Granulated Catfish (*Pterodoras granulosus*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, December 2018
Web Version, 1/2/2020

Photo: Johann Natterer. Licensed under Public Domain (created around 1830). Available: https://commons.wikimedia.org/wiki/File:Johann_Natterer_-_Abotoado_(Pterodoras_granulosus).jpg. (December 7, 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018a):

"South America: Amazon and Paraná River basins [Argentina, Bolivia, Brazil, Colombia, Paraguay, Peru, Uruguay] and coastal drainages in Guyana and Suriname."

"[In Argentina:] Found in upper Paraná [López et al. 2005]. Known from Dock Sur, El Puerto de Buenos Aires [Burgess 1989]."

Status in the United States

From Nico et al. (2018):

"The Pinellas County, Florida, record [a failed introduction in 1977] is likely the basis for inclusion of this species in several published lists of unestablished, nonindigenous fishes (e.g., Courtenay and Hensley 1980; Courtenay et al. 1984, 1986; Courtenay and Stauffer 1990; Courtenay et al. 1991; Robins et al. 1991)."

"Failed in Florida."

From NatureServe (2018):

"Florida: single specimen found dead in a canal (Fuller et al. 1999)."

Pterodoras granulosus is for sale in the aquarium trade in the United States.
From AquaImports (2018):

"GRANULATED CATFISH (PTERODORAS GRANULOSUS) […] $39.99"

Means of Introductions in the United States

From Nico et al. (2018):

"This fish was probably an aquarium release, as many species of Doradidae are popular in the aquarium trade."

Remarks

GBIF Secretariat (2018) reported observation records of *Pterodoras granulosus* in the Orinoco River basin. The Orinoco basin (found in Colombia and Venezuela) is outside the described distribution of the species. Information was sought regarding the presence of *P. granulosus* in the Orinoco basin but no confirmation of presence was found. Since the presence of the species could not be confirmed in the peer-reviewed or grey literature or through a scientific database those observations were not included in any analysis in this screening summary.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2018), *Pterodoras granulosus* (Valenciennes 1821) is the valid name for this species. It was originally described as *Doras granulosus* Valenciennes in Humboldt & Valenciennes 1821.

From ITIS (2018):

"Kingdom Animalia
  Subkingdom Bilateria
    Infrakingdom Deuterostomia

Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Doradidae
Genus *Pterodoras*
Species *Pterodoras granulosus*"

Size, Weight, and Age Range

From Froese and Pauly (2018a):

"Maturity: L_m 25.4, range 64 - ? cm
Max length : 70.0 cm TL male/unsexed; [Sabaj and Ferraris 2003]; max. published weight: 6.5 kg [IGFA 2001]"

Environment

From Froese and Pauly (2018a):

"Freshwater; demersal; pH range: 7.5 - ?; potamodromous [Riede 2004]. […]; 20°C - 24°C [assumed to be recommended aquarium temperature] [Baensch and Riehl 1985]"

Climate/Range

From Froese and Pauly (2018a):

"Subtropical; […]"

Distribution Outside the United States

Native

From Froese and Pauly (2018a):

"South America: Amazon and Paraná River basins [Argentina, Bolivia, Brazil, Colombia, Paraguay, Peru, Uruguay] and coastal drainages in Guyana and Suriname."

"[In Argentina:] Found in upper Paraná [López et al. 2005]. Known from Dock Sur, El Puerto de Buenos Aires [Burgess 1989]."

Introduced

From Júlio Júnior et al. (2009):

"Four thorny catfishes successfully invaded the upper rio Paraná after [the closure of the] Itaipu [Dam]: *Oxydoras eigenmanni* (= *Doras eigenmanni* in Zawadzki et al., 1996), *Platydoras*

armatulus, *Pterodoras granulosus*, and *Trachydoras paraguayensis*, as already stated by Zawadzki et al. (1996). The only native doradid species upstream from the Falls was *Rhinodoras dorbignyi*, which remains hitherto cohabiting with congeners. Some of the introduced species became common, such as *T. paraguayensis*, especially in the years just after the impoundment, and *P. granulosus*, currently the second most important species in biomass considering artisanal fisheries in the Itaipu Reservoir (Okada et al., 2005)."

Garcia et al (2018) list *P. granulosus* as non-native to the Rosana Reservoir and the Taquaruçu Reservoir. These reservoirs are further upstream on the Paraná River than the Itaipu impoundment.

Means of Introduction Outside the United States

From Júlio Júnior et al. (2009):

"[…] 33 species of native fishes in the lower rio Paraná basin that successfully colonized the upper rio Paraná after Itaipu impoundment, that flooded the natural geographic barrier constituted by the Sete Quedas Falls."

Short Description

From Assumpção et al. (2012):

"Morphologic and behavioral characteristic of *Pterodoras granulosus* such as depressed ventrally body […]"

Biology

From Froese and Pauly (2018a):

"Nocturnal predator. Occurs in small groups. Feeds mainly on the fruits of *Astrocaryum javary* [Goulding 1981]. Captured individuals had a large amount of fleshy fruits in their stomachs. This fish is also known to feed on snails and aquatic macrophytes [Burgess 1989]."

From Nico et al. (2018):

"Primarily omnivorous, consuming a wide diet including filamentous algae, portions of terrestrial plants, benthic and terrestrial invertebrates, and other fishes (Hahn et al. 1992). It also feeds on palm fruits and may act to disperse seeds in the flooded forests (Goulding [1981]). *Pterodoras granulosus* is a migratory species, making yearly spawning migrations during the rainy season (December - March) from large rivers and reservoirs into shallow flooded areas (Makrakis et al. 2007)."

Human Uses

From Froese and Pauly (2018a):

"Fisheries: commercial; aquarium: public aquariums"

From Okada et al. (2005):

"The main species caught in the artisanal fishery during the period, in order of decreasing abundance, were perna-de-moça (*Hypophthalmus edentatus*), armado (*Pterodoras granulosus*), […]"

"The tendency towards depletion in the artisanal fishery, involving all species, reflects spatial and temporal variations of the main species, particularly declines in catches of *H. edentates* in the lacustrine zone and *P. granulosus* in the fluvial zone."

Diseases

No records of OIE-reportable diseases (OIE 2020) were found for *Pterodoras granulosus*.

Chambrier et al. (2006) list *Pterodoras granulosus* as a host for *Proteocephalus* sp.

Moravec and Thatcher (1997) describe the parasite *Raphidascaroides braziliensis* from *Pterodoras granulosus*.

Moravec et al. (1992) describe the parasite *Neoparaseuratum travassosi* from *Pterodoras granulosus*.

From Froese and Pauly (2018a):

"Procamallanus Infection 10, Parasitic infestations (protozoa, worms, etc.)
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Procamallanus Infection 10, Parasitic infestations (protozoa, worms, etc.)
Klossinemella Infestation, Parasitic infestations (protozoa, worms, etc.)
Klossinemella Infestation, Parasitic infestations (protozoa, worms, etc.)
Rondonia Infestation, Parasitic infestations (protozoa, worms, etc.)
Spectatus Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Spectatus Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Neoparaseratum Infestation, Parasitic infestations (protozoa, worms, etc.)
Cucullanus Infestation 14, Parasitic infestations (protozoa, worms, etc.)
Raphidascaroides Infection 2, Parasitic infestations (protozoa, worms, etc.)
Paracamallanus Infection 2, Parasitic infestations (protozoa, worms, etc.)"

Froese and Pauly (2018b) list *Pterodoras granulosus* as a host for *Dolops longicauda* and *Ergasilus bryconis*.

Poelen et al. (2014) list *Travassosinia dilatata*, *Neoechinorhynchus pterodoridis*, *Monticellia belavistensis*, *Cosmetocleithrum bulbocirrus*, *Vancleaveus janauacaensis*, *Spriocamallanus inopinatus*, *Paracamallanus amazonensis*, *Klossinemella iheringi*, *Rondonia rondoni*, *Spectatus spectatus*, *Cucullanus pinnai*, *Pseudocladorchis* sp., *Dadatrema* sp., and *Microrochis* sp. as additional parasites of *Pterodoras granulosus*.

Threat to Humans

From Froese and Pauly (2018a):

"Harmless"

3 Impacts of Introductions

Some records of introduction were found; however, there was no information on actual impacts of introduction found. The below information indicates that there may be an economic impact since *Pterodoras granulosus* is a significant part of an artisanal fishery but no information could be found stating the economic scale of that fishery, if it was in existence before the dam was removed and *P. granulosus* invaded, or any changes to the fishery associated with that invasion.

From Júlio Júnior et al. (2009):

"Four thorny catfishes successfully invaded the upper rio Paraná after [the closure of the] Itaipu [Dam]: *Oxydoras eigenmanni* (= *Doras eigenmanni* in Zawadzki et al., 1996), *Platydoras armatulus*, *Pterodoras granulosus*, and *Trachydoras paraguayensis*, as already stated by Zawadzki et al. (1996). The only native doradid species upstream from the Falls was *Rhinodoras dorbignyi*, which remains hitherto cohabiting with congeners. Some of the introduced species became common, such as *T. paraguayensis*, especially in the years just after the impoundment, and *P. granulosus*, currently the second most important species in biomass considering artisanal fisheries in the Itaipu Reservoir (Okada et al., 2005)."

4 Global Distribution

Figure 1. Known global distribution of *Pterodoras granulosus*. Locations are in Colombia, Peru, Brazil, Bolivia, Paraguay, Uruguay, and Argentina. Map from GBIF Secretariat (2018). The following observations were not used to select source points for the climate match. The northern cluster of locations (Colombia) were not used to select source points for the climate match. Those locations are all identified as *Pterodoras granulosus* but are within the Orinoco River Basin, which is outside the described distribution of the species. Information was sought

regarding the presence of *P. granulosus* in the Orinoco basin but no confirmation of presence was found. The location of the Pacific Coast of Peru is outside the described distribution and no other source supported the existence of an established population at that location. The recorded collection locality does not match the given coordinates for the location in the ocean to the east of Brazil.

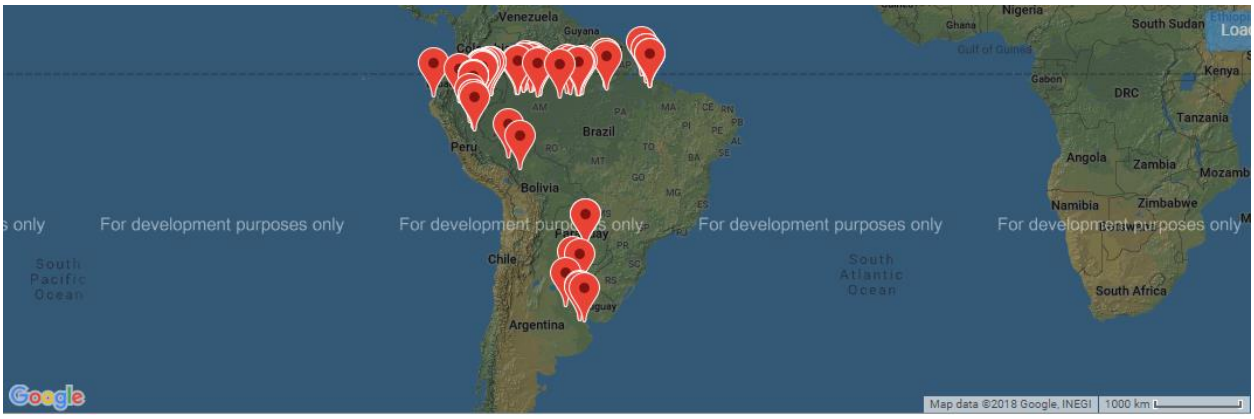

Figure 2. Additional known distribution of *Pterodoras granulosus*. Additional locations are in Argentina, Peru, and Bolivia. Map from VertNet (2018).

5 Distribution Within the United States

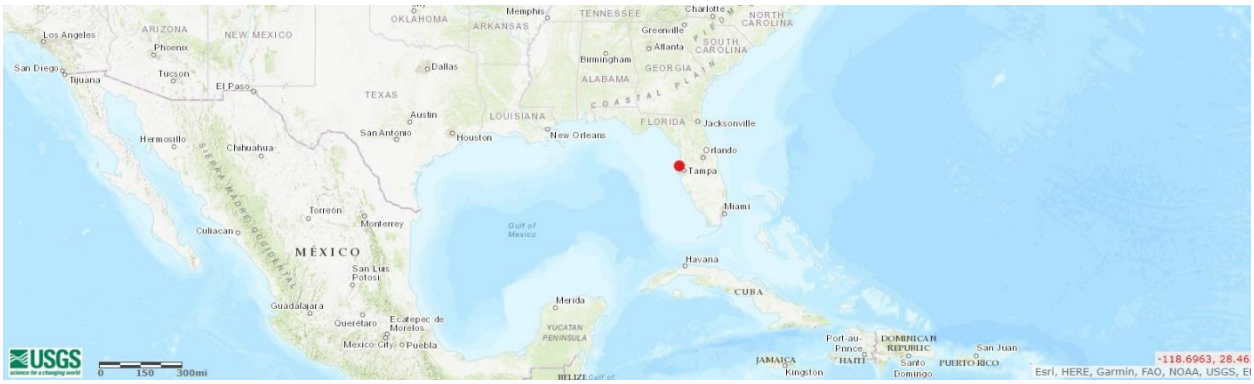

Figure 3. Location of known introduction of *Pterodoras granulosus* in the United States, reported from Florida. Map adapted from Nico et al. (2018). The location in Florida was not used to select source points for the climate match. The introduction failed to established a wild population.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Pterodoras granulosus* was high in Florida, the southern coast of Georgia, and along the Gulf Coast. An area of medium match stretched from New Jersey and Pennsylvania, along the southern edge of the Great Lakes basin and west to central Texas. There were also small areas of medium match in Arizona. The climate match was low everywhere else. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.091, medium. (Scores between 0.005 and 0.103 are classified as medium.) Alabama, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Texas, and Virginia all had high individual Climate 6 scores, Arkansas, Delaware, New Jersey, and Tennessee had medium scores, and all other States had low individual scores.

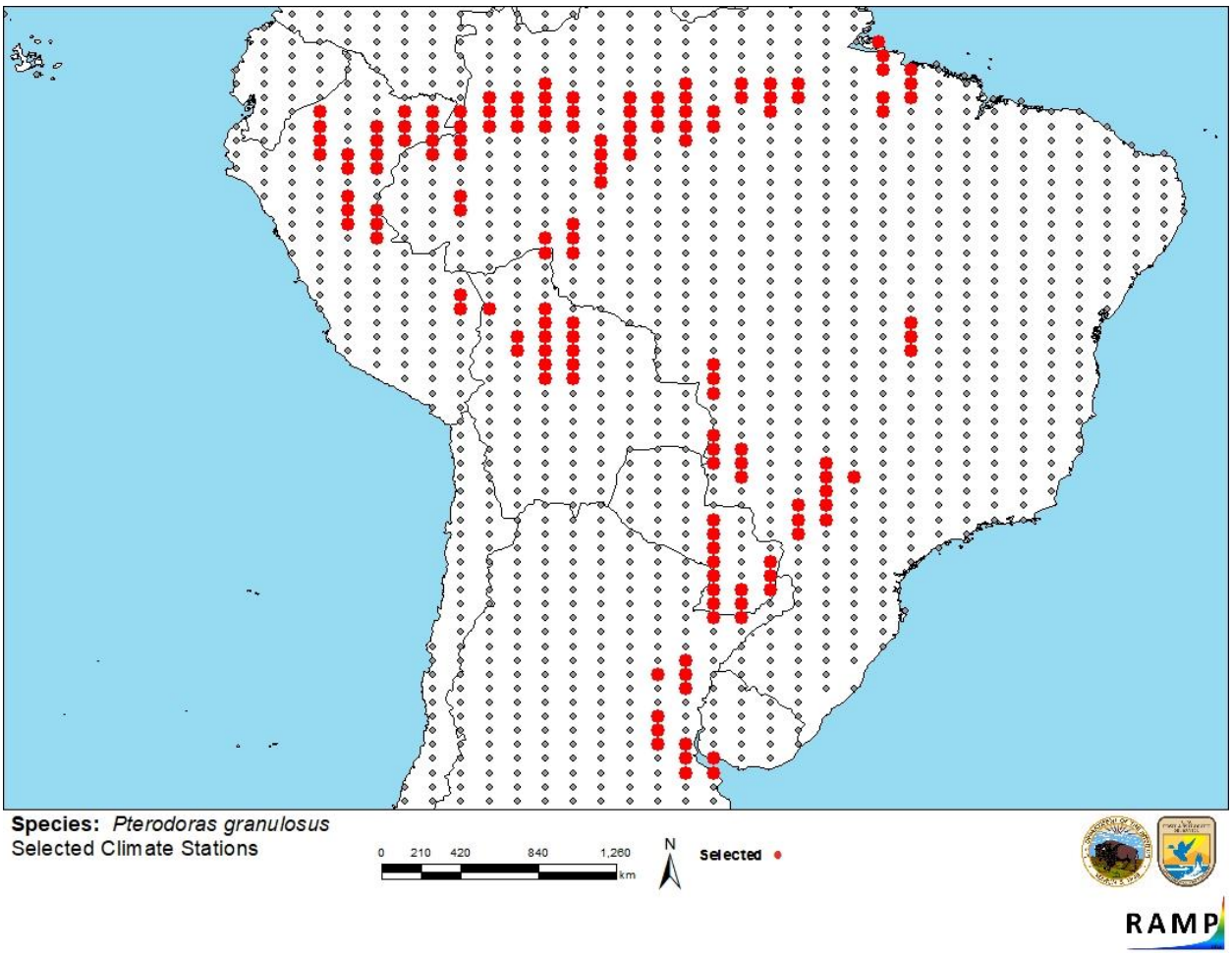

Figure 4. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Brazil, Colombia, Peru, Bolivia, Paraguay, Argentina, Uruguay) and non-source locations (gray) for *Pterodoras granulosus* climate matching. Source locations from GBIF Secretariat (2018) and VertNet (2018). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

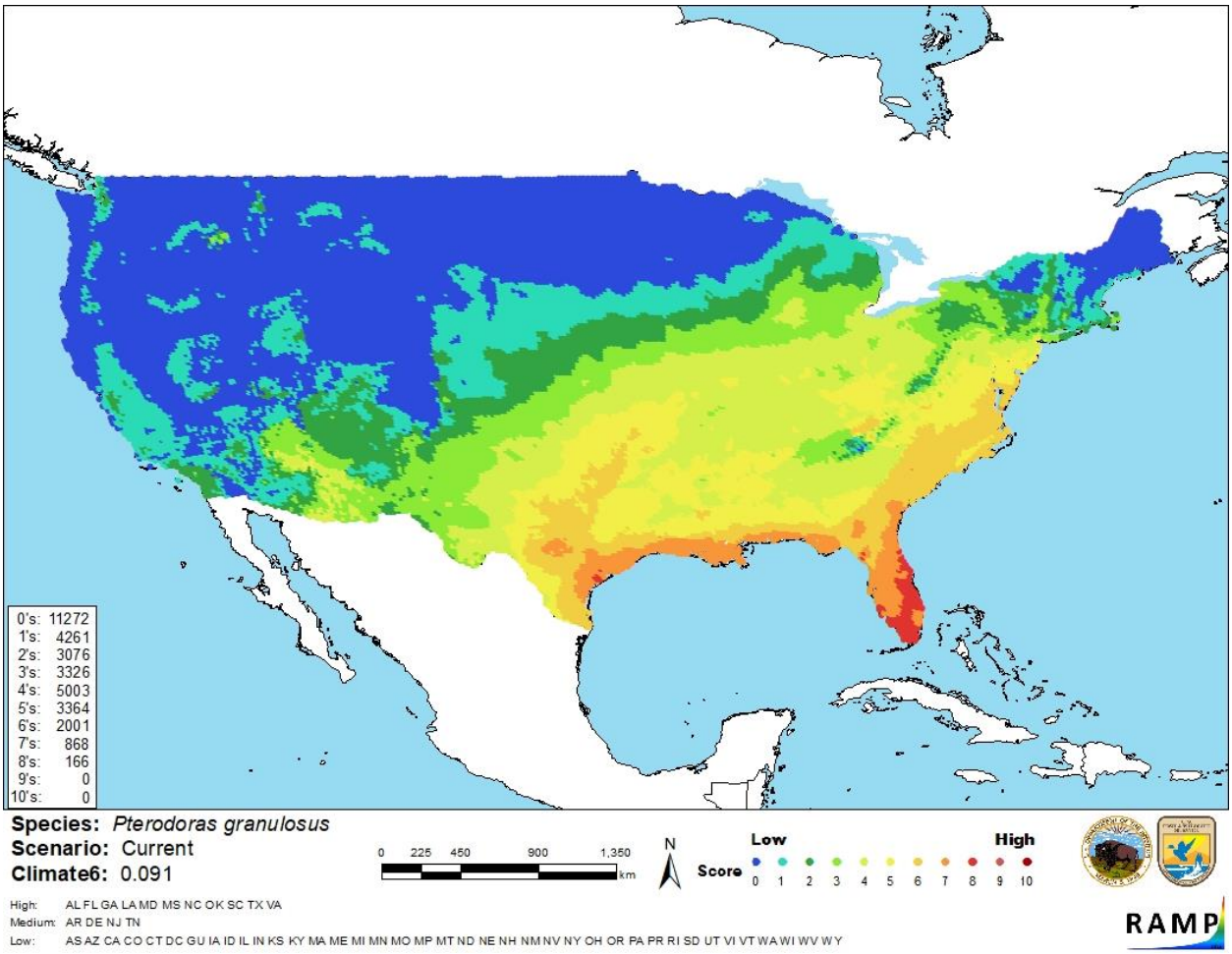

Figure 5. Map of RAMP (Sanders et al. 2018) climate matches for *Pterodoras granulosus* in the contiguous United States based on source locations reported by GBIF Secretariat (2018) and VertNet (2018). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

The certainty of assessment for *Pterodoras granulosus* is low. There is some general information available for the species. Records of introduction were found but information on impacts of introduction was only hinted at in the literature, no records of documented impacts were found. The distribution is moderately well documented. One database contains many records in the Orinoco River basin but no other sources corroborate the species' presence in that basin.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Granulated Catfish (*Pterodoras granulosus*) is a species of catfish native to the Amazon and Paraná river basins in South America. The fish is consumed by local populations and is present in the aquarium industry. The history of invasiveness is none documented. Records of introduction were found. A failed introduction occurred in Florida, and successful introductions occurred in rivers in South America. This species is found in trade. No information was found regarding scientifically defensible documented impacts of introduction. There is documentation of an artisanal fishery relying on this species in an invaded area but there is not enough accompanying information to determine any sort of economic or ecological impact beyond speculation. The climate match to the contiguous United States was medium. There were areas of high match, particularly in Florida and along the Gulf Coast. The certainty of assessment is low because of a lack of information on impacts of introduction, and questions about the species' distribution. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** No additional information.
- **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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