Blue Catfish (*Ictalurus furcatus*)
Ecological Risk Screening Summary

Web Version—08/01/2014

Photo: R.H. Pos, USFWS

1 Native Range, and Status in the United States

Native Range

From Robins et al. (1991):

"North America: USA (Mobile and Mississippi basins; and Texas coastal [drainages] between Mississippi and Río Grande basins) and Mexico (Río Bravo (Grande) and Soto La Marina basins)."

Status in the United States

From Fuller and Neilson (2014):

"Established in most locations. Probably extirpated from the San Juan and Canadian drainages in New Mexico (Sublette et al. 1990). Established in the Chattahoochee River in Alabama and Georgia (Ober, personal communication), the Apalachicola and Escambia rivers in Florida (R. Cailteux, personal communication)."

"The blue catfish has been stocked in the Chattahoochee River (Dahlberg and Scott 1971), the Choctawhatchee River and perhaps the Conecuh River (Mettee et al. 1996) in Alabama; in the Colorado River in Arizona (Minckley 1973); reservoirs in the Ouachita, White, St. Francis, and Red drainages in Arkansas (Robison and Buchanan 1988); several reservoirs in southern California drainages (Richardson et al. 1970, Moyle 1976); the Arkansas, upper Rio Grande, and Platte drainages in Colorado (Everhart and Seaman 1971, Barkuloo 1967, Zuckerman and Behnke 1986, Rasmussen 1998); ponds in the Florida panhandle (Anonymous 1968); and the Escambia, Yellow, Choctawhatchee, and Apalachicola rivers (R. Cailteux, personal communication) in Florida; the Savannah, Chattahoochee, Altamaha, and Satilla rivers in Georgia (Dahlberg and Scott 1971, T. Bonvechio, personal communication, Ober, personal communication); the Snake River, Idaho (Idaho Fish and Game 1990); western division of the Piedmont, Chesapeake and Delaware Bay drainage, including the mainstem Potomac River and C&O Canal, in Maryland (Lee et al. 1981, Starnes et al. 2011); Lake St. Croix and Lake Pepin, Minnesota (Phillips et al. 1982); Morris and Passaic counties, New Jersey (Fowler 1952, Stiles 1978); the San Juan and Canadian rivers, New Mexico (Minckley 1973, Sublette et al. 1990); the Cape Fear, Catawba, Neuse, and Yadkin drainages, North Carolina (Guire et al. 1984, Hocutt et al. 1986, Menhinick 1991, Rohde et al. 1994); Indian and Buckeye lakes, and the Great Miami and Muskingum drainages, Ohio (Trautman 1981, Hocutt et al. 1986, Burr and Page 1986); impoundments in Oklahoma (Miller and Robison 1973); the Columbia River, Snake River, and Willamette River, Oregon (Lampman 1946, Bond 1994, Graham 1999); the Savannah River, Hartwell Lake, Lake Keowee, Lake Moultrie, Lake Marion, Congaree River, Wateree River, Great Pee Dee River, and the Santee-Cooper Reservoir, South Carolina (Dahlberg and Scott 1971, Rohde et al. 1994, Graham 1999, Rohde et al. 2009); the Potomac, lower Rappahannock, and lower James drainages, Lake Anna in the upper York drainage, and John H. Kerr Reservoir in the middle Roanoke drainage, Virginia (Hocutt et al. 1986, Burkhead and Jenkins 1994, IGFA 2012); and in the Snake River, Washington in the early 1900s (Graham 1999)."

Means of Introductions in the United States

From Fuller and Neilson (2014):

"Intentionally stocked for food and sport. Stocked in the Cape Fear River, North Carolina, in 1966 (Guire et al. 1984). Introductions in the Choctawhatchee River, Alabama, were due to flooding of a private lake in 1993 (Mettee et al. 1996). Recent introductions into the Chattahoochee River in Alabama and Georgia were due to flooding of catfish farms in Alabama during a storm in March 1990 (Ober, personal communication). Presumably these fish moved downstream into the Apalachicola in Florida. Sources of introductions in Escambia and Yellow rivers of Florida are unknown (R. Cailteux, personal communication)."

Remarks

From Fuller and Neilson (2014):

"Blue catfish has been stocked to feed on the introduced Asian clam *Corbiucula fluminea*. Although the species may not actually control clam populations, it is hoped that clam biomass could be converted to fish biomass and create trophy-sized catfish to catch (Dill and Cordone 1997). Blue catfish are known to consume the invasive Asian clam, *Corbicula fluminea*, in Lake Norman (NC Wildlife Resources Commission, pers. comm.), and feed almost exclusively on *Corbicula* in the Cape Fear River, North Carolina, (M. Moser, personal communication). Not listed as occurring in South Carolina by Loyacano (1975). Not listed as occurring in Idaho by Simpson and Wallace (1978). Reports of *I. furcatus* in the New drainage in West Virginia and Virginia are more likely misidentified *I. punctatus* (Burkhead et al. 1980). See Burkhead et al. (1980) for discussion of these reports. Stauffer et al. (1995) do not list this species for the Kanawha (including the New) drainage of West Virginia."

"There is considerable doubt about the introduction of this species in the Potomac River near the turn of the century. Although numerous authors (Bean and Weed 1911, McAtee and Weed 1915, Wiley 1970; Jenkins et al. 1972, Stauffer et al. 1978, Graham 1999) report that the species was introduced between 1898 and 1905, it appears that statement is based on misidentified *I. punctatus* (Burkhead et al. 1980), or if any of those fish actually were *I. furcatus*, the introduction failed. Starnes et al. (2011) reported that young *I. furcatus* were increasing in number in the lower reaches of the Potomac, and that this species is established in river and the Chesapeake and Ohio Canal up through the Plummers Island region."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2011):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Ictaluridae
Genus Ictalurus
Species Ictalurus furcatus (Valenciennes in Cuvier and Valenciennes, 1840)

Taxonomic Status: Valid."

Size, Weight, and Age Range

From Robins et al. (1991):

"Maturity: Lm ? range ? - ? cm; Max length : 165 cm TL male/unsexed; (Page and Burr 1991); max. published weight: 68.0 kg (Frimodt 1995); max. reported age: 21 years (Hugg 1996)."

Environment

From Robins et al. (1991):

"Freshwater; brackish; demersal; depth range 50 - ? m (Page and Burr 1991)."

Climate/Range

From Robins et al. (1991):

"Subtropical; 44°N - 26°N."

Distribution Outside the United States

Native

From Robins et al. (1991):

"North America: USA (Mobile and Mississippi basins; and Texas coastal [drainages] between Mississippi and Río Grande basins) and Mexico (Río Bravo (Grande) and Soto La Marina basins)."

Introduced

From Robins et al. (1991):

This species is reported as introduced in China (Ma et al. 2003).

Means of Introduction Outside the United States

From Robins et al. (1991):

Reason given for the introduction in China is aquaculture and fisheries (Ma et al. 2003).

Short description

From Siriwardena (2014):

"*Ictalurus* has the Greek meaning of "fish cat", and *furcatus* has the Latin meaning of "forked", a reference to the species' forked tail fin (Texas Parks and Wildlife 2012). It has a moderately robust, elongated body with a deeply forked tail and a rounded head, which has a sub-terminal mouth (Hubbs et al. 1991, Goldstein and Simon 1999, Ross 2001, Virginia Department of Game and Inland Fisheries 2012). The lower jaw of the mouth never protrudes beyond the upper jaw (Graham 1999). *I. furcatus* has a bluish-grey colouration on the back, silvery grey sides and a greyish-white abdomen (Sublette et al. 1990). The breeding male is dark blue in the body (Moyle 1976). Blue catfish populations in Rio Grande River in Texas differ from blue catfish in other areas in that the juvenile and young are very speckled and many adults retain their spots (Wilcox 1960)."

"The deeply forked caudal fin of *I. furcatus* has no adipose adjoining it and the genital orifices of the male and female are distinct (Hubbs et al. 1991). In the male, the papilla is more prominent with a circular opening whereas in the female it is more recessed and the opening is slit-like (Moyle 1976). It has 30-36 anal fin rays (Hubbs et al. 1991), 6 dorsal fin rays, 8-10 pectoral fin rays, 8 pelvic fin rays; and a gill raker count of 14-21 (Ross 2001)."

Biology

From Robins et al. (1991):

"Inhabits deep water of impoundments and main channels and backwaters of medium to large rivers, over mud, sand and gravel (Page and Burr 1991). Prefers clear, strongly flowing water."

From Siriwardena (2014):

"The spawning behaviour of *I. furcatus* appears to be similar to that of *I. punctatus*. However, most *I. furcatus* are not sexually mature until they reach about 60 cm in length. Like *I. punctatus*, *I. furcatus* pursues a varied diet, but it tends to eat fish earlier in life. Although invertebrates still comprise the major portion of the diet, blue catfish as small as 10 cm in length have been known to consume other fish. Individuals larger than 20 cm eat fish and large invertebrates. *I. furcatus* commonly attain weights of 20-40 lbs. and may reach weights well in excess of 100 lbs. It is reported that fish exceeding 350 lbs. were landed from the Mississippi River during the late 1800s."

"Spawning of *I. furcatus* occurs in late spring and early summer at water temperatures of 21-25^{0}C (Sublette et al. 1990). However, the spawning season may vary according to geographic location, in April and May (in Louisiana) or in June (in Illinois) (Jordan and Evermann 1916, Pflieger 1975, Smith 1979). Spawning takes place in nests constructed by the male in sheltered areas, often in pools and backwaters (Sublette et al. 1990, Simon 1999). Although nesting habits are similar to those of *I. punctatus* (Pflieger 1975) no other North American freshwater fish is known to provide the same level of parental care as *I. furcatus.* The young of this species will be guarded by the parents at the nest until the young have hatched (Smith 1979, Higgins 2006)."

"*I. furcatus* are the most migratory of the ictalurids, moving in response to water temperatures and travelling great distances in search of spawning habitats (Graham 1999)."

"*I. furcatus* are opportunistic predators and will eat any species of fish they can catch. Although highly adaptable in their feeding habits, three general feeding stages have been determined for *I. furcatus* based on size and age classes (Higgins 2006). As young (<10 cm) they feed primarily on zooplankton, as juveniles (up to 24 cm) they feed on small benthic invertebrates, and as adults, they feed on larger and more mobile organisms, becoming primarily nocturnal piscivores as adults (Ross et al. 2004)."

Human uses

From Robins et al. (1991):

"Fisheries: commercial; aquaculture: commercial; gamefish: yes; aquarium: public aquariums."

"Marketed fresh and frozen. Eaten steamed, fried, broiled, microwaved and baked (Frimodt 1995)."

Diseases

From Robins et al. (1991):

Contracaecum Infestation 3, Parasitic infestations and Enteric Septicaemia of Catfish, Parasitic infestations.

Enteric Septicaemia of Catfish is an OIE-reportable disease.

Threat to humans

No threat from handling this species, but does accumulate high concentrations of PCBs, organotin compounds, and DDE (Garman et al. 1998 in Schloesser et al. 2011).

3 Impacts of Introductions

From Fuller and Neilson (2014):

"Hybridizes with threatened Yaqui catfish *I. pricei* in Mexico (U.S. Fish and Wildlife Service 1994)."

From Siriwardena (2014):

"The blue catfish, *Ictalurus furcatus*, is native to central and southern states of the USA, Mexico and Guatemala. In China, it has been introduced for aquaculture but is not known as invasive. It is, however, ranked among the most invasive species in Chesapeake Bay in the United States (Higgins 2006). It has the ability to grow to a large size, to exceed 165 cm in length and 45 kg in weight and has a lifespan of around 20 years (Graham 1999). These characters coupled with its omnivorous feeding strategy, ability to consume a broad prey base and its high abundance have raised concerns over the effects of this large predator on fish communities in Chesapeake Bay tributaries (Schloesser et al. 2011). Its potential to expand into a wide geographic area also causes concerns regarding its invasiveness given that it can tolerate a range of habitats from freshwater to estuarine water (Perry 1969). Spread of *I. furcatus* populations is suspected to have influenced resident fish assemblages. For example, white catfish (*Ictalurus catus*), a native species traditionally utilized by commercial fishers, experienced declines after *I. furcatus* populations became established in the mid-1990s (Tuckey and Fabrizio 2010). The pattern of establishment followed by a lag phase and then rapid dispersal of *I. furcatus* in Chesapeake Bay tributaries in the USA is consistent with population dynamics of an invasive species (Sakai et al. 2001)."

"This species is ranked in the top five "species of concern" in Virginia and also as a high priority in Maryland by the US Environmental Protection Agency's Chesapeake Bay Program. It was further identified as a species for which a risk assessment plan is required (Moser 2002)."

"Spread of *I. furcatus* populations is thought to have influenced resident fish populations. A decline in the abundance of white catfish (*Ictalurus catus*), a native species with traditional commercial fisheries value, has been reported after *I. furcatus* populations became established in the mid-1990s (Tuckey and Fabrizio 2010). *I. furcatus* may represent a relatively new, and potentially significant, source of mortality for economically and ecologically important estuarine fishes such as juvenile American shad (*Alosa sapidissima*), Atlantic menhaden, and river herring (*Alosa spp*.) (Chandler 1998)."

From Higgins (2006):

”The introduction of piscivorous *I. furcatus* in Virginia has been associated with declines in anadromous clupeid populations of American shad (*Alsoa sapidissima*) and blueback herring (*A. aestivalis*), possibly compromising major restoration programs, and adding to the documented negative economic and ecological effects of invasive species range expansion (Ashley and Buff 1987, MacAvoy et al. 2000). Among the deleterious impacts on native aquatic communities is the alteration of habitats, especially by nest building species such as *I. furcatus* (Courtenay and Stauffer 1984). Alteration of Chesapeake Bay tributaries from historically bottom-up biomass controlled processes to one that is 'top heavy' with predators has been suggested to be a serious consequence of the introduction and spread of *I. furcatus* (Garman et al. 1991).”

4 Global Distribution

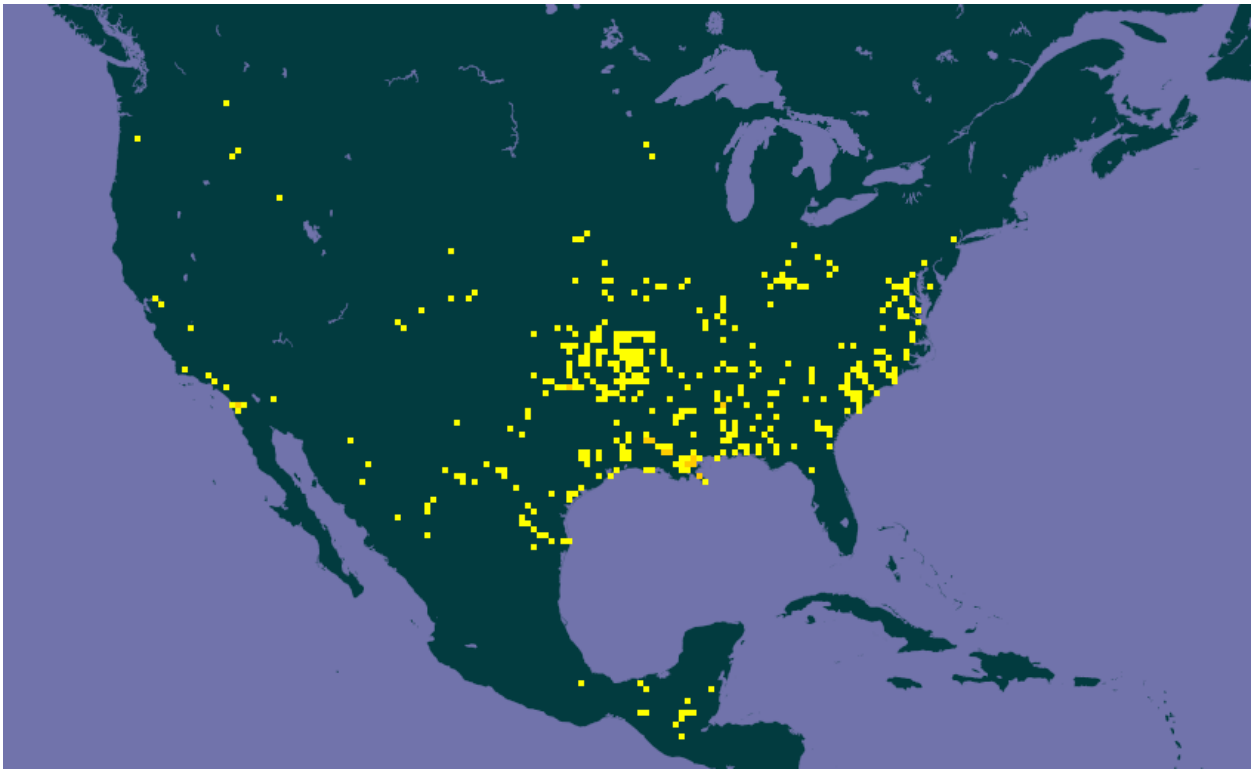

Figure 1. Global distribution of *Ictalurus furcatus*. Map from GBIF (2014).

5 Distribution within the United States

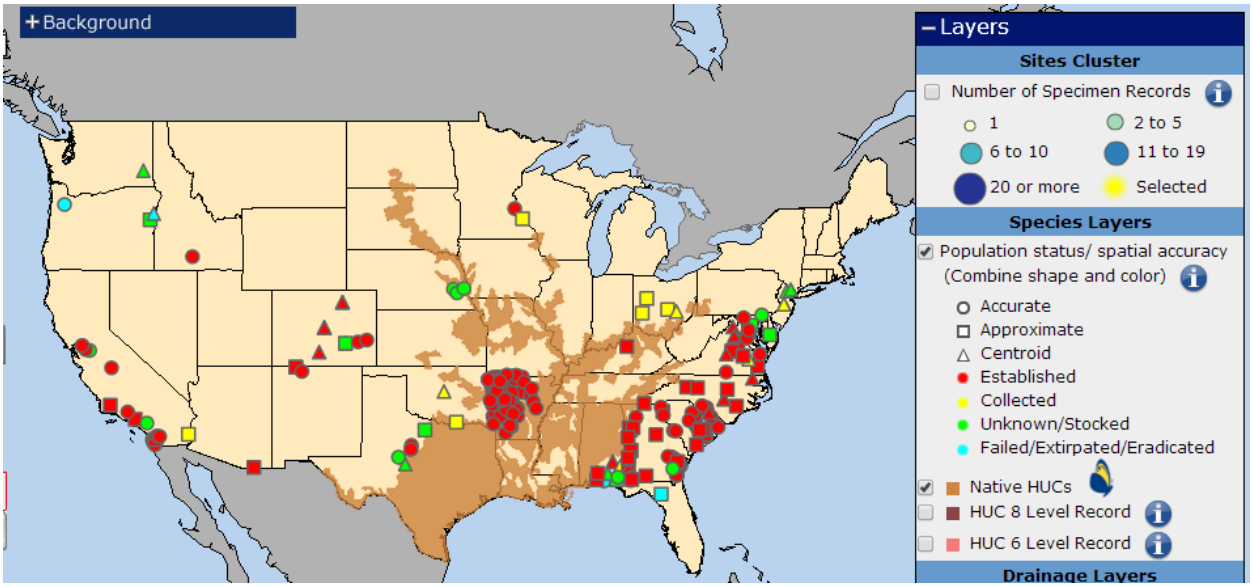

Figure 2. Distribution of *Ictalurus furcatus* in the U.S. Map from Fuller and Nielson (2014).

6 CLIMATCH

Summary of Climate Matching Analysis

The climate match (Australian Bureau of Rural Sciences 2008; 16 climate variables; Euclidean Distance) was very high throughout the contiguous U.S. Medium to low matches were only found in Maine and the coastal Northwest. Climate 6 proportion indicated that the contiguous U.S. has a high climate match. The range for a high climate match is 0.103 and greater; climate match of *Ictalurus furcatus* is 0.919.

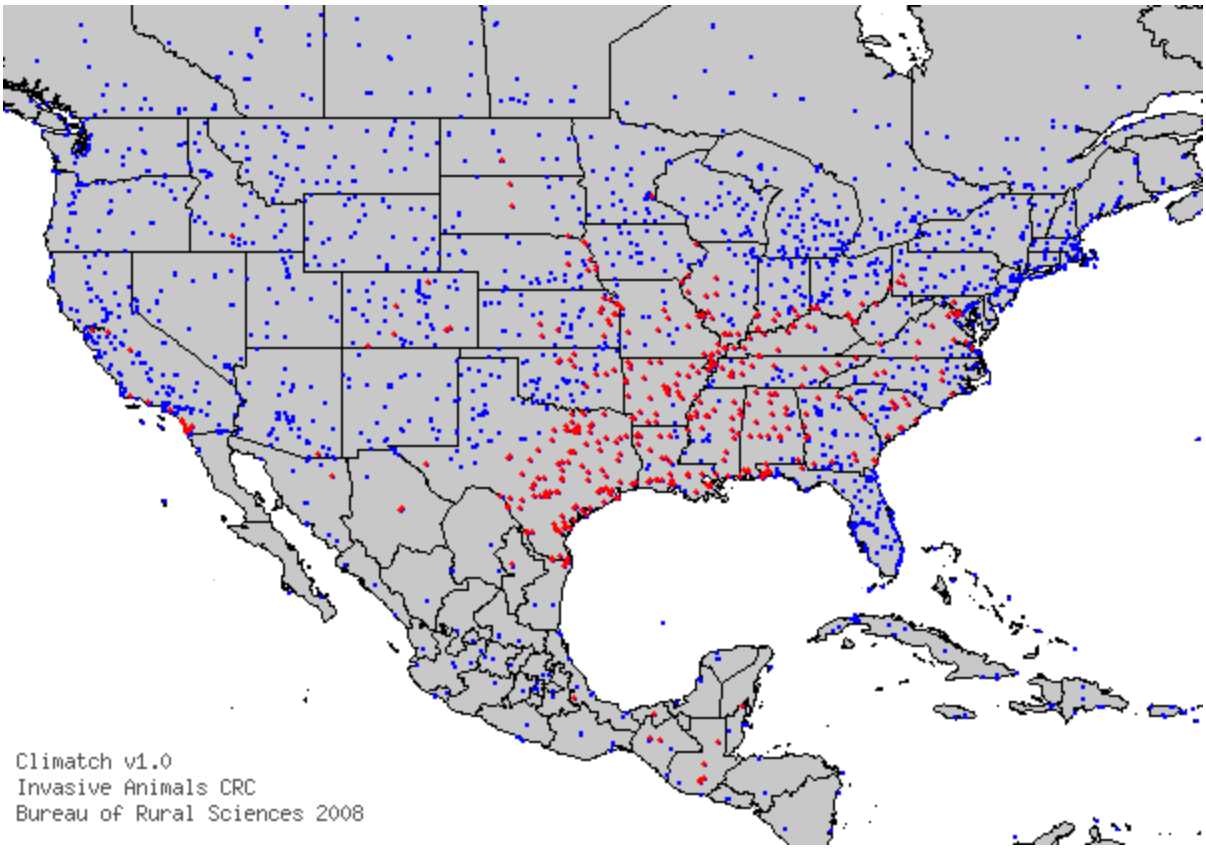

Figure 3. CLIMATCH (Australian Bureau of Rural Sciences 2008) source map showing weather stations selected as source locations (red) and non-source locations (blue) for *Ictalurus furcatus* climate matching. Source locations from GBIF (2014) and Fuller and Nielson (2014).

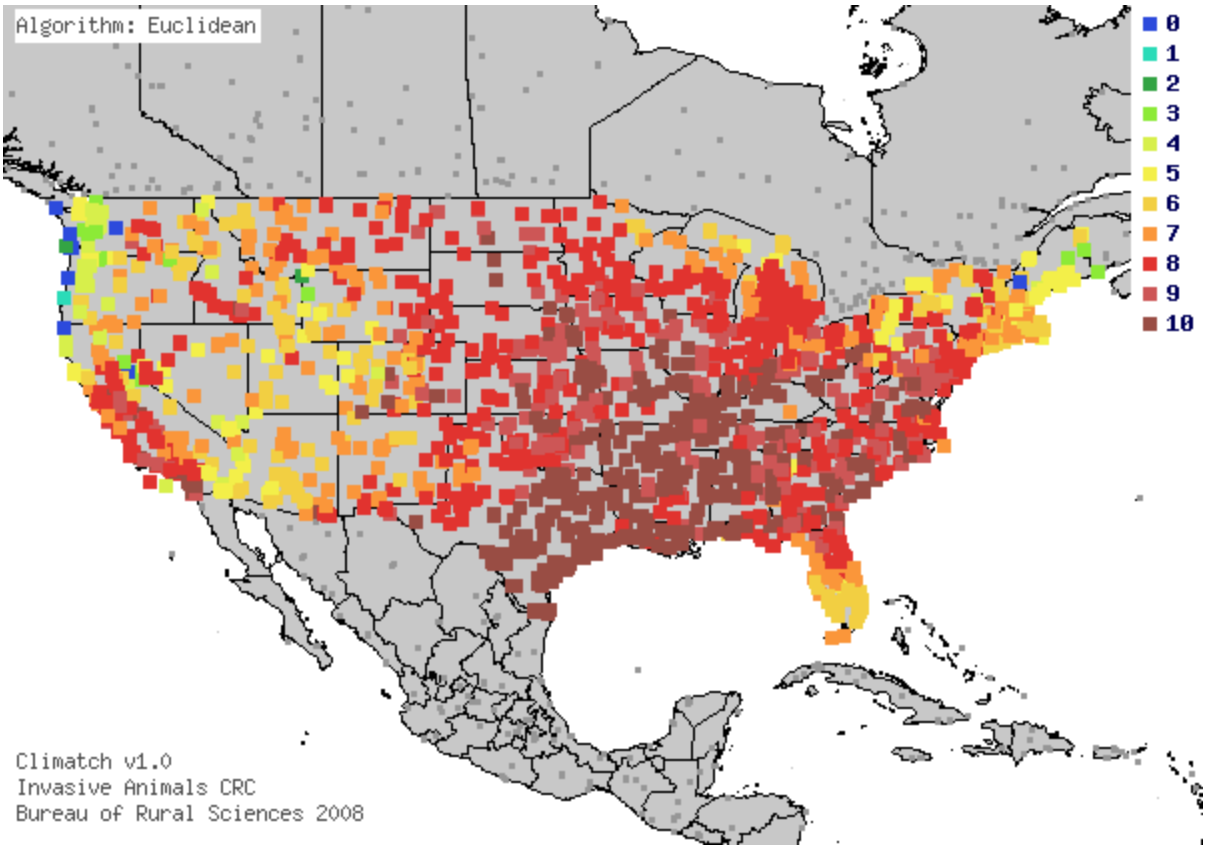

Figure 4. Map of CLIMATCH (Australian Bureau of Rural Sciences 2008) climate matches for *Ictalurus furcatus* in the contiguous United States based on source locations reported by GBIF (2014) and Fuller and Nielson (2014). 0= Lowest match, 10=Highest match.

Table 1. CLIMATCH (Australian Bureau of Rural Sciences 2008) climate match scores.

CLIMATCH Score	0	1	2	3	4	5	6	7	8	9	10
Count	9	1	2	17	43	88	194	270	630	246	474
Climate 6 Proportion =		0.919									

7 Certainty of Assessment

Information on the biology, distribution, and impacts of this species is readily available. Certainty of assessment for this species is high.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Ictalurus furcatus is a freshwater and brackish water fish native to portions of the Mississippi River basin, Texas, and Mexico. Stocking, aquaculture, and migration have all contributed to the spread of this species throughout much of the southern half of the U.S. Impacts such as hybridization with native species, reduction of native fish abundance, and alteration of local habitats have been reported for this species. The high climate match, ability to reproduce rapidly, and generalist diet all contribute to making this species one of concern for the contiguous U.S. The overall risk for this species is high.

Assessment Elements

- **History of Invasiveness (Sec. 3):** High
- **Climate Match (Sec.6):** High
- **Certainty of Assessment (Sec. 7):** High
- **Remarks/Important additional information** Host of OIE-reportable disease, accumulates high concentrations of PCBs, organotin compounds, and DDE
- **Overall Risk Assessment Category: High**

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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