Jaguar Guapote (*Parachromis managuensis*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, July 2014 and July 2015

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1 Native Range, and Status in the United States

Native Range

From Nico et al. (2015):

"Tropical America. Atlantic Slope drainages in Central America from Río Ulúa in Honduras to Río Matina in Costa Rica (Bussing 1987). Distribution maps in Bussing (1987) and Conkel (1993)."

Status in the United States

From Nico et al. (2015):

"Established in Florida and Puerto Rico; formerly established in Utah, presumably eradicated; locally established in Hawaii and Nevada; reported from southern Louisiana."

"The first records of this species in Florida were based on specimens taken from canals and other water bodies in the Miami area, Dade County, in the early 1990s (International Game Fishing Association 2000). More recently, the species has appeared in other canals in the southeastern part of the state including sites west of Miami in canals located in the eastern portions of the Everglades (Gestring and Shafland 1997; Nico, unpublished data). The species is locally established in a pond on the campus of University of Hawaii on Oahu, Hawaii; it was first found at that site ca. 1992 (Yamamoto, personal communication). Two specimens were collected from an unnamed tributary to Big Branch Bayou in Lacombe, Louisiana, near a tropical fish farm in 2004 (K. Piller, pers. comm.), and one specimen from a pond in Baton Rouge (M. O'Connell, pers. comm). In 2004 specimens were collected from Baton Rouge, pond in Wedgewood Subdivision (McElroy, unpublished). A reproducing population was discovered in a 1-acre pond at a private ranch in the south end of the Smoke Creek Desert, Nevada, in 2005 (A. Shaul, pers. comm.). It is established in Boiler Spring, a thermal spring pool in the Virgin-Colorado Rivers drainage of southwestern Utah, in the community of Washington, Washington County (Marsh et al. 1989; Courtenay and Stauffer 1990). Boiler Spring fish first were discovered in April 1988 during a rotenone operation by state personnel; the population consisted of 3-4 different size classes totaling an estimated 500 fish (Minckley and C. Knight, personal communication). Voucher specimens were taken in September 1988; at that time, efforts to eliminate the fish with rotenone and explosives failed (Marsh et al. 1989). There were additional unconfirmed reports of fish in other habitats, including at least one breeding population in a local private pond (Marsh et al. 1989). State personnel more recently indicated that the species has been eradicated from Utah (B. Schmidt, personal communication)."

Means of Introductions in the United States

From Nico et al. (2015):

"Introductions are presumably from aquarium releases, although escapes from fish farms cannot be ruled out in southern Florida. The specimens in Lacombe, Louisiana were collected near a tropical fish farm and are probably escapees."

Remarks

From Nico et al. (2015):

"On 14 September 1988, Utah Division of Wildlife personnel killed several hundred P. managuensis at Boiler Spring with rotenone and explosives, but they were unsuccessful in eradicating the fish (Marsh et al. 1989); however, the most recent report indicates the species has been eradicated throughout the state (B. Schmidt, personal communication). Boiler Spring flows into the Virgin River via Mill Creek and irrigation systems. This aggressive cichlid was

considered a potential threat as a predator of native fish fauna of the Virgin River (Marsh et al. 1989)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2015):

"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 Labroidei
Family Cichlidae
Genus Parachromis
Species *Parachromis managuensis* (Günther, 1867)"

"Taxonomic Status: valid"

Size, Weight, and Age Range

From Froese and Pauly (2015):

"Maturity: Lm ? range ? - ? cm
Max length : 55.0 cm TL male/unsexed; [IGFA 2001]; max. published weight: 1.6 kg [IGFA 2001]"

Environment

From Froese and Pauly (2015):

"Freshwater; benthopelagic; pH range: 7.0 - 8.7; dH range: 10 - 15; depth range 3 - 10 m [Agasen et al. 2006]."

Climate/Range

From Froese and Pauly (2015):

"Tropical; 25°C - 36°C [Bussing 1998]; 37°N - 9°N"

From Nico et al. (2015):

"Cold temperatures limit its northern range expansion in Florida. Fish in southern Florida are periodically killed during cold winters (W.F. Loftus, personal communication) which allows them only to temporarily inhabit interior wetlands away from the canals that serve as thermal refuges (Kline et al. [2014])."

Distribution Outside the United States

Native

From Nico et al. (2015):

"Tropical America. Atlantic Slope drainages in Central America from Río Ulúa in Honduras to Río Matina in Costa Rica (Bussing 1987). Distribution maps in Bussing (1987) and Conkel (1993)."

Introduced

From Froese and Pauly (2015):

"Mexico; probably established"
"Taiwan; established"
"Canada; not established"
"Singapore; established"
"Honduras; established"
"Guatemala; established"
"El Salvador; probably established"
"Panama; established"
"Cuba; established"
"China; unknown [status]"
"Philippines; established"

Means of Introduction Outside the United States

From Froese and Pauly (2015):

"unknown"
"ornamental"
"aquaculture"

Short description

From Froese and Pauly (2015):

"Dorsal spines (total): 17 - 18; Dorsal soft rays (total): 10-11; Anal spines: 6-8; Anal soft rays: 11 - 12. This species is distinguished by its large mouth, projecting lower jaw, prominent enlarged canine teeth, black spots on fins and body, a more or less continuous black stripe between the eye and opercular margin, another between the eye and the lower angle of the opercle; a row of black blotches along the middle of the side. Distinguished from other members

of the genus by having the preopercle expanded at the angle. Body color silvery or golden-green to purple; back moss green, sides with purple iridescence, belly whitish or yellowish; dorsal, anal and caudal fins with numerous black spots, interspaces whitish, yellowish or with blue iridescence; a black blotch on the caudal-fin base. Breeding females with stronger crimson hue to the gill cover."

Biology

From Froese and Pauly (2015):

"Inhabits lakes, preferring turbid waters and mud bottoms of the highly eutrophic lakes [Conkel 1993]. Found in springs and ponds over detritus and sand bottom [Page and Burr 1991]. Commonly found in very warm, oxygen depleted inundation lakes [Nassar and Nonell 1992]. Highly predaceous, feeding mainly on small fishes and macroinvertebrates [Conkel 1993; Yamamoto and Tagawa 2000]. Oviparous, spawns in batches"

"Deposits up to 5,000 eggs on rocks and other hard substrates; both parents guard the eggs and resulting fry [Yamamoto and Tagawa 2000]. Reported to deposit up to 10,496 eggs [Agasen et al. 2006]."

From Nico et al. (2015):

"*Parachromis managuensis*, as with other guapotes, is highly piscivorous, consuming a variety of fishes. Aquatic invertebrates comprise an important portion of the juvenile diet (Bussing 1987; Gestring and Shafland 1997)."

Human uses

From Froese and Pauly (2015):

"Fisheries: commercial; aquaculture: commercial; aquarium: commercial"

Diseases

From Froese and Pauly (2015):

"Ascocotyle Infestation 2, Parasitic infestations (protozoa, worms, etc.)"
"Ascocotyle Infestation 3, Parasitic infestations (protozoa, worms, etc.)"
"Centrocestus Disease, Parasitic infestations (protozoa, worms, etc.)"
"Contracaecum Disease (larvae), Parasitic infestations (protozoa, worms, etc.)"
"Crassicutis Infection, Parasitic infestations (protozoa, worms, etc.)"
"Diplostomum Infection, Parasitic infestations (protozoa, worms, etc.)"
"Echinochasmus Infestation 2, Parasitic infestations (protozoa, worms, etc.)"
"Falcaustra Infection (*Falcaustra* sp.), Parasitic infestations (protozoa, worms, etc.)"
"Genarchella Infection, Parasitic infestations (protozoa, worms, etc.)"
"Haplorchis Infestation 2, Parasitic infestations (protozoa, worms, etc.)"
"Mexiconema Infestation, Parasitic infestations (protozoa, worms, etc.)"
"Neoechinorhynchus Infestation 6, Parasitic infestations (protozoa, worms, etc.)"

“Oligogonotylus Infection, Parasitic infestations (protozoa, worms, etc.)”
“Pelaezia Infection, Parasitic infestations (protozoa, worms, etc.)”
“Perezitrema Infection, Parasitic infestations (protozoa, worms, etc.)”
“Polymorphus Infestation, Parasitic infestations (protozoa, worms, etc.)”
“Posthodiplostomum Infestation 2, Parasitic infestations (protozoa, worms, etc.)”
“Procamallanus Infection 13, Parasitic infestations (protozoa, worms, etc.)”
“Raphidascaris Disease, Parasitic infestations (protozoa, worms, etc.)”
“Rhabdochona Disease, Parasitic infestations (protozoa, worms, etc.)”
“Rhabdochona Infestation 5, Parasitic infestations (protozoa, worms, etc.)”
“Saccocoelioides Infection, Parasitic infestations (protozoa, worms, etc.)”
“Sciadicleithrum Infection, Parasitic infestations (protozoa, worms, etc.)”
“Sciadicleithrum Infection 2, Parasitic infestations (protozoa, worms, etc.)”
“Sciadicleithrum Infection 4, Parasitic infestations (protozoa, worms, etc.)”
“Skin Flukes, Parasitic infestations (protozoa, worms, etc.)”
“Spiroxys Infestation, Parasitic infestations (protozoa, worms, etc.)”
“Uvulifer Infection, Parasitic infestations (protozoa, worms, etc.)”
“Yellow Grub, Parasitic infestations (protozoa, worms, etc.)”

There are no known OIE reportable diseases for this species.

Threat to humans

From Froese and Pauly (2015):

“Potential pest”

3 Impacts of Introductions

From Joshi (2006):

“Only last year, the presence in Lake Taal (Batangas) of the “jaguar guapote” (*Parachromis managuensis)*, a piscivorous cichlid from Central America, was reported by Agasen (2005). Believed to have been introduced as an aquarium fish the species has become established (naturally breeding) and invasive. Fishermen of the lake have reported a decline in their catch of indigenous fish species as the white goby (*G. giurus*) and the theraponid (*Therapon plumbeus*) as well as that of the introduced Nile tilapia (*Oreochromis niloticus*). Considered as a threat to the indigenous and endemic fishes of the lake, increased fishing effort to eradicate the “jaguar guapote” has been recommended.”

From Rosana et al. (2006a):

“*Parachromis managuensis* has established in Talisay and has also settled in Tanauan and Laurel. The estimated production of 8.2MT comprising 57.6% of the total catch suggests that the alien fish has successfully competed for a niche previously occupied by native species such as *L. plumbeus* and *G. guirus*.”

“The percentage composition of the five major fishes caught in Taal Lake, shows that *P. managuensis* ranked fourth in abundance with *S. tawilis*-first, *O. niloticus*-second, *C. chanos*-third and *G. guirus*-fifth, hence displacing further the already low population of native species.”

“Jaguar guapote is not beneficial after all since it starts to displace the indigenous species that are far more beneficial in terms of their marketability. Though respondents and consumers alike found the fish beneficial since it has been a source of food and income, it was however, low enough to augment their family needs. Jaguar guapote is utilized as substitute to the indigenous fish for food since production of native fish became relatively lower after the advent of the invasive alien fish in Taal Lake.”

From Froese and Pauly (2015):

“Abundant in the Pandan Canal and Yishun Stormwater collection pond [in Singapore]. Suspected in Jurong lake. Extremely damaging to local ecosystem as it breeds extremely fast and is a voracious predator. The population of all other fish species in the Pandan canal has declined [B. Y. Tang, personal communication].”

“Also widely introduced throughout Central America for the control of juvenile tilapias and other forage fishes in lakes and to repopulate lakes [Welcomme 1988]. Used as a biological control in aquaculture ponds. Has displaced local predators [Lever 1996].”

“Has been reported as present in the northeastern portion of Taal Lake, where it has dominated the catch composition of gill nets [Kawit and Rosana 2002]. Significant decline in catch of native species in Taal lake such as *Glossogobius guirus*, *Leiopotherapon plumbeus* and the Atyid prawn has been attributed to the species, however, over 50% of fisherfolk in Talisay and Tanauan reported that the presence of the fish benefited them [BFAR 2006]. The presence of this fish has displaced the indigenous species which are more beneficial in terms of marketability [Rosana et al. 2006b].”

4 Global Distribution

Figure 1. Map of known global distribution of *Parachromis managuensis*. Map from GBIF (2015). Points in China and central Mexico were not included in climate matching (Sec. 6) because these points do not represent extant populations.

5 Distribution within the United States

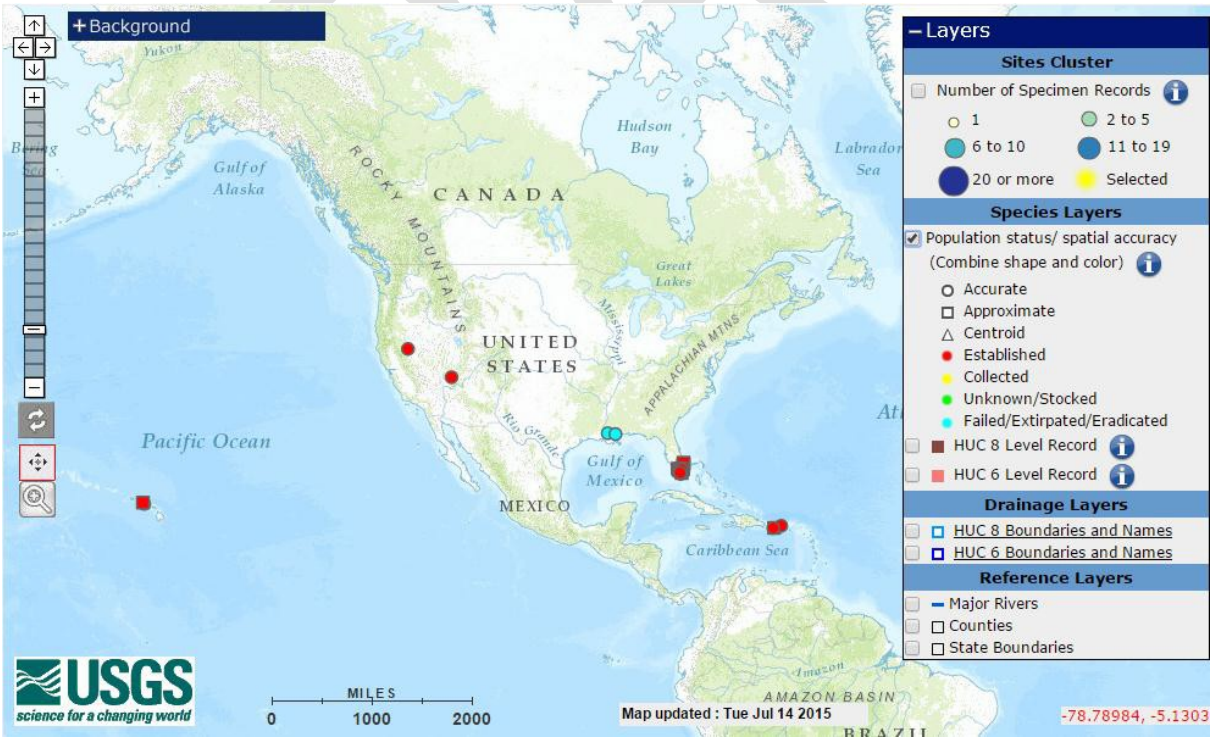

Figure 2. Distribution of *Parachromis managuensis* in the U.S. Map from Nico et al. (2015).

6 Climate Match

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) is high in Florida and parts of the Interior West. The northern portion of the Texas Gulf Coast is a medium match. Low match covers the majority of the country. Climate 6 match indicates that the continental U.S. has a high climate match. The range for a high climate match is 0.103 and greater; Climate 6 score of *Parachromis managuensis* is 0.115.

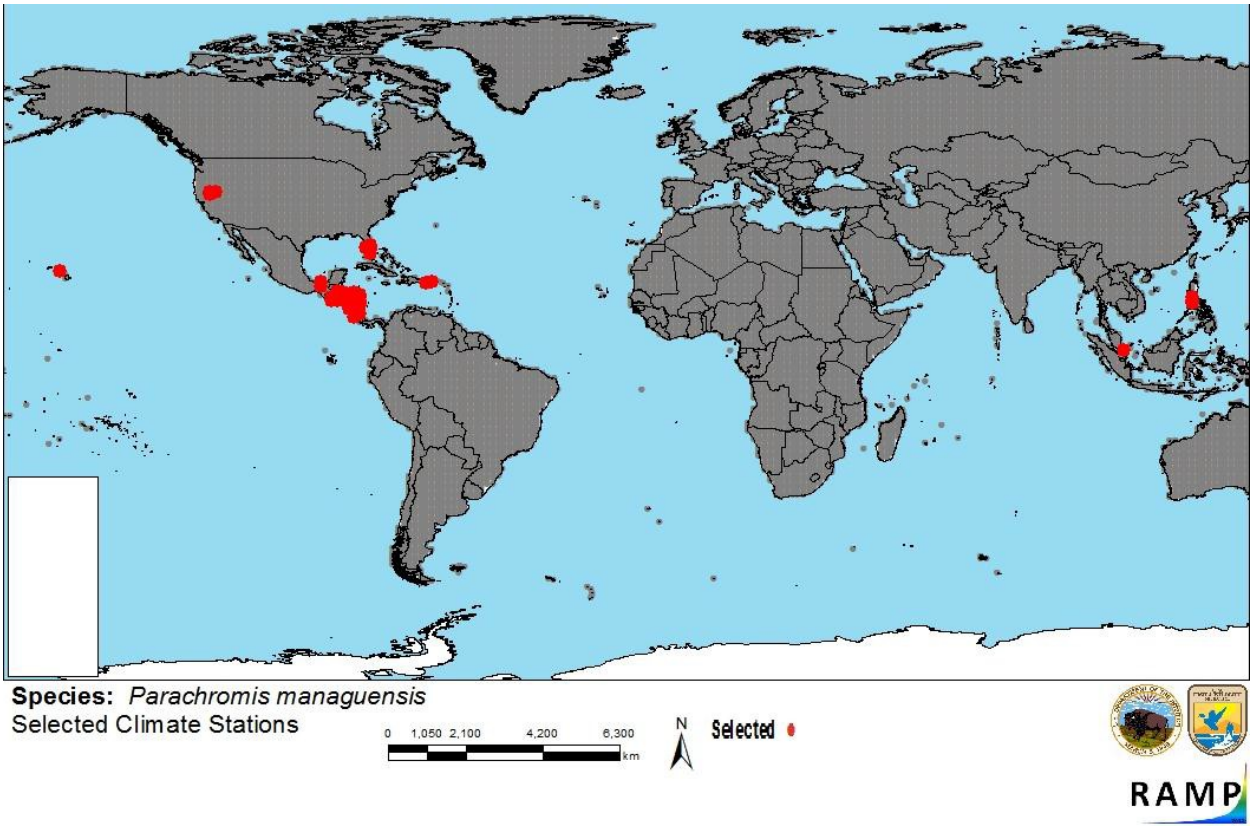

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Parachromis managuensis* climate matching. Source locations from Froese and Pauly (2015), GBIF (2015), and Nico et al. (2015).

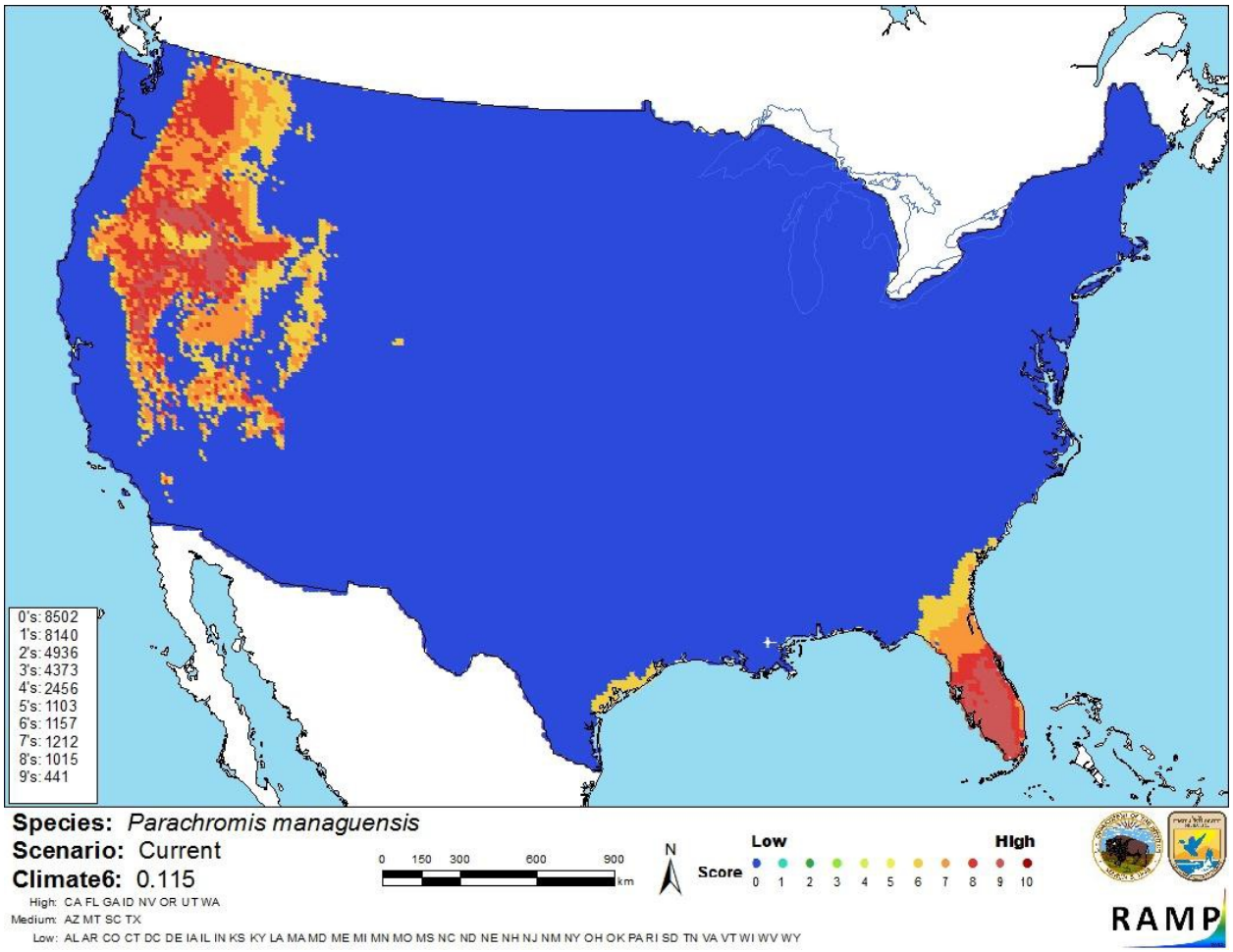

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Parachromis managuensis* in the continental United States based on source locations reported by Froese and Pauly (2015), GBIF (2015), and Nico et al. (2015). 0= Lowest match, 10=Highest match. Climate match scores are tabulated on left.

7 Certainty of Assessment

Information on the biology, distribution, and impacts of *P. managuensis* is available. Negative impacts from introductions of this species are documented in the scientific literature, although further study would be useful to better characterize these impacts. Certainty of this assessment is medium.

8 Risk Assessment

Summary of Risk to the Continental United States

Parachromis managuensis has shown an ability to establish populations within the U.S. Although the impacts of this species in the U.S. are not well-studied, *P. managuensis* has been associated with declines of native fish species in multiple locations globally. The climate match analysis, which indicates that the contiguous U.S. is a high match for *P. managuensis* is slightly misleading. Both of the locations where *P. managuensis* became established in the West (Utah

and Nevada) were private ponds, and cold winter temperatures limited dispersal outside of these ponds (Nico et al. 2015). Therefore, it is likely that the climate in the West is not as highly suitable as the climate match would suggest. Nevertheless, the potential for the species to spread in the South and especially Florida is a very real threat. The overall risk posed by this species is high.

Assessment Elements

- ☐ **History of Invasiveness (Sec. 3):** High
- ☐ **Climate Match (Sec.6):** High
- ☐ **Certainty of Assessment (Sec. 7):** Medium
- ☐ **Overall Risk Assessment Category: High**

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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