

Mud Carp (*Cirrhinus molitorella*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2011

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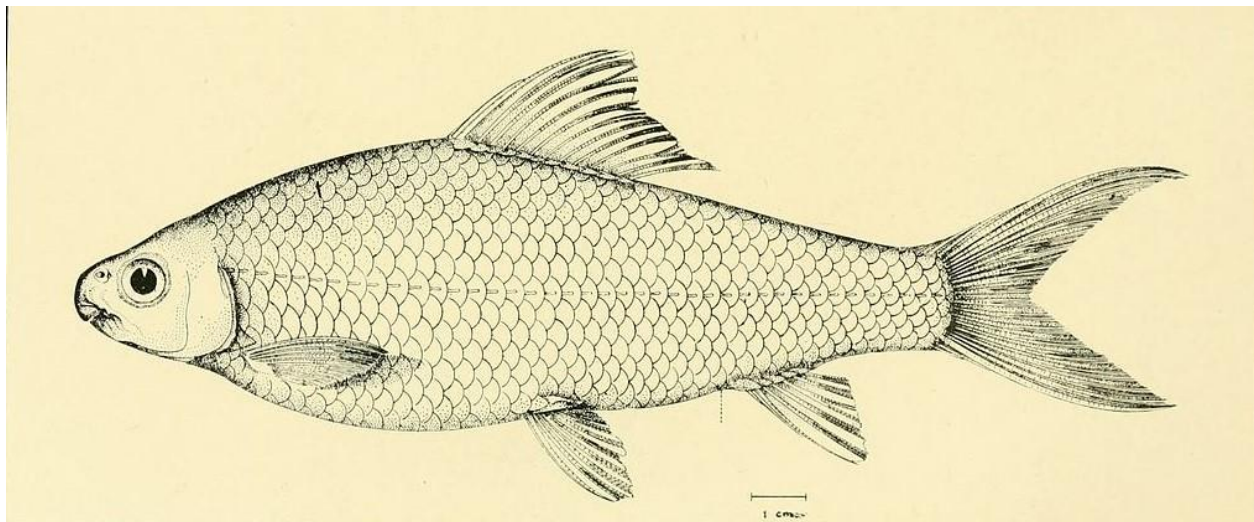


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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Asia: Mekong, Chao Phraya, Nam Theun, Xe Bangfai and the Nanpangjiang basins [Cambodia, China, Laos, Thailand, Vietnam]; also from the Red River (China and Viet Nam).”

Status in the United States

This species has not been reported in the United States. There is no indication this species is in trade in the United States.

Means of Introductions in the United States

This species has not been reported in the United States.

Remarks

Eschmeyer et al. (2018) report *Leuciscus chevanella*, *Cirrhina chinensis*, *Labeo collaris*, *Labeo garnieri*, *Labeo jordani*, *Cirrhinus melanostigma*, *Leuciscus molitorella*, and *Labeo pingi* as synonyms for *Cirrhinus molitorella*. Information searches included checks under all reported species synonyms for *C. molitorella*.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Cirrhinus*
Species *Cirrhinus molitorella* (Valenciennes in Cuvier and Valenciennes, 1844)”

“Taxonomic Status: valid”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 55.0 cm TL male/unsexed; [Singhanouvong et al. 1996] common length : 15.2 cm SL male/unsexed; [Nichols 1943]; max. published weight: 500.00 g [Hwang, Chen, and Yueh 1988]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; potamodromous [Roberts 1997]; depth range 5 - 20 m [Shao and Lim 1991].”

“[...] 22°C - 26°C [Baensch and Riehl 1991; assumed to represent recommended aquarium water temperatures]”

Climate/Range

From Froese and Pauly (2018):

“Tropical; [...] 24°N - 12°N, 98°E - 108°E”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Asia: Mekong, Chao Phraya, Nam Theun, Xe Bangfai and the Nanpangjiang basins [Cambodia, China, Laos, Thailand, Vietnam]; also from the Red River (China and Viet Nam).”

Introduced

Froese and Pauly (2018) list Singapore and Taiwan as places where *C. molitorella* is established in the wild. In Singapore, *C. molitorella* was “important [in] aquaculture after 1945, but rising land values have now rendered this activity uneconomic and it has declined considerably in recent years [Chou and Lam 1989].” Introductions in Taiwan predate the 18th century; in Taiwan, the species is “used collectively for commercial mono- or polyculture.”

Froese and Pauly (2018) also report that *C. molitorella* has been introduced but is not established in Thailand (where it is also native in some areas), Malaysia, Japan, Hong Kong, Indonesia, and Panama.

From FAO (2018):

“Mud carp have been introduced to several other countries, including Indonesia, Singapore, Japan, Taiwan Province of China and Hong Kong SAR. Almost all reported farmed production of mud carp occurs in the People's Republic of China.”

Means of Introduction Outside the United States

Introductions appear to have occurred for aquaculture purposes (Froese and Pauly 2018; FAO 2018).

Short Description

From Froese and Pauly (2018):

“Dorsal spines (total): 0; Dorsal soft rays (total): 11-15; Vertebrae: 34 - 38. Has 37-43 scales on the lateral line (including those on base of caudal-fin); 7-8+1/2 scale rows between lateral line and dorsal-fin origin [Kottelat 1998]. Differs from all other species of the genus in having more or less discrete marks on each scale on the upper, middle, and sometimes lower parts of the body. Such marks, visible in most freshly caught and recently preserved specimens, are sometimes intensely developed, giving the fish a markedly reticulated appearance. *C. molitorella* often has a very intense humeral mark which is vivid bluish-green in life. In other *Cirrhinus* the humeral

marks are black or bluish black [Roberts 1997]. Usually a conspicuous black bar shortly behind pectoral base [Kottelat 2001]. Gill rakers on the lower arm of first arch 65-85 [Rainboth 1996].”

Biology

From Froese and Pauly (2018):

“Known from midwater to bottom depths of large and medium-sized rivers. Move into flooded forests during the rainy season and grazes on algae, phytoplankton and detritus [Rainboth 1996]. Occur in rapids and slow deep reaches [Singhanouvong et al. 1996]. Reported to be omnivorous [Lim et al. 1999]. Wild stocks are strongly migratory while the cultivated stocks probably have lost the migratory behavior [Roberts 1997]. Prefer flowing water and not known to proliferate in impoundments. Large fish are marketed fresh, smaller ones are used to make prahoc [Kottelat 2001]. Attain at least 40 cm SL [Roberts 1997].”

Human Uses

From Froese and Pauly (2018):

“Fisheries: commercial; aquaculture: commercial”

From FAO (2018):

“Mud carp has a long history in aquaculture and is one of the most important species cultured in inland water bodies in southern China.”

Diseases

FAO (2018) lists bacterial septicaemia, saprolegniasis, myxobolosis, bothriocephalosis, and argulosis as diseases associated with *C. molitorella*.

No OIE-reportable diseases have been documented for *C. molitorella*.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

From FAO (2018):

“Mud carp is an omnivore, and a very suitable secondary species in polyculture in ponds and pens. In those cases it does not need special feeding and there is no negative impact on the environment or other fish. However, its intensive culture as a major species is more dependent on pelleted feed. Accumulation and discharge of various wastes to natural water bodies may cause adverse impacts. Poor management of fish health may result in the extensive use of various chemicals and drugs, which may affect the quality of the product and also cause pollution.”

4 Global Distribution



Figure 1. Known global distribution of *Cirrhinus molitorella*, reported from Southeast Asia (China, Taiwan, Vietnam, Laos, Thailand, Cambodia, Malaysia). Map from GBIF Secretariat (2017). A point in the United States was excluded from the extent of this map and from the climate matching analysis because it does not represent a verifiable introduction or established population; appears to be a misidentification. The point in Malaysia was excluded from the climate matching analysis because introduction of *C. molitorella* to Malaysia did not result in an established population.

5 Distribution Within the United States

This species has not been reported in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2018; 16 climate variables; Euclidean Distance) for *Cirrhinus molitorella* in the contiguous United States is medium overall, represented by a Climate 6 score of 0.014. The range of proportions classified as medium match is from 0.005 to 0.103, inclusive. Peninsula Florida had a high match, while the remainder of the coastal areas from southern Virginia through Texas had a medium match. Most of the remainder of the contiguous United States had a low match. Locally, Florida showed a high Climate 6 score, while Georgia and South Carolina showed medium scores. Isolated areas within the southeastern United States also demonstrated medium matches, although overall scores for these states remained low.

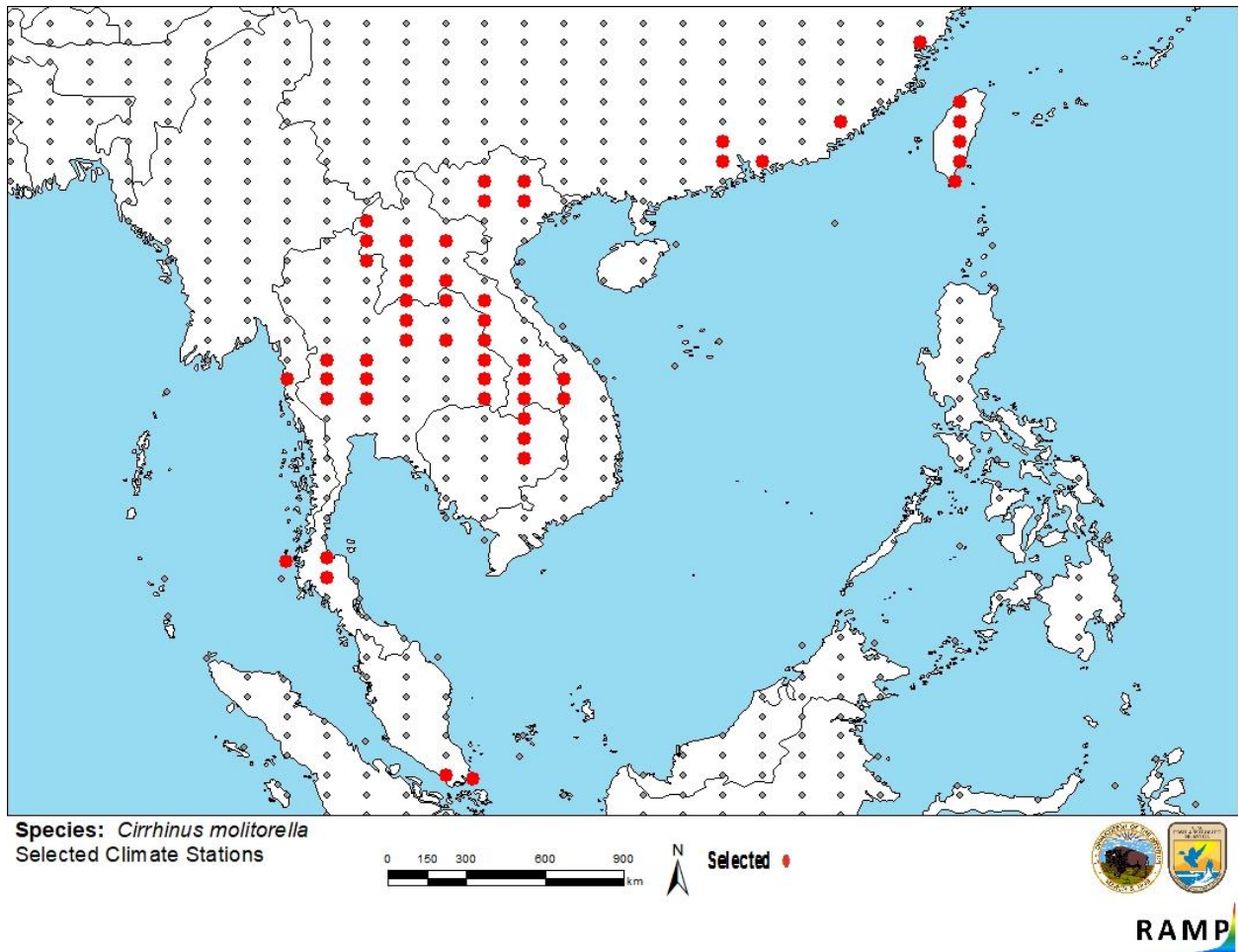


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; China, Taiwan, Vietnam, Cambodia, Laos, Thailand, Myanmar, Singapore) and non-source locations (gray) for *Cirrhinus molitorella* climate matching. Source locations from GBIF Secretariat (2017) and Froese and Pauly (2018). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

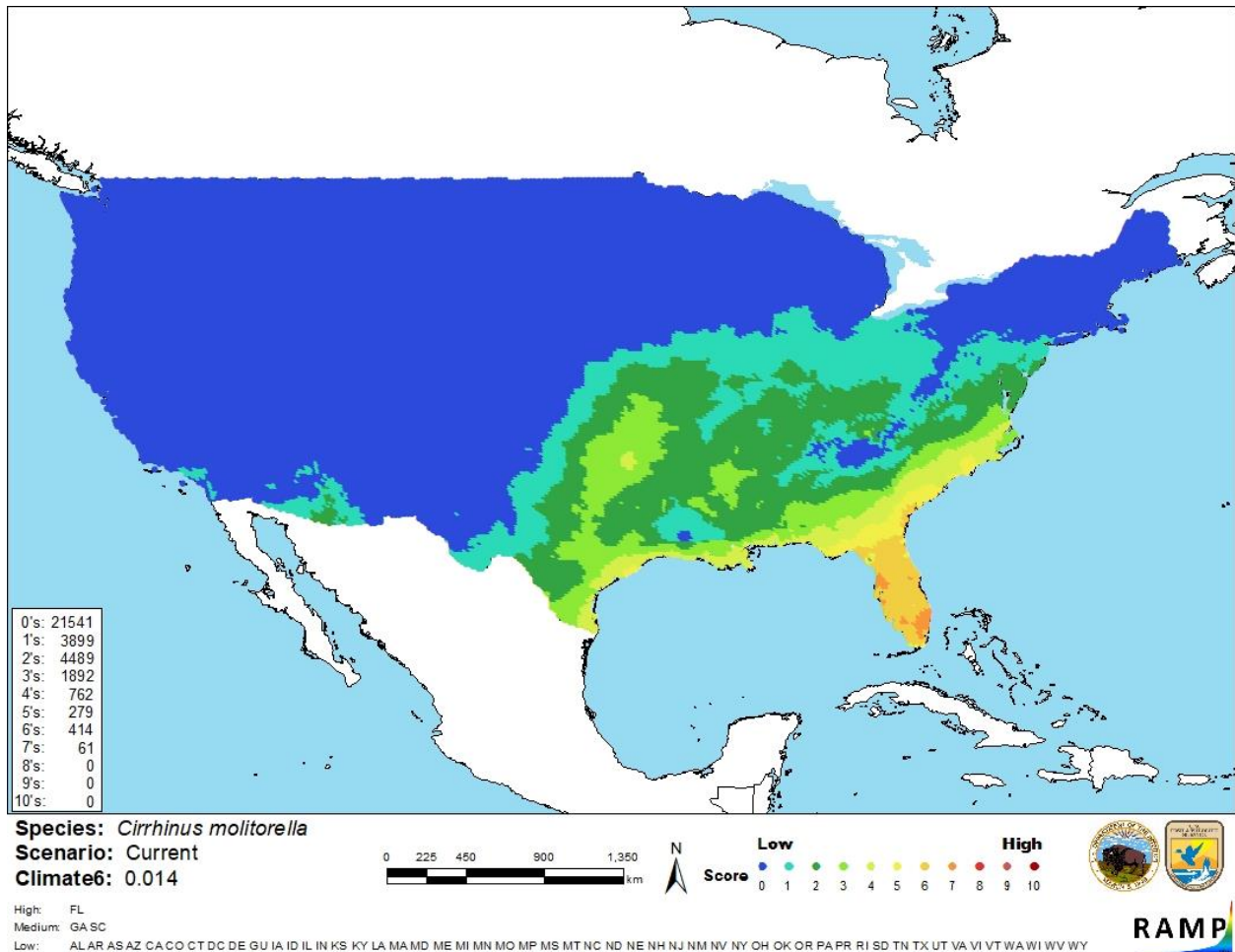


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Cirrhinus molitorella* in the contiguous United States based on source locations reported by GBIF Secretariat (2017) and Froese and Pauly (2018). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

A fair amount of research has been devoted to the study of *Cirrhinus molitorella*, although a large amount of this research pertains to its use in aquaculture. This species has become established in two locations outside its native range as a result of introductions for aquaculture, but no information is available on impacts of these introductions. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Cirrhinus molitorella, commonly known as mud carp, is a fish species native to China and southeastern Asia. Mud carp has an extensive history in aquaculture and is one of the most important species cultured for consumption in China. *C. molitorella* has been introduced for aquaculture in Indonesia, Singapore, Japan, Taiwan Province of China and Hong Kong SAR, but is only established in Taiwan and Singapore. A fair amount of information is available on *C. molitorella*, although some gaps of information essential to an assessment currently exists. There is no information available on impacts of introduction to natural settings, as opposed to aquaculture settings. Overall climate match within the contiguous United States is medium, with the highest matches occurring in Georgia, South Carolina, and Florida. Given the lack of information about impacts of introduction in natural settings, medium climate match within the contiguous United States, and low certainty of assessment, overall risk for *Cirrhinus molitorella* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **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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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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