U.S. Fish & Wildlife Service

Climbing Perch (*Anabas testudineus*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2014
Revised, May 2019
Web Version, 10/16/2019

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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"Asia: India to Wallace line including China. May have been distributed in more areas than were commonly reported."

Froese and Pauly (2019) lists *Anabas testudineus* as native to Andaman Island, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Singapore, Sri Lanka, Taiwan, Thailand, Timor-Leste, and Viet Nam.

From Nico and Fuller (2019):

"Native Range: Tropical Asia. Native to India, Sri Lanka, Burma, Southeast Asia, southern China, and Malaysia (Sterba 1973; Axelrod et al. 1985; FishBase 2011)."

Status in the United States

From Froese and Pauly (2019):

"Reported to be established in South Florida but no specimens were known to have been collected [Courtenay et al. 1984]."

From Nico and Fuller (2019):

"Nonindigenous Occurrences: A small population was formerly established near a fish farm on Piney Point Road in northwestern Manatee County, Florida, in late 1960s/early 1970s; however, it was not found in 1970-1972 surveys and the population is thought to have died out, probably due to cold winter temperatures (Courtenay and Hensley 1979; Courtenay and Stauffer 1990)."

"Status: Extirpated. Formerly established locally in Manatee County, Florida (Courtenay and Hensley 1979; Courtenay and Stauffer 1990). Shafland et al. (2008) list it as a formerly reproducing species."

Means of Introductions in the United States

From Froese and Pauly (2019):

"Introduced through accidental release from aquaria [Courtenay and Stauffer 1990]."

Remarks

A previous version of this ERSS was published in August 2014. Revisions were done to incorporate new information and to bring the document in line with current standards.

From Nico and Fuller (2019):

"Remarks: Roberts (1989) considered *Anabas* to be among the hardiest of fishes. There are no known voucher specimens."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

"**Current status:** Valid as *Anabas testudineus* (Bloch 1792)."

From ITIS (2019):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Anabantoidei
Family Anabantidae
Genus *Anabas*
Species *Anabas testudineus* (Bloch, 1792)"

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length : 25.0 cm TL male/unsexed; [Talwar and Jhingran 1991]; common length : 12.5 cm TL male/unsexed; [Davidson 1975]"

Environment

From Froese and Pauly (2019):

"Freshwater; brackish; demersal; potamodromous [Riede 2004]; […]; 22°C - 30°C [Riehl and Baensch 1991] [assumed to be recommended aquarium temperature]; […]."

Climate/Range

From Froese and Pauly (2019):

"Tropical; […]; 28°N - 10°S"

Distribution Outside the United States

Native

From Froese and Pauly (2019):

"Asia: India to Wallace line including China. May have been distributed in more areas than were commonly reported."

Froese and Pauly (2019) lists *Anabas testudineus* as native to Andaman Island, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Singapore, Sri Lanka, Taiwan, Thailand, Timor-Leste, and Viet Nam.

From Nico and Fuller (2019):

"Native Range: Tropical Asia. Native to India, Sri Lanka, Burma, Southeast Asia, southern China, and Malaysia (Sterba 1973; Axelrod et al. 1985; FishBase 2011)."

Introduced

From Froese and Pauly (2019):

"The species has been reported from Saibai Island, 4 km away from Papua New Guinea where it has been observed before 1994. Establishment is not considered surprising due to the proximity of the PNG coast to the island and due to the hardiness of the species."

"Introduced to Irian Jaya, possibly in the Merauke area and has now spread to the Morehead River in Papua New Guinea."

FAO (2019) lists *Anabas testudineus* as introduced to Indonesia and Madagascar from unknown, introduced to the Philippines from Malaysia, and introduced to Bangladesh from Thailand.

Means of Introduction Outside the United States

From Froese and Pauly (2019):

"The species may have made the movement from PNG [Papua New Guinea] to SaiBai Island through: 1. the system of mangrove creeks connecting swamps to the sea or flooding of low lying areas with king tides associated with northwest monsoon; 2. on small crafts from PNG to SaiBai island; and 3. translocated live by waterbirds or birds of prey from PNG."

Short Description

From Froese and Pauly (2019):

"Dorsal spines (total): 16 - 20; Dorsal soft rays (total): 7-10; Anal spines: 9-11; Anal soft rays: 8 - 11. Color in life dark to pale greenish, very pale below, back dusky to olive; head with longitudinal stripes ventrally; posterior margin of opercle with a dark spot; iris golden reddish. Body form variable, affected by age and amount of food consumed. Scaled head with 4-5 rows between eye and rear margin of preoperculum. Scales large and regularly arranged, ciliate."

Biology

From Froese and Pauly (2019):

"Found mostly in canals, lakes, ponds, swamps and estuaries [Menon 1999; Vidthayanon 2002]. Adults occur in medium to large rivers, brooks, flooded fields and stagnant water bodies including sluggish flowing canals [Taki 1978]. Often found in areas with dense vegetation [Rainboth 1996]. Can tolerate extremely unfavorable water conditions and is associated mainly with turbid, stagnant waters [Pethiyagoda 1991]. They remain buried under the mud during dry season [Rahman 1989]. Feed on macrophytic vegetation, shrimps and fish fry [Pethiyagoda 1991]. Reported to undertake lateral migration from the Mekong mainstream, or other permanent

water bodies, to flooded areas during the flood season and return to the permanent water bodies at the onset of the dry season [Sokheng et al. 1999]. During the dry season, they stay in pools associated with submerged woods and shrubs [Sokheng et al. 1999]. Posses [sic] an accessory air-breathing organ [Allen 1991]. Able to survive for several days or weeks out of water if the air breathing organs can be kept moist [Rahman 1989]. Quite famous for its ability to walk; […]."

"Guards eggs at the surface of hypoxic waters [Balon 1990]."

From Davenport and Abdul Matin (1990):

"Climbing perches use the tail for forward propulsion when on land. The spiny gill covers are used to obtain purchase on the substratum. Unusually amongst teleosts, the opercular and subopercular bone are not bound strongly together into a single operculum. Instead they are joined only by a thin, flexible membrane, so that the fish has two sections of the gill cover hinged separately; the opercular on the suspensorium and the subopercular on the rearmost part of the lower jaw. The gill covers open very widely and the subopercular rotates ventrally as well as laterally. Two modes of locomotion are employed. Usually *Annbus* adopts a near-upright posture and alternately drives the left and right spiny suboperculars into the substratum, using the tail to vault over the subopercular (which acts in the manner of a short vaulting pole). During vigorous movement the fish may leave the substratum altogether during the vault. Fatigued fish, or fish which have fallen during climbing, move on their sides, using the tail for propulsion and a single spiny opercular which is repeatedly driven into the substratum."

Human Uses

From Froese and Pauly (2019):

"[…] important food fish in SE Asia, considered as a tasty food fish [Herre 1935] but not of the finest quality since it is bony [Davidson 1975]. Usually sold live in markets where it is kept alive for several days by keeping it moist [Rainboth 1996]. Economic foodfish in the Southeast Asia [Vidthayanon 2002]."

"Used in rice-fish culture but not considered a first class food fish because they are rather bony. Introduced by Hindu and Malay fishermen [Herre 1935]."

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

From Pal and Chaudhry (2010):

"This is a very hardy fish and is of considerable fisheries interest. It is caught mainly from low-lying swamps and marshy tracts as well as derelict pits, pools and puddles which remain in the process of drying up during summer months. It is also caught during rainy weather when it is found on the ground surface in wetland areas.

Despite its moderate size, the fish is regarded as highly valued for its fins flavour, restorative values and prolonged freshness out of ponds, reservoirs and rice fields. It can be cultured alone

or in combination with *Clarias batrachus* and *Heteropneustes fossilis*. It also forms a good component for culture in carp ponds."

From Zalina et al. (2012):

"*A. testudineus* also has a potential used in mosquito control in rice fields and temporary pools. The habitat similarity with the mosquito immature and the ability of these fish to tolerate low level of oxygen in aquatic systems favour their augmentative release as a part of a biological control program (Bhattacharjee et al., 2009). At present due to high price and increasing market demand, climbing perch culture has been expanding especially in certain parts of India including North Eastern state (Sarkar et al., 2005). However, larval rearing of climbing perch is still a problem for fish farming because of its low survival."

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Anabas testudineus.*

From Froese and Pauly (2019):

"Anchor worm Disease, Parasitic infestations (protozoa, worms, etc.)
Procerovum Infestation 1, Parasitic infestations (protozoa, worms, etc.)
Gnathostoma Infestation, Parasitic infestations (protozoa, worms, etc.)
Procerovum Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Centrocestus Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Camallanus Infection 1, Parasitic infestations (protozoa, worms, etc.)
Stellantchasmus Infestation, Parasitic infestations (protozoa, worms, etc.)
Lernaea Infestation, Parasitic infestations (protozoa, worms, etc.)
Dactylogyrus Gill Flukes Disease, Parasitic infestations (protozoa, worms, etc.)
Contracaecum Disease, Parasitic infestations (protozoa, worms, etc.)
Tripartiella Disease, Parasitic infestations (protozoa, worms, etc.)
Gnathostoma Infestation, Parasitic infestations (protozoa, worms, etc.)
Camallanus Infection 1, Parasitic infestations (protozoa, worms, etc.)
Allocreadium Infestation 6, Parasitic infestations (protozoa, worms, etc.)
Neopecoelina Infestation, Parasitic infestations (protozoa, worms, etc.)
Camallanus Infection 8, Parasitic infestations (protozoa, worms, etc.)
Paragendria Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Lernaea Infestation, Parasitic infestations (protozoa, worms, etc.)"

Poelen et al. (2014) lists *Trianchoratus parvulus, Trianchoratus grandis, Trianchoratus gussevi, Hysterothylacium krishnai, Camallanus bahli, Camallanus kulasirii, Camallanus pearsei, Camallanus, Camallanus bidigitalis, Neoparacamallanus sweeti, Proleptus anabantis, Pingus, Pingus madhuai, Procerovum varium, Allocreadium handiai, Posthodiplostomum, Centrocestus caninus, Procerovum calderoni, Stellantchasmus falcatus, Genarchopsis goppo, Allocreadium minutum, Neopecoelina saharарnpurensis, Gnathostoma spinigerum,* and *Camallanus anabantis* are parasites of *Anabas testudineus*. Poelen et al. (2004) lists *Gnathostoma spinigerum, Camallanus anabantis,* and *Trianchoratus gussevi* as an endoparasite of *Anabas testudineus* and *Anabas testudineus* as a host of *Haplorchis pumilio.*

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

No records of impacts of introductions were found for *Anabas testudineus*; therefore, there is no information on impacts of introduction.

4 Global Distribution

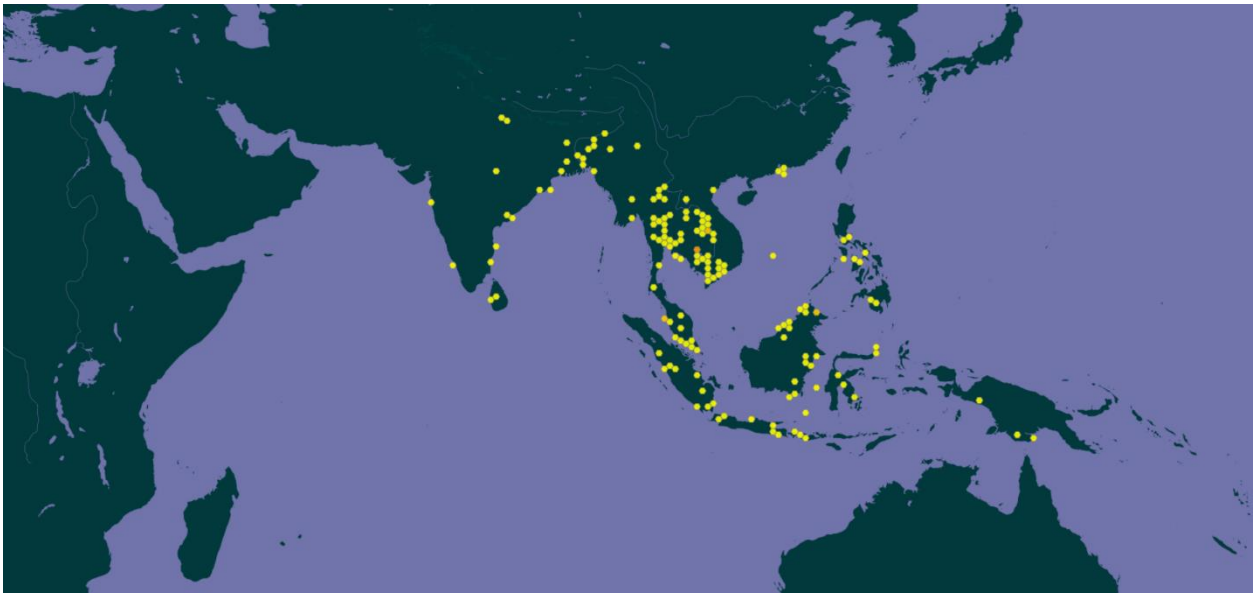

Figure 1. Known global distribution of *Anabas testudineus*. Map from GBIF Secretariat (2019).

5 Distribution Within the United States

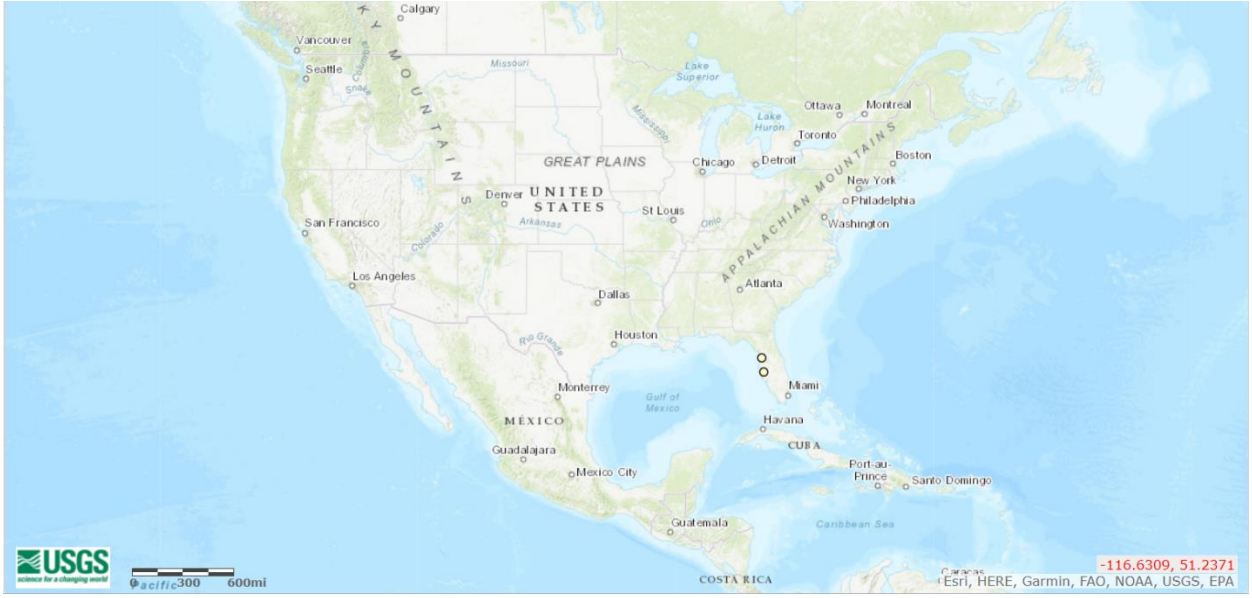

Figure 2. Known distribution of *Anabas testudineus* in the United States. Map from Nico and Fuller (2019). Nico and Fuller (2019) states that *Anabas testudineus* was introduced to Florida but has since been extripated. The populations in Florida were not used to select source points for the climate match.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Anabas testudineus* was low for the majority of the contiguous United States with patches of medium match along the southern coast around the Gulf of Mexico. There was a small patch of high climate match in the southern tip of Florida and Texas. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.003, low (scores between 0.000 and 0.005, inclusive, are classified as low). A majority of the United States had low individual Climate 6 scores, except for Texas, which had a medium score, and Florida, which had a high score.

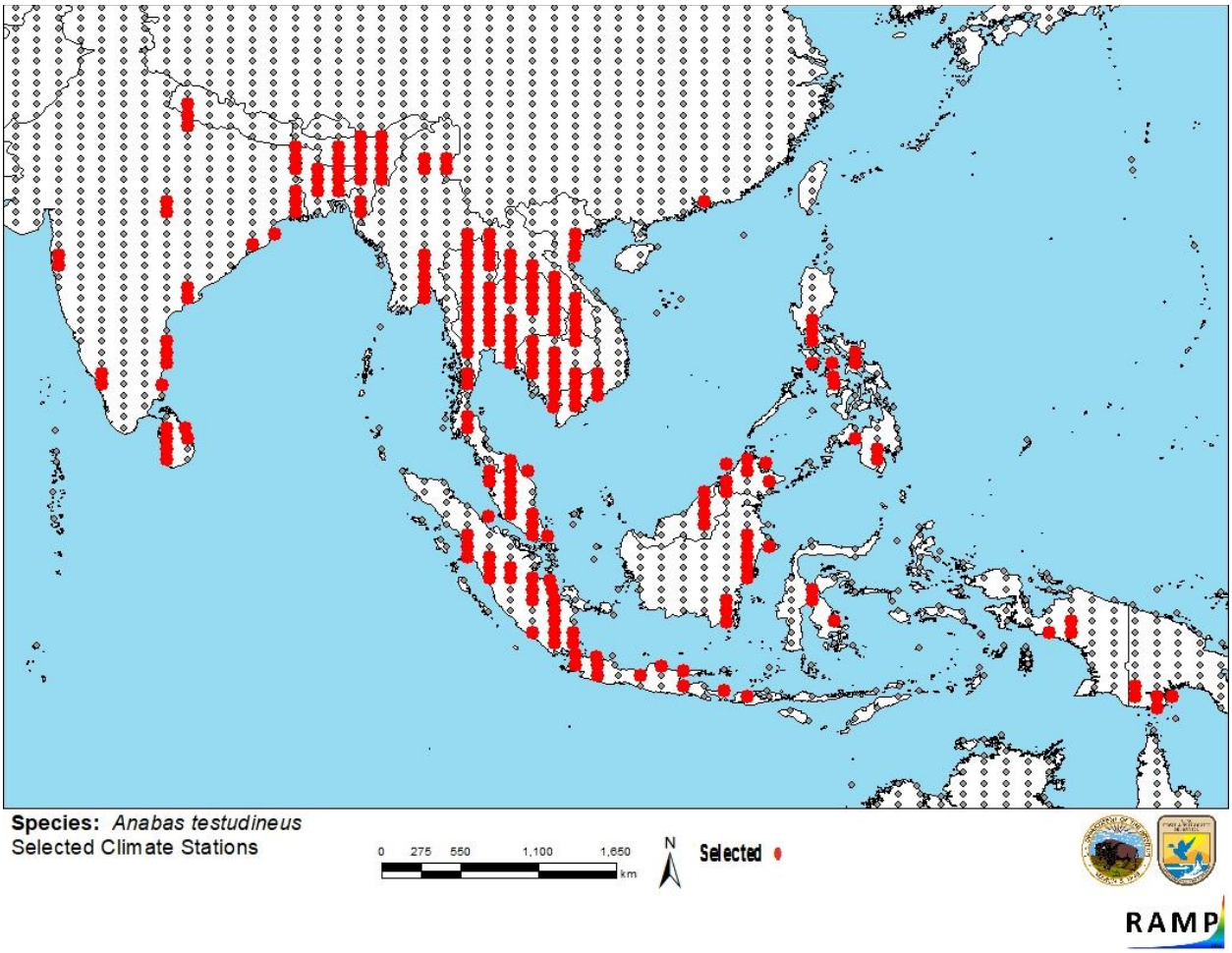

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in Asia selected as source locations (red; Andaman Island, Bangladesh, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Singapore, Sri Lanka, Taiwan, Thailand, Timor-Leste, and Viet Nam) and non-source locations (gray) for *Anabas testudineus* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

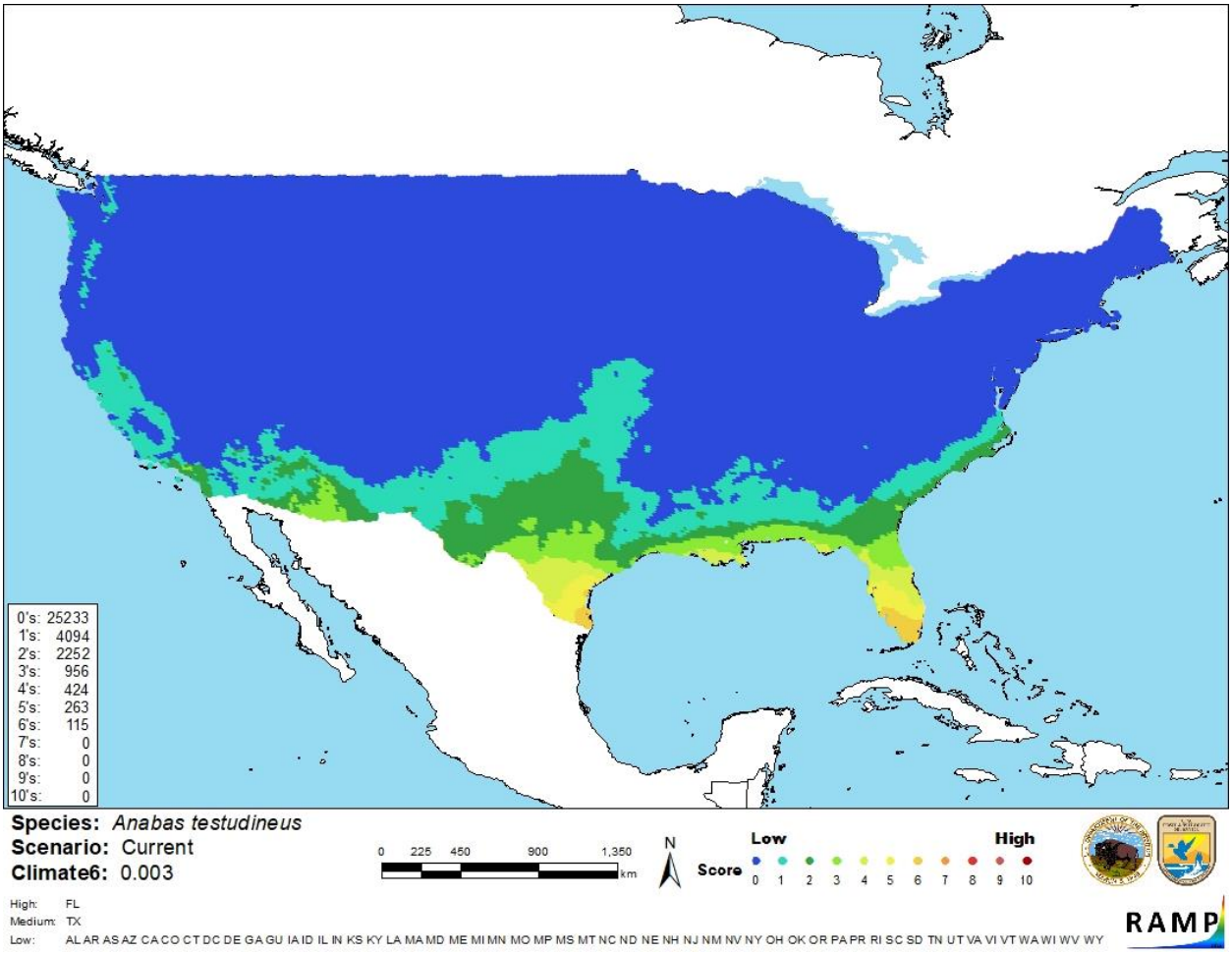

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Anabas testudineus* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0 = Lowest match, 10 = Highest match.

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 *Anabas testudineus* is low. There is minimal information available for this species. Information on introductions was found for *Anabas testudineus*; however, no information was found on the impacts of introductions.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Climbing perch, *Anabas testudineus* is a freshwater and slightly brackish water fish present throughout the Indian subcontinent and Southeast Asia. The history of invasiveness is none documented. Climbing perch has been introduced outside of its native range; however, no information has been found on impacts from the introductions. The climate match for the contiguous United States was low, with Florida having an individually high climate score and Texas having an individually medium climate score. The certainty of assessment is low. The overall risk assessment category is uncertain.

Assessment Elements

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