Eremophilus mutisii (catfish, no common name)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, December 2016
Revised, January, March, and December 2017
Web Version, 12/27/2017

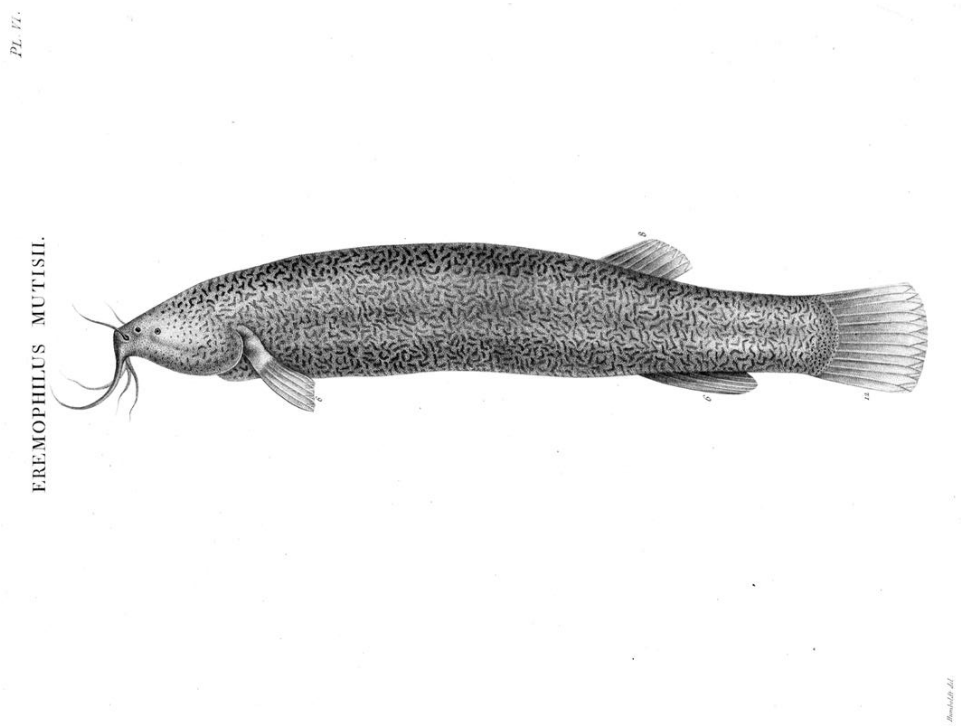

Image: A. Humboldt. Public domain. Available: https://commons.wikimedia.org/w/index.php?curid=8287320. (January 2017).

1 Native Range and Status in the United States

Native Range

From Mesa-Salazar et al. (2016):

"This species is endemic to the upper Bogota River basin, a tributary of the Magdalena River, in Colombia, and has been found in the Altiplano Cundiboyacense […]"

Status in the United States

There have been no documented occurrences in the United States.

Means of Introduction into the United States

There have been no documented occurrences in the United States.

Remarks

From GBIF (2016):

"SYNONYMS
Trachypoma marmoratum Giebel, 1871"

From DoNascimiento et al. (2014):

"Reexamination of the syntypes of the enigmatic *Trichomycterus venulosus*, described from Páramo de Cruz Verde, Eastern Cordillera of Colombia, allowed us to assess its actual taxonomic status. This nominal species is demonstrated to constitute a junior synonym of *Eremophilus mutisii* […]"

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 Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Trichomycteridae
Subfamily Trichomycterinae
Genus *Eremophilus*
Species *Eremophilus mutisii* Humboldt, 1805"

"Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 30.0 cm male/unsexed; [de Pínna and Wosiacki 2003]"

Environment

From Froese and Pauly (2016):

"Freshwater; demersal."

"22°C - 28°C [Baensch and Riehl 1995; assumed to be recommended aquarium water temperature]"

From Mesa-Salazar et al. (2016):

"This is a territorial species with benthic habits. It can live in low oxygen concentrations (from 2 mg/l) and can even breathe outside of the water (Pineda 1983, Cala 1986, Del Castillo-López and Garzón-Díaz 1986, Cala et al. 1986, Mojica et al. 2012)."

Climate/Range

From Froese and Pauly (2016):

"Tropical; […] 5°N - 4°N"

From Mesa-Salazar et al. (2016):

"[…] distributed between the 2,500 and 3,100 m asl., where temperatures reach the 18-20°C."

Distribution Outside the United States

Native

From Mesa-Salazar et al. (2016):

"This species is endemic to the upper Bogota River basin, a tributary of the Magdalena River, in Colombia, and has been found in the Altiplano Cundiboyacense, distributed between the 2,500 and 3,100 m above sea level where temperatures reach 18-20°C."

Introduced

From Froese and Pauly (2016):

"Probably introduced into Ubaté, Chinquinquirá and Tundama valleys, Colombia."

From Mesa-Salazar et al. (2016):

"During the 1950s, this species, together with ***Grundulus bogotensis***, was introduced to cold waters in Colombia as food for the introduced trout (***Oncorhynchus mykiss***) and it established viable populations in several water bodies (Mojica *et al.* 2012)."

Means of Introduction Outside the United States

From Mesa-Salazar et al. (2016):

"[…] introduced to cold waters in Colombia as food for the introduced trout (***Oncorhynchus mykiss***) […]"

Short Description

From Eigenmann and Eigenmann (1890):

"This genus differs from *Pygidium* in having no ventral fins."

"Yellowish with reticulating brown lines and dots."

From DoNascimiento et al. (2014):

"Premaxilla shape […] Anterior margin extending more laterally than posterior margin
Premaxilla relative length […] Premaxilla equal or slightly shorter than maxilla
Autopalatine […] Posterolateral process extending posteriorly to anguloarticular articulation with quadrate. Lateral margin slightly convex
Branchiostegal rays […] 7-8
Pectoral-fin rays […] 8
Precaudal vertebrae […] 17-18
Caudal vertebrae […] 25
Ribs […] 16-18
First hemal spine […] Vertebra 19
Dorsal-fin rays […] 13-14
Dorsal-fin basal radials […] 10
Dorsal-fin insertion […] Vertebrae 21-27
Anal-fin rays […] 11
Anal-fin basal radials […] 8
Anal-fin insertion […] Vertebrae 25-31
Neural spine of compound caudal vertebra […] Complete, 1/3-1/2 of adjacent neural spine height
Dorsal procurrent caudal-fin rays […] 13-16
Dorsal procurrent rays origin […] Vertebrae 6-8
Ventral procurrent caudal-fin rays […] 12-15
Ventral procurrent rays origin […] Vertebrae 6-8
Caudal skeleton […] PH+1+2, 3, 4+5"

Biology

From Mesa-Salazar et al. (2016):

"In the native range, this species is frequent but not abundant. It used to be more common but its population has declined due to fishing and urbanization (Mojica et al. 2012). Its population has been fragmented due to urban expansion. The population in parts of the introduced range (Lake Fúquene) have [sic] decreased due to overfishing (Mojica et al. 2012)."

"Its [sic] feeds on molluscs, anelids, crustacean and insect larvae that live in muddy bottoms, and, occasionally, on diatom algae, plant remains and other fishes' eggs (Pinilla et al. 2006, Rosado-Puccini 2007). Its [sic] reproduces all year long with peaks during the rainy season. Spawning is once a year in April, May and June. Its fecundity fluctuates between 10,000 and 50,000 eggs per female (Rodríguez-Forero 1992, Pinilla et al. 2006). It has been successfully reproduced in captivity (Marcucci et al. 2004a, Marcucci et al. 2004b, González-Acosta and Rosado-Puccini 2005a, 2005b, Mojica et al. 2012)."

From Cala (1987):

"*Eremophilus mutisii* uses the stomach for aerial respiration. Inspiration is during a rapid dash to and from the surface. Air-breathing occurs in hypoxic and normoxic water, but is not obligatory. The evolution of a reduced swimbladder is associated with a benthic mode of life in *E. mutisii*."

"Under aquarium conditions, *E. mutisii* seemed to be nocturnally active in normoxic water conditions when aerial respiration decreased significantly, and it burrowed in sandy bottoms or under other cover, such as a piece of rooftile. The burrowing behaviour of *E. mutisii* in the stream or aquarium bottom would be enhanced by a negative buoyancy, as Gee (1976) suggested for *Pygidium*. Periodically, the fish dashes upwards, breaks surface, and quickly returns to the bottom. The movement is a quick dart, swimming nearly vertically upwards, followed by a nearly vertical downward dash. Bubbles of gas leave the opercular openings when the fish descends or reaches the bottom. Fish surfaced only rarely at high oxygen levels, but more often as the oxygen level decreased."

"In the field I observed that *E. mutisii* survived for a long time out of water if not exposed to direct solar radiation. I kept three individuals out of water on wet grass for one night (16 h, air temperature 6-12° C); all survived and swam normally when they were put back into the aquarium."

Human Uses

From Mesa-Salazar (2016):

"This species is captured for local consumption by fishermen. An increase of captures in the Fúquene lake and the Tominé reservoir due to overfishing has been observed (Mojica *et al.* 2012). It has been historically fished for human consumption by the people living on the shore of rivers and lakes (Mojica *et al.* 2012). Due to its current restricted distribution because of pollution or desiccation of its habitat, it is only consumed in the areas where it remains (Rodríguez-Forero et al. 2007, Mojica et al. 2012). Currently, it is used only for local consumption."

Diseases

From Rodríguez et al. (2005):

"Fishes were captured from Fúquene Lake, Cundinamarca department, Colombia (05°28'N 73°44'W) and stocked in 100 L glass tanks in captivity. Ten fishes with skin ulcers were kept in

an independent tank and changes in morphology, bacterial flora and organization of tissues were evaluated by means of bacteriology and histology techniques during eight days. Cultures for bacteria were done from the skin ulcers and from the tank water, and an antibiogram was carried out. The analysis showed the presence of common bacteria in the water flora and ulcers: *Pseudomona* spp. and *Escherichia coli*, resistant to the amoxicilin and sensitive to the ciprofloxacin, norfloxacin, furazolidon and tetraciclin. The histology demonstrated necrosis of the epidermis and underlaying tissues with inflammatory cells, and gill hyperplasia. Pathological signs are associated with stress factors."

Threat to Humans

From Rodríguez Forero et al. (2009):

"Heavy metal accumulation of lead (Pb), chromium (Cr), and cadmium (Cd) in the muscle of the catfish *Eremophilus mutisii* was studied in 47 specimens, captured by anglers in the Bogotá River at two sampling sites (Chocontá and Suesca) during May-October 2005. […] Metal accumulation in muscle (wet weight) of specimens at Chocontá and Suesca showed high levels of Pb (3.4 and 3.1 ppm, respectively), Cr (1.8 and 2.1 ppm, respectively), and Cd (0.35 and 0.48, respectively). Metal levels in waters (ppm) indicated that average Pb (0.028 Chocontá, 0.029 Suesca), Fe (0.462 Chocontá, 1.1 Suesca), and Cr (0.113 Chocontá) were above the maximum levels (MCLs) allowed in drinking waters. […] The concentration of Pb, Cr, and Cd in the muscle of this fish species should be viewed carefully due to likely implications in public health, given the consumption of this fish by locals in this area. These concentrations were above the maximum levels recommended by regulatory agencies and, depending on daily intake by consumers, might represent a risk for human health."

3 Impacts of Introductions

No information available.

4 Global Distribution

Figure 1. Known global established locations of *Eremophilus mutisii* in Colombia. Map from GBIF (2016).

5 Distribution Within the United States

There has not been any documented occurrence in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for the contiguous U.S. was low. The range of scores indicating a low climate match is 0.000-0.005; the Climate 6 score for *Eremophilus mutisii* was 0.0. Medium climate matches were recorded around Puget Sound, Washington, and coastal California; the remainder of the contiguous U.S. showed low climate matches.

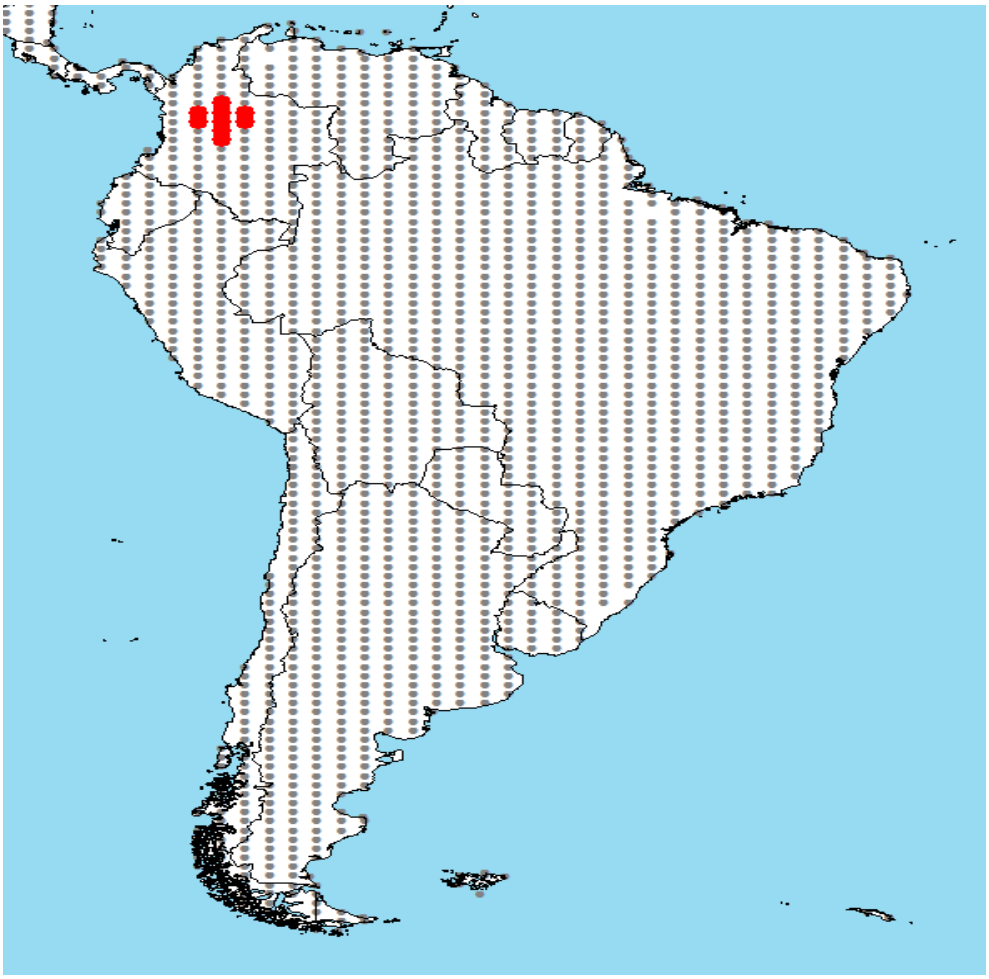

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) in Colombia and non-source locations (gray) for *Eremophilus mutisii* climate matching. Source locations from GBIF (2016).

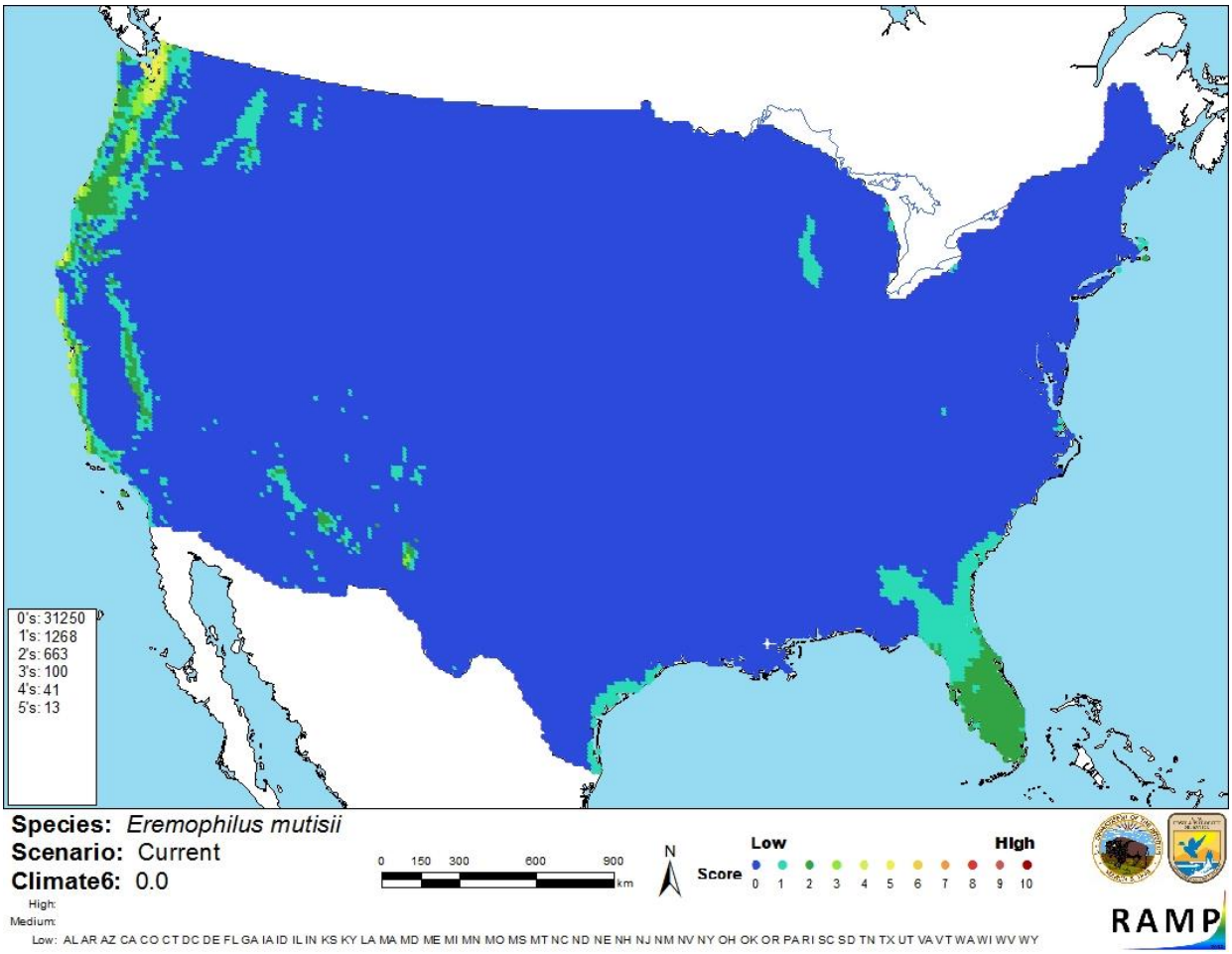

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Eremophilus mutisii* in the contiguous United States based on source locations from GBIF (2016). 0= Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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

7 Certainty of Assessment

Information is available on the biology and distribution of *Eremophilus mutisii*, but no information is available on any impacts that have occurred where the species is established outside its native range. Therefore, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Eremophilus mutisii is a small catfish native to Colombia, where it is a local food source for humans. *E. mutisii* was successfully introduced into several water bodies in Colombia as food for introduced trout. However, no information on potential impacts of these introductions is available. Climate match to the contiguous U.S. is low, with highest match occurring along the Pacific coast. The overall risk posed by this species is uncertain.

Assessment Elements

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