Desert Goby (*Chlamydogobius eremius*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2017
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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2016):

"Oceania: South Australia, Australia."

From Lehtonen et al. (2011):

"[…] endemic to the Lake Eyre drainage basin in Central Australia."

Status in the United States

This species has not been reported as introduced or established in the U.S.

Means of Introductions in the United States

This species has not been reported as introduced or established in the U.S.

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 Acanthopterygii
Order Perciformes
Suborder Gobiodei
Family Gobiidae
Genus *Chlamydogobius*
Species *Chlamydogobius eremius* (Zietz, 1896)"

From Eschmeyer et al. (2017):

"Current status: Valid as *Chlamydogobius eremius* (Zietz 1896). Gobiidae: Gobionellinae."

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 6.0 cm TL male/unsexed; [Allen 1989]"

Environment

From Froese and Pauly (2016):

"Freshwater; demersal; pH range: 7.0 - 8.0; dH range: 9 - 19."

"Found in harsh environment characterized by rapid fluctuations in temperature and salinity [Allen 1989; Allen et al. 2002]. Field observations and laboratory experimentation indicate that it can withstand wide ranges of […] salinity (0-60 p.p.t.), pH (6.8-11.0) and very low dissolved

oxygen level [Allen et al. 2002]."

Climate/Range

From Froese and Pauly (2016):

"Temperate; 10°C - 35°C [Baensch and Riehl 1985], preferred ?, 136°E - 137°E"

"Field observations and laboratory experimentation indicate that it can withstand wide ranges of temperature (5°-41°C) […]"

Distribution Outside the United States

Native

From Froese and Pauly (2016):

"Oceania: South Australia, Australia."

From Lehtonen et al. (2011):

"[…] endemic to the Lake Eyre drainage basin in Central Australia."

Introduced

This species has not been reported as introduced or established outside of its native range.

Means of Introduction Outside the United States

This species has not been reported as introduced or established outside of its native range.

Short Description

From Bray and Gomon (2017):

"Desert gobies are greyish-brown with 7-8 darker saddles along the back, and marbled brown markings on the upper sides. The first dorsal fin has a bright blue median band and a yellow submarginal band, and the underside of the head is yellow."

"The brightly-coloured breeding males have vivid yellow and blue markings on the first dorsal fin, and white margins on the second dorsal, anal and caudal fins."

"The Desert Goby differs from all other *Chlamydogobius* species in lacking scales on the head a [*sic*] breast."

Biology

From Froese and Pauly (2016):

"Occurs in pools and streams associated with artesian springs and bores [Allen 1989; Allen et al. 2002]. Lives in shaded areas around plants or rocks [Allen et al. 2002]."

"Feeds on insects, crustaceans, filamentous algae and detritus [Allen 1989]."

"Female deposits eggs on the ceiling of a rocky crevice. Male guards the nest until hatching, which requires 10 to 17 days at temperatures ranging from 27°-30° C."

From Lehtonen et al. (2011):

"Male desert gobies establish nests under rock crevices and rely on conspicuous displays to attract passing females for mating."

From Mossop et al. (2015):

"First, while more mobile than many aquatic invertebrates, the species has a relatively poor swimming ability for a fish (McNeil and Schmarr, 2009). Furthermore, as larvae, *C. eremius* rapidly settles onto the substrate and does not experience the pelagic larval phase that facilitates dispersal in many other fishes (e.g. McGlashan and Hughes, 2001). Second, physiological and behavioural adaptations allow *C. eremius* to tolerate extreme fluctuations in water quality (Glover, 1982; Thompson and Withers, 2002), including salinities threefold that of seawater (we have recorded fish in water > 100,000 mg/L)."

From van Lieshout et al. (2013):

"Male desert gobies provide uniparental care and use their pectoral fins to fan the brood (often under hypoxic conditions) […]"

Human Uses

From Bray and Gomon (2017):

"Desert gobies are popular aquarium fishes."

Diseases

No information available. No OIE-reportable diseases have been documented for this species.

Threat to Humans

From Froese and Pauly (2016):

"Harmless"

3 Impacts of Introductions

This species has not been reported as introduced or established outside of its native range.

4 Global Distribution

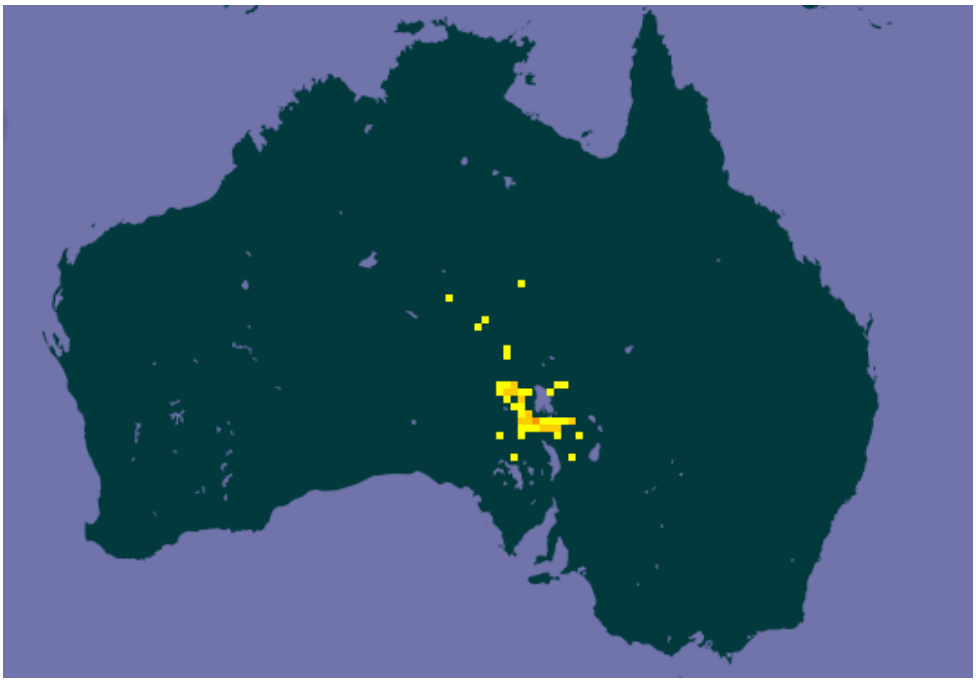

Figure 1. Known global distribution of *Chlamydogobius eremius*. Map from GBIF (2016).

5 Distribution Within the United States

This species has not been reported as introduced or established in the U.S.

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 0.076, indicating a medium climate match. Climate 6 scores between 0.005 and 0.103 are classified as medium match. The southwest border of Texas and Arizona had high values; medium values occurred in the Southwest U.S. generally and into the Rocky Mountain range. The north, northwest, northeast, and eastern states had low values.

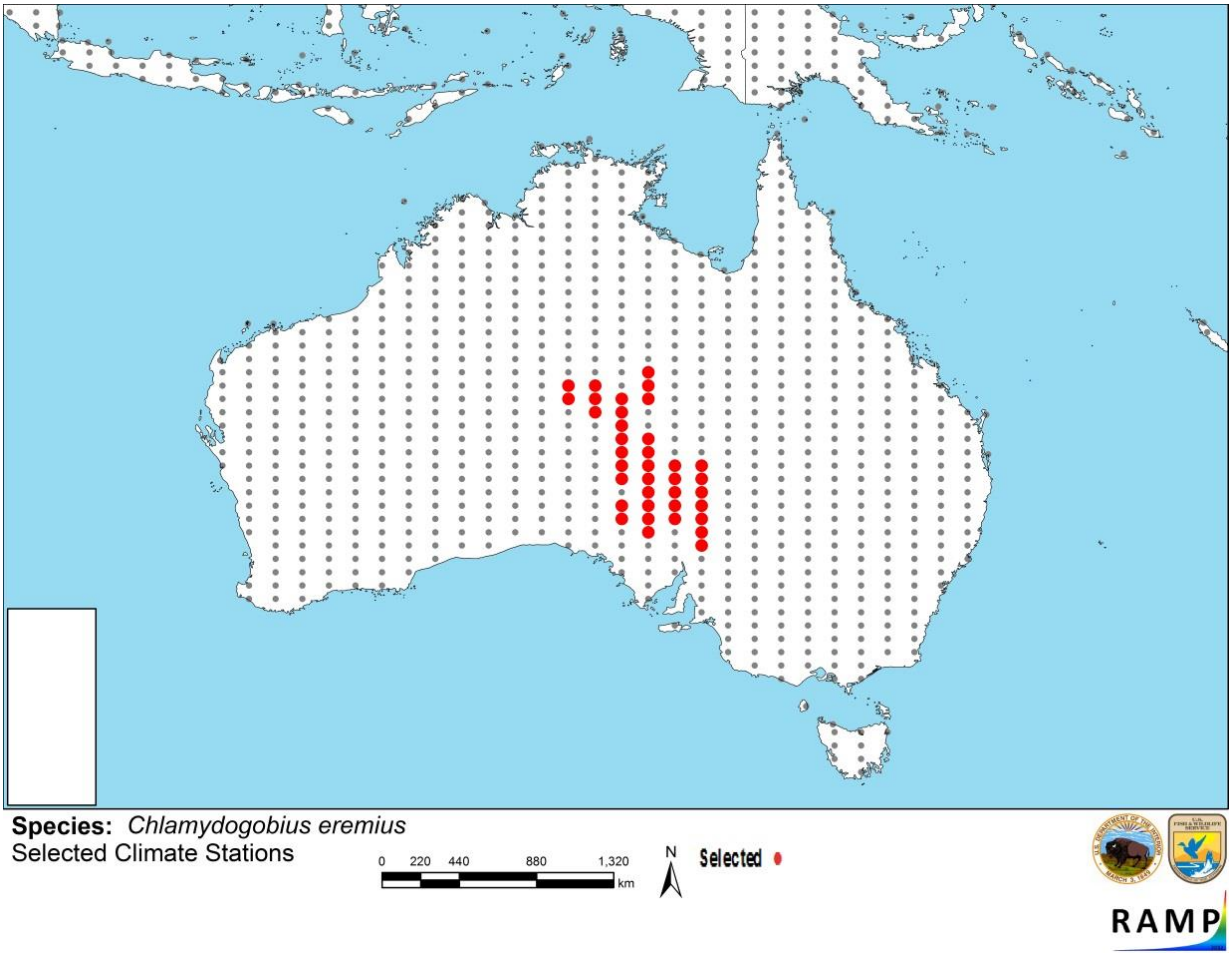

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Chlamydogobius eremius* climate matching. Source locations from GBIF (2016).

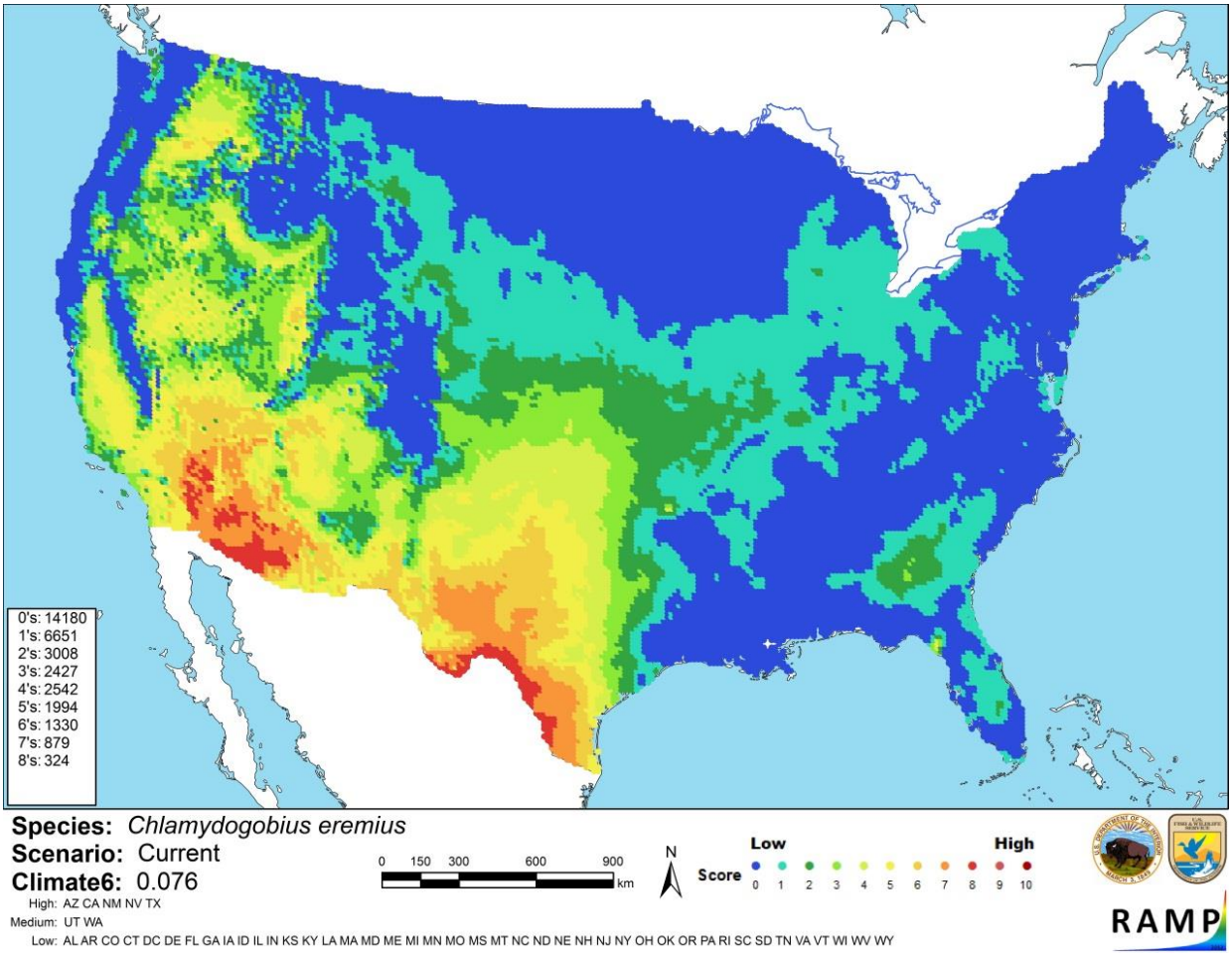

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Chlamydogobius eremius* in the contiguous United States based on source locations reported by GBIF (2016). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

Information on the biology, ecology, and distribution of *Chlamydogobius eremius* is available. However, no introductions of this species outside of its native range have been documented. More information is needed to assess the potential invasiveness of *C. eremius*. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Chlamydogobius eremius, commonly known as desert goby, is a small fish native to the Lake Eyre drainage basin in Central Australia. *C. eremius* is able to endure wide ranges of salinity, temperature, and pH, as well as low dissolved oxygen levels. This species has a medium climate match with the contiguous United States. The biology of this species has been well documented. However, more information on the history of invasiveness is needed because no introductions outside of the native range are currently known. Overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **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.

Allen, G. R. 1989. Freshwater fishes of Australia. T.F.H. Publications, Inc., Neptune City, New Jersey.

Allen, G. R., S. H. Midgley, and M. Allen. 2002. Field guide to the freshwater fishes of Australia. Western Australian Museum, Perth, Western Australia.

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