Nile Tigerfish (*Hydrocynus forskahlii*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2011
Revised, December 2018, February 2019
Web Version, 10/10/2019

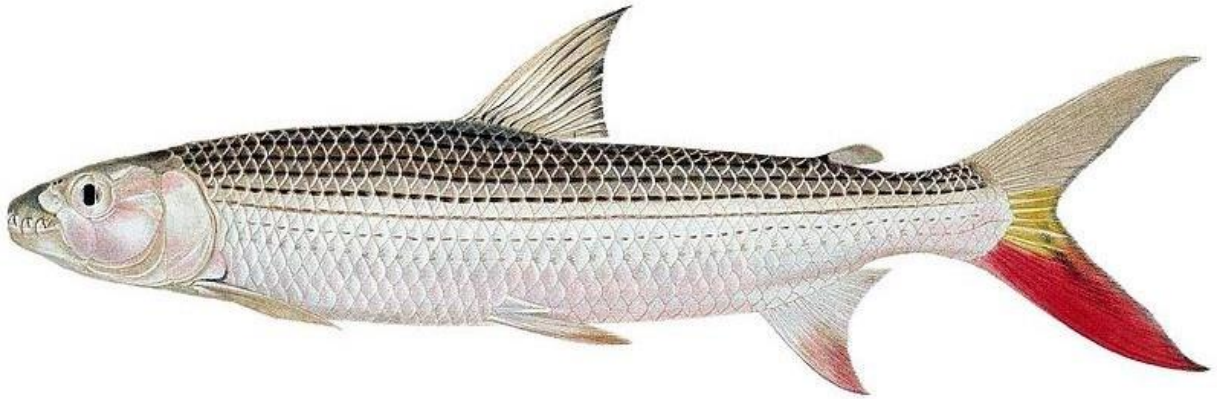

Photo: George Albert Boulenger. Licensed under Creative Commons Attribution 2.0 Generic. Available: https://commons.wikimedia.org/wiki/File:Hydrocynus_forskahlii_(The_fishes_of_the_Nile_(Pl._XVII)_(6961607491)).jpg. (December 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

"Africa: Cross, Wouri and Sanaga basin in Lower Guinea ichthyofaunal province [Paugy and Schaefer 2007]. Also in Chad, Niger, Ogun, Ouémé, Mono, Volta, Comoé, Bandama, Sassandra, Nipoué, St. Paul, Mano, Little Scarcies, Gambia and Senegal basins in West Africa [Paugy 1990, 2003; Paugy and Schaefer 2007]; Nile River, including Lake Albert [Greenwood 1966; Paugy 1984]; Lake Turkana and Omo River [Paugy 1984, 1990; Paugy and Schaefer 2007]; and Congo River basin [Paugy 1990; Paugy and Schaefer 2007]. [Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda and Zambia]"

Status in the United States

Hydrocynus forskahlii has not been found in the wild or in trade in the United States.

Means of Introductions in the United States
No introductions of *Hydrocynus forskahlii* in the United States have been reported.

Remarks
No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing
From Fricke et al. (2018):

"**Current status:** Valid as *Hydrocynus forskahlii* (Cuvier 1819)."

From ITIS (2018):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Characiformes
Family Alestiidae
Genus *Hydrocynus*
Species *Hydrocynus forskahlii* (Cuvier, 1819)"

Size, Weight, and Age Range
From Froese and Pauly (2018):

"Maturity: L_m 20.0, range 21 - ? cm
Max length : 78.0 cm SL male/unsexed; [Paugy 1990]; max. published weight: 15.5 kg [Bell-Cross and Minshull 1988]; max. reported age: 4 years [Srinn 1974]"

Environment
From Froese and Pauly (2018):

"Freshwater; pelagic; potamodromous [migrates within fresh water] [Riede 2004]."

Climate/Range
From Froese and Pauly (2018):

"Tropical [Paugy 1984]"

Distribution Outside the United States
Native
From Froese and Pauly (2018):

"Africa: Cross, Wouri and Sanaga basin in Lower Guinea ichthyofaunal province [Paugy and Schaefer 2007]. Also in Chad, Niger, Ogun, Ouémé, Mono, Volta, Comoé, Bandama, Sassandra, Nipoué, St. Paul, Mano, Little Scarcies, Gambia and Senegal basins in West Africa [Paugy 1990, 2003; Paugy and Schaefer 2007]; Nile River, including Lake Albert [Greenwood 1966; Paugy 1984]; Lake Turkana and Omo River [Paugy 1984, 1990; Paugy and Schaefer 2007]; and Congo River basin [Paugy 1990; Paugy and Schaefer 2007]. [Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda and Zambia]"

Introduced
Hydrocynus forskahlii has not been reported as introduced outside of its native range.

Means of Introduction Outside the United States
No introductions have been reported for *Hydrocynus forskahlii*.

Short Description
From Froese and Pauly (2018):

"Diagnosis: 2 scale rows between lateral line and scaly process at pelvic-fin bases; eye <70% of interorbital space [Paugy 1990, 2003]. Dorsal-fin uniformly greyish and its origin in front of pelvic fins; adipose fin greyish; caudal fin without black edge [Paugy 2003; Paugy and Schaefer 2007]."

Biology
From Froese and Pauly (2018):

"Forms shoals; an open water predator often found near the water surface; feeds on fishes, preferring long bodied fish as they are easier to swallow and also takes insects, grass and snails; cannibalistic; preyed upon by fish eagle *Haliaeetus vocifer*; breeding migrations have been reported up several tributaries of Lake Kariba during the rains [Bell-Cross and Minshull 1988]."

Human Uses

From Froese and Pauly (2018):

"Fisheries: commercial; gamefish: yes"

Diseases

According to Poelen et al. (2014), *H. forskahlii* is known to have the following parasites: *Philometroides hydrocyonae, Paragorgorhynchus albertianum, Neoechinorhynchus africanus, Annulotrema cryptophallus, Annulotrema curvipenis, Annulotrema hydrocynusi, Annulotrema magnihamula, Annulotrema nili, Annulotrema, Annulotrema spiropenis, Neodactylogyrus, Rhabdochona aegyptiacus, Rhabdochona congolensis, Monascus typicus,* and *Dinurus gizae.*

No OIE reportable diseases (OIE 2019) were found for *Hydrocynus forskahlii*.

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

No introductions of *H. forskahlii* have been reported anywhere outside of their native range.

4 Global Distribution

Figure 1. Known global distribution of *Hydrocynus forskahlii*. Map from GBIF Secretariat (2018). Locations in Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda and Zambia. The source location farthest south was a misidentification in Zimbabwe and was not used for the climate match.

5 Distribution Within the United States

No records of *Hydrocynus forskahlii* were found in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

A majority of the northern contiguous United States had a very low match; most of the high and medium areas of match are in the southern contiguous United States with the highest areas in southern California and Arizona. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.029, medium (scores greater than 0.005, but less than 0.103, are classified as medium). Most States had low individual Climate 6 scores, except Arizona, California, and Florida, which had high individual climate score, and Texas and Nevada, which had medium individual scores.

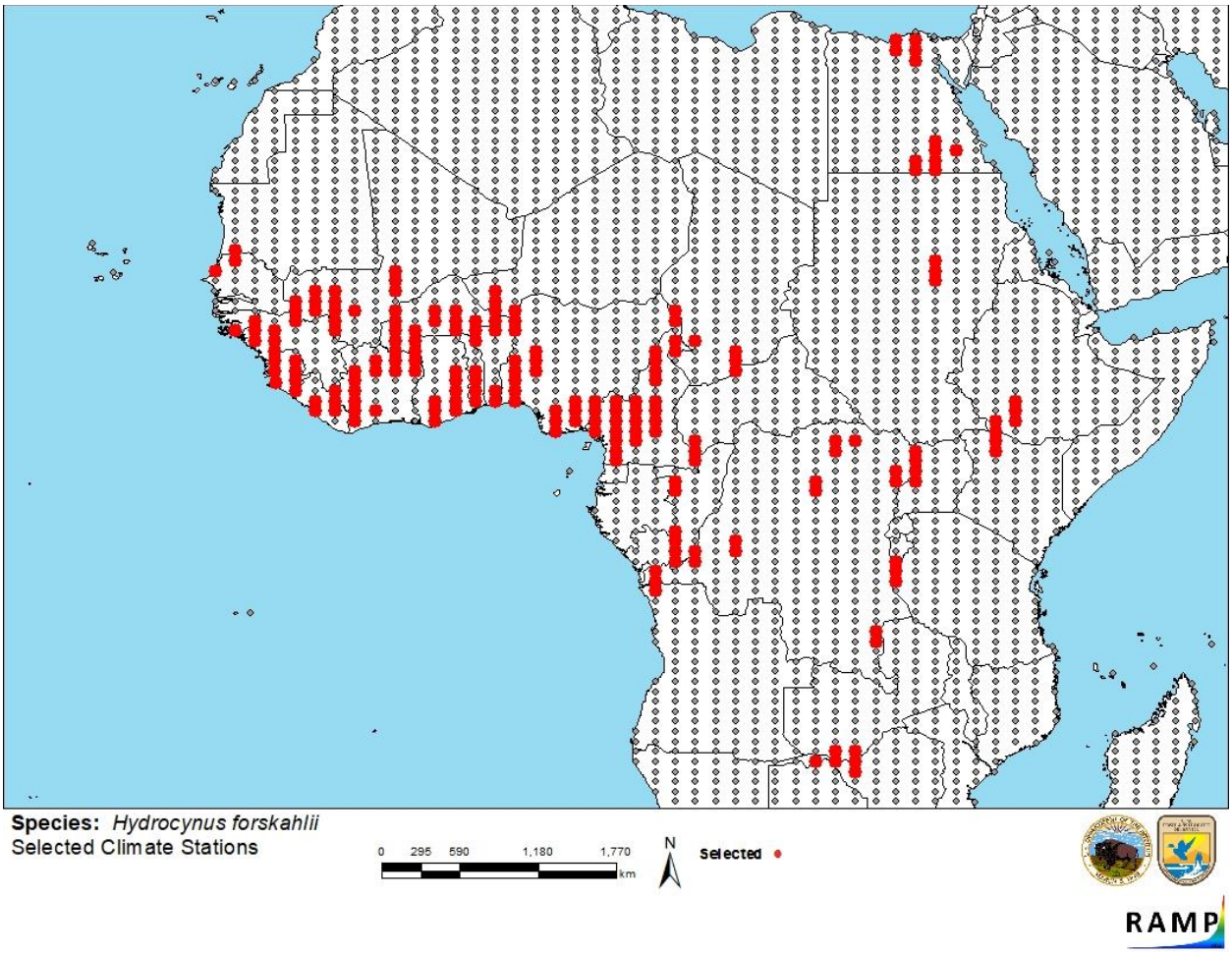

Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Africa selected as source locations (red; Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda and Zambia) and non-source locations (gray) for *Hydrocynus forskahlii* climate matching. Source locations from GBIF Secretariat (2018). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

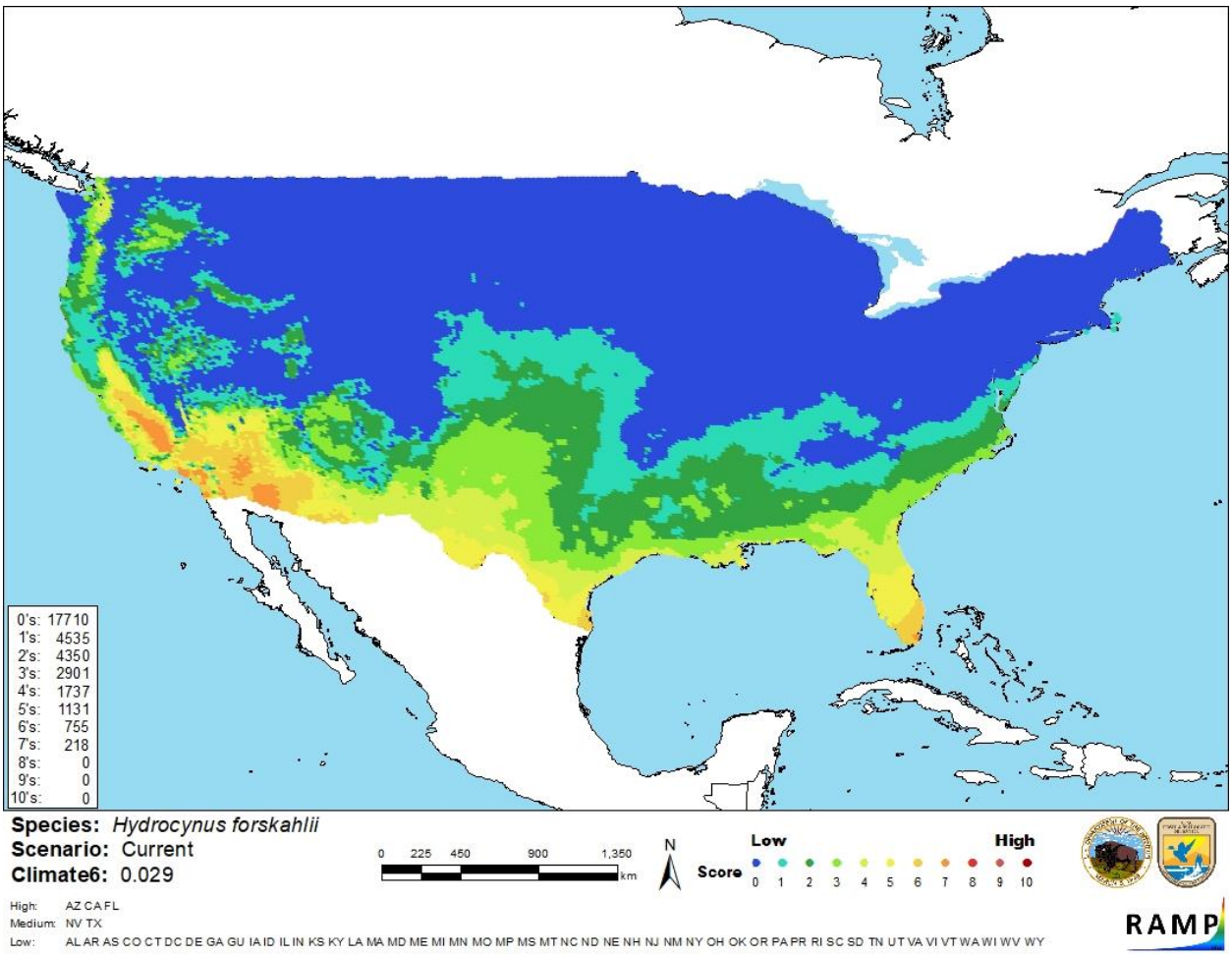

Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Hydrocynus forskahlii* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0 = Lowest match, 10 = Highest match.

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

Basic biological and distribution information is available on *Hydrocynus forskahlii*. It has a very wide distribution yet no introductions have been reported outside of the native range; therefore, there is no information on impacts of introduction. The certainty of assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The Nile Tiger-fish (*Hydrocynus forskahlii*) is a freshwater fish native to 27 countries distributed throughout Africa. This species has not been recorded as introduced or established anywhere in the world outside of its native range. The climate match for the contiguous United States is medium. Arizona, California, and Florida scored high climate scores, while Nevada and Texas scored medium scores, with the rest of the States receiving low individual scores. The certainty of assessment is low. The overall risk assessment for *H. forskahlii* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **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.

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. (December 2018).

Froese, R., and D. Pauly, editors. 2018. *Hydrocynus forskahlii* (Cuvier, 1819). FishBase. Available: https://www.fishbase.de/summary/Hydrocynus-forskahlii.html. (December 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Hydrocynus forskahlii* (Cuvier, 1819). Global Biodiversity Information Facility, Copenhagen. Available: https://www.gbif.org/species/2356166. (December 2018).

ITIS (Integrated Taxonomic Information System). 2018. *Hydrocynus forskahlii* (Cuvier, 1819). Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=641101#null. (December 2018).

OIE (World Organisation for Animal Health). 2019. OIE-listed diseases, infections and infestations in force in 2019. Available: http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/. (October 2019).

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. Hoff. 2018. Risk assessment mapping program: RAMP, version 3.1. U.S. Fish and Wildlife Service.

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.

Bell-Cross, G., and J. L. Minshull. 1988. The fishes of Zimbabwe. National Museums and Monuments of Zimbabwe, Harare.

Cuvier, G. 1819. Sur les poissons du sous-genre *Hydrocyon*, sur deux nouvelles espèces de *Chalceus*, sur trois nouvelles espèces du *Serrasalmes*, et sur l'*Argentina glossodonta* de Forskahl, qui est l'*Albula gonorhynchus* de Bloch. Mémoires du Muséum National d'Histoire Naturelle, Paris (N. S.) (Série A) Zoologie 5:351–379.

Greenwood, P. H. 1966. The fishes of Uganda. The Uganda Society, Kampala.

Paugy, D. 1984. Characidae. Pages 140–183 *in* J. Daget, J. -P. Gosse and D. F. E. Thys van den Audenaerde, editors. Check-list of the freshwater fishes of Africa. ORSTOM, Paris, and MRAC, Tervuren, Belgium.

Paugy, D. 1990. Characidae. Pages 195–236 *in* C. Lévêque, D. Paugy and G. G. Teugels, editors. Faune des poissons d'eaux douces et saumâtres de l'Afrique de l'Ouest. Tome I. Coll. Faune Tropicale n° XXVIII. Musée Royal de l'Afrique Centrale, Tervuren, Belguim et O.R.S.T.O.M., Paris.

Paugy, D. 2003. Alestidae. Pages 236–282 *in* D. Paugy, C. Lévêque and G. G Teugels, editors. The fresh and brackish water fishes of West Africa, volume 1. Coll. faune et flore tropicales 40. Institut de recherche de développement, Paris, Muséum national d'histoire naturelle, Paris, and Musée royal de l'Afrique Central, Tervuren, Belgium.

Paugy, D., and S. A. Schaefer. 2007. Alestidae. Pages 347–411 *in* M. L. J. Stiassny, G. G. Teugels and C. D. Hopkins, editors. Poissons d'eaux douces et saumâtres de basse Guinée, ouest de l'Afrique centrale/The fresh and brackish water fishes of Lower Guinea, west-central Africa, volume 1. Coll. Faune et Flore tropicales 42. Istitut de recherche pour le développement, Paris, Muséum nationale d'histoire naturelle, Paris, and Musée royale de l'Afrique centrale, Tervuren, Belgique.

Riede, K. 2004. Global register of migratory species - from global to regional scales. Federal Agency for Nature Conservation, Final Report, R&D-Projekt 808 05 081, Bonn.

Srinn, K. Y. 1974. Biologie d' *Hydrocynus forskalii* du bassin tchadien. Thèse de 3ème cycle, Université Paul Sabatier, Toulouse, France.