Moga (*Hypsophrys nicaraguensis*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, February 2019
Web Version, 1/16/2020

Photo: Tomolyka. Licensed under CC BY-SA 3.0. Available: https://en.wikipedia.org/wiki/Hypsophrys_nicaraguensis#/media/File:Hypsophrys_nicaraguensis.jpg. (February 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"Central America: Atlantic slope, from the San Juan drainage, including Lake Nicaragua, in Costa Rica and Nicaragua, to the Matina River drainage in Costa Rica."

Status in the United States

According to Neilson (2019), *Hypsophrys nicaraguensis* has been introduced to Oahu, Hawaii in the United States and has become established. This species is also found across the United States in the aquarium trade.

From Neilson (2019):

"In Hawaii, Nicaraguan cichlids can be found in Ho'omaluhia Reservoir and the streams that drain it."

Hypsophrys nicaraguensis is in trade within the United States.

From That Pet Place (2019):

"Nicaragua Cichlid - *Hypsophrys nicaraguensis* - Juvenile
[…]
$12.99
Item: 204270
In Stock"

Means of Introductions in the United States

According to Neilson (2019), it is likely *H. nicaraguensis* was introduced to Hawaii by aquarium release.

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Hypsophrys nicaraguensis* (Günther 1864) is the current and valid name of this species. The original name of this species was *Heros nicaraguensis* (Günther 1864).

From ITIS (2019):

"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 *Hypsophrys*
Species *Hypsophrys nicaraguensis* (Günther 1864)"

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length : 16.5 cm SL male/unsexed; [Kullander 2003]; 20.0 cm TL (female)"

Environment
From Froese and Pauly (2019):

"Freshwater; benthopelagic; pH range: 7.0 - 8.0; dH range: 9 - 20. […]; 23°C - 36°C [Bussing 1998]"

Climate/Range
From Froese and Pauly (2019):

"Tropical; […]"

Distribution Outside the United States
Native
From Froese and Pauly (2019):

"Central America: Atlantic slope, from the San Juan drainage, including Lake Nicaragua, in Costa Rica and Nicaragua, to the Matina River drainage in Costa Rica."

Introduced
According to Froese and Pauly (2019), *Hypsophrys nicaraguensis* has been introduced to the Philippines. It is unknown whether or not the species is established in the wild.

Means of Introduction Outside the United States
According to Froese and Pauly (2019), *Hypsophrys nicaraguensis* was introduced to the Philippines for ornamental reasons.

Short Description
From Froese and Pauly (2019):

"Dorsal spines (total): 18 - 19; Dorsal soft rays (total): 9-11; Anal spines: 7-8; Anal soft rays: 7 - 9. This species can be distinguished by the dark line running through the middle of the body and the large black blotch positioned midlength; head profile extremely curved with the mouth on the lower part of the head; in males, the scales have dark edges producing a reticulated pattern, their fins with many dark spots, and a red edge to the dorsal fin; both males with iridescent, greenish-blue head and with gold to copper-colored bodies [Yamamoto and Tagawa 2000]."

Biology
From Froese and Pauly (2019):

"Inhabit lakes and rivers with slow to moderate currents, between 5 to 200 m elevation [Bussing 1998]. Juveniles feed on aquatic insects, while adults feed on bottom detritus, seeds and leaves. Also naturally feed on snails and other mollusks, but will accept a variety of food in captivity [Yamamoto and Tagawa 2000]."

“Deposits eggs in sand depressions. Produces about 200-400 non adhesive eggs with females practicing communal care during the post spawning period (an unusual behavior referred to as "creching", [Yamamoto and Tagawa 2000]). A group of 3 or 4 females stand guard over their combined spawns, encircling the expanded group and do not allow any intruders or predators into the rearing arena.”

From Abate et al. (2010):

“Nicaragua cichlids are substrate brooders that provide bi-parental care and protection for approximately four weeks after the eggs hatch and while the fry become more independent of the nest site”

Human Uses

From Froese and Pauly (2019):

“Fisheries: of no interest; aquarium: commercial”

From That Pet Place (2019):

“Nicaragua Cichlid - *Hypsophrys nicaraguensis* – Juvenile
[…]
$12.99
Item: 204270
In Stock”

Diseases

No records of OIE-reportable diseases (OIE 2020) were found for *Hypsophrys nicaraguensis*.

According to Poelen et al. (2019), *Hypsophrys nicaraguensis* is the host to the parasite *Crassicutis cichlasomae*. According to De Chambrier et al. (2017), *H. nicaraguensis* is a host to the tapeworm *Cichlidocestus janikae*.

Threat to Humans

From Froese and Pauly (2019):

“Harmless”

3 Impacts of Introductions

Although this species has documented introductions outside of their native range, no impacts of introduction have been reported in the literature.

4 Global Distribution

Figure 1. Known global distribution of *Hypsophrys nicaraguensis*. Locations in Costa Rica, Nicaragua and Hawaii. Map from GBIF Secretariat (2019).

5 Distribution Within the United States

Figure 2. Known distribution of *Hypsophrys nicaraguensis* in the United States. Locations on the Hawaiian island of Oahu. Map from Neilson (2019).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match was generally very low for the contiguous United States. Very small areas of medium match were found at the most southern tips of California, Florida and Texas. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low (scores between 0.000 and 0.005, inclusive, are classified as low). All States received low individual Climate 6 scores.

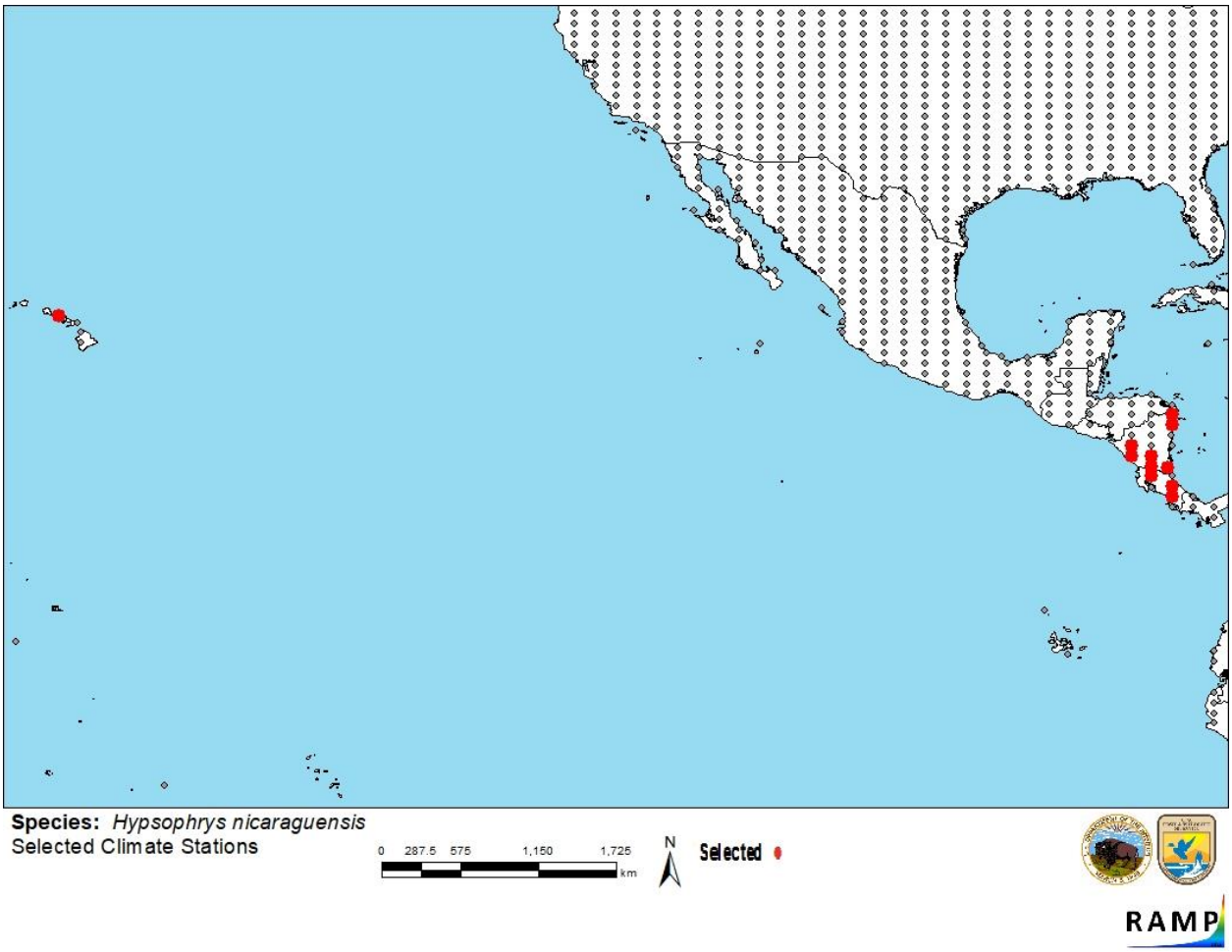

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in Costa Rica, Nicaragua, and Hawaii selected as source locations (red) and non-source locations (gray) for *Hypsophrys nicaraguensis* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

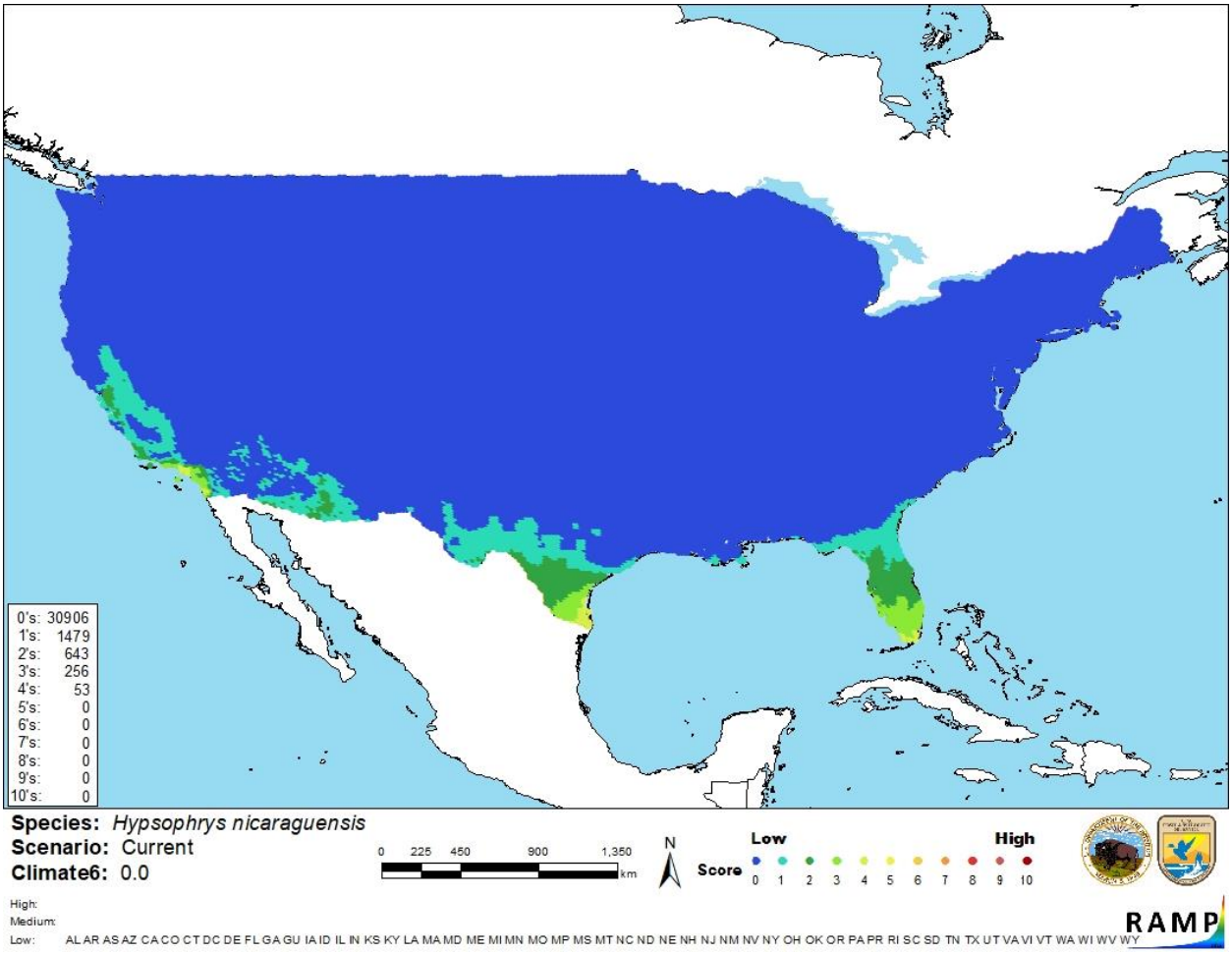

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Hypsophrys nicaraguensis* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0 = Lowest match, 10 = Highest match.

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

The certainty of assessment is low. Although *Hypsophrys nicaraguensis* has been reported as introduced and established outside of their native range, no information has been reported on the impacts of introduction.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Moga (*Hypsophrys nicaraguensis*) is a Central America cichlid native to Costa Rica and Nicaragua. We categorize the history of invasiveness for *H. nicaraguensis* as none documented because there is no scientifically credible studies documenting negative impacts of introduction. This species has been introduced outside of their native range in two areas: Hawaii, where an established population now exists and the Philippines, where it is unknown if the population has become established. *Hypsophrys nicaraguensis* is found in the aquarium trade in the United States. The climate match for the contiguous United States was very low, with all states receiving low individual climate scores. The certainty of assessment is low. The overall risk assessment category for *Hypsophrys nicaraguensis* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** No additional information.
- **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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De Chambrier, A., C. D. Pinacho-Pinacho, J. S. Hernández-Orts, and T. Scholz. 2017. A new genus and two new species of Proteocephalidean tapeworms (Cestoda) from cichlid fish (Perciformes: Cichlidae) in the Neotropics. Journal of Parasitology 103(1):83–94.

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That Pet Place. 2019. Nicaragua Cichlid- *Hypsophrys nicaraguensis* – Juvenile. Available: https://www.thatpetplace.com/Hypsophrys-nicaraguensis-nicaragua-cichlid-204270. (February 2019).

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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Kullander, S. O. 2003. Cichlidae (cichlids). Pages 605–654 *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.

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