

Wayanad Mahseer (*Neolissochilus wynaadensis*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, April 2015

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1 Native Range and Status in the United States

Native Range

From Ali et al. (2014):

“*Neolissochilus wynaadensis* is endemic to the Western Ghats of India (Dahanukar & Raghavan 2013). The species has a restricted distribution (an area of occupancy of 1000km²) occurring in the east flowing streams and rivers part of the larger Cauvery drainage, i.e., Kalindi Stream of Kabini River in Thirunelli; Noolpuzha Stream of Kabini River inside the Wayanad Wildlife Sanctuary, Kakkanhalla and Moyar tributaries inside the Mudumalai Wildlife Sanctuary, as well as streams near Vythiri in Wayanad, and Muvathoklu, Mukkodlu, Surlabi, Bhagamandala and

Abbey falls in Kodagu (see Image 3; Table 5). In Kodagu, *N. wynaadensis* has also been recorded in Hamyala (Images 4, 5) and Kakkehole (Steven Lockett, pers. comm. 2013). However, no voucher specimens are available. The species is currently known between the altitudinal range 400–1100 m. The fact that the species has a very restricted distribution, and is confined to only a few tributaries/streams in its range is additionally evident from the studies of Johnson & Arunachalam (2009) (studies conducted in 2001–2002) where they did not record *N. wynaadensis* from two tributaries (Thalipuzha and Bavalipuzha) of the east flowing Cauvery in Wayanad District.

Abraham (2011), mentions that the fish also occurs in the Chooralmala and Kanthampara areas in Wayanad (part of the west flowing Chaliyar River system), without providing any reference. The author also mentions (a personal communication; see <http://www.iucnredlist.org/details/172429/0>) that the species occurs in the Periya Forest Range near Mananthavady, Wayanad. It is to be noted that, in a comprehensive study of the fishes of Nilgiri Biosphere Reserve including parts of Wayanad and upper reaches of Chaliyar (Easa & Basha 1995; Easa & Shaji 1997), not a single specimen of *N. wynaadensis* was collected from Chooralmala and Kanthampara (see Easa & Basha 1995; Table 10; p 29), suggesting that the species could be restricted to only the east flowing drainages (Easa & Shaji 1997). Therefore, in the absence of any references to the records, and actual voucher specimens, it is premature to conclude that *N. wynaadensis* occurs in the west flowing drainages as suggested by Abraham (2011).

Arunachalam et al. (2005) mentioned that *N. wynaadensis* occurs in Vattapoil in Wayanad District by citing Gopi (2000). This record may however be based on the personal examination of voucher specimens (ZSI WRS Calicut 6868) collected from this location, rather than as mentioned by Gopi (2000). This is because, Gopi (2000), in his review on the fishes of Kerala, does not mention such a location and only records this species from Thirunelli and Vythiri (see p 62 and 71).

Abraham (2011) mentions about a record of *N. wynaadensis* from Bhadra River, citing Shahnawaz et al. (2009 sic) (note that the correct year should have been 2010). However a perusal of the original paper by Shahnawaz et al. (2010) reveals no such record. Similarly, although Pillai (1929) and Hora & Law (1941) recorded *Barbus wynaadensis* from Travancore in southern Kerala, it is highly unlikely that the species occurs in the region. The record by Pillai (1929) from Tenmalai was also doubted by Menon (2004). In all probability, the specimen misidentified as *Barbus wynaadensis* from Travancore could be the fish currently known as '*Barbodes' carnaticus*.

Neolissochilus wynaadensis was reported from Mula-Mutha River of Pune by Tonapi & Mulherkar (1963). However, this record was doubted by Kharat et al. (2001, p 47). Similarly, the records of *N. wynaadensis* from China (Wu 1964, cited in Talwar & Jhingran 1991), especially from the Yunnan region (Wu 1977, cited in Chen et al. 1999; Yang & Chen 1994; Jing et al. 2013; also see cytb sequence KC696524 in GenBank) are 'at best' misidentifications, and may in all probability be *N. hexagonolepis*, *N. stracheyi* (see Fig 1) or an undescribed species similar to it. The examination of the specimen, KIZ8110101 (see Yang & Chen 1994) at the Kunming Institute of Zoology, China will help clear the exact identity of the '*Barbodes wynaadensis*' recorded from the rivers in Yunnan."

Status in the United States

No records of *Neolissochilus wynaadensis* in wild or in trade the United States were found.

Means of Introductions in the United States

No records of *Neolissochilus wynaadensis* in the United States were found.

Remarks

Eschmeyer et al. (2017) list the valid name as *Neolissochilus wynaadensis*. At the time of assessment, most databases did not yet incorporate this change and still used *Barbodes wynaadensis* as the valid name. Information searches were conducted using both names.

From Abraham (2011):

“Red List Category & Criteria: Critically Endangered A2ace ver 3.1

Barbodes wynaadensis is a highly restricted species which has undergone drastic population declines of more than 80% over the last 10 years due to several known and unknown threats. It is therefore assessed as Critically Endangered.”

“The population has declined drastically: by more than 80% in the last ten years. Several surveys in Wyanad (1999 to 2004 and in 2008) have not found this species. The last time this fish was recorded was in 1998 (M. Arunachalam pers. comm. 2010). In another instance, the last sighting was in 1996 (C.P. Shaji pers. comm. 2010). However, there is one collection by Dinesh of Kerala Fisheries College from Thirunelli Temple in Wyanad in 2008, and Anvar Ali and Rajeev Raghavan of Conservation Research Group (CRG), St. Albert's College, Kochi collected this species from Thirunelli Temple stream in 2003.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2017):

“**Current status:** Valid as *Neolissochilus wynaadensis* (Day 1873).”

From ITIS (2015):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi

Order Cypriniformes
Superfamily Cyprinidea
Family Cyprinidae
Genus *Barbodes*
Species *Barbodes wynaadensis* (Day, 1873)”

Size, Weight, and Age Range

From Froese and Pauly (2015):

“Max length: 25.0 cm TL male/unsexed; [Menon 1999]”

Environment

From Froese and Pauly (2015):

“Freshwater, benthopelagic.”

Climate/Range

From Froese and Pauly (2015):

“Tropical”

From Abraham (2011):

“This species prefers colder climates and the recent rise in the temperature could be a reason for its decline (C.P. Shaji pers. comm.).”

Abraham (2011) lists the lower elevation limit as 500m and the upper elevation limit as 950m.

From Ali et al. (2014):

“The species is currently known between the altitudinal range 400–1100 m.”

Distribution Outside the United States

Native

See Section 1: Native Range for full discussion of distribution from Ali et al. (2014).

From Ali et al. (2014):

“*Neolissochilus wynaadensis* is endemic to the Western Ghats of India (Dahanukar & Raghavan 2013).”

Introduced

No records of *Neolissochilus wynaadensis* introductions were found.

Means of Introduction Outside the United States

No records of *Neolissochilus wynaadensis* introductions were found.

Short Description

From Yang and Chen (1994):

“Because most primitive species of *Barbodes* such as *B. benasi*, *B. wynaadensis*, and *B. hexagonolepis* (Wu et al. 1977; Chu et al. 1989) possess an anteriorly positioned dorsal fin.”

“Because most primitive species of *Barbodes* such as *B. benasi*, *B. wynaadensis*, and *B. hexagonolepis* (Wu et al. 1977; Chu et al. 1989) possess 7-11 predorsal scales.”

From Ali et al. (2014):

“[...], *N. wynaadensis* also has a wide range of lateral line scale counts (26–29).”

Arunachalam et al. (2017) lists the following for *Neolissochilus wynaadensis*: iv.9 dorsal fin rays, iii.5 anal fin rays, i.8 pelvic fin rays, i.15 pectoral fin rays, 10+9 caudal fin rays, 4 upper transverse scale rows, 5-6 lower transverse scale rows, 4 lateral line to pelvic scale rows, 28-29 lateral-line scales, 10 pre-dorsal scales, 12 circumpenduncular scale rows, 18-19 circumferential scale rows, 7-8 transverse breast scale rows, and 25-26 pre anal scale rows.

From Anna Mercy et al. (2007):

“Body elongate, its depth 3.75 to 4.4 times in standard length. Head broad, its length 4.2 to 4.5 times in standard length. Mouth smoothly rounded; lower labial fold interrupted. Barbels two pairs; maxillary barbels as long as orbit, rostral ones shorter. Dorsal fin inserted slightly nearer to snout-tip than to base of caudal fin, its last unbranched ray non-osseous and weak. Scales moderate; lateral line with 26 to 28 scales; lateral transverse scalerows 4 to 6; predorsal scales 10.”

“Leaden silvery along the back, with a dark band running from behind the eyes to the middle of the base of caudal fin where it often ends in a round black blotch; belly light orange. Fins greyish at edges.”

Biology

From Ali et al. (2014):

“The pool-riffle habitats have a moderate flow velocity and provide good hiding places for the species. These habitats are also frequented by riffle beetles and chironomids that form the major food for *N. wynaadensis* (Manojkumar & Kurup 2002). [...] It has also been suggested that *N. wynaadensis* are long range migrants that travel to the upper reaches of rivers for spawning (Menon 2004).”

From Froese and Pauly (2015):

“Occurs in fast flowing streams and rivers with rocky bottom (Menon 1999).”

From Anna Mercy et al. (2007:55):

“It is omnivorous.”

Human Uses

Jayalal and Ramachandran (2012) lists *Neolissochilus wynaadensis* as a species exported from India for the ornamental trade.

From Abraham (2011):

“The species is fished occasionally by tribal communities (C.P. Shaji. pers. comm. 2010).”

Diseases

Information on pathogens or parasites of *Neolissochilus wynaadensis* was not found. **No records of OIE-reportable diseases (OIE 2020) were found for *N. wynaadensis*.**

Threat to Humans

From Froese and Pauly (2015):

“Harmless”

3 Impacts of Introductions

No records of *Neolissochilus wynaadensis* introductions were found; therefore, there is no information on impacts of introductions.

4 Global Distribution

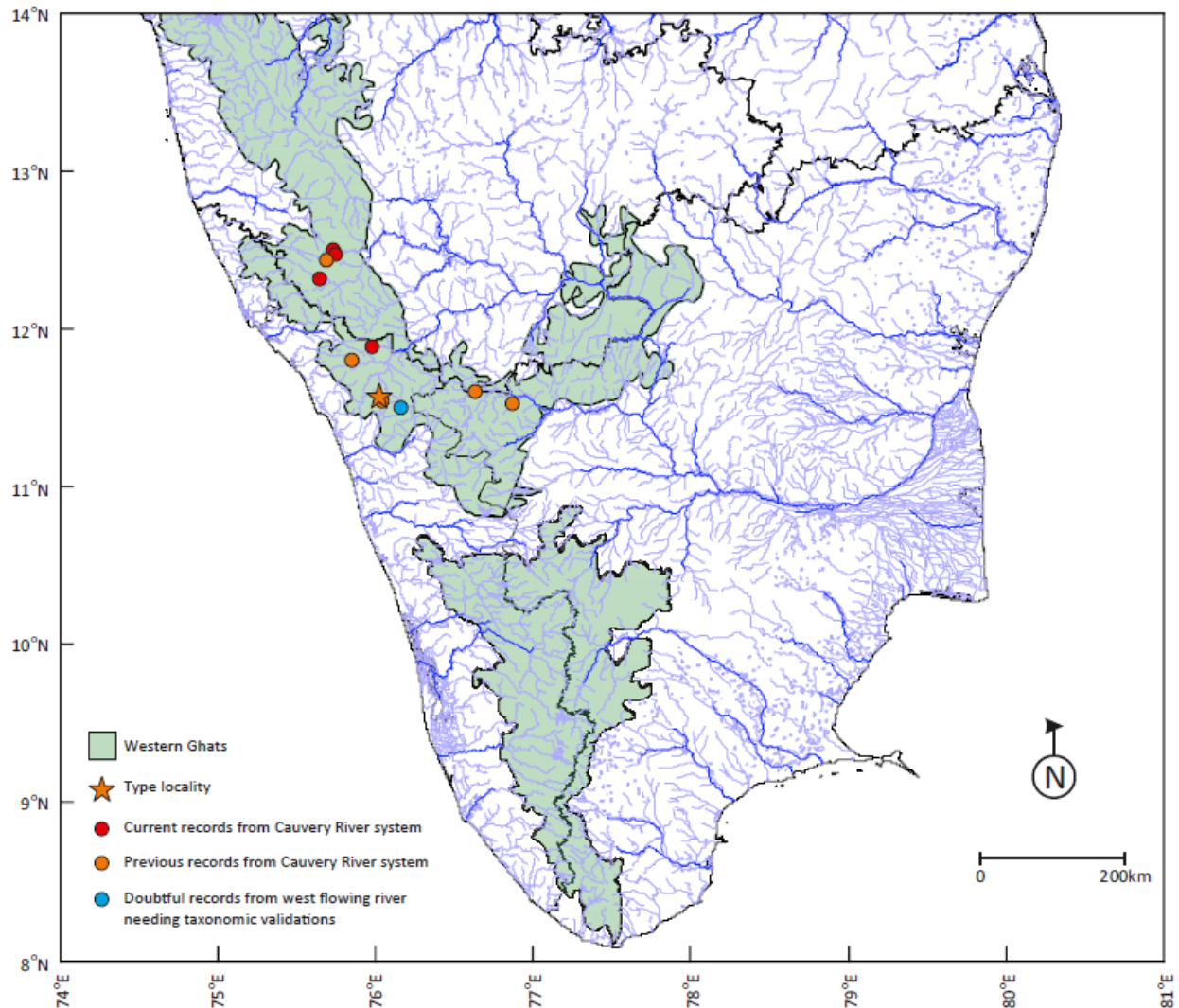


Figure 1. Distribution of *Neolissochilus wynaadensis* in the Western Ghats, India. Map from Ali et al. (2014, Figure 3; Creative Commons BY 4.0 International License).

5 Distribution Within the United States

No records of *Neolissochilus wynaadensis* in the wild in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Neolissochilus wynaadensis* was medium for southern Texas and a small spot in southern California. The match was low everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low. (Scores between 0.000 and 0.005, inclusive, are classified as low.) All States had low individual Climate 6 scores.

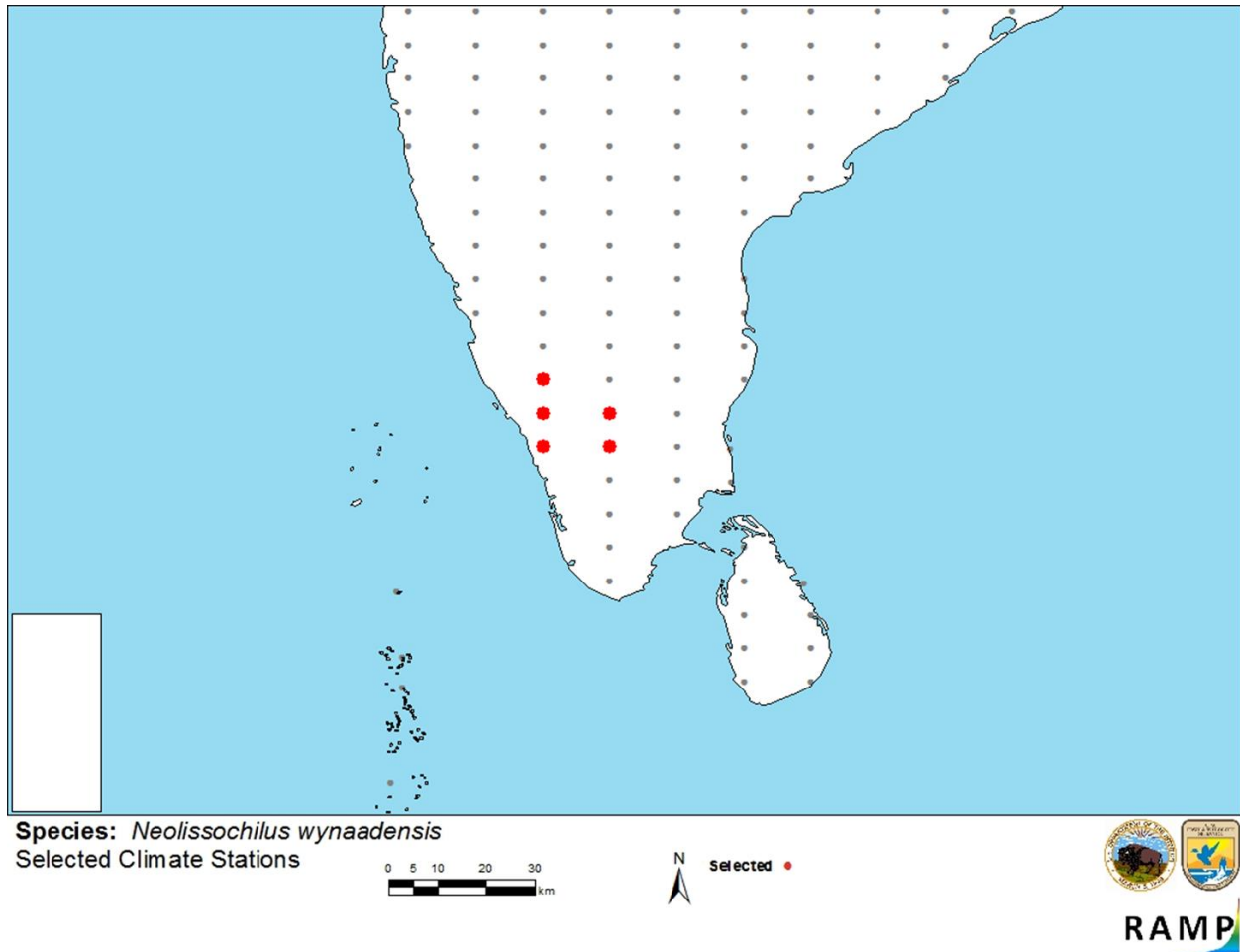


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; India) and non-source locations (gray) for *Neolissochilus wynaadensis* climate matching. Source locations from Ali et al. (2014). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

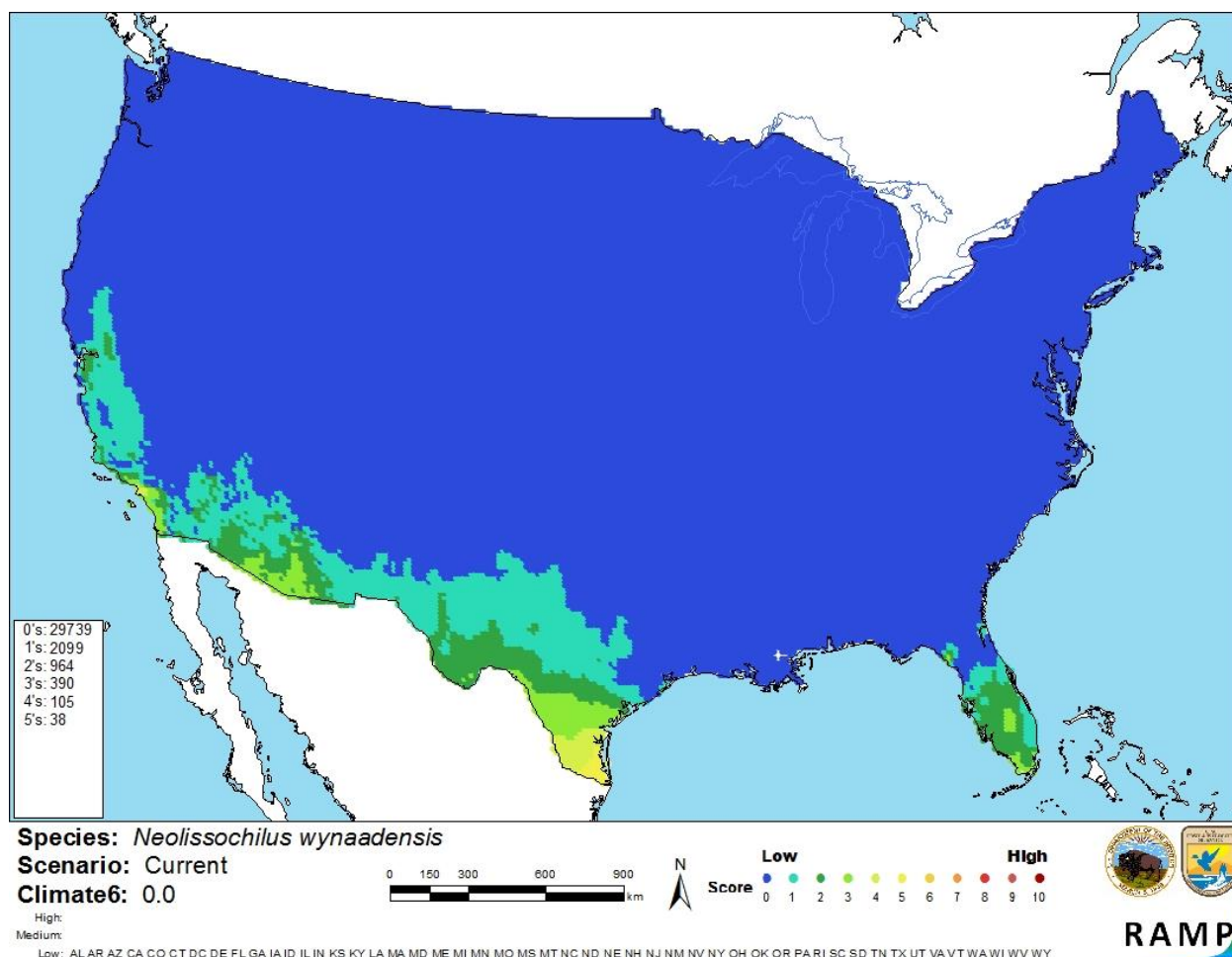


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Neolissochilus wynaadensis* in the contiguous United States based on source locations reported by Ali et al. (2014). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

The certainty of assessment is low. There was adequate biological information for *Neolissochilus wynaadensis*. A detailed range description was available. No records of introductions were found; therefore there is a lack of information on impacts of introduction. One reference did list this species as exported for the ornamental trade but no specific numbers on trade volume or duration were available.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Neolissochilus wynaadensis, Wayanad Mahseer, is a fish endemic to the Western Ghats of India. Many sources still refer to this species by the synonym *Barbodes wynaadensis*. It has recently undergone drastic population reductions and is listed by the IUCN as Critically Endangered. There is some use of this species as a subsistence fishery and one source mentioned that it has been exported for the ornamental trade. The history of invasiveness for *N. wynaadensis* is uncertain. No records of introductions were found. The overall climate match for the contiguous United States is low; only the southern tip of Texas and a small area in Southern California had a medium match. The certainty of assessment is low due to lack of information. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information** Records of this species in China are misidentifications. Recent change in valid scientific name, many sources still use the synonym *Barbodes wynaadensis*.
- **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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