

Gourami (*Osphronemus goramy*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, March 2019
Web Version, 5/1/2020

Organism Type: Fish

Overall Risk Assessment Category: Uncertain



Photo: George Chernilevsky. Image available through public domain. Available: https://commons.wikimedia.org/wiki/File:Osphronemus_goramy_2008_G1.jpg. (March 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2020):

“Asia: probably limited to Sumatra, Borneo, Java, the Malay Peninsula, Thailand and Indochina (Mekong basin).”

“[In Cambodia:] Known from Mae Khong, Sekong at Stung Treng and Srepok [Kottelat 1985]. Found in the lower Mekong basin, but occurrence is doubtful [Roberts 1994].”

“Known from the Mekong basin [in China].”

“Known from Java, Borneo and Sumatra [Indonesia] [Kottelat 1985]. Found in the Kapuas basin, Kalimantan Barat, Borneo [Roberts 1992; Kottelat and Widjanarti 2005]. Recorded from Danau Sentarum National Park in the Kapuas basin, Kalimantan Barat [Kottelat and Widjanarti 2005].”

“[In Laos:] Known from the Mekong basin around Pak Beng to the Khone Falls [Hill and Hill 1994]. Found in Ban Hang Khone at Don Khone, about 3 km below the fall line of the great waterfalls of the Mekong River at Lee Pee [Roberts 1993].”

“Found in Mekong, Chao Phraya, Maeklong and Peninsular Thailand river systems [Vidthayanon et al. 1997]. [...]; also from Phatthalung, Hang-kaben (Phra Nakhon Si Ayutthaya), Tapi river (Surat Thani), Kanchanaburi, Mekong river and Songkhla [Monkolprasit et al. 1997].”

Status in the United States

From Nico and Neilson (2019):

“Reported from California, Florida, Hawaii, and Washington. Although a few of the fish introduced to Hawaii survived for an extended period, they did not reproduce (Brock 1960).”

“Brock (1960) stated that there may have been introductions into Hawaii prior to 1950 which, similar to the one reported, were unsuccessful.”

According to Nico and Nielson (2019), the status of *O. goramy* is failed in Washington, Hawaii, and California. There is a single report of the species as collected in Florida in 1999. Since there have been no further reports the species cannot be considered to be established in Florida.

Osphronemus goramy is in trade within the United States (Aqua-Imports 2020).

Means of Introductions in the United States

From Nico and Nielson (2019):

“According to Brock (1960), the giant gourami introduced to Hawaii came from the Philippines. The reason for the introduction was not given, although it was presumably stocked as a food fish. The other introductions were possible aquarium releases as this species soon outgrows containers.”

“During the late 1800s there were plans to introduce this species into California waters, apparently because of its potential as a food fish, but live specimens were never obtained (Dill and Cordone 1997).”

Remarks

There may be some discrepancy in the described native range of *Osphronemus goramy*, possibly due to misidentification with *O. exodon*. In some accounts *O. goramy* is considered native to the Mekong basin, in others it is considered an introduced species.

From Froese and Pauly (2020):

“Specimens of this species previously reported from Ban Hang Khone [island south of Laos] [Roberts 1993] have been reidentified as *O. exodon* [Roberts and Baird 1995]. This fish probably does not occur naturally in the Mekong basin [Roberts and Baird 1995].”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Osphronemus goramy* Lacepède 1801 is the current and valid name of this species.

From ITIS (2019):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Family Osphronemidae
Subfamily Osphronemidae
Genus *Osphronemus*
Species *Osphronemus goramy* Lacepède, 1801

Size, Weight, and Age Range

From Froese and Pauly (2020):

“Max length : 70.0 cm SL male/unsexed; [Rainboth 1996]; common length : 45.0 cm SL male/unsexed; [Rainboth 1996]”

From Nico and Neilson (2019):

“Size: 80 cm SL maximum, but averages 40 cm SL.”

From Amornsakun et al. (2014):

“Female giant gourami, *Osphronemus goramy*, was found to have a size at sexual maturity of 33.88±7.42 cm in TL and 968.75±68.78 g in average body weight.”

Environment

From Froese and Pauly (2020):

“Freshwater; brackish; benthopelagic; pH range: 6.5 - 8.0; dH range: ? - 25; depth range 10 - ? m [Frimodt 1995]. [...] 20°C - 30°C [Riehl and Baensch 1996; assumed to be recommended aquarium temperature] [...]”

Climate/Range

From Froese and Pauly (2020):

“Tropical; [...] 6°N - 9°S”

Distribution Outside the United States

Native

From Froese and Pauly (2020):

“Asia: probably limited to Sumatra, Borneo, Java, the Malay Peninsula, Thailand and Indochina (Mekong basin).”

“[In Cambodia:] Known from Mae Khong, Sekong at Stung Treng and Srepok [Kottelat 1985]. Found in the lower Mekong basin, but occurrence is doubtful [Roberts 1994].”

“Known from the Mekong basin [in China].”

“Known from Java, Borneo and Sumatra [Indonesia] [Kottelat 1985]. Found in the Kapuas basin, Kalimantan Barat, Borneo [Roberts 1992; Kottelat and Widjanarti 2005]. Recorded from Danau Sentarum National Park in the Kapuas basin, Kalimantan Barat [Kottelat and Widjanarti 2005].”

“[In Laos:] Known from the Mekong basin around Pak Beng to the Khone Falls [Hill and Hill 1994]. Found in Ban Hang Khone at Don Khone, about 3 km below the fall line of the great waterfalls of the Mekong River at Lee Pee [Roberts 1993].”

“Found in Mekong, Chao Phraya, Maeklong and Peninsular Thailand river systems [Vidthayanon et al. 1997]. [...]; also from Phatthalung, Hang-kaben (Phra Nakhon Si Ayutthaya), Tapi river (Surat Thani), Kanchanaburi, Mekong river and Songkhla [Monkolprasit et al. 1997].”

Introduced

According to Froese and Pauly (2020), *Osphronemus goramy* has been introduced and established in India, Colombia, New Caledonia, Mauritius, Madagascar, Sri Lanka, Philippines,

Singapore, Myanmar, and Papua New Guinea. *O. goramy* has been introduced but is not established in Australia, Italy, New Zealand, Seychelles, Indonesia (Irian Jaya), Côte d'Ivoire, Uganda, and Cambodia; and it has been introduced and has an unknown population status in Algeria, France, Japan, and China.

From Froese and Pauly (2020):

“Apparently absent in Sarawak [Malaysia] and presence in Sabah [Malaysia] may be due to relatively late introductions.”

“Presence of fisheries in Pangalanes [Madagascar]. Also recorded from the lower Mangoro river [Reinthal and Stiassny 1997].”

“Individuals introduced [to Cambodia] from VietNam in 2000, have not established [Nouv et al. 2005]. [*O. goramy* is native in much of Cambodia.]”

“Widely introduced and cultured from Sri Lanka to China [outside the Mekong basin] [Roberts 1992].”

“[In India:] Found in Maharashtra [Archarya and Iftekhar 2000], the Chalakudy river, part of the Western Ghats, Kerala [Raghavan et al. 2008], ponds and lakes of Nilgiris and Chalakkudy river system [Radhakrishnan et al. 2012].”

“Introduced [to India] in the early 19th century [Lever 1996]. Reintroduced after 1865 [Lever 1996] and 1916 [Welcomme 1988]. [...] Established in Tamil Nadu (Vooren, 1968).”

“Reported in Laguna de Bay [Palma et al. 2005], Lake Mainit [Philippines] [Mercene 1997].”

“Most common in the coastal wet zone swamps [of Sri Lanka]. Popular in the wild and wells of Migahatenne area (Bentota basin). Large fish can be seen in the ponds at the Polonnaruwa and Kitulgala rest houses.”

“Introduced [in Papua New Guinea] to a number of districts, but most of these introductions were unsuccessful [Allen 1991]. A total of 37 adult fish were released into a small ox-bow lake (approx. 10 ha) in the upper Ramu floodplain area. No monitoring of the release was conducted as the area is inaccessible [Coates 1997].”

Means of Introduction Outside the United States

From Vidthayanon (2012):

“The species has been widely introduced to several countries for aquaculture purposes.”

According to FAO (2019), the known means of introduction are accidental, ornamental and through aquaculture.

From Froese and Pauly (2020):

“The introduction [to Colombia] was due to accidental escape of ornamental fish.”

Short Description

From Froese and Pauly (2020):

“Dorsal spines (total): 12 - 14; Dorsal soft rays (total): 10-13; Anal spines: 9-13; Anal soft rays: 18 - 21; Vertebrae: 30 - 31. With 8-10 complete dark vertical bars in juvenile color phase; adults without vertical bars or sexual dichromatism, both sexes drab; transverse scale rows usually 6.1.12; dorsal fin spines usually 12-13 (rarely 11 or 14); soft-rayed portion of anal fin greatly enlarged, its distal margin parallel to distal margin of caudal fin; caudal fin rounded or obtusely rounded, not truncate or emarginate [Roberts 1992]. Pelvic fins with first soft ray prolonged into a thread-like tentacle reaching posteriorly to or beyond hind margin of caudal fin.”

Biology

From Froese and Pauly (2020):

“Inhabits swamps, lakes and rivers [Frimodt 1995], among vegetation [Kottelat and Widjanarti 2005]. Enters flooded forest [Roberts 1993]. Found in medium to large rivers and stagnant water bodies including sluggish flowing canals [Taki 1978]. Omnivorous. Feeds on both plants and animals such as some aquatic weeds, fish, frogs, earthworms and sometimes dead animals [Ukkatawewat 1984]. Can breathe moist air, so can be kept alive for long periods out of water, making it possible to distribute it in areas lacking a cold chain [Frimodt 1995]. Was reported from miocene deposits in Central Sumatra [Sanders 1934].”

“Makes nests of bubbles in which the eggs and larvae float, protected by the male [Frimodt 1995].”

From Vidthayanon (2012):

“Inhabits lowland rivers, marshlands to submontane streams. Well adaptive [sic] to impounded waters.”

From Amornsakun et al. (2014):

“The fecundity was 5,508 ova/fish and gonadosomatic index (GSI) was 2.32%. It [*O. goramy*] is one kind of freshwater fish that has low fecundity [...].”

“The giant gourami showed hatching out in 26 hr 18 min at 28-30°C,[...]”

From Aryani et al. (2017):

“Giant gourami is a species with a low growth rate, however, this species is resistant to poor water quality [...].”

“Giant gourami are facultative air breathers, meaning it can tolerance [sic] low DO.”

Human Uses

From Froese and Pauly (2020):

“Fisheries: commercial; aquaculture: commercial; aquarium: commercial”

“Utilized fresh and eaten steamed, pan-fried and baked [Frimodt 1995].”

“Recorded as having been or being farmed in rice fields [in Malaysia] [Halwart and Gupta 2004].”

“Its flesh has good flavour. Is one of the species cultured by the Fisheries Department [in Thailand] [Ukkatawewat 1984]; [...]”

“Culture of this species [in India] was unsuccessful because of its slow growth. Due to its nest building habit, the rate of survival of its progeny is high. Known to control aquatic weeds to some extent.”

“Although for a time they were also successfully reared in aquaculture [in the Philippines] they were eventually supplanted by other more popular and faster growing species [Lever 1996].”

“Contribute to food security and income for the rural people [in Myanmar].”

From Nico and Neilson (2019):

“This is a famous food fish in Southeast Asia and important in freshwater aquaculture in tropical Asia (Roberts 1989, 1992).”

Diseases

No records of OIE-reportable diseases (OIE 2020) were found for *Osphronemus goramy*.

From Kitao et al. (1989):

“Accordingly, the isolates from the diseased giant gourami were classified as a new species of *Nocardia*.”

According to Froese and Pauly (2020), *O. goramy* can have anchor worm disease and parasitic infestations.

Threat to Humans

From Froese and Pauly (2020):

“Harmless”

3 Impacts of Introductions

No information on documented impacts of introduction was found. Below is the only information found indicating a concern about a *potential* impact of introduction.

From Raghavan et al. (2008):

“Although, *O. goramy* has not been considered as a pest in many of the areas where they were introduced, we believe that its co-occurrence with a popular native ornamental species, *Pseudosphromenus cupanus* (Cuvier 1831) would lead to competition for habitat and food.”

Froese and Pauly (2020) also indicate that some ecological effects could be present in India due to the introduced population of *O. goramy*.

4 History of Invasiveness

Osphronemus goramy has been introduced widely outside of its native range. There are established, non-native populations in ten countries in southern Asia, Africa, and South America. It has been introduced into an additional 12 countries in Asia, Africa, Oceania, and Europe; it either did not establish a population in those locations or the status is unknown. *O. goramy* was introduced in four different States within the United States with no evidence of an established population. No concrete evidence of impacts of introductions was found but information on potential impacts was available. Due to the lack of information regarding impacts of introduction the history of invasiveness is Data Deficient.

5 Global Distribution



Figure 1. Known global distribution of *Osphronemus goramy*. Locations are in India, the United States (California), Colombia, Seychelles, Madagascar, Mauritius, Reunion, Thailand, Laos, Cambodia, Malaysia, Indonesia, Philippines, and Taiwan. Map from GBIF Secretariat (2019). Observations in California, the Seychelles, Reunion, and Taiwan were not used to select source points for the climate match because no established populations have been documented in those locations.

Osphronemus goramy has also been reported as established in New Caledonia, Sri Lanka, Myanmar, and Papua New Guinea but no georeferenced observations were available to use to select source points for the climate match.

6 Distribution Within the United States

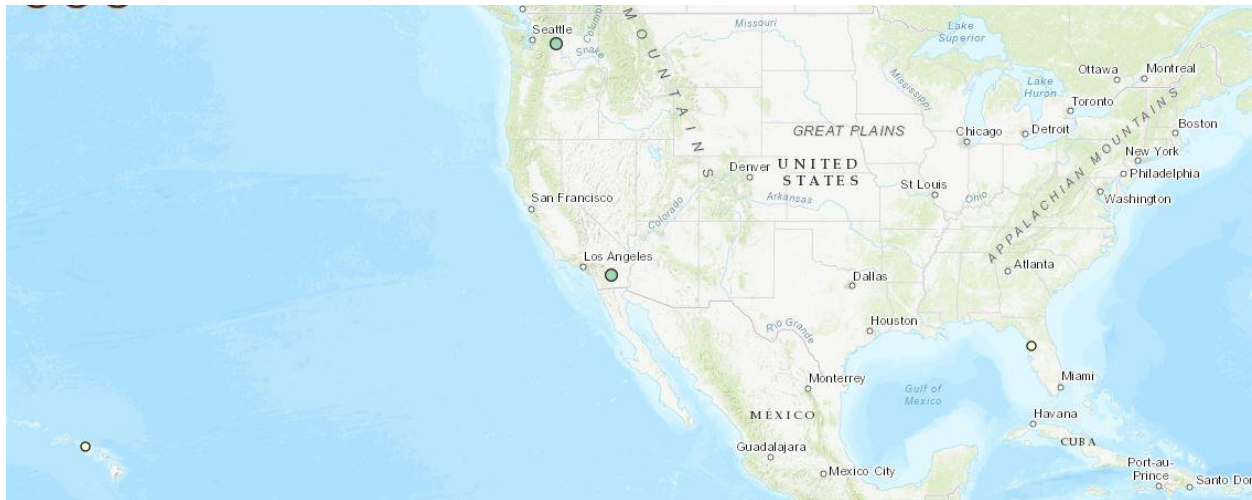


Figure 2. Reported locations of *Osphronemus goramy* in the United States. Locations are in southern California, Hawaii, Florida, and Washington. Map from Nico and Neilson (2019). These locations were not used to select source points for the climate match as they do not represent established populations.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for the contiguous United States was generally very low. The southern tip of Florida had a high match while the rest of peninsular Florida and southern Texas had medium matches. There were also areas of medium match along the Gulf Coast. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for contiguous United States was 0.004, low (scores between 0.000 and 0.005, inclusive, are classified as low). All States had low individual climate scores except Florida, which had a high score, and Texas, which had a medium score.

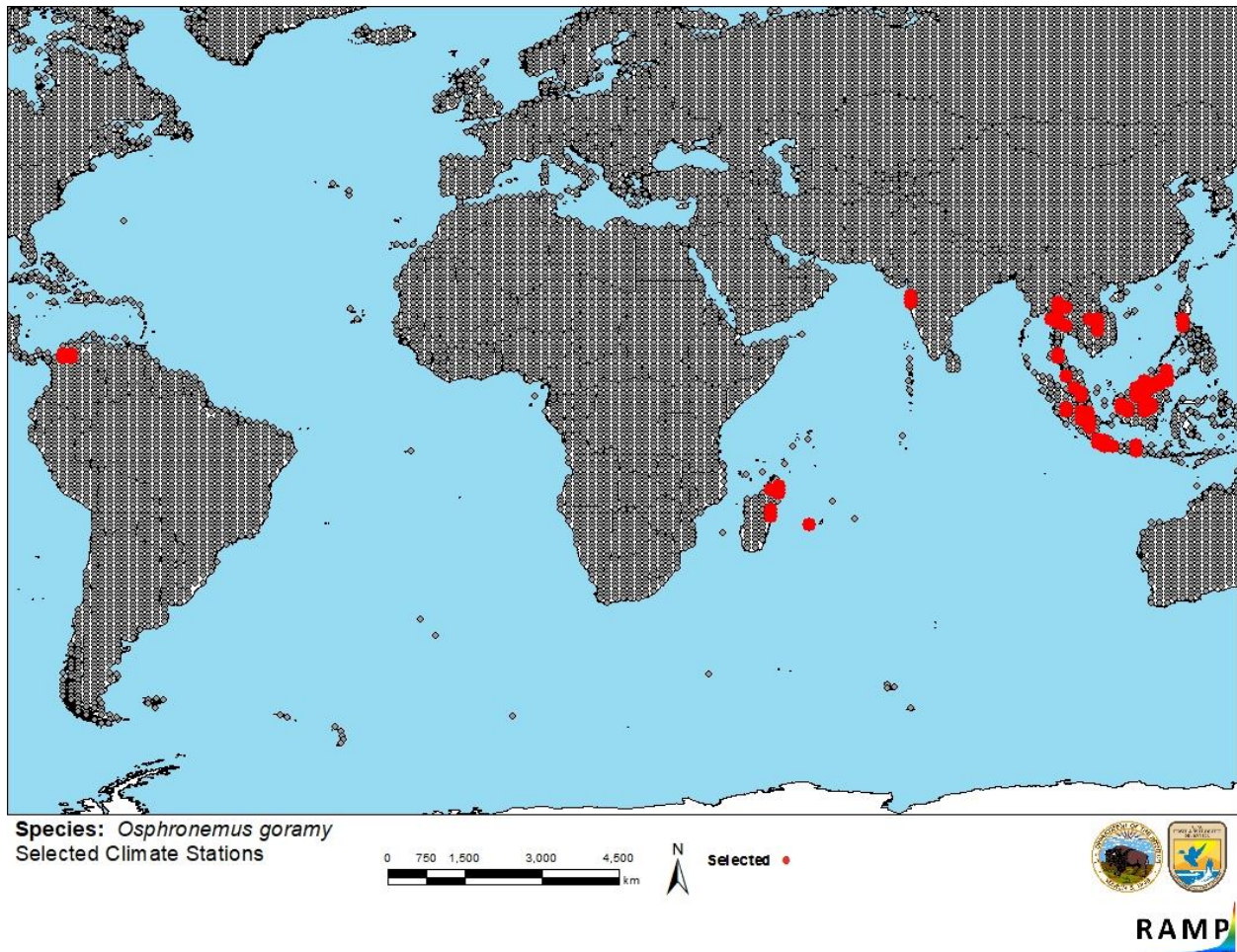


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations South America, Madagascar, and southern Asia selected as source locations (red; Indonesia, Philippines, Myanmar, Malaysia, Thailand, Cambodia, Vietnam, India, Colombia, Seychelles, Madagascar, and Reunion) and non-source locations (gray) for *Osphronemus goramy* climate matching. Source locations from GBIF Secretariat (2019). Source locations were selected to be within 100km of known observations of the species and do not represent actual observation locations.

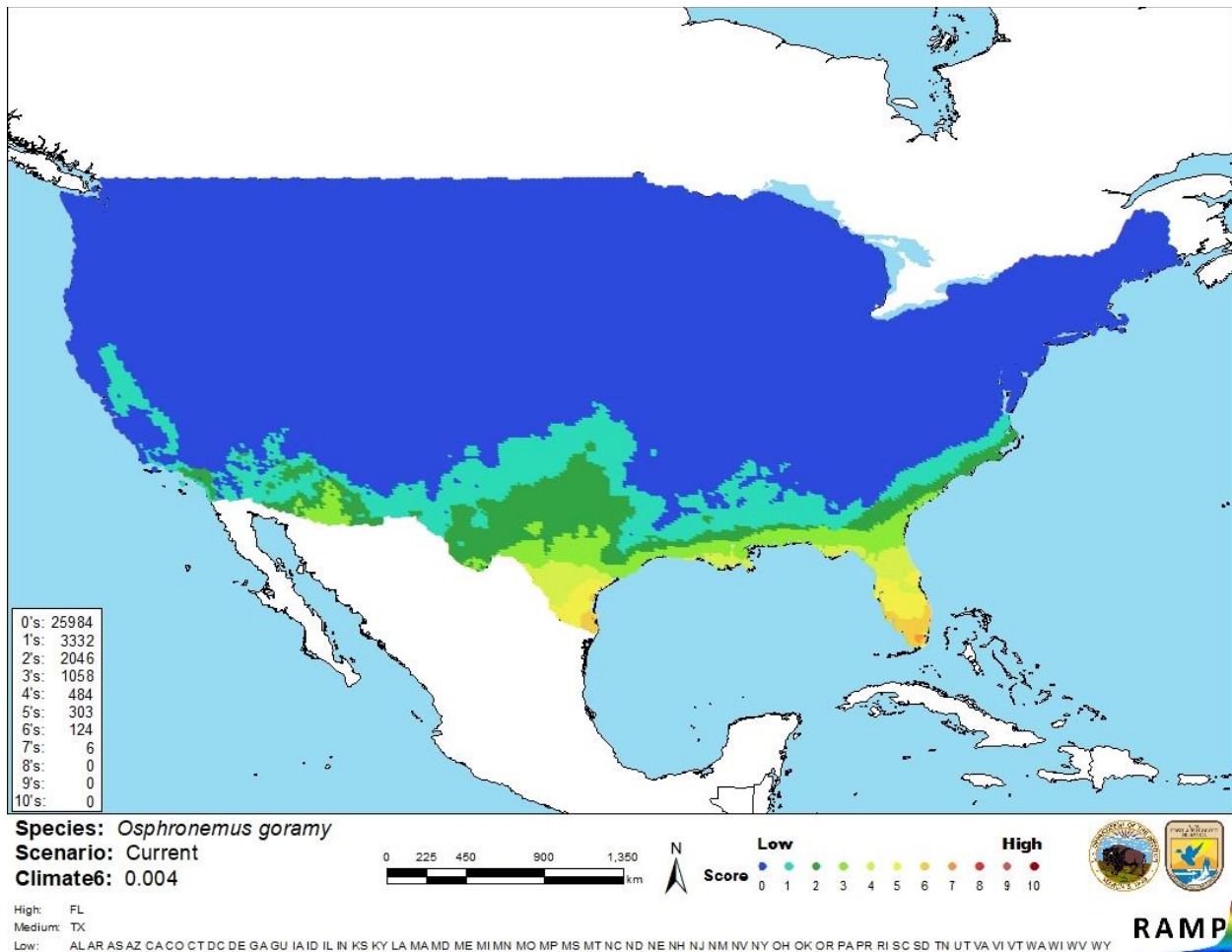


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Osphronemus goramy* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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

8 Certainty of Assessment

Certainty of assessment is low for *Osphronemus goramy*. Basic information is available for this species. While there has been established populations outside of their native range, no information has been documented about the impacts of their introduction.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Gourami (*Osphronemus goramy*) is a tropical freshwater fish native to Southeast Asia. There is some discrepancy about whether *O. goramy* is native to the Mekong Basin; some reports in this area may be due to misidentification of *O. exodon*. *O. goramy* are facultative air breathers which allows them to live in poor quality waterways. This species is common in aquaculture and commercial fisheries due its popularity as a food fish. The history of invasiveness for *O. goramy* is Data Deficient. *O. goramy* has been introduced and became established in India, Colombia, New Caledonia, Mauritius, Madagascar, Sri Lanka, Philippines, Singapore, Myanmar, and Papua New Guinea. The introductions were mostly caused by aquaculture and aquarium releases. *O. goramy* has also been introduced in four U.S. States but none of the introductions resulted in an established population. No detailed information on negative impacts of their introduction has been found, although some have suggested possible “ecological effects” or competition for habitat and food sources with native species. The overall climate match with the contiguous United States is low. Areas along the Gulf Coast had medium matches and a small portion of southern Florida had a high match. Certainty of assessment is low. The overall risk assessment category for *Osphronemus goramy* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **Overall Climate Match Category (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information: No additional remarks**
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

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

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11 Literature Cited in Quoted Material

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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