Striped Catfish (*Pangasianodon hypophthalmus*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, January 2018
Web Version, 8/16/2018

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1 Native Range and Status in the United States

Native Range

From Neilson et al. (2018):

"Southeast Asia; Mekong and Chao Phraya rivers and Maeklong basins (Van Zalinge et al. 2002)."

Status in the United States

From Neilson et al. (2018):

"This species was reported in 1988 from **a Florida** creek that drains into the Hillsborough River near Tampa (Shafland et al. 2008, as *Platytropius siamensis*), and from a non-specific location circa 1999 (P. Shafland, personal communication). In 2017, a specimen was captured by commercial fisherman in the Illinois River near Naplate, **Illinois** (K. Irons, pers. comm.)."

"**Status:** Unknown; likely failed."

"Shafland et al. (2008) report the capture of five "false Siamese shark" (identified as *Platytropius siamensis*), stating that it is a common aquarium fish. However, this species has not been observed in the wild since the mid-1970s and is currently classified as extinct (Ng 2011), and thus was likely not common in the aquarium trade in 1988. This is likely a case of misidentified individuals of *Pangasiodon hypophthalmus*, which is commonly found in the aquarium trade, and the report of Shafland et al. (2008) is included here."

Means of Introduction into the United States

From Neilson et al. (2018):

"Unknown. Likely aquarium release as it is common in the trade."

Remarks

From Neilson et al. (2018):

"Common name: iridescent shark
Synonyms and Other Names: *Pangasius hypophthalmus* (Sauvage, 1878), *Pangasius sutchi* Fowler, 1937; tra, swai, striped catfish, sutchi catfish"

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Bailly (2017):

"Biota > Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > Pisces (Superclass) > Actinopterygii (Class) > Siluriformes (Order) > Pangasiidae (Family) > *Pangasianodon* (Genus) > *Pangasianodon hypophthalmus* (Species)"

From Eschmeyer et al. (2018):

"**Current status:** Valid as *Pangasianodon hypophthalmus* (Sauvage 1878)."

Size, Weight, and Age Range

From Froese and Pauly (2017):

"Max length : 130 cm SL male/unsexed; [Roberts and Vidthayanon 1991]; max. published weight: 44.0 kg […]"

Environment

From Froese and Pauly (2017):

"Freshwater; benthopelagic; pH range: 6.5 - 7.5; dH range: 2 - 29; potamodromous [Riede 2004]."

"[…] 22°C - 26°C [Riehl and Baensch 1996; assumed to be recommended aquarium water temperatures]"

Climate/Range

From Froese and Pauly (2017):

"Tropical; […] 19°N - 8°N"

Distribution Outside the United States

Native

From Neilson et al. (2018):

"Southeast Asia; Mekong and Chao Phraya rivers and Maeklong basins (Van Zalinge et al. 2002)."

Introduced

Froese and Pauly (2017) report that *P. hypophthalmus* has become established in Myanmar (introduced 1982) and Bangladesh (introduced 1990), and probably established in the Philippines (introduced 1978). They report that *P. hypothalamus* was also introduced to the following countries where establishment either failed or is unknown: Guam (unknown introduction date), Malaysia (unknown introduction date), Singapore (unknown introduction date), Taiwan (introduced 1969), Indonesia (introduced 1972), and China (introduced 1978).

From Lakra and Singh (2010):

"A few specimens of *P. sutchi* have been caught from the wild in Andhra Pradesh and also from wetlands in West Bengal. Bench mark surveys indicated the availability of *P. sutchi* in natural waters. The present occurrence of *P. sutchi* in natural waters is in need of further study with regards to the conditions it can survive in […] However, gut analysis of the collected specimens from wild showed presence of shell and plant debris in the stomach. The gonads of the wild caught specimens have not been found fully developed and mature."

Means of Introduction Outside the United States

From Froese and Pauly (2017):

"Introduced into additional river basins for aquaculture."

Short Description

From Froese and Pauly (2017):

"Fins dark grey or black; 6 branched dorsal-fin rays; gill rakers normally developed; young with a black stripe along lateral line and a second long black stripe below lateral line, large adults uniformly grey [Rainboth 1996]. Dark stripe on the middle of anal fin; dark stripe in each caudal lobe; small gill rakers regularly interspersed with larger ones [Kottelat 2001]."

From Neilson et al. (2018):

"*Pangasianodon hypophthalmus* is similar in body shape to blue (*Ictalurus furcatus*) and channel catfish (*I. punctatus*), but can be generally distinguished by the number of pairs of barbels around the mouth: *P. hypophthalmus* has only two pairs of maxillary barbels (at the corner of the mouth), whereas *Ictalurus* spp. have four pairs of barbels including chin (below the mouth) and nasal (above the mouth) barbels."

Biology

From Froese and Pauly (2017):

"Inhabits large rivers [Rainboth 1996]. Omnivorous [Ukkatawewat 1984], feeding on fish and crustaceans as well as on vegetable debris [Rainboth 1996]. A migratory species, moving upstream of the Mekong from unknown rearing areas to spawn in unknown areas in May-July and returning to the mainstream when the river waters fall seeking rearing habitats in September -December [Hill and Hill 1994]. South of the Khone Falls, upstream migration occurs from October to February, with peak in November-December. This migration is triggered by receding water and appears to be a dispersal migration following the lateral migration from flooded areas back into the Mekong at the end of the flood season. Downstream migration takes place from May to August from Stung Treng to Kandal in Cambodia and further into the Mekong Delta in Viet Nam. The presence of eggs during March to August from Stung Treng to Kandal indicates that the downstream migration is both a spawning and a trophic migration eventually bringing the fish into floodplain areas in Cambodia and Viet Nam during the flood season [Sokheng et al. 1999]. Common in the lower Mekong, where the young are collected for rearing in floating fish cages. In the middle Mekong it is represented by large individuals that lose the dark coloration of the juveniles and subadults and become grey without stripe [Rainboth 1996]."

From Neilson et al. (2018):

"Inhabits main channels of large rivers, moving to floodplains and marshy areas during flooding in the rainy season. Omnivorous, primarily feeding on algae, zooplankton, crustaceans, and fishes. Large migratory spawner, capable of long distance movements (>300 km) upstream in major rivers in Southeast Asia to spawning areas in northeastern Cambodia (Vidthayanon and Hogan 2011; Van Zalinge et al. 2002)."

Human Uses

From Froese and Pauly (2017):

"Fisheries: commercial; aquaculture: commercial; aquarium: public aquariums"

"One of the most important aquaculture species in Thailand [Roberts 1993]."

From Neilson et al. (2018):

"Farmed widely as a food fish in Asia, and sold in the U.S. as swai. Wild stocks have generally declined since the 1980s due to overexploitation (Vidthayanon and Hogan 2011)."

Diseases

From Froese and Pauly (2017):

"White spot Disease, Parasitic infestations (protozoa, worms, etc.)
Trichodinosis, Parasitic infestations (protozoa, worms, etc.)
Cryptobia Infestation, Parasitic infestations (protozoa, worms, etc.)
Silurodiscoides Infestation, Parasitic infestations (protozoa, worms, etc.)
Enteric Septicaemia of Catfish, Parasitic infestations (protozoa, worms, etc.)
Dactylogyrus Gill Flukes Disease, Parasitic infestations (protozoa, worms, etc.)
Sporozoa Infection (*Hennegya* sp.), Parasitic infestations (protozoa, worms, etc.)
Ichthyobodo Infection, Parasitic infestations (protozoa, worms, etc.)
Sporozoa-infections, other, Parasitic infestations (protozoa, worms, etc.)
Bacterial Infections (general), Bacterial diseases
Sporozoa Plasmodia Infection, Parasitic infestations (protozoa, worms, etc.)
DMS, Others"

From Tripathi et al. (2014):

"*Thaparocleidus caecus* and *Thaparocleidus siamensis* are parasitic monogeneans found on the gills of striped catfish *Pangasianodon hypophthalmus* (Pangasiidae), a native species of Southeast Asia. We report *T. caecus* and *T. siamensis,* for the first time in India, from the gills of aquarium-kept *P. hypophthalmus* (prevalence 40 % and 80 % respectively). We also report *T. siamensis* from the gills of pond-cultured *P. hypophthalmus* (prevalence 100 %); no specimen of *T. caecus* was observed on pond-cultured *P. hypophthalmus* (prevalence 0 %)."

From Crumlish et al. (2010):

"The two main diseases in the pangasius catfish industry are bacillary necrosis of *Pangasianodon* (BNP) and motile aeromonas septicaemia (MAS), where the aetiological agents have been identified as *Edwardsiella ictaluri* and *Aeromonas hydrophila*, respectively. […] [BNP] presented with few external clinical signs but internally the liver, kidney and spleen had pinpoint white spots. Crumlish, Dung, Turnbull, Ngoc & Ferguson (2002) identified *Edwardsiella ictaluri* as the aetiological agent of BNP infections in natural outbreaks. This bacterium was first identified as a significant threat to the USA channel catfish, *Ictalurus*

punctatus (Rafinesque), industry causing enteric septicaemia of catfish (ESC) (Hawke, McWhorter, Steigerwalt & Brenner 1981). It is a highly contagious disease and resulted in 67% of channel catfish production sites being affected by ESC in a single year (Panangala, Shoemaker, van Santen, Dybvig & Klesius 2007. [*sic*]"

Threat to Humans

From Froese and Pauly (2017):

"Harmless"

3 Impacts of Introductions

From Neilson et al. (2018):

"**Impact of Introduction** [in the U.S.]**:** Unknown, but likely none due to failure of introduction."

From Barua et al. (2001):

"The most 'disastrous' alien invasive fishes are *Clarias gariepinus* (African magur), *Pangasius sutchi* (Pangas) [synonym of *P. hypophthalmus*], *Pangasius giganticus* (Giant Pangas), *Tilapia mossambica* (Tilapia) and *Oreochromis niloticus* (Nilotica). These were brought in from Thailand between 1953 and 1990 (Rahman, 1997). The predatory habit of the first three species is well known. […] Among the introduced alien invasive species of fishes, *Clarias gariepinus* and *Pangasius* spp. are voracious eaters."

From Lakra and Singh (2010):

"**Biodiversity**
The locations of culture and hatchery sites of *P. hypophthalmus* in India have been found to be close to open waters and hence there exists every chance of its escape. […] It has potential to mature and breed naturally in wild and hence escapee fish may colonise and form feral populations in different agro-climatic conditions impacting the ecosystem and in turn affecting the biodiversity. In India, the breeding of local *P. pangasius*, which has a similar spawning period which will be overlapped by *P. hypophthalmus* in case of its establishment in the wild. The presence of similar numbers of chromosomes in both the species (2n=60) may facilitate hybridisation leading to genetic pollution which in turn could dilute the gene pool of local *P. pangasius* whose population has declined critically [Sarkar et al. 2006]. An experimental trial for cross breeding between *P. pangasius* with *P. hypophthalmus* has already been successfully attempted in Bangladesh [Khan and Mollah 2004; Hossain 2006]."

"**Issues of fish health**
Gill fluke infection is commonly seen in all *P. hypophthalmus* farms with infection rates varying from 60% to 90% of fish. […] Due to the open culture of *P. hypophthalmus*, risk of disease and parasite transfer to wild stocks would be possible. […] A report from New Zealand on risk assessment of Vietnamese *P. hypophthalmus* has highlighted the possible transfer of *Edwardsiela ictahuri* [*sic*] in aquaculture areas in Vietnam which is a concern of OIE listed disease [Reed 2008]. It is pertinent to mention that infection of *P. hypophthalmus* does not result in clinically apparent disease. Therefore, septicaemic fish are quite likely to be harvested for human consumption. There remains the possibility that some fish could be carrier of *E. ictaluri* without displaying clinical signs. […] If such infected fish is harvested and processed for consumption, it will have a serious concern with human health."

4 Global Distribution

Figure 1. Known global distribution of *P. hypophthalmus*, reported from the United States, Mexico, Belize, Egypt, India, Southeast Asia, Indonesia, Philippines, and Japan. Map from GBIF Secretariat (2017). Only the occurrences reported in Thailand, Vietnam, and Cambodia were included in the climate matching analysis. Records in Indonesia, Belize, and Mexico are of *P. hypophthalmus* found in markets, rather than in natural systems. All other records outside of Thailand, Vietnam, and Cambodia have issues reported by GBIF Secretariat (2017) including suspicious coordinate reprojection or invalid basis of record.

5 Distribution Within the United States

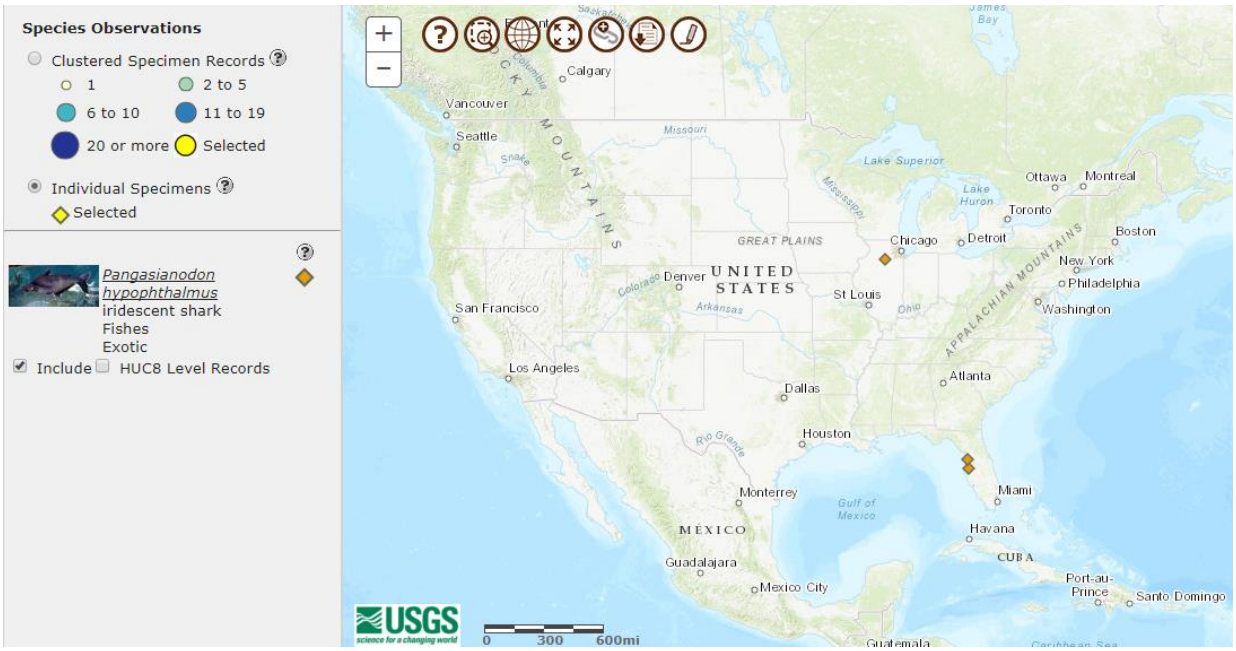

Figure 2. Known occurrences of *Pangasianodon hypophthalmus* in the United States, where it has been reported from Florida and Illinois. Map from Neilson et al. (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was medium in southern Florida and southern Texas. The rest of the contiguous U.S. showed low climate match. Climate 6 score indicated that the contiguous United States has an overall low climate match. Scores indicating a low climate match range from 0.000 through 0.005; the Climate 6 score of the *P. hypophthalmus* is 0.000.

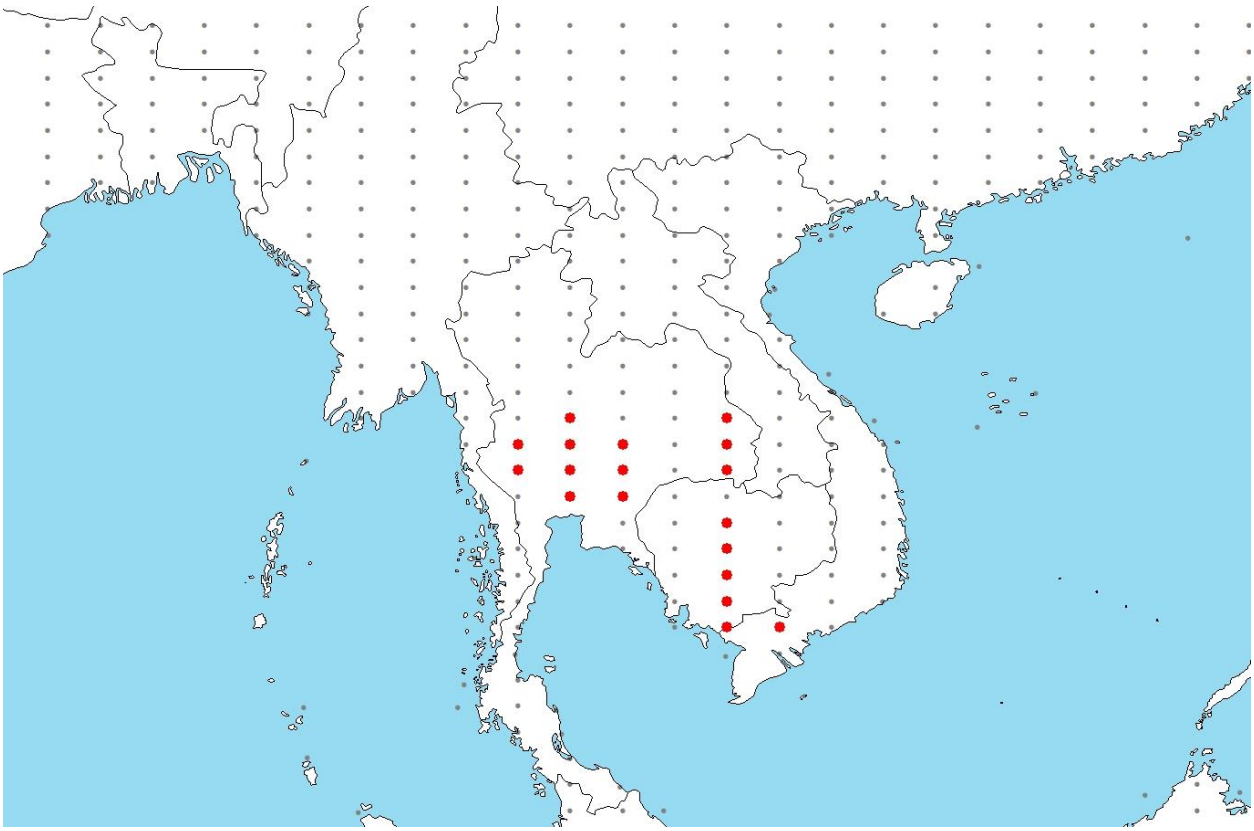

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in Thailand, Cambodia, and Vietnam selected as source locations (red) and non-source locations (gray) for *P. hypophthalmus* climate matching. Source locations from GBIF Secretariat (2017).

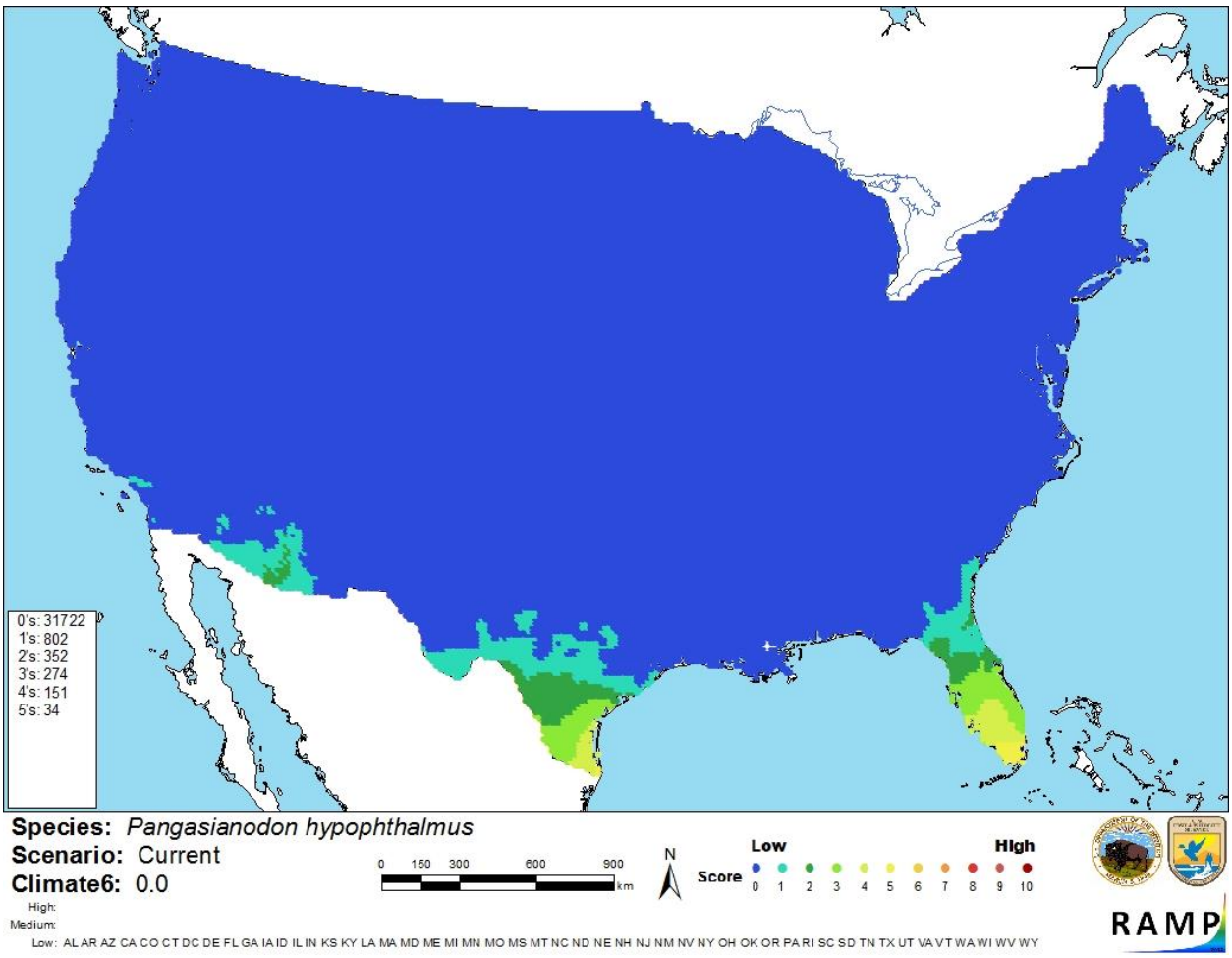

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *P. hypophthalmus* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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 is available on the biology and ecology of *Pangasianodon hypophthalmus*. The native distribution of the species is satisfactorily described, but there is uncertainty surrounding the status of the species in countries where the species has been introduced. Similarly, there is uncertainty surrounding the impacts of introduction of *P. hypophthalmus*, with little evidence

from wild populations to support expectations of negative impact. For these reasons, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Pangasianodon hypophthalmus is a large catfish native to Southeast Asia. It has been broadly introduced throughout Asia for aquacultural purposes, and within the U.S., it has been collected from Florida and Illinois. U.S. records of *P. hypophthalmus* are thought to result from aquarium releases and do not represent established populations. The climate match to the contiguous U.S. is low overall, with medium match occurring only in extreme southern Florida and Texas. Negative impacts have been reported from Bangladesh, but the information available does not rise to the level of clear and convincing evidence. Potential negative impacts have been voiced for introduced *P. hypophthalmus* in India. Because of the uncertainty surrounding the impacts of *P. hypophthalmus* introduction, overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness: None Documented**
- **Climate Match: Low**
- **Certainty of Assessment: 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.

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