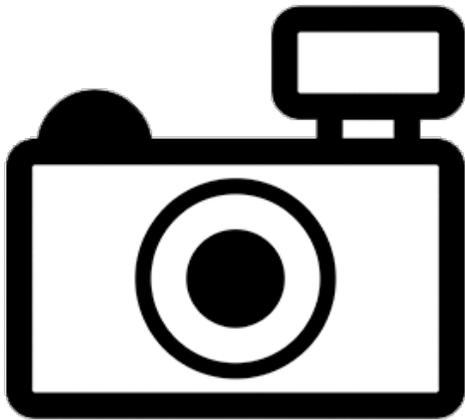


# Kululu (*Sarotherodon steinbachi*)

## Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, May 2012  
Revised, September 2018  
Web Version, 2/22/2021

Organism Type: Fish  
Overall Risk Assessment Category: Uncertain



No Photo Available

## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2018):

“Africa: endemic to Lake Barombi Mbo, West Cameroon [Lamboj 2004; Stiassny et al. 2008].”

### Status in the United States

No records of *Sarotherodon steinbachi* in the wild or in trade in the United States were found.

The Florida Fish and Wildlife Conservation Commission has listed the tilapia *S. steinbachi* as a prohibited species. Prohibited nonnative species (FFWCC 2018), “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.”

From Louisiana State Legislature (2019):

“No person, firm, or corporation shall at any time possess, sell, or cause to be transported into this state by any other person, firm, or corporation, without first obtaining the written permission of the secretary of the Department of Wildlife and Fisheries, any of the following species of fish: freshwater electric eel (*Electrophorus* sp.); rudd (*Scardinius erythrophthalmus*); all members of the families *Synbranchidae* (Asian swamp eels); *Channidae* (snakeheads); *Clariidae* (walking catfishes); *Trichomycteridae* (pencil catfishes); all species of tilapia [*Sarotherodon steinbachi* is a species of tilapia], [...]”

*Sarotherodon steinbachi* falls within Group IV of New Mexico’s Department of Game and Fish Director’s Species Importation List (New Mexico Department of Game and Fish 2010). “The importation of these species [Group IV] are prohibited for the general public but may be allowed for, scientific study, department approved restoration and recovery plans, zoological display, temporary events/entertainment, use as service animal or by a qualified expert.”

From State of Nevada (2018):

“Except as otherwise provided in this section and NAC 504.486, the importation, transportation or possession of the following species of live wildlife or hybrids thereof, including viable embryos or gametes, is prohibited: [...] All species in the genera *Tilapia* and *Sarotherodon*”

Tilapia species are prohibited to be sold and used as bait or stocked in heated-water reservoirs in the State of Oklahoma (Oklahoma Secretary of State 2019).

All species in the genus *Sarotherodon* are listed as prohibited in Texas (Texas Parks and Wildlife 2020).

From Utah Office of Administrative Rules (2019):

“All species of fish listed in Subsections (2) through (30) are classified as prohibited for collection, importation and possession, [...] (30) *Tilapia*, (*Tilapia* and *Sarotherodon*) (All species) family Cichlidae.”

A permit is required to import, possess, or sell any species of tilapia in Virginia (Virginia Department of Game and Inland Fisheries 2020).

All species in the genus *Sarotherodon* are considered regulated Type A species in Washington. Regulated Type A species (Washington State Senate 2019) are “nonnative aquatic animal species that pose a low to moderate invasive risk that can be managed based on intended use or geographic scope of introduction, have a beneficial use, and are a priority for department-led or department-approved management of the species' beneficial use and invasive risks.”

## **Means of Introductions in the United States**

No records of *Sarotherodon steinbachi* in the wild in the United States were found.

## Remarks

From Froese and Pauly (2018):

“Critically Endangered (CR)”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2018), *Sarotherodon steinbachi* (Trewavas 1962) is the current valid name of this species. *Sarotherodon steinbachi* was originally described as *Tilapia steinbachi* Trewavas 1962.

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 *Sarotherodon*

Species *Sarotherodon steinbachi* (Trewavas, 1962)

### Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 11.3 cm SL male/unsexed; [Stiassny et al. 2008]”

### Environment

From Froese and Pauly (2018):

“Freshwater; demersal.”

“[...]; 24°C - 26°C [assumed to be recommended aquarium temperature range] [Baensch and Riehl 1997]; [...]”

## **Climate**

From Froese and Pauly (2018):

“Tropical; [...]; 5°N - 4°N”

## **Distribution Outside the United States**

Native

From Froese and Pauly (2018):

“Africa: endemic to Lake Barombi Mbo, West Cameroon [Lamboj 2004; Stiassny et al. 2008].”

Introduced

No records of introductions of *Sarotherodon steinbachi* were found.

## **Means of Introduction Outside the United States**

No records of introductions of *Sarotherodon steinbachi* were found.

## **Short Description**

From Froese and Pauly (2018):

“Dorsal spines (total): 16 - 17; Dorsal soft rays (total): 10-11; Anal spines: 3; Anal soft rays: 8 - 10; Vertebrae: 29 - 31. Diagnosis: 19-23 rakers on lower limb of first arch [Stiassny et al. 2008]. Length of lower pharyngeal jaw 40-50% of head length [Stiassny et al. 2008], width 34.5-38.0 [Trewavas 1983]. Pearly yellow in life, with no markings on body; preserved specimens dark grey on back, with a horizontal darker band in some; decurved snout [Trewavas 1983].”

## **Biology**

From Froese and Pauly (2018):

“Seems to prefer shallow areas near the edges of the lake [Lamboj 2004]. Occurs in schools at the surface; stomach of specimens which were examined contained organic debris; benthic and epilithic diatoms, and sponge spicules were nearly always present and many had inorganic particles in the stomach; individuals were seen shoveling sand into the mouth, moving it about in the buccopharynx, then spitting out the sand and making swallowing movements [Trewavas 1983]. Lacks marked sexual dichromatism when sexually active [Stiassny et al. 2008]. Probably a biparental ovophilic mouthbrooder that forms little to no [Lamboj 2004] and only temporary pair bonds [Stiassny et al. 2008].”

“Exhibits biparental mouth-brooding.”

## Human Uses

From Froese and Pauly (2018):

“Fisheries:”

## Diseases

No records of diseases of *Sarotherodon steinbachi* were found. **No records of OIE-reportable diseases (OIE 2021) were found for *S. steinbachi*.**

## Threat to Humans

From Froese and Pauly (2018):

“Harmless”

## 3 Impacts of Introductions

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No records of introductions of *Sarotherodon steinbachi* were found; therefore, there is no information on impacts of introductions.

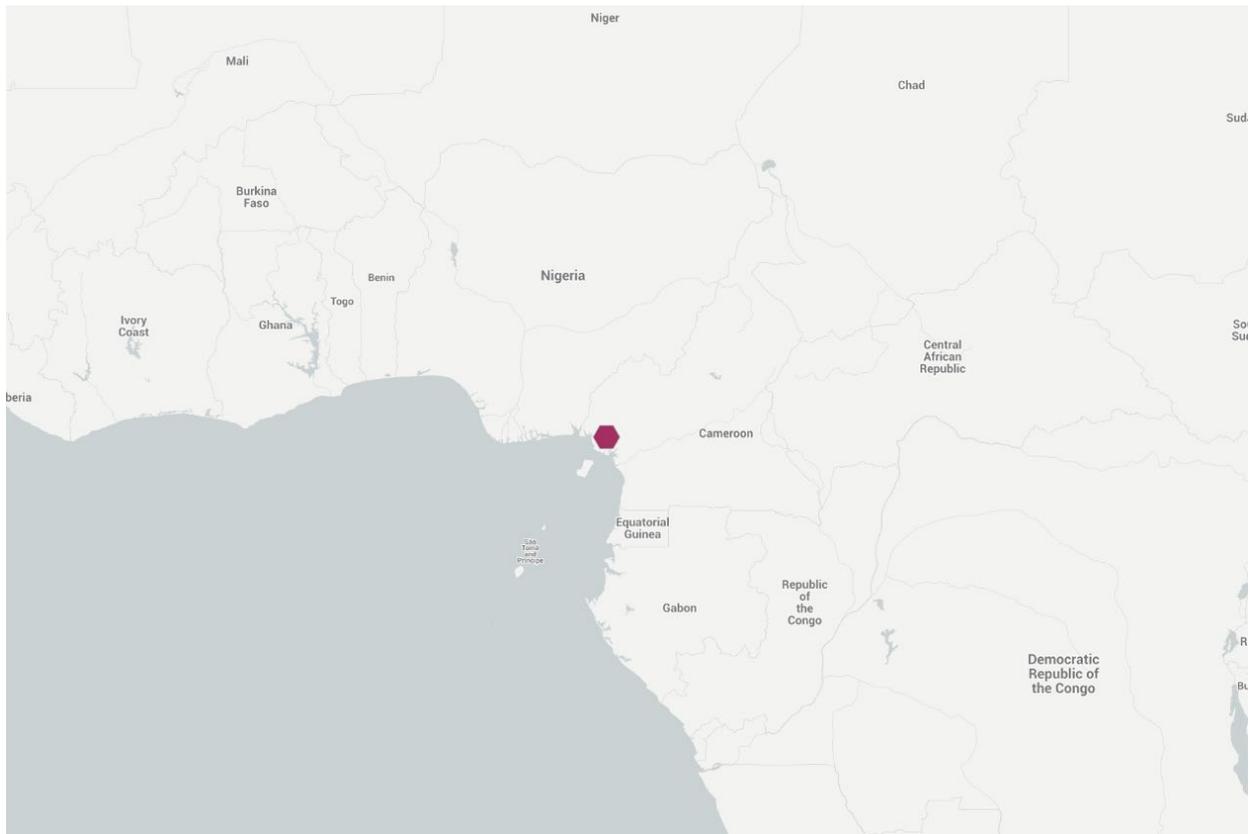
## 4 History of Invasiveness

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There are no known nonnative populations of *Sarotherodon steinbachi*.

## 5 Global Distribution

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**Figure 1.** Map of West Cameroon showing location where *Sarotherodon steinbachi* has been reported. Map from GBIF Secretariat (2018).

## 6 Distribution Within the United States

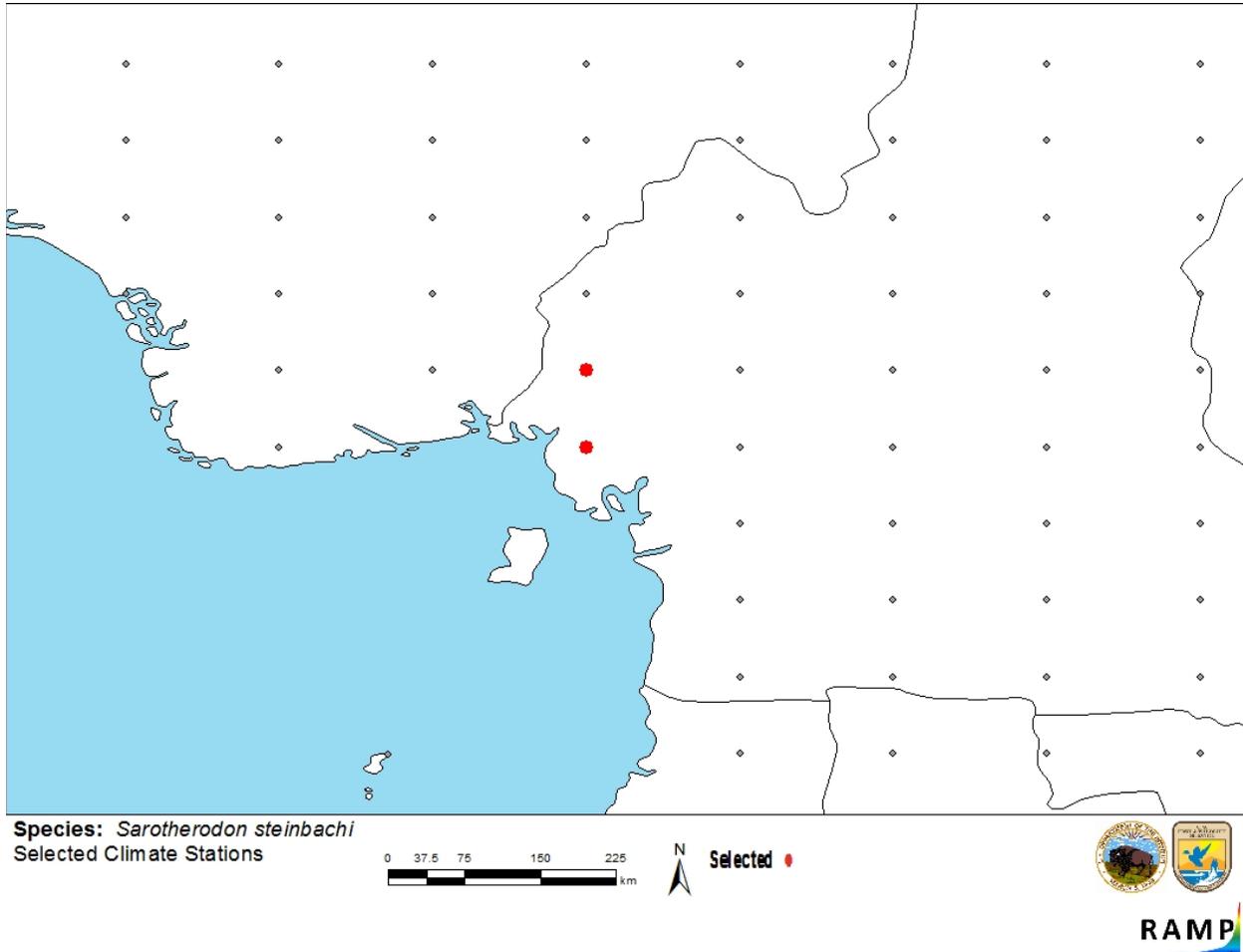
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No records of *Sarotherodon steinbachi* in the wild in the United States were found.

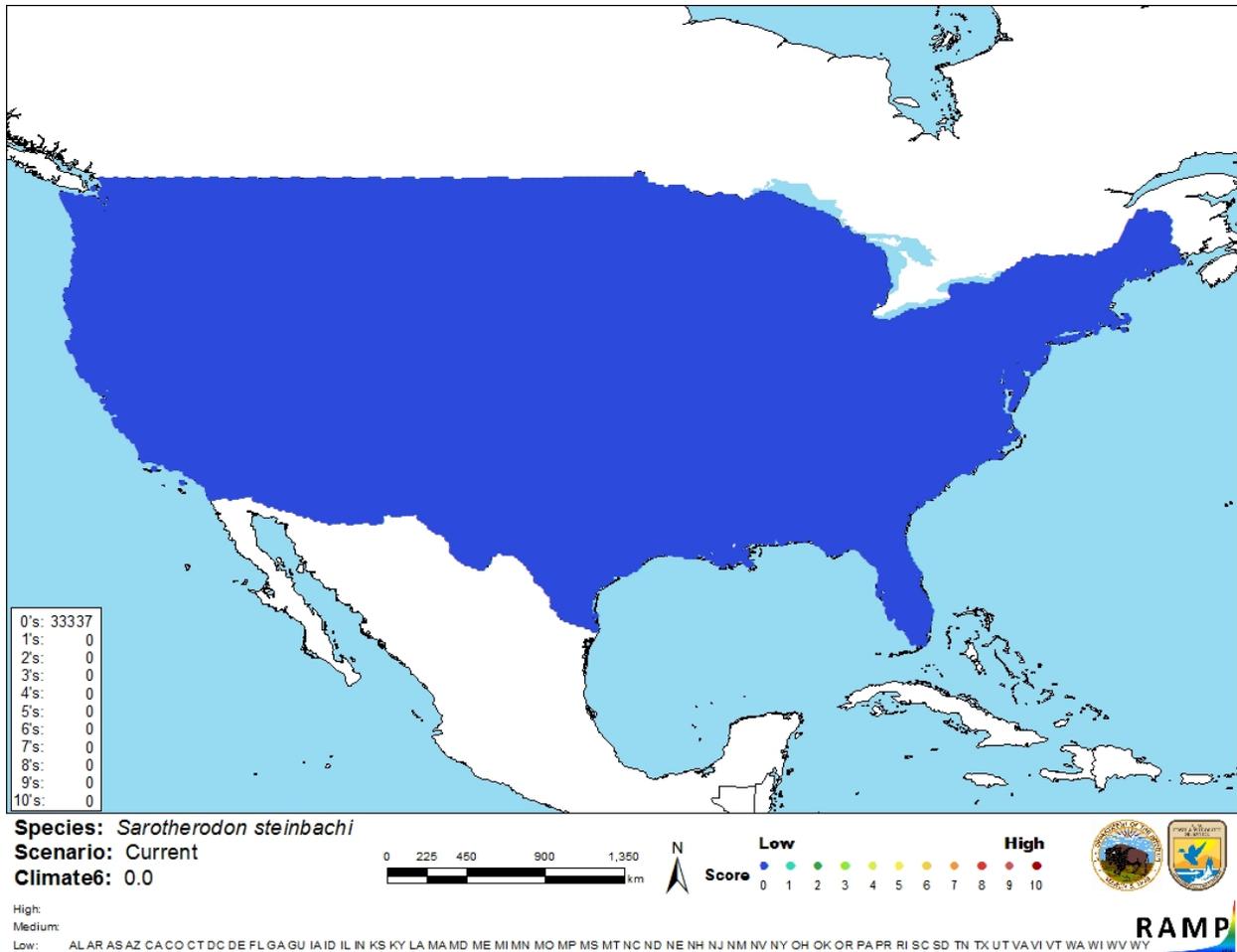
# 7 Climate Matching

## Summary of Climate Matching Analysis

The climate match for *Sarotherodon steinbachi* was low across the entire contiguous United States. There were no areas of medium or high match. 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 had low individual climate scores.



**Figure 2.** RAMP (Sanders et al. 2018) source map showing weather stations in West Cameroon selected as source locations (red) and non-source locations (gray) for *Sarotherodon steinbachi* 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 *Sarotherodon steinbachi* in the contiguous United States based on source locations reported from GBIF Secretariat (2018). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
$\geq 0.103$	High

## 8 Certainty of Assessment

The certainty of assessment is low. There was some general information about the species available from peer-reviewed sources. There were no records of introductions found, and, therefore, there is no information on impacts available to evaluate.

## 9 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Sarotherodon steinbachi* is a species of tilapia endemic to Lake Barombi Mbo in Cameroon. The history of invasiveness is uncertain. There were no records of introductions to the wild found and, therefore, no information on impacts of introduction. The climate match was low for the entire contiguous United States. The certainty of assessment is low. The overall risk assessment is uncertain.

### Assessment Elements

- **History of Invasiveness (Sec. 3): No Known Nonnative Populations**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** This species is regulated in multiple States.
- **Overall Risk Assessment Category: Uncertain**

## 10 Literature Cited

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**Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.**

Fricke R, Eschmeyer WN, van der Laan R, editors. 2018. Catalog of fishes: genera, species, references. California Academy of Science. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp> (September 2018).

[FFWCC] Florida Fish and Wildlife Conservation Commission. 2018. Prohibited species list. Tallahassee, Florida: Florida Fish and Wildlife Conservation Commission. Available: <http://myfwc.com/wildlifehabitats/nonnatives/regulations/prohibited/> (September 2018).

Froese R, Pauly D, editors. 2018. *Sarotherodon steinbachi* (Trewavas, 1962). FishBase. Available <https://www.fishbase.de/summary/Sarotherodon-steinbachi.html> (September 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Sarotherodon steinbachi* (Trewavas, 1962). Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/2372894> (September 2018).

[ITIS] Integrated Taxonomic Information System. 2018. *Sarotherodon steinbachi* (Trewavas, 1962). Reston, Virginia: Integrated Taxonomic Information System. Available: [https://www.itis.gov/servlet/SingleRpt/SingleRpt?search\\_topic=TSN&search\\_value=648902#null](https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=648902#null) (September 2018).

- Louisiana State Legislature. 2019. Exotic fish; importation, sale, and possession of certain exotic species prohibited; permit required; penalty. Louisiana Revised Statutes, Title 56, Section 319.
- New Mexico Department of Game and Fish. 2010. Director's species importation list. Santa Fe, New Mexico: New Mexico Department of Game and Fish. Available: [http://www.wildlife.state.nm.us/download/enforcement/importation/information/Directors-Species-Importation-List-08\\_03\\_2010.pdf](http://www.wildlife.state.nm.us/download/enforcement/importation/information/Directors-Species-Importation-List-08_03_2010.pdf) (November 2020).
- [OIE] World Organisation for Animal Health. 2021. OIE-listed diseases, infections and infestations in force in 2021. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2021/> (February 2021).
- Oklahoma Secretary of State. 2019. List of restricted exotic species. Oklahoma Administrative Code, Title 800, Chapter 20-1-2.
- Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.
- State of Nevada. 2018. Restrictions on importation, transportation and possession of certain species. Nevada Administrative Code, Chapter 503, Section 110.
- Texas Parks and Wildlife. 2020. Invasive, prohibited and exotic species. Austin, Texas: Texas Parks and Wildlife. Available: [https://tpwd.texas.gov/huntwild/wild/species/exotic/prohibited\\_aquatic.phtml](https://tpwd.texas.gov/huntwild/wild/species/exotic/prohibited_aquatic.phtml) (November 2020).
- Utah Office of Administrative Rules. 2019. Classification and specific rules for fish. Utah Administrative Code, Rule R657-3-23.
- Virginia Department of Game and Inland Fisheries. 2020. Nongame fish, reptile, amphibian and aquatic invertebrate regulations. Henrico, Virginia: Virginia Department of Game and Inland Fisheries. Available: <https://www.dgif.virginia.gov/fishing/regulations/nongame/> (November 2020).
- Washington State Senate. 2019. Invasive/nonnative species. Washington Administrative Code, Chapter 220-640.

## 11 Literature Cited in Quoted Material

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**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 HA, Riehl R. 1997. Aquarien atlas, Band 5. Melle, Germany: Mergus Verlag.

Lamboj A. 2004. The cichlid fishes of Western Africa. Bornheim, Germany: Birgit Schmettkamp Verlag.

Stiassny MLJ, Lamboj A, De Weirtd D, Teugels GG. 2008. Cichlidae. Pages 269–403 in Stiassny MLJ, Teugels GG, Hopkins CD, editors. The fresh and brackish water fishes of Lower Guinea, West-Central Africa volume 2. IRD Editions.

Trewavas E. 1962. Fishes of the crater lakes of the northwestern Cameroons. Bonner Zoologische Beiträge 13:146–192.

Trewavas E. 1983. Tilapiine fishes of the genera *Sarotherodon*, *Oreochromis* and *Danakilia*. London: British Museum of Natural History.