded; no occipital process; no fontanel; no adipose; mouth large, cheeks entirely covered by suborbitals; teeth all conical; maxilla with a canine and numerous small teeth; premaxilla with a large canine near symphysis and a smaller one toward the sides, and numerous conical teeth; palatines with patches of teeth, the outer series enlarged; a detached patch of teeth in front of the palatines, maxilla extending beyond the orbit; walls of swim bladder normal; supratemporal plate single. It has large, regularly-ordered scales and a thick cylindrical body."

"The eye [in *Hoplias malabaricus*] measures 16 to 20 times in the SL […]. The eye does not usually enter into the dorsal profile. This species is usually light brown or tan in life, and gray in preservative."

"DR [dorsal rays] 13-15; AR [anal rays] 10-11; LLS [lateral line scales] 37-43."

"The following data are from Eigenmann (1912): Head length 3-3.4 in the SL; head depth 4.3 in SL. The eye diameter measures 7 times in the head length of large specimens (200 mm SL or more); 5-6 times in specimens 100-200 mm, 4.3-5 times in specimens 50-100 mm. The eye diameter fits 2.4 times in the interorbital width in specimens 300-400 mm, 1.6-2 in specimens 200-300, 1.5 in specimens 100-200 mm, 1-1.3 in specimens 50-100 mm."

"The fins are usually spotted. As a rule, the body is much lighter in this species than in H. macrophthalmus, gray to tan, with irregular blotches and spots, and the abdomen whitish. However, in some habitats the body can be quite dark, and relative eye size must be used to distinguish the two species."

Biology

From Froese and Pauly (2017):

"Occurs in diverse habitats from free flowing clear water streams, well up into the valleys, to slow turbid waters, water courses, irrigation and drainage ditches, and ponds on the plains [Kenny 1995]. Rests in vegetation during the day and is active at night [Bussing 1987]. Adults feed on fish; juveniles feed on crustacean and insect larvae [Galvis 1997], shrimps and other small invertebrates [Bussing 1987]. Spawn in pits located in shallow water at a temperature of about 26°C [Breder and Rosen 1966]. Males guard the nests even after the eggs have hatched [Breder and Rosen 1966]. […] Live fish are difficult to handle and potentially dangerous because of their sharp teeth, strong jaws, and slippery bodies."

From Taphorn (1990):

"It is mostly piscivorous, but also takes other aquatic animals such as prawns and aquatic insects (Taphorn & Lilyestrom 1984; Saavedra 1984; Lowe-McConnell 1975, Pearse 1920). Prey are swallowed whole. Its hunting strategy is to sit in ambush, using protective coloring to blend in with vegetation and debris on the bottom in shallow water near shore."

"It has been found in almost every type of biotope present in the [lower Apure] drainage, with the exception of the highest mountain streams, but is especially common in temporary or disturbed areas, and lentic systems in general. Unlike Hoplerythrinus unitaeniatus, which has special respiratory organs that allows it to breath [*sic*] atmospheric air, this fish is an exclusive water-breather (Rantin & Johansen 1984). Even so, it often inhabits hypoxic water bodies. This is possible due to a high anaerobic capacity, and special behavioral respiratory responses such as increased breath frequency and volume, reduction of activity at low oxygen concentrations, and physiological adjustment of oxygen uptake through the gills. It is tolerant of low salinity water (such as in northern Lake Maracaibo), and pollution (it is one of the few remaining native species in the now nearly totally polluted Lake Valencia)."

"This species can reach sexual maturity in 12 months. Spawning occurs chiefly at the beginning of the rainy season from April to June, but can continue throughout the high water season for about five months. The female lays between 2500-3000 eggs (average diameter 2.0 mm) in a shallow depression in shallow water near shore where eggs are guarded by the male. Eggs hatch in about four days, and the yolk sac is absorbed in another ten (von Ihering et al . 1928; Azevedo and Gomes 1943)."

Human Uses

From Froese and Pauly (2017):

"Fisheries: commercial; aquaculture: commercial; aquarium: public aquariums"

From Taphorn (1990):

"It is consumed locally if nothing else is available."

Diseases

Poelen et al. (2014) list the following as parasites of *Hoplias malabaricus*: *Quadrigyrus torquatus*, *Urocleidoides eremitus*, *Pandosentis iracundus*, *Gyrodactylus trairae*, *Genarchella overstreeti*, *Neoechinorhynchus paraquayensis*, *Urocleidoides seremitus*, *Procamallanus hilarii*, *Pseudoproleptus* sp., *Procamallanus inopinatus*, *Capillaria zederi*, *Ithyoclinostomum dimorphum*, *Sphincterodiplostomum borjanensis*, *Pseudosellacotyla lutzi*, Dactylogyridae, *Gracilisentis variabilis*, *Neoechinorhynchus paraguayensis*, *Polyacanthorhynchus rhopalorhynchus*, *Quadrigyrus brasiliensis*, *Quadrigyrus machadoi*, *Nomimoscolex matogrossensis*, *Proteocephalus regoi*, *Spirocamallanus wrighti*, *Procamallanus peraccuratus*, *Klossinemella iheringi*, *Guyanema baudi*, *Heliconema izecksohni*, *Paraseuratum soaresi*, *Capillostrongyloides sentinosa*, *Paracapillaria piscicola*, *Clinostomum complanatum*, *Siphoderina grandispinus*, *Diplostomum compactum*, *Sphincterodiplostomum musculosum*, *Eustrongylides ignotus*, *Spirocamallanus hilarii*, *Pseudoproleptus* sp., and *Goezia spinulosa* (Strona et al. 2013, Benesh et al. 2017, and Smithsonian Institution, no date).

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

Threat to Humans

From Nico et al. (2018):

"Live fish are difficult to handle and potentially dangerous because of their sharp teeth, strong jaws, and slippery bodies."

3 Impacts of Introductions

From Nico et al. (2018):

"According to Courtenay (personal communication), Florida *Hoplias* were causing severe injuries to native centrarchids, especially *Lepomis* species."

4 Global Distribution

Figure 1. Known global distribution of *Hoplias malabaricus*, reported from much of South America, southern Central America, and Florida (United States). Map from GBIF Secretariat (2017). A point in the Indian ocean was excluded from the extent of this map and climate match analysis due to incorrect location.

5 Distribution Within the United States

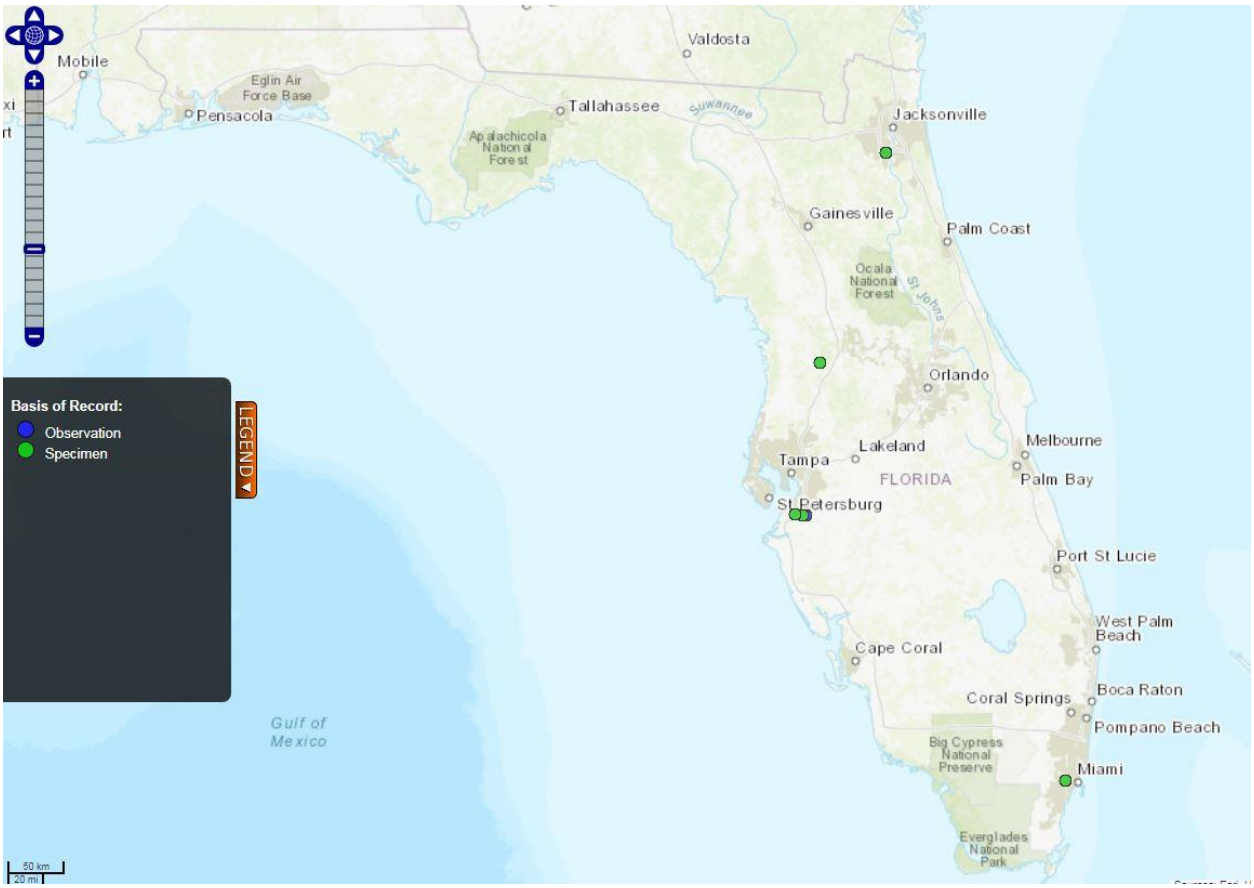

Figure 2. Known distribution of *Hoplias malabaricus* in the United States (Florida). Map from BISON (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.117, which is a high climate match. The climate match was highest in Florida. It was medium-high along the Gulf Coast, and medium across most of the South and the Midwest. The northern United States, New England, and Western states generally had a low climate match.

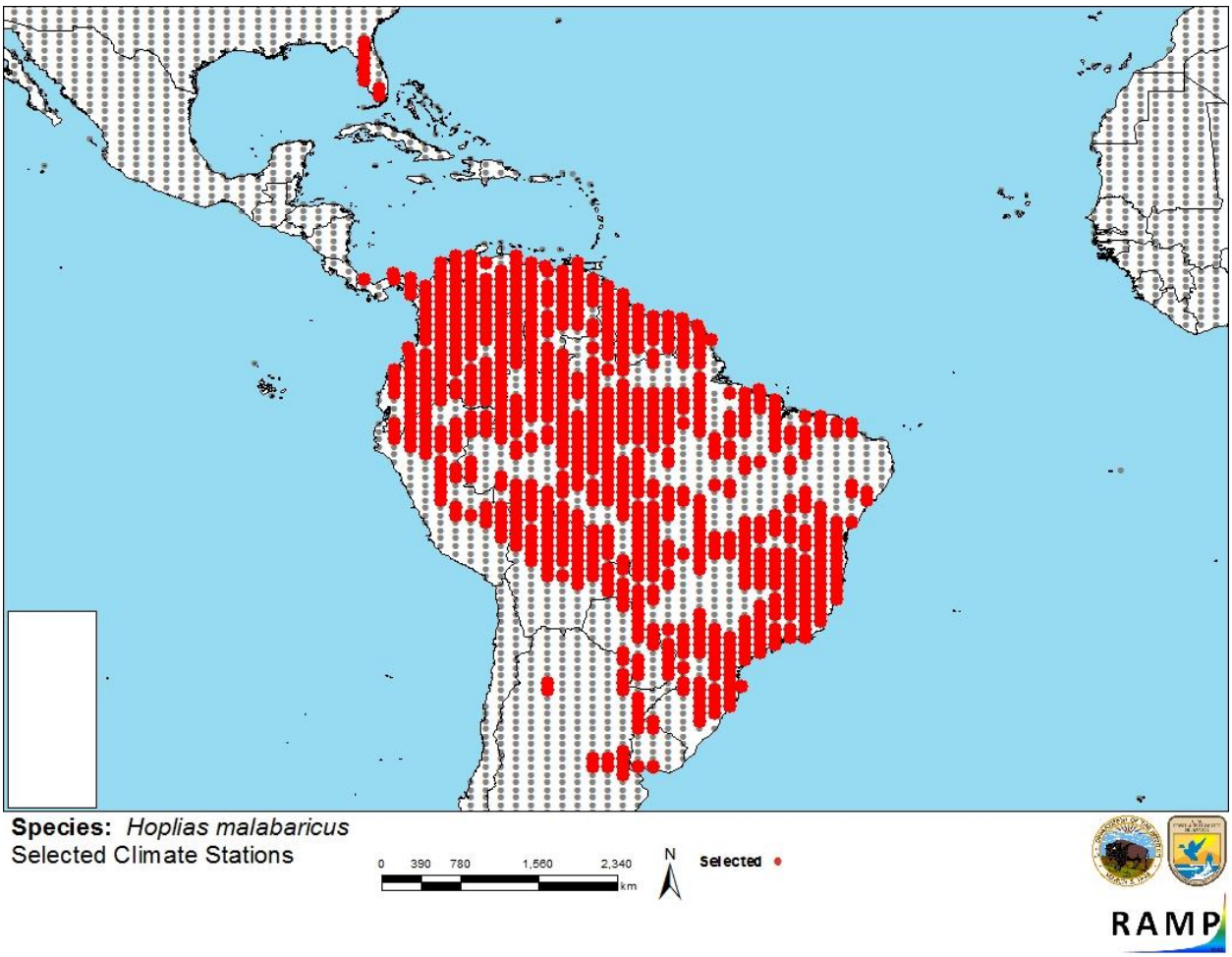

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations in North and South America selected as source locations (red; United States, Costa Rica, Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, Ecuador, Peru, Brazil, Bolivia, Paraguay, Argentina, Uruguay) and non-source locations (gray) for *Hoplias malabaricus* climate matching. Source locations from GBIF Secretariat (2017).

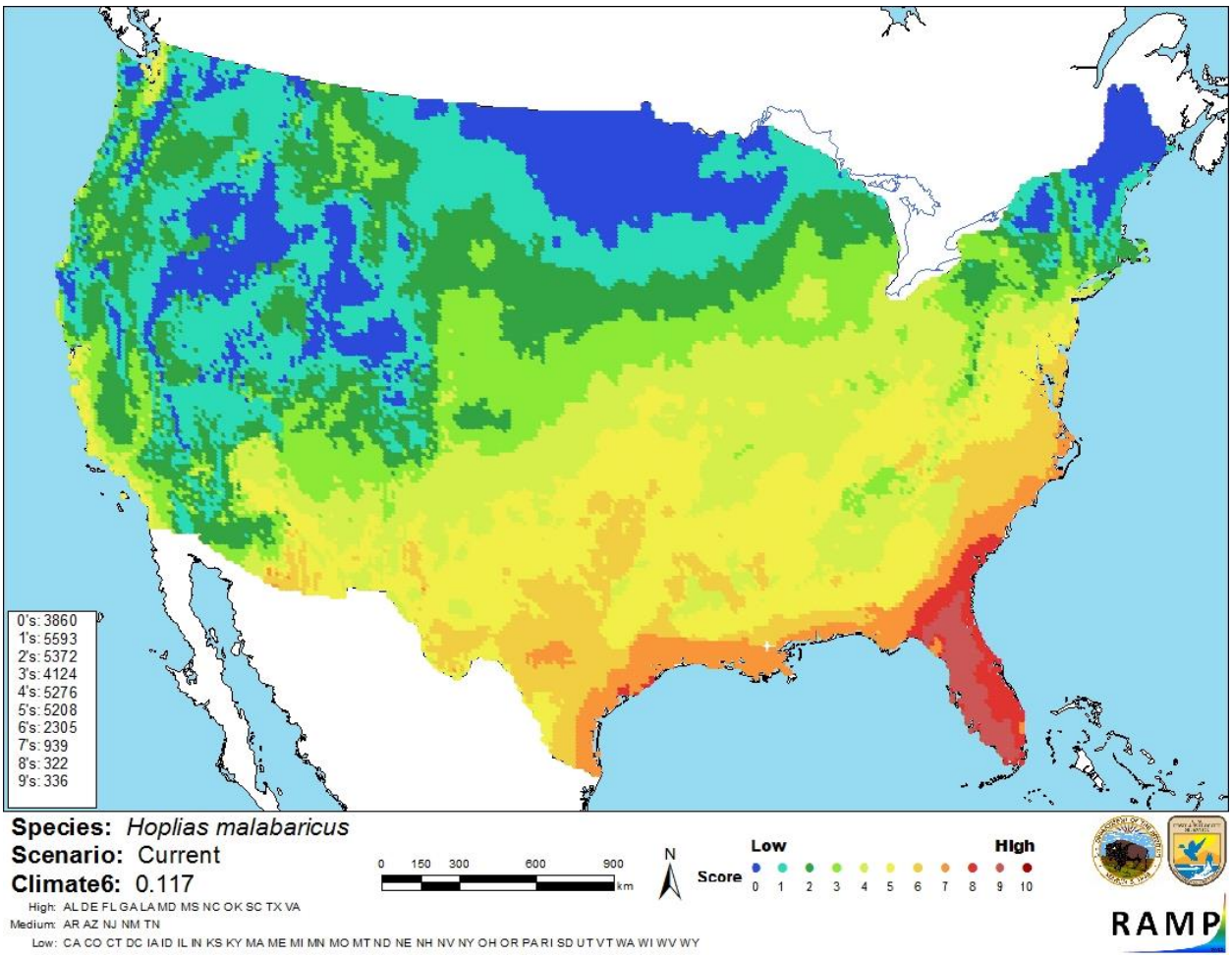

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Hoplias malabaricus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0= Lowest match, 10= Highest match. Counts of climate match scores are tabulated on the left.

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

7 Certainty of Assessment

Information on the biology and distribution of *Hoplias malabaricus* is readily available. This species is reported from Florida, but the status of its population is unknown, and no credible information is available on impacts from its introduction. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Hoplias malabaricus is a freshwater fish widely distributed in South America. This species has been documented as introduced in Florida, likely as a result of an accidental or intentional aquaculture release. No information is available on the status of its population there. No negative impacts of this species have been documented. *H. malabaricus* has a high climate match with the contiguous United States. Further information is needed to adequately assess the risk this species poses to the contiguous United States. Overall risk assessment category is uncertain.

Assessment Elements

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

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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.

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