Hong Kong Catfish (*Clarias fuscus*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, June 2017
Revised, September 2017
Web Version, 11/30/2017

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1 Native Range and Status in the United States

Native Range

From Cui and Zhao (2012):

"The species is known from southern China, Taiwan, Province of China, and northern Viet Nam (Kottelat 2001) and northeastern Lao PDR."

Status in the United States

From Nico (2017):

"**Nonindigenous Occurrences:** This species has been known from streams on the major islands of Hawaii since the late 1800s (Jordan and Evermann 1905; Brock 1960; Maciolek 1984; Devick 1991a, 1991b, Mundy 2005)."

"**Status:** Cobb (1902) indicated that that [*sic*] this catfish was fairly common in the vicinity of Honolulu; Brock (1960) stated that it was established in the waters of Kauai, Oahu, and Maui prior to the turn of the century. Based on recent information, the species is considered established on the major islands of Hawaii, including Hawaii, Kauai, Maui, Molakai, and Oahu; it is most common in stream habitats (Brock 1960; Maciolek 1984; Devick 1991a, 1991b)."

From Yamasaki (2003):

"Prior to 1900, Chinese immigrants introduced the Chinese catfish to Hawaii & Asia as a source of food (Maciolek, 1984 and Devick, 1991[b]). In the early 1980s, these fish had begun to be produced commercially. […] Chinese catfish was an alternative fish to those caught in Hawaiian waters and the industry for them grew tremendously, with the value of the crop in 1984 jumping from $15,000 to $372,600 only ten years later (Anonymous, 1996)."

Means of Introductions in the United States

From Nico (2017):

"This catfish is believed to have been introduced to Hawaii from Asia by Chinese immigrants, prior to 1900 (Cobb 1902; Jordan and Evermann 1902, 1905; Maciolek 1984). Jordan and Evermann (1905) stated that the species "was introduced from China a few years ago . . ." The fish was introduced apparently as a food source (Devick 1991b). Cobb (1902) and Jordan and Evermann (1905) stated that the catfish was commonly raised in the irrigation ditches and freshwater ponds in Hawaii and typically sold alive to the Chinese."

From Qin et al. (1998):

"USA Federal law (e.g., Lacey Act) specifically prohibits import of live clariid catfish into the USA or between States, thereby precluding import of these faster growing clariid species into Hawaii."

From FFWCC (2017):

"Prohibited nonnative species 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. Very limited exceptions may be made by permit from the Executive Director […]
[Species on the list include:] *Clarias fuscus*(Whitespotted clarias)"

Remarks

From Nico (2017):

"Cobb (1902) and Jordan and Evermann (1902) recorded the species found in Hawaii as *Macropternotus maqur*; Jordan and Evermann (1905) recognized it as *Clarias fuscus* (although in obvious error they use the name *Clarias magur* in one part of their report)."

"Synonyms and Other Names: Chinese catfish, Hong Kong catfish, puntat"

From ITIS (2017):

"Common Name(s): whitespotted clarias [English]
whitespotted freshwater catfish [English]"

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Clariidae
Genus *Clarias*
Species *Clarias fuscus* (Lacepède, 1803)"

"Taxonomic Status:
Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Max length : 24.5 cm SL male/unsexed; [Zheng and Pan 1990]; common length : 9.6 cm SL male/unsexed; [Nichols 1943]"

Environment

From Froese and Pauly (2017):

"Freshwater; demersal; depth range 3 - ? m."

"Adults occur in streams, ponds, ditches and reservoirs. […] Benthic."

Climate/Range

From Froese and Pauly (2017):

"Subtropical; 26°N - 17°N"

Distribution Outside the United States

Native

From Cui and Zhao (2012):

"The species is known from southern China, Taiwan, Province of China, and northern Viet Nam (Kottelat 2001) and northeastern Lao PDR."

Introduced

From Cui and Zhao (2012):

"The species has been introduced to […] Japan (Okinawajima and Ishigakijima Islands, Ryukyu Archipelago; Masuda et al. 1984), and the Philippines."

From Arai and Hirano (1974):

"Recently nine specimens of *Clarias fuscus* (Lacepède) were collected at Ishigaki Island (24°23'N, 124°09'E) in the southern Ryukyus. These specimens constitute the first record of the family Clariidae from Japan. […] It is unknown whether *Clarias* specimens from Ishigaki Island are natural or introduced […]"

From Santos et al. (2015):

"Six *Clarias* species have been reported in the country [of the Philippines]. Of these, only *C. batrachus*, *C. gariepinus*, and *C. macrocephalus* are commonly found in the market today. The others, *C. nieuhofii*, *C. meladerma*, and *C. fuscus*, have not been reported in recent years. The status of these *Clarias* species is quite controversial due to conflicting reports from old checklists, recent surveys, as well as current findings."

Means of Introduction Outside the United States

From NIES (2017):

"For aquaculture (Ishigakijima Is.) and for pet animal (Okinawajima Is.)"

From Santos et al. (2015):

"*Clarias* species are abundant and are important food fishes in the Philippine market."

Short Description

From Froese and Pauly (2017):

"Dorsal soft rays (total): 59-63; Anal soft rays: 42 - 46. Nude body without scale, sticky. Yellowish brown or dark gray, white and gray stomach. Lateral white dots on the sides [Zheng and Pan 1990]. Sometimes confused with the channel catfish, but *Clarias fuscus* can be differentiated by its rounded tail and long dorsal and anal fins [Yamamoto and Tagawa 2000]."

Biology

From Froese and Pauly (2017):

"They prefer deeper pools and tend to hide under thick mats of vegetation; are nocturnal feeders foraging on small fishes, worms, crustaceans and insects [Yamamoto and Tagawa 2000]."

"Oviparous [Breder and Rosen 1966]."

Human Uses

From Qin et al. (1998):

"Chinese catfish *Clarias fuscus*, imported to Hawaii from Asia about 100 years ago, is a popular aquaculture species in Hawaii due to its ease of spawning, tolerance of low dissolved oxygen and high stocking density, and high market value (Young et al., 1989; Young and Fast, 1990; Anderson and Fast, 1991)."

From Froese and Pauly (2017):

"Fisheries: minor commercial; aquaculture: commercial"

Diseases

From Froese and Pauly (2017):

"Edwardsiellosis, Bacterial diseases
Aeromonosis, Bacterial diseases"

From Amin et al. (2004):

"Immature stages of *Pallisentis* (*Pallisentis*) *celatus* Van Cleave, 1928, were collected from the intestine of three species of occasional fish hosts in the Red River near Hanoi (21°1'N; 105°52'E). These are new records from *Clarias fuscus* (Valenciennes in Cuvier & Valenciennes,

1840), *Ophiocephalus maculatus* (Lacépède, 1801) and *Mastacembelus armatus* (Lacépède, 1800)."

From Arthur and Te (2006):

"Protozoa
Ichthyophthirius multifiliis (NV) [Letters in parentheses represent distribution of the parasite in Vietnam.]
Digenea
Masenia collata (HN)
Orientocreadium batrachoides (HN)
Phyllodistomum clariasi (HN)
Monogenoidea
Gyrodactylus fusci (HN)
Quadriacanthus kobiensis (HN)
Nematoda
Procamallanus (Procamallanus) clarius (HN)
Protoleptinae gen. sp. larva (HN)
Spinitectus clariasi (HN)"

Threat to Humans

From Froese and Pauly (2017):

"Venomous [Man and Hodgkiss 1981]"

From Wright (2009):

"The venom glands of catfishes are found in association with sharp, bony spines along the leading edge of the dorsal and pectoral fins, which can be locked into place when the catfish is threatened […]. When a spine enters a potential predator, the integument surrounding the venom gland cells is torn, releasing venom into the wound. Catfish venoms have been shown to display neurotoxic and hemolytic properties and can produce a variety of additional effects such as severe pain, ischemia, muscle spasm, and respiratory distress; though any single species' venom may not display all of these properties [Halstead 1978]."

3 Impacts of Introductions

From Nico (2017):

"**Impact of Introduction:** Unknown."

From NIES (2017):

"Unknown impact."

From CABI (2017):

"In Taiwan, the faster growth of the introduced *C. batrachus* has led to the diminished importance of the local *Clarias fuscus* as a cultured species (Liao and Lia, 1989). In both these countries [Taiwan and the Philippines, where *C. microcephalus* is native], despite the obvious economic benefits from aquaculture of an introduced species, the demand for the local indigenous catfish species is still higher and commands a better market value."

4 Global Distribution

Figure 1. Known global distribution of *C. fuscus*. Map from GBIF (2017). The location reported in Thailand was excluded from this map and the climate matching analysis because Thailand is not part of the described range of this species (see Distribution Ouside the United States in Section 2).

5 Distribution Within the United States

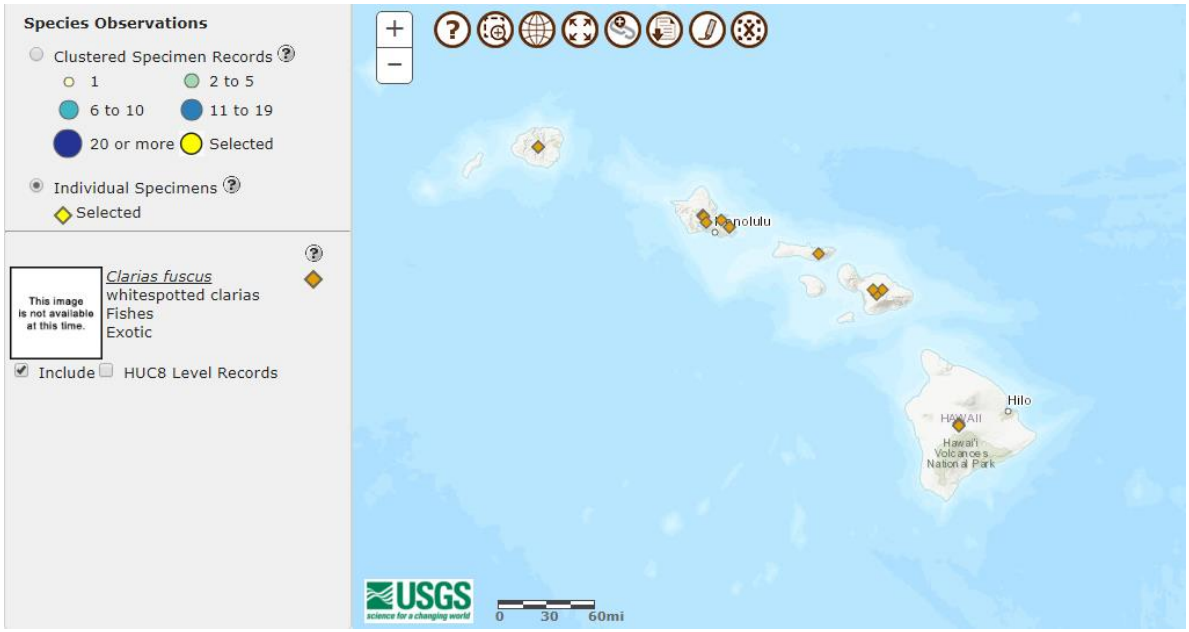

Figure 2. Known distribution of *C. fuscus* in the United States (Hawaii). Map from Nico (2017).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean distance) for *C. fuscus* was medium-high in peninsular Florida, medium in the Southerns Plain region and the Southeast Atlantic coastline, and low elsewhere in the contiguous U.S. The Climate 6 score for the contiguous U.S. was 0.028 for *C. fuscus*, indicating a medium climate match overall.

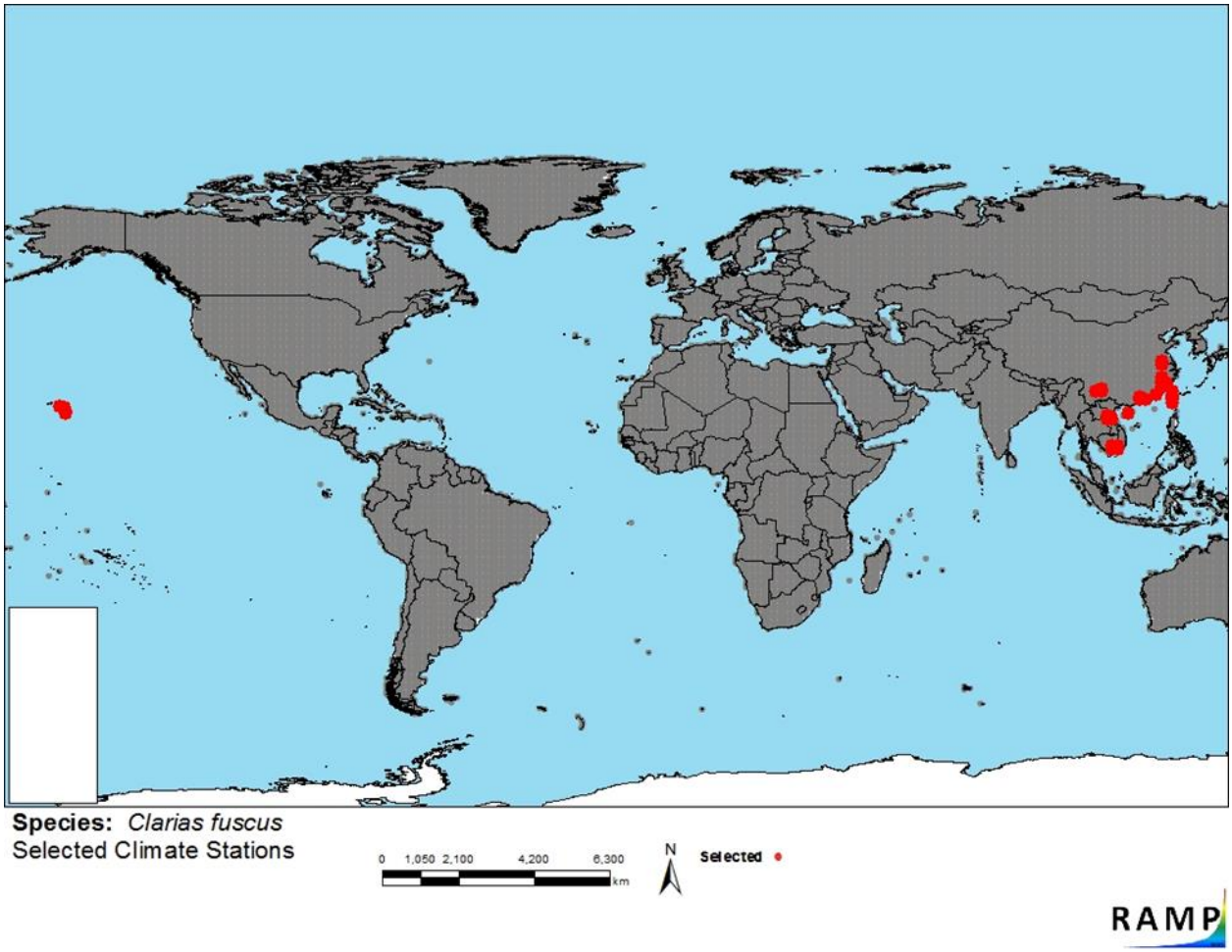

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *C. fuscus* climate matching. Source locations from GBIF (2017).

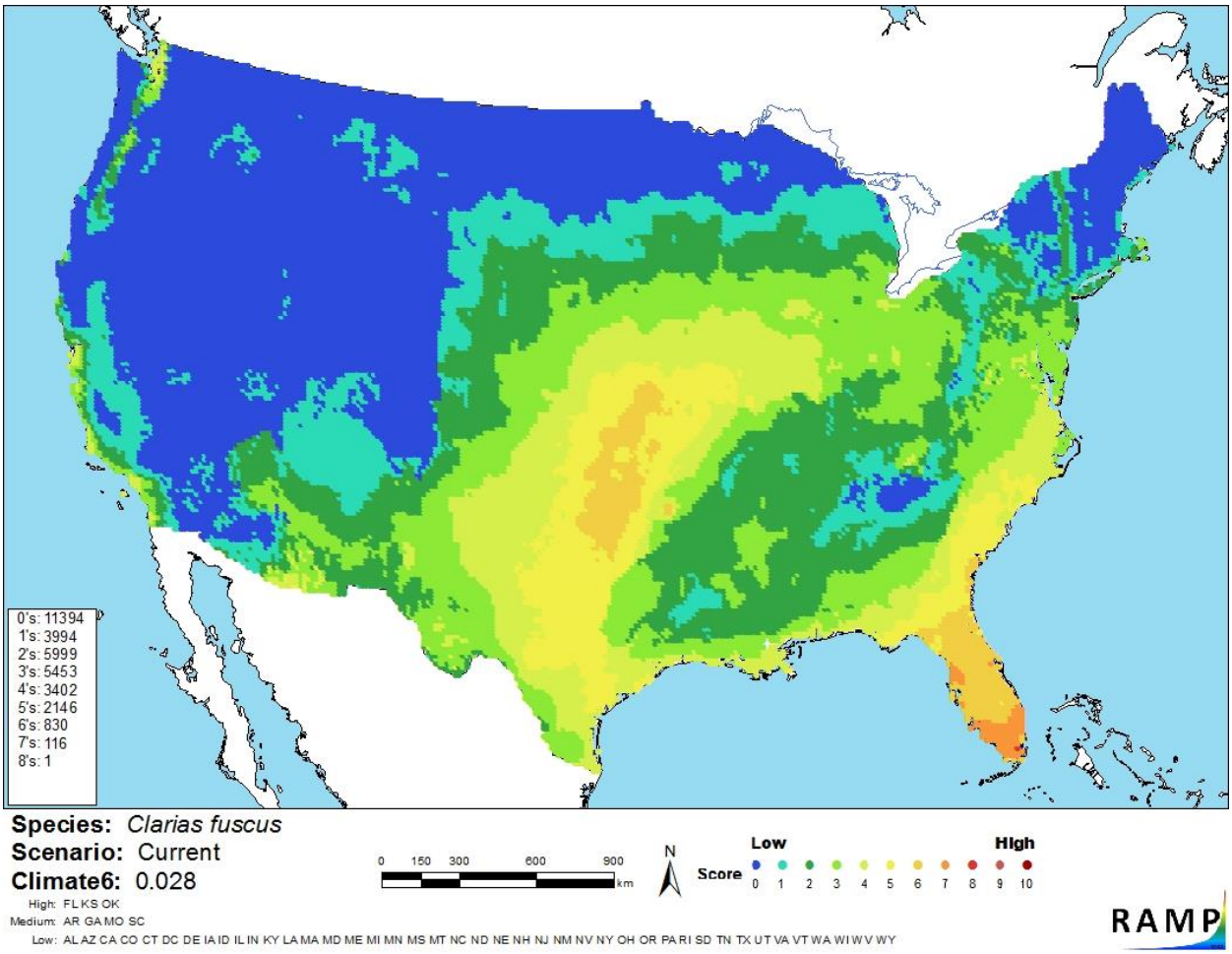

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *C. fuscus* in the contiguous United States based on source locations reported by GBIF (2017). 0=Lowest match, 10=Highest match.

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

Information is available on the biology, ecology, and distribution of *C. fuscus*. There is some confusion surrounding the status of populations in Japan and Philippines. No information on observed impacts of *C. fuscus* introduction were found in researching this assessment, apart from one impact on another introduced species. Therefore, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Clarias fuscus is a freshwater fish native to eastern Asia, with introduced populations reported in Hawaii, the Philippines, and Japan. The species was introduced to Hawaii for aquaculture purposes near the turn of the 20th century, and it remains commercially important in the aquaculture industry. The live importation of *C. fuscus* into the contiguous U.S. is now prohibited under the Lacey Act. Climate match to the contiguous U.S. is medium. Information regarding the impacts of introduction of *C. fuscus* is lacking despite many decades of establishment in Hawaii and elsewhere. Therefore, the overall risk posed by *C. fuscus* 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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