

Giant Mekong Catfish (*Pangasianodon gigas*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2012

Revised, April 2019

Web Version, 6/19/2020

Organism Type: Fish

Overall Risk Assessment Category: Uncertain



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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019a):

“Asia: endemic to the Mekong basin [...]”

From Hogan (2011):

“This is a Mekong endemic species (Rainboth 1996). Historically, it was distributed throughout the Mekong River basin from the coast of Viet Nam to northern Lao PDR. [...] it is believed that this fish migrates from the deep pools of the lower Mekong, upstream into northeast Cambodia and possibly up to Lao PDR or Thailand to spawn (Hogan et al. 2001). At least one spawning site is known (northern Thailand/Lao PDR), with a further possible spawning area in northeast Cambodia (Z. Hogan, pers. comm. 2003).”

From Mitamura (2007):

“Historically, this species was distributed throughout the basin from China to Vietnam, but it now appears to be limited to the Mekong River and its tributaries in Thailand, Lao People's Democratic Republic, and Cambodia.”

Status in the United States

There are no records of *Pangasianodon gigas* in the wild or trade in the United States.

Means of Introductions in the United States

There are no records of *Pangasianodon gigas* in the wild in the United States.

Remarks

From Froese and Pauly (2019a):

“International trade banned. [CITES I, since 1.7.1975; CMS Appendix I]”

“Threatened due to over harvesting and habitat loss [Stone 2007].”

From Hogan (2011):

“Alongside overfishing, main threats to the species include habitat loss and degradation, [...] and genetic introgression with cultured stocks.”

“The Thai Department of Fisheries began releasing captive-bred individuals in 1985. Between 2000 and 2003, approximately 10,000 captive-bred fish were released into the Mekong. Captive-bred individuals are no longer released into the Mekong, however they are released into reservoirs in Thailand. Large fish are now caught regularly in some Thai reservoirs but there is no evidence of self-sustaining populations.”

Hogan (2011; IUCN Red List) lists *Pangasianodon gigas* as Critically Endangered.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

“**Current status:** Valid as *Pangasianodon gigas* Chevey 1931.”

From Froese and Pauly (2019b):

“Biota > Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > [...] Actinopterygii (Class) > Siluriformes (Order) > Pangasiidae (Family) > *Pangasianodon* (Genus) > *Pangasianodon gigas* (Species)”

Size, Weight, and Age Range

From Froese and Pauly (2019a):

“Max length : 300 cm TL male/unsexed; [Baird et al. 1999]; 235.0 cm SL (female); max. published weight: 350.0 kg [Kottelat 2001]; max. reported age: 10 years [Hogan 2017].”

“Cited in the Guinness Book of Records as largest freshwater fish [Foot 2000].”

From Hogan (2011):

“The species is one of the world's largest freshwater fish, measuring up to three meters in length and weighing in excess of 300 kg (Smith 1945, Roberts and Vidthayanon 1991).”

“For wild individuals, generation length has been reported as less than ten years, however this is difficult to verify. The best estimate of generation length is between 10 and 15 years (Z. Hogan pers. comm. 2003), but this is a very uncertain estimate and further research on the life history of this species is needed to confirm this.”

From Sukumasavin (2006):

“There is no report on the age at first maturity in nature. The spawners that were caught in Chiang Khong in 1984- 1990 were estimated to be 6-12 years old with body weight of 150-250 kg (Pholprasith and Tavarutmaneegul 1997). Mature females are larger than the males. Captive spawners were 14-18 years old with a body weight of 40-60 kg.”

Environment

From Froese and Pauly (2019a):

“Freshwater; benthopelagic; potamodromous [Riede 2004].”

Climate

From Froese and Pauly (2019a):

“Tropical”

Distribution Outside the United States

Native

From Froese and Pauly (2019a):

“Asia: endemic to the Mekong basin [...]”

From Hogan (2011):

“This is a Mekong endemic species (Rainboth 1996). Historically, it was distributed throughout

the Mekong River basin from the coast of Viet Nam to northern Lao PDR. [...] it is believed that this fish migrates from the deep pools of the lower Mekong, upstream into northeast Cambodia and possibly up to Lao PDR or Thailand to spawn (Hogan et al. 2001). At least one spawning site is known (northern Thailand/Lao PDR), with a further possible spawning area in northeast Cambodia (Z. Hogan, pers. comm. 2003).”

From Mitamura (2007):

“Historically, this species was distributed throughout the basin from China to Vietnam, but it now appears to be limited to the Mekong River and its tributaries in Thailand, Lao People's Democratic Republic, and Cambodia.”

Introduced

From Hogan (2004):

“The species has also been introduced into reservoirs and rivers throughout Thailand, but these introductions have failed to result in established populations (Hogan et al. 2001).”

Means of Introduction Outside the United States

From Hogan (2004):

“The species has also been introduced into reservoirs and rivers throughout Thailand, but these introductions have failed to result in established populations (Hogan et al. 2001).”

Short Description

From Froese and Pauly (2019a):

“Dorsal spines (total): 2; Dorsal soft rays (total): 7-8; Anal soft rays: 35; Vertebrae: 48. Body without stripes; posterior nostril located near anterior nostril; 7 branched dorsal-fin rays; gill rakers rudimentary or absent; fins grey, never black [Rainboth 1996]. The center of the eye above the horizontal line through the mouth angle in juveniles; eye totally below the level of mouth angle in subadults and adults. The maxillary and mandibular pairs of barbels well developed in juveniles; mandibular barbels become rudimentary in subadults and adults [Fumihato 1989]. Gigantic size; oral teeth and gill rakers present in small juveniles, absent at about 30-50 cm SL; dorsal, pelvic and pectoral fins without filamentous extensions [Kottelat 2001]. Distinguished from other large catfish in the Mekong by its lack of teeth and the almost complete absence of barbels [Davidson 1975].”

Biology

From Froese and Pauly (2019a):

“A migratory species [Hill and Hill 1994] which occurs in medium to large-sized rivers [Taki 1978]. Feeds on detritus and algae on the bottom [Vidthayanon 2005]; feeds only on vegetation in the river but takes other food in captivity; little is known on its general pattern of life and

migratory journeys for spawning [Davidson 1975]. Shows one of the fastest growth rates of any fish in the world, reaching 150 to 200 kg in 6 years [Rainboth 1996].”

From Hogan (2004):

“In Cambodia, the Mekong giant catfish moves out of the flooded habitats of Tonle Sap Lake at the end of the rainy season (October–December). During the dry season, the species inhabits deep water areas of the Mekong River. *P. gigas* is migratory, but the extent of migrations is unknown.”

From Sukumasavin (2006):

“After the yolk sac has been absorbed, giant catfish hatchlings are fed zooplankton (*Moina* sp.) for two weeks. The fry are cannibalistic (Pholprasith 1983). When the fish are one year old, they become herbivorous (Pookaswan 1969). Adults feed on filamentous algae, but probably also ingest insect larvae and periphyton. The lack of dentition on the jaws and vomer area has led fishery biologists to believe that the fish feeds on algae growing on submerged rocky substrates (Pholprasith 1983).”

From Ikeya and Kume (2011):

“Currently, these fish are considered to be herbivorous, as adults in the wild are likely to feed mainly on the filamentous attached algae *Cladophora* spp. (Akagi et al., 1996). In the Mekong River, *Cladophora* spp. grows during the dry season (November to March in the next year). In contrast, during the wet season (April to October), the majority of *Cladophora* spp. in deep waters die and a few of them survive in shallow waters, because light cannot reach the bottom of the river due to turbidity (Prathumratana et al., 2008). It is predicted that this seasonal change in the abundance of *Cladophora* spp. affects the feeding rhythm of the catfish; that is, they prey on the filamentous attached macroalgae during the dry season and fast during the wet season.”

From Ching et al. (2015):

“In Mekong giant catfish *Pangasianodon gigas*, horizontal and vertical movements were much larger in scale during daytime than at night in Mae Peum Reservoir, Thailand (Mitamura et al. 2007, 2008).”

Human Uses

From Froese and Pauly (2019a):

“Fisheries: commercial; aquaculture: experimental”

From Hogan (2011):

“The species historically was consumed as a high value food fish, now the species is officially protected and intentional harvesting of the species is banned. Some captive bred individuals (second generation individuals have recently been bred in ponds) have been released to supply

some trade. Some wild individuals are still occasionally caught as bycatch. Captive bred stocks are frequently used in game fishing ponds in Thailand.”

“The Thai Department of Fisheries began releasing captive-bred individuals in 1985. Between 2000 and 2003, approximately 10,000 captive-bred fish were released into the Mekong. Captive-bred individuals are no longer released into the Mekong, however they are released into reservoirs in Thailand.”

From Ikeya and Kume (2011):

“In the Mekong River basin, *P. gigas* has been a popular food resource for the local people and is thus the most important species for fisheries in the area (Akagi et al., 1996; Hogan, 2004).”

From Mitamura (2008):

“Recently, fish of variable size (>100 kg, but immature) have been harvested in reservoirs by local fishers, and are traded in the market as valuable resources. [Mattson 2002]”

Diseases

No records of OIE-reportable diseases (OIE 2020) were found for *Pangasianodon gigas*.

Poelen et al. (2014) lists *Cladorchis* as a parasite of *Pangasianodon gigas*.

Purivirojkul and Areechon (2008) list *Alitropus typus*, *Proisorhynchoides chiangkongensis*, and *Proisorhynchoides siamensis* as parasites of *Pangasianodon gigas*.

From Purivirojkul and Sirikanjana (2006):

“Two species of parasites were found in the intestine of Mekong giant catfishes. Both were in genus *Proisorhynchoides* (Digenea: Bucephalidae). *Proisorhynchoides* sp.1 was found in all fish samples, while *Proisorhynchoides* sp.2 was found in two fishes caught in the year 2005.”

Threat to Humans

From Froese and Pauly (2019a):

“Harmless”

3 Impacts of Introductions

According to Hogan (2004) *Pangasianodon gigas* has been introduced into reservoirs and rivers in Thailand but has failed to establish. Therefore there is no information on impacts of introduction.

4 History of Invasiveness

Pangasianodon gigas has been introduced to reservoirs and rivers in Thailand outside of its native range in that country. None of those introductions resulted in an established population. No reports of impacts from those introductions were found. The history of invasiveness No Known Nonnative Population.

5 Global Distribution

No georeferenced observations were found for *Pangasianodon gigas*. IUCN Red List (Hogan 2011) contains a map of the generalized distribution of this species within the Mekong River basin in southeastern Asia. That range stretches from northern Laos south along the Thailand border into Cambodia and into southern Vietnam. Source points for the climate match were chosen to represent this range. A few locations of observations in northern Thailand were given in Mitamura (2007).

6 Distribution Within the United States

No records of *Pangasianodon gigas* in the wild in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

Most of the contiguous United States had a low climate match. The only areas of medium climate match were in the southern tip of Texas and southern peninsular Florida. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for 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. The source points for the climate match were selected to approximate the general range of the species as given in text and the map found in the IUCN Red List assessment for the species (Hogan 2011).

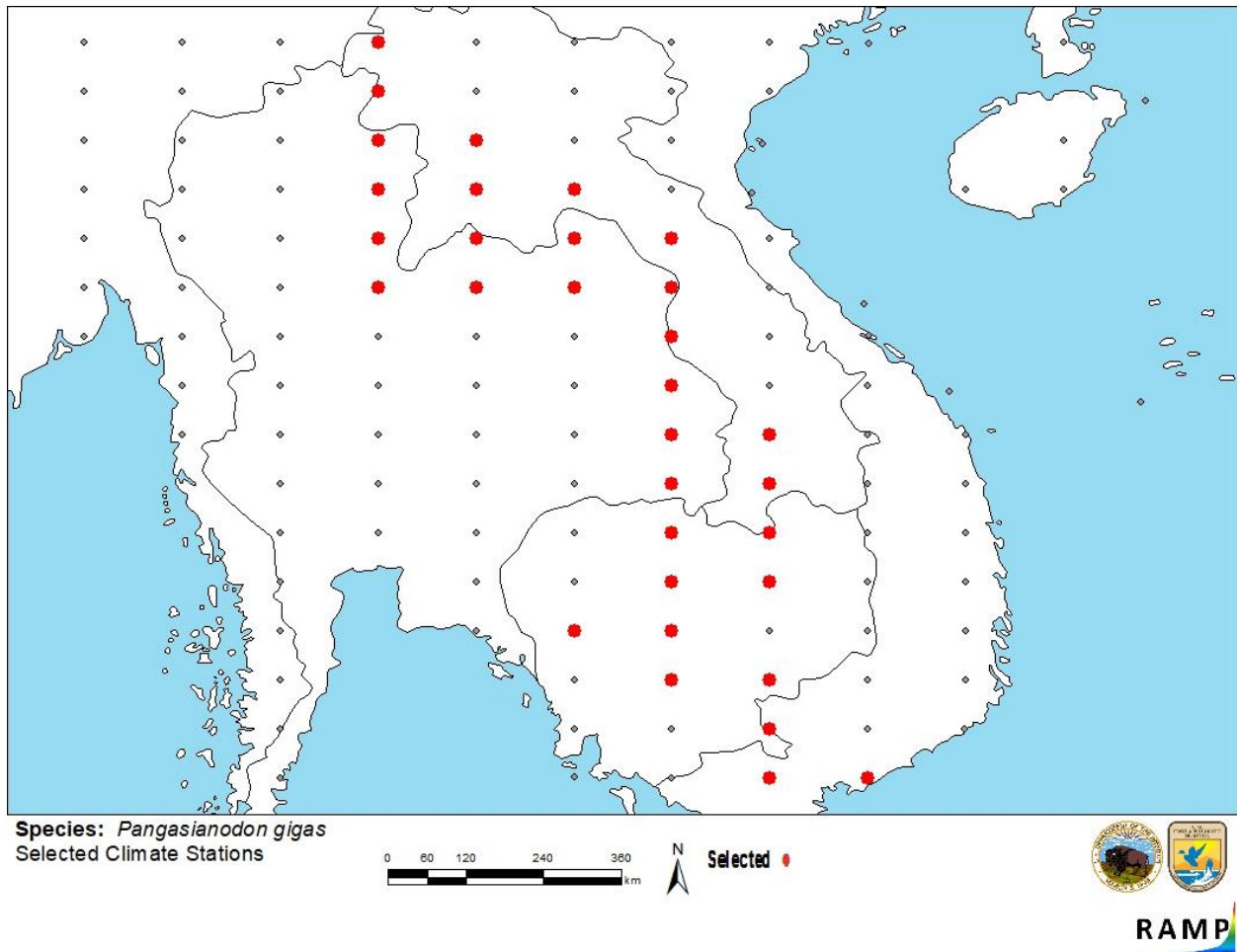


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in southeast Asia selected as source locations (red; Vietnam, Cambodia, Laos, Thailand) and non-source locations (gray) for *Pangasianodon gigas* climate matching. Locations are approximate based on information from Hogan (2011) and Mitamura (2007). Selected source locations represent the described range of *P. gigas*.

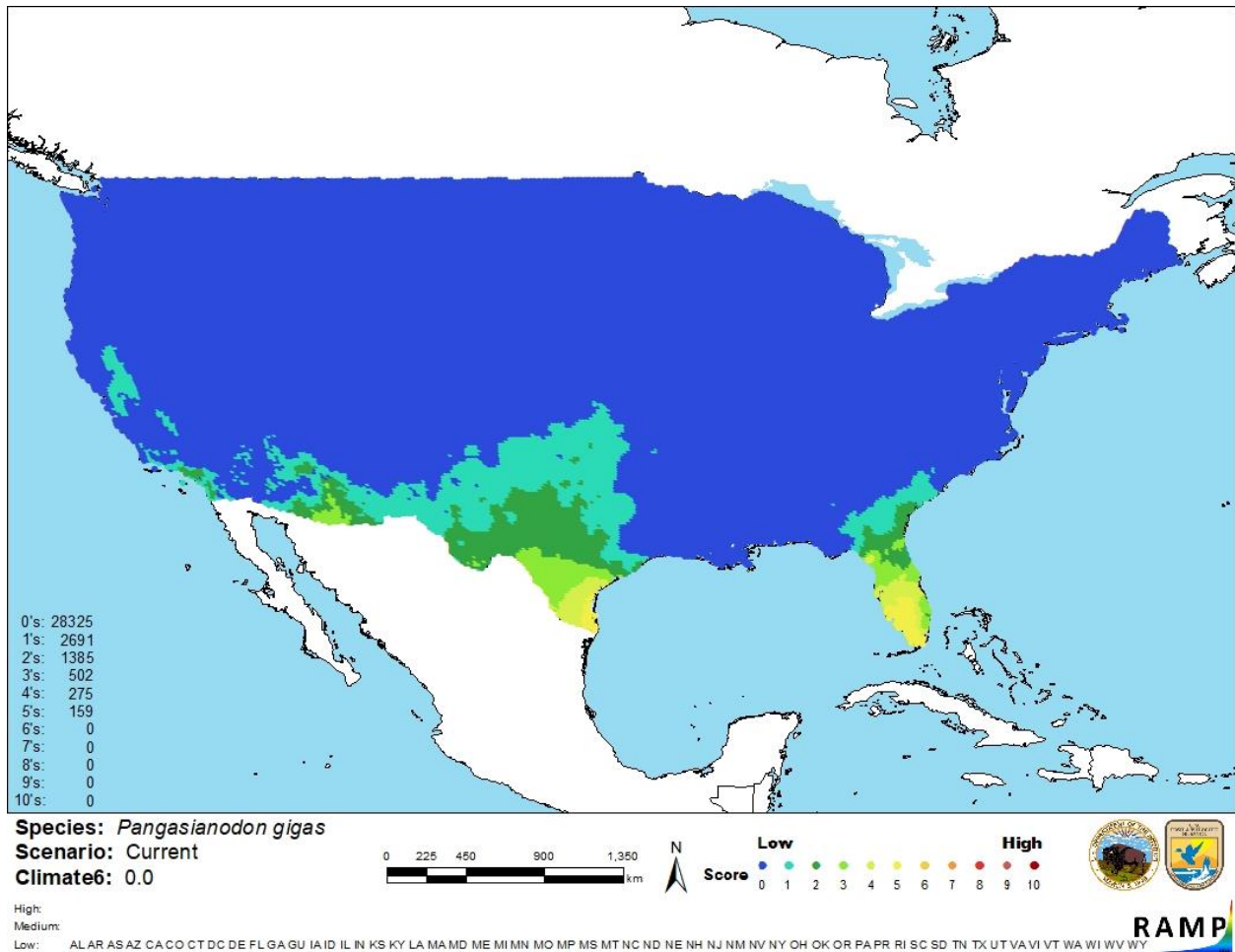


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Pangasianodon gigas* in the contiguous United States based on source locations reported by Hogan (2011) and Mitamura (2007). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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
≥ 0.103	High

8 Certainty of Assessment

The certainty of assessment is low. There is some quality information available about the biology of this species but more research is needed for other aspects of this assessment. There is some evidence of introductions into reservoirs in Thailand outside its native range, but those populations have not established. The climate match was based mostly on a verbal description of

the species' range and not georeferenced observations, which decreases the certainty of the results.

9 Risk Assessment

Summary of Risk to the Contiguous United States

The Mekong Giant Catfish (*Pangasianodon gigas*) is one of the world's largest freshwater fish. It is endemic to the Mekong River basin in southern Asia. The population of this species has been decreasing overtime and is now considered critically endangered. *Pangasianodon gigas* is now protected in their native range and has been banned from international trade by CITES Appendix I. Historically *P. gigas* was caught for human consumption and was considered one of the most important fish in the areas. Some aquaculture programs have been started to continue to provide the food source. Stocking programs were previously in place to help supplement the wild population but now are mostly used to stock recreational fishing ponds. There is only one record of introduction outside of their native range in Thailand in which the population did not establish, so the history of invasiveness No Known Nonnative Population. The climate match for United States was low for most of the contiguous United States. However, there were areas of medium match in southern Texas and Florida. The climate match was based on a general description of the range of the species and not georeferenced observations. The certainty of assessment is low due to lack of information. The overall risk assessment category for *Pangasianodon gigas* is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information:** Considered critically endangered by the IUCN Red List.
- **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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