Mayan Cichlid (*Cichlasoma urophthalmum*)
Ecological Risk Screening Summary

Web Version – 11/01/2012

Photo: Alexander Calder

1 Native Range, and Status in the United States

Native Range
From Robins (2001):

The Mayan cichlid is native to the Central American Atlantic slope waters of southeastern Mexico (including the Yucatán Peninsula), Belize, Guatemala, Honduras, and Nicaragua.

Nonindigenous Occurrences
From Schofield et al. (2011):

- "This species was first documented in Florida when specimens were observed and collected and observed in Everglades National Park in 1983; it is established in several areas in and around the park (Loftus 1987; Lorenz et al. 1997; Smith-Vaniz, personal communication [not cited]; Tilmant 1999) and Big Cypress National Preserve (Nico, unpublished data; Tilmant 1999)."
- "On the east side of Florida it has been recorded from Canal C-111 north to the Little River Canal (C-7 Canal) (Shafland 1995)."

- "A single specimen was taken from a rock pit in Manatee County in October 1975 (Smith-Vaniz, personal communication [not cited])."
- "Mayan ciclids have also been collected in Lake Okeechobee and Lake Osbourne, Palm Beach County in 2003 (Cocking 2003; Werner 2003)."
- "A new population was found in Charlotte Harbor in the summer of 2003 (Adams and Wolfe 2007; Associated Press 2003; Charlotte Harbor NEP 2004; Byrley, personal communication [not cited]). This is the most northern population known."
- Reported established in Florida Panther National Wildlife Refuge (2005)."
- "A specimen was collected in Holiday Park in Broward County (International Game Fishing Association 2000)."
- "In 2006, this species was found to be established in Mobbly Bayou in Tampa Bay and in canals on Merritt Island in 2007 (Paperno et al. 2008)."

C. urophthalmum was also found in the Chao Phraya River delta region, in Thailand in 2004 (Nico 2007).

Means of Introductions

From Schofield et al. (2011):

"The origins and dates of actual Florida introductions are unknown (Loftus 1987). Fish were probably aquarium releases or fish farm escapes."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2011):

Kingdom Animalia
Phylum Chordata
Subphylum Vertebrata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus Cichlasoma
Species *Cichlasoma urophthalmum*

Taxonomic Current Standing: Valid

Size, Weight, Age

From Froese and Pauly (2011):

"Max length : 39.4 cm TL male/unsexed; (IGFA 2001); max. published weight: 1,130 g (IGFA 2001)."

Environment

From Froese and Pauly (2011):

"Freshwater; brackish; benthopelagic; depth range 2 - ? m (Conkel 1993)"

Climate/Range

Subtropical (Froese and Pauly 2011)

Distribution

From Froese and Pauly (2011):

"Central America: Atlantic slope, Thailand, Singapore, Florida, USA"

Short description

From GISD (2011):

"Cichlasoma urophthalmus is a medium sized cichlid fish. Adults range from 8 to 22 cm standard length (SL) and a maximum of 600 g weight. Important traits useful for distinguishing *C. urophthalmus*: 1) seven (rarely 8) prominent dark bars on body (the first an oblique along nape that crosses near the lateral line origin, and the seventh or posterior-most bar positioned on the caudal peduncle); 2) conspicuous, dark blotch centered above the caudal fin base and often outlined by a light halo (this blotch may be nearly round, oval square, or vertically elongate, and is noticeably blacker than the dark body bands); 3) caudal fin rounded; 4) anal-fin spines 5-7 (usually 6); 5) dorsal-fin spines 14-18 (usually16); and 6) well developed canine, unicuspid teeth in both jaws. Males and females are similar in appearance and are difficult to distinguish even during reproductive season, when both sexes develop intense red on the ventral side of their body. This species is however; highly variable in colour and anatomical features such as body."

Biology

From Froese and Pauly (2011):

"Inhabit freshwater marshes and mangrove swamps. Adults prefer coastal lagoons and rivers and will tolerate marine conditions. Feed on small fishes and macro-invertebrates. Spawn on the bottom in both fresh and brackish water. "

Human uses

From Froese and Pauly (2011):

"Cultured as fish food, exploited as a game fish, and the aquarium trade"

Diseases

The following list of parasitic infestations and diseases is taken directly from Fishbase (Froese and Pauly 2011) and more details on each entry can be found there. None of the diseases are OIE-reportable (OIE 2012).

"Raillietnema Infestation, Parasitic infestations (protozoa, worms, etc.)
Rhabdochona Disease, Parasitic infestations (protozoa, worms, etc.)
Yellow Grub, Parasitic infestations (protozoa, worms, etc.)
Helicometrina Disease, Parasitic infestations (protozoa, worms, etc.)
Bothriocephalus Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Posthodiplostomum Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Goezia Disease, Parasitic infestations (protozoa, worms, etc.)
Spiroxys Infestation, Parasitic infestations (protozoa, worms, etc.)
Procamallanus Infection 13, Parasitic infestations (protozoa, worms, etc.)
Raillietnema Infestation, Parasitic infestations (protozoa, worms, etc.)
Rhabdochona Infestation 5, Parasitic infestations (protozoa, worms, etc.)
Serpinema Infestation, Parasitic infestations (protozoa, worms, etc.)
Crassicutis Infection, Parasitic infestations (protozoa, worms, etc.)
Diptherostomum Infection, Parasitic infestations (protozoa, worms, etc.)
Genarchella Infection, Parasitic infestations (protozoa, worms, etc.)
Homalometron Infection, Parasitic infestations (protozoa, worms, etc.)
Lecithochirium Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Oligogonotylus Infection, Parasitic infestations (protozoa, worms, etc.)
Oligogonotylus Infection, Parasitic infestations (protozoa, worms, etc.)
Phyllodistomum Infestation 6, Parasitic infestations (protozoa, worms, etc.)
Saccocoelioides Infection, Parasitic infestations (protozoa, worms, etc.)
Rhabdochona Infestation 6, Parasitic infestations (protozoa, worms, etc.)
Contracaecum Disease (larvae), Parasitic infestations (protozoa, worms, etc.)
Contracaecum Disease (larvae), Parasitic infestations (protozoa, worms, etc.)
Gnathostoma Disease (larvae), Parasitic infestations (protozoa, worms, etc.)
Tabascotrema Infection, Parasitic infestations (protozoa, worms, etc.)
Apharyngostrigea Disease, Parasitic infestations (protozoa, worms, etc.)
Ascocotyle Infestation 1, Parasitic infestations (protozoa, worms, etc.)
Ascocotyle Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Ascocotyle Disease, Parasitic infestations (protozoa, worms, etc.)
Cladocystis Infection, Parasitic infestations (protozoa, worms, etc.)
Ascocotyle Infestation 3, Parasitic infestations (protozoa, worms, etc.)
Diplostomum Infection, Parasitic infestations (protozoa, worms, etc.)
Drepanocephalus Infection, Parasitic infestations (protozoa, worms, etc.)

Echinochasmus Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Mesostephanus Infection, Parasitic infestations (protozoa, worms, etc.)
Pelaezia Infection, Parasitic infestations (protozoa, worms, etc.)
Perezitrema Infection, Parasitic infestations (protozoa, worms, etc.)
Ribeiroia Infection, Parasitic infestations (protozoa, worms, etc.)
Stunkardiella Infection, Parasitic infestations (protozoa, worms, etc.)
Torticaecum Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Uvulifer Infection, Parasitic infestations (protozoa, worms, etc.)
Sciadicleithrum Infection 3, Parasitic infestations (protozoa, worms, etc.)
Bothriocephalus Infestation 5, Parasitic infestations (protozoa, worms, etc.)
Glassocercus Infestation, Parasitic infestations (protozoa, worms, etc.)
Capillaria Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Mexiconema Infestation, Parasitic infestations (protozoa, worms, etc.)
Falcaustra Infection (Falcaustra sp.), Parasitic infestations (protozoa, worms, etc.)
Pseudoterranova Infection, Parasitic infestations (protozoa, worms, etc.)
Acanthocephalus Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Dollfusentis Infection, Parasitic infestations (protozoa, worms, etc.)
Neoechinorhynchus Infestation 6, Parasitic infestations (protozoa, worms, etc.)
Polymorphus Infestation, Parasitic infestations (protozoa, worms, etc.)
Southwellina Infestation, Parasitic infestations (protozoa, worms, etc.)"

Threat to humans

Harmless (Froese and Pauly 2011)

3 Impacts of Introductions

From GISD (2011):

"Predation: Nest predation of native centrarchids by Mayan cichlids has been observed in the Everglades National Park (Trexler et al. 2000). Presence of Mayan cichlids may affect prey behavior. For example, a laboratory study of the native mosquitofish, *Gambusia holbrooki* in Florida found that this species reduced its use of tank microhabitats in the presence of Mayan cichlids (Rehage et al. 2009)."

"Competition: Mayan cichlids compete with native substrate-spawning species, e.g. native largemouth bass (*Micropterus salmoides*), warmouth (*Chaenobryttus gulosus*) and spotted sunfish (*Lepomis punctatus*) in Everglades National Park. The catch of native species was found to vary inversely with the catch of Mayan cichlids. Although this pattern does not provide proof of a cause-and-effect relationship, further research in this habitat may provide evidence of community-level effects as a result of the Mayan cichlid invasion (Trexler et al. 2000)."

"Ecosystem change: There is concern that the interaction between Mayan cichlids and native fishes could alter the ecology of the Everglades and the Florida Bay region (Faunce et al. 2002)."

"Disease transmission: *Cichlasoma urophthalmus* is a potential vector of diseases and parasites. It was found to be an intermediate host to an unidentified member of the genus *Contracaecum*, a group of anisakid nematodes known to infect birds and mammals, including humans (Bergmann & Motta 2004). Studies in Mexico have reported *C. urophthalmus* as host to a diverse range of parasites, including 71 helminth species (Nico et al. 2007), and the larvae of the nematode *Serpinema trispinosum*, which affects turtles (Nico et al. 2007)."

From Schofield et al. (2011):

"Studies have shown native fish population reductions concominant with Mayan cichlid introduction and proliferation, possibly through competition pressures for food and space (Trexler et al. 2000). Because of their generalist diet, they may also feed on juveniles of other native fish species (Ferriter et al. 2006, Paperno et al. 2008)."

4 Global Distribution

Figure 1 (above). Known partial distribution of *Cichlasoma urophthalmum* (GBIF 2010).

Figure 2 (above). Approximate partial distribution of *C. urophthalmum* in Thailand. Map from Wikimedia.org (2011), graphically altered by adding range information from Nico et al. (2007).

5 Distribution within the United States

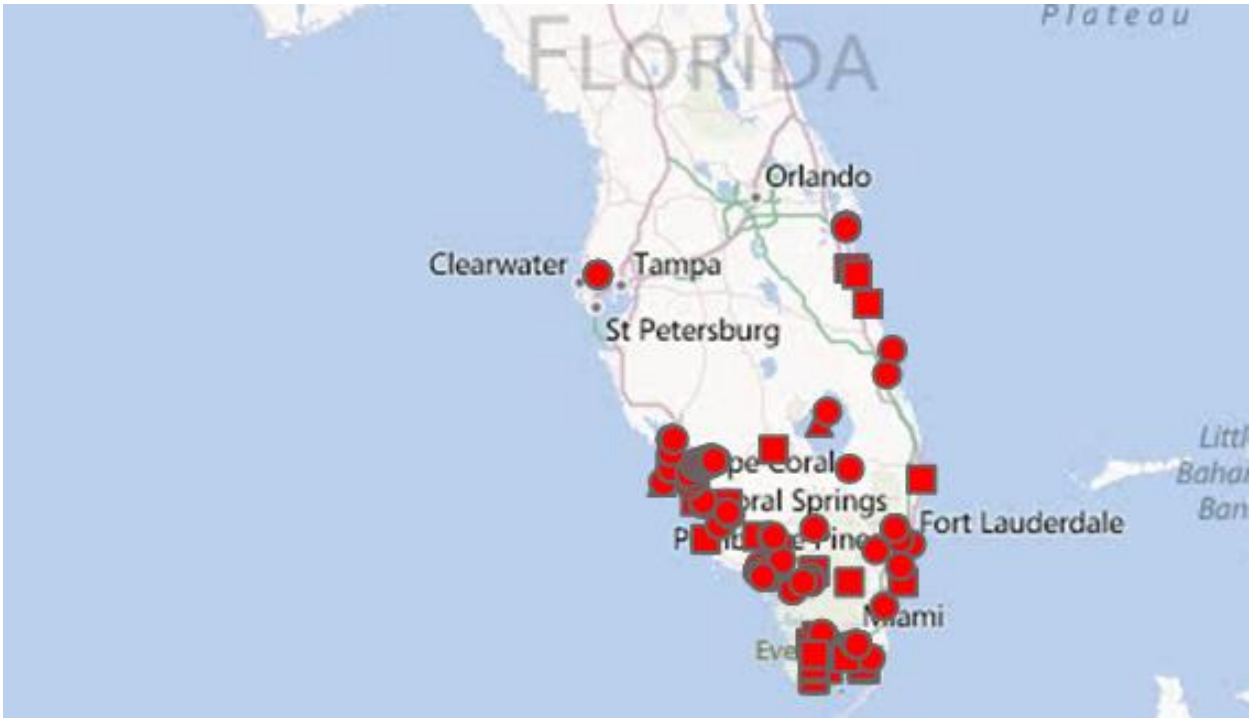
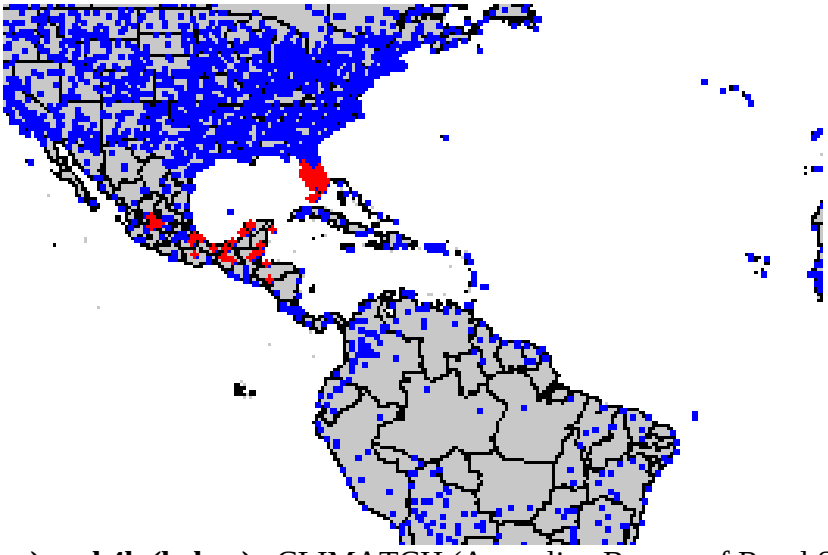


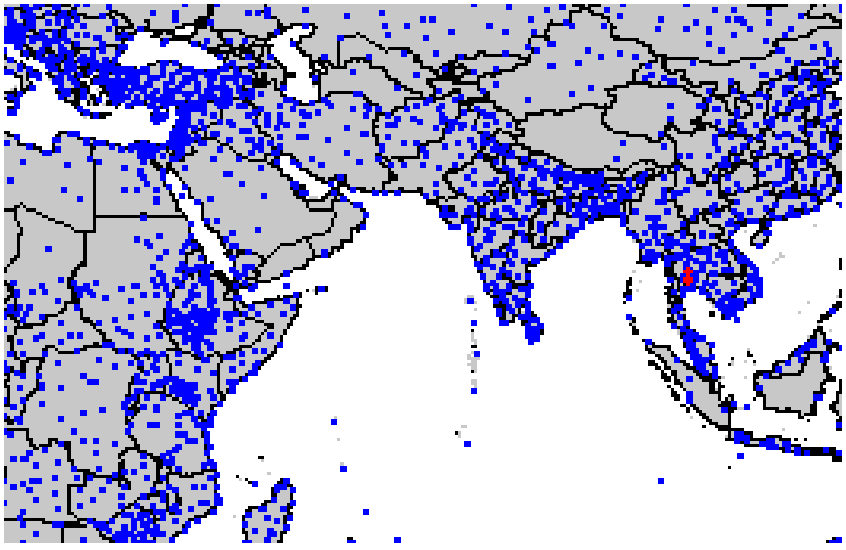
Figure 3 (above). The map depicts 89 established populations reported by USGS NAS program as of 2009.

6 CLIMATCH

Summary of Climate Matching Analysis

The climate match (Australian Bureau of Rural Sciences 2010; 16 climate variables; Euclidean Distance) was highest for the Floridian coast of the United States. The range for a medium climate match is 0.005 - 0.103: the Continental United States has a medium climate match at 0.087 for *C. urophthalmum.*





Figures 4a (above) and 4b (below). CLIMATCH (Australian Bureau of Rural Sciences 2010) source map showing weather stations in Central America (above) and Asia (below) selected as source locations (red) and non-source locations (blue) for *C. urophthalmum.* Source locations from GBIF (2010) and Schofield et al. (2011).

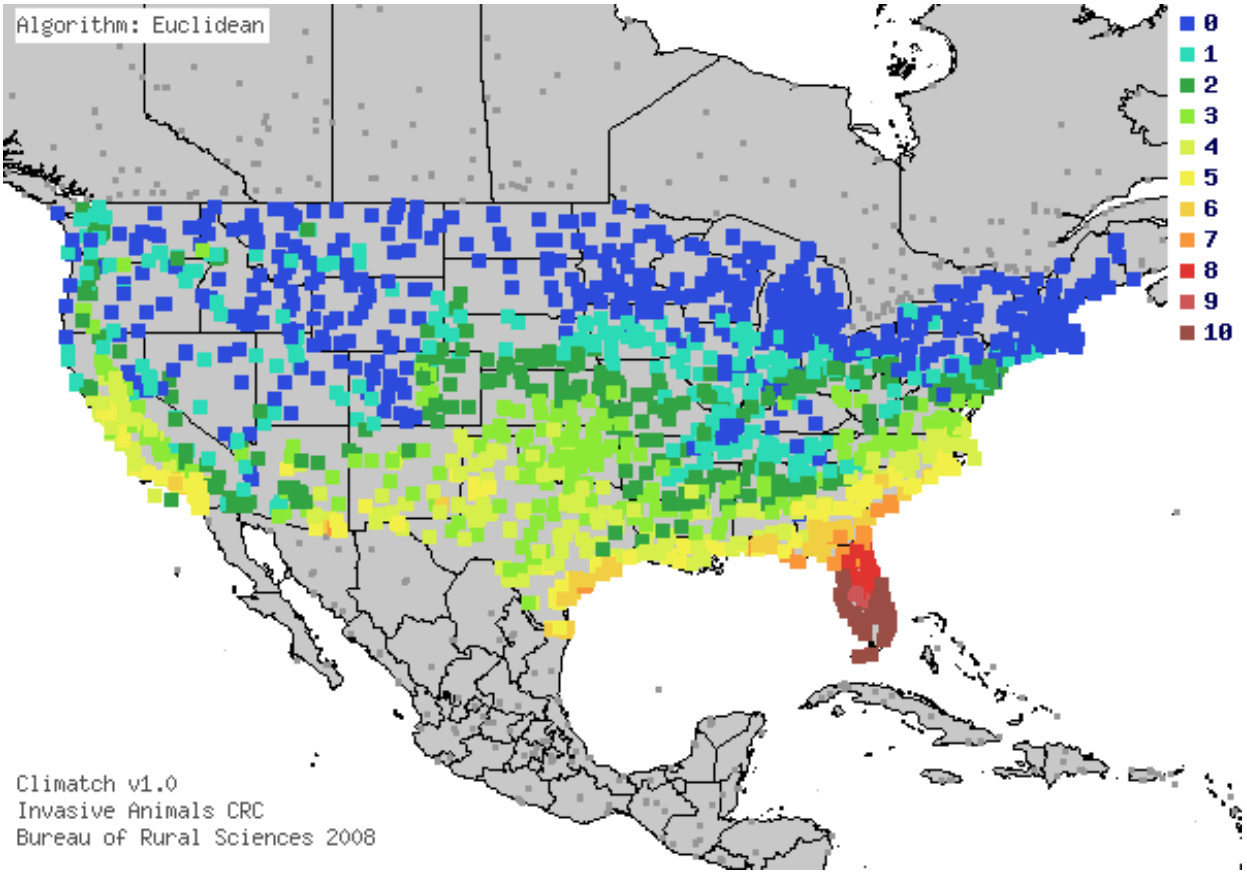


Figure 6 (above). Map of CLIMATCH (Australian Bureau of Rural Sciences 2010) climate matches for *C. urophthalmum* in the continental United States based on source locations reported locations from GBIF (2010) and Schofield et al. (2011). 0= Lowest match, 10=Highest match

Table 1 (below). CLIMATCH (Australian Bureau of Rural Sciences 2010) climate match scores.

CLIMATCH Score	0	1	2	3	4	5	6	7	8	9	10
Count	597	295	301	243	245	122	69	22	25	7	48
Climate 6 Proportion = 0.087 (Medium)											

7 Certainty of Assessment

Although the introduction and establishment of *C. urophthalmum* has been well documented in Florida, there is less documentation on the impacts this species may have to non-native habitats. The available information on impacts of invasiveness (2 sources in Section 3) indicates that where *C. urophthalmum* has become established, numbers of native species decline. However, neither source specifically states that the reason the populations decline is directly the fault of the Mayan cichlid. Information on *C. urophthalmum* in the Global Invasive Species Database (GISD 2011) even states that more research is needed to confirm this. In addition, the species was first discovered almost 30 years ago, but has not spread beyond Florida. Based on these facts, the history of invasiveness must be considered uncertain, thus giving this ERSS an overall risk assessment of uncertain.

8 Risk Assessment

Summary of Risk to the Continental United States

Introduction and population establishment of *C. urophthalmum* in Florida (United States) is well documented. Climate matches of 6 or higher are indicated for many parts of the Southeastern United States. Although the population has not spread beyond Florida since its initial discovery almost 30 years ago, spread of the population to areas with high climate matched is certainly possible and can be reasonably expected to continue without active eradication measures. The native fauna is potentially at a higher risk to disease and parasite transmission in the presence of *C. urophthalmum* because of the high rate of infestation found within this species. Further research is needed on this species.

Assessment Elements

- **History of Invasiveness (Sec. 3):** Uncertain
- **Climate Match (Sec. 6):** Medium
- **Certainty of Assessment (Sec. 7):** Medium
- **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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