U.S. Fish & Wildlife Service

Flathead Catfish (*Pylodictis olivaris*)
Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, September 2014
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Photo: E. Engbretson, U.S. Fish and Wildlife Service.

1 Native Range and Status in the United States

Native Range

From Fuller et al. (2019):

"Lower Great Lakes and Mississippi River basins from western Pennsylvania to White-Little Missouri River system, North Dakota, and south to Louisiana; Gulf Slope from Mobile Bay drainage, Georgia and Alabama, to Mexico (Page and Burr 1991)."

"Native to Lake Erie and tributaries to Lake Erie and Lake Michigan (Hocutt and Wiley 1986)."

Status in the United States

From Fuller et al. (2019):

"The flathead catfish has become established in most waters where introduced. For instance, it is widespread and reproducing in the lower Colorado River basin (Dill and Cordone 1997). As of about 1980, the Cape Fear River population had expanded from the site of its initial release near Fayetteville, North Carolina, and was found to inhabit a 201-kilometer stretch of the river (Guire et al. 1984). In samples taken by Guire et al. (1984) from the Cape Fear River, flathead accounted for 10.52% of total fish numbers and 64.7% of total fish weight. Establishment in Oregon is uncertain (Bond 1994). The species does not appear to have survived to reproduce in Wyoming (Hubert 1994). It has been reported from the San Pedro River, Arizona, and from the Suwannee River, Florida. Established in Blue Marsh Reservoir and the Schuylkill River in Pennsylvania; reported in Springton Reservoir, Pennsylvania."

According to Fuller et al. (2019), nonnative occurrences of *P. olivaris* have been reported in the following states, with years of observation and hydrologic units in parentheses:

- **Alabama** (1996-2013; Lower Choctawhatchee, Lower Conecuh, Middle Chattahoochee-Walter F, Perdido, Upper Conecuh)
- **Arizona** (1940-2015; Aqua Fria, Bill Williams, Havasu-Mohave Lakes, Imperial Reservoir, Lower Colorado, Lower Colorado Region, Lower Gila, Lower Salt, Lower Verde, Middle Gila, San Francisco, Upper Gila-San Carlos Reservoir, Upper Salt, Upper San Pedro, Upper Santa Cruz, Upper Verde, White, Yuma Desert)
- **Arkansas** (1884-2009; Beaver Reservoir, Fourche La Fave, Illinois, Ouachita Headwaters, Petit Jean, Poteau, Robert S. Kerr Reservoir, Upper Ouachita, Upper Saline)
- **California** (1962-2014; Havasu-Mohave Lakes, Imperial Reservoir, Lower Colorado, Salton Sea, Santa Margarita)
- **Colorado** (1895-2015; Cache La Poudre, Middle South Platte-Cherry Creek, Purgatoire, San Luis, South Fork Republican, South Platte, Upper Arkansas, Upper Arkansas-John Martin Reservoir, Upper Arkansas-Lake Meredith)
- **Delaware** (2018; Brandywine-Christina)
- **Florida** (1950-2015; Apalachicola, Chipola, Escambia, Hillsborough, Lower Chattahoochee, Lower Choctawhatchee, Lower Ochlockonee, Lower St. Johns, Lower Suwannee, Peace, Pensacola Bay, Perdido, Santa Fe, Upper Suwannee, Yellow)
- **Georgia** (1950-2016; Altamaha, Little, Lower Chattahoochee, Lower Flint, Lower Ochlockonee, Lower Ocmulgee, Lower Oconee, Lower Ogeechee, Middle Chattahoochee-Lake Harding, Middle Chattahoochee-Walter F, Middle Flint, Middle Savannah, Ohoopee, Satilla, Savannah, Spring, Tugaloo, Upper Chattahoochee, Upper Flint, Upper Ochlockonee, Upper Ocmulgee, Upper Oconee, Upper Savannah)
- **Idaho** (1943-2015; Brownlee Reservoir, Middle Snake-Payette)
- **Illinois** (2010-2011; Chicago, Des Plaines, Little Calumet-Galien)
- **Indiana** (2010; Little Calumet-Galien)
- **Iowa** (1940-2002; Blackbird-Soldier, Lower Big Sioux, Missouri-Little Sioux)
- **Kansas** (1910-2017; Arkansas-White-Red Region, Big, Big Nemaha, Caney, Chikaskia, Coon-Pickerel, Cow, Elk, Fall, Gar-Peace, Hackberry, Kaw Lake, Little Arkansas, Lower Big Blue, Lower Cottonwood, Lower Little Blue, Lower North Fork Solomon, Lower

Republican, Lower Saline, Lower Salt Fork Arkansas, Lower Smoky Hill, Lower South Fork Solomon, Lower Walnut Creek, Lower Walnut River, Medicine Lodge, Middle Arkansas, Middle Arkansas-Slate, Middle Neosho, Middle Republican, Middle Smoky Hill, Middle Verdigris, Neosho Headwaters, Ninnescah, North Fork Ninnescah, Pawnee, Prairie Dog, Rattlesnake, Smoky Hill, Solomon, South Fork Ninnescah, Spring, Tarkio-Wolf, Upper Cimarron, Upper Cottonwood, Upper Neosho, Upper North Fork Solomon, Upper Saline, Upper Smoky Hill, Upper South Fork Solomon, Upper Verdigris, Upper Walnut River)

- **Maryland** (2002-2017; Chester-Sassafras, Conococheague-Opequon, Lower Susquehanna, Middle Potomac-Catoctin, Upper Chesapeake Bay)
- **Michigan** (1922-2017; Au Sable, Betsy-Chocolay, Black-Macatawa, Boardman-Charlevoix, Cass, Clinton, Detroit, Flint, Kalamazoo, Kawkawlin-Pine, Lake Erie, Lake Huron, Lake Michigan, Lake St. Clair, Lower Grand, Manistee, Maple, Muskegon, Pere Marquette-White, Saginaw, Shiawassee, St. Clair, St. Joseph, Thornapple, Thunder Bay, Tittabawassee, Upper Grand)
- **Minnesota** (1978-2001; Crow, Upper Mississippi-Crow-Rum)
- **Missouri** (2006; Spring)
- **Nebraska** (1926-2016; Big Nemaha, Blackbird-Soldier, Calamus, Frenchman, Harlan County Reservoir, Keg-Weeping Water, Lewis and Clark Lake, Little Nemaha, Logan, Loup, Lower Elkhorn, Lower Little Blue, Lower Middle Loup, Lower Niobrara, Lower North Loup, Lower North Platte, Lower Platte, Lower Platte-Shell, Lower South Platte, Medicine, Middle Big Blue, Middle Platte-Buffalo, Middle Platte-Prairie, Middle Republican, Red Willow, Salt, South Fork Big Nemaha, South Loup, Tarkio-Wolf, Turkey, Upper Big Blue, Upper Elkhorn, Upper Little Blue, Upper Niobrara, Upper Republican, West Fork Big Blue, Wood)
- **Nevada** (2007; Ivanpah-Pahrump Valleys)
- **New Jersey** (1999-2017; Crosswicks-Neshaminy, Middle Delaware-Mongaup-Brodhead, Middle Delaware-Musconetcong, Raritan)
- **New Mexico** (1949-2015; San Francisco, Upper Gila, Upper Gila-Mangas)
- **New York** (2011; Upper Delaware)
- **North Carolina** (1965-2017; Black, Cape Fear, Contentnea, Deep, Haw, Lower Cape Fear, Lower Neuse, Lower Pee Dee, Lower Tar, Lower Yadkin, Lumber, Middle Neuse, Northeast Cape Fear, Pamlico, Roanoke Rapids, Rocky, Upper Cape Fear, Upper Catawba, Upper Dan, Upper Neuse, Upper Pee Dee, Upper Tar, Upper Yadkin, Waccamaw, White Oak River)
- **North Dakota** (1973-2016; Lake Sakakawea, Lower Little Missouri, Upper Lake Oahe)
- **Ohio** (1890-2017; Ashtabula-Chagrin, Auglaize, Black-Rocky, Cedar-Portage, Cuyahoga, Huron-Vermilion, Lake Erie, Lower Maumee, Sandusky, St. Marys, Tiffin, Upper Maumee)
- **Oklahoma** (1946-2010; Bird, Black Bear-Red Rock, Blue-China, Cache, Caney, Chikaskia, Deep Fork, Dirty-Greenleaf, Farmers-Mud, Illinois, Kaw Lake, Kiamichi, Lake O' The Cherokees, Lake Texoma, Little, Lower Beaver, Lower Canadian, Lower Canadian-Deer, Lower Canadian-Walnut, Lower Cimarron, Lower Cimarron-Eagle Chief, Lower Cimarron-Skeleton, Lower Neosho, Lower North Canadian, Lower North Fork Red, Lower Salt Fork Arkansas, Lower Verdigris, Lower Wolf, Medicine Lodge,

Middle North Canadian, Middle Verdigris, Neosho, Northern Beaver, Polecat-Snake, Poteau, Robert S. Kerr Reservoir, Spring, Upper Cimarron, West Cache)
- **Oregon** (1975-2015; Brownlee Reservoir, Lower Malheur, Middle Columbia-Lake Wallula, Middle Snake-Payette, Middle Snake-Succor)
- **Pennsylvania** (1991-2016; Crosswicks-Neshaminy, Lehigh, Lower Delaware, Lower Susquehanna, Lower Susquehanna-Penns, Lower Susquehanna-Swatara, Middle Delaware-Musconetcong, Schuylkill, Upper Susquehanna-Lackawanna)
- **South Carolina** (1964-2018; Carolina Coastal-Sampit, Congaree, Cooper, Edisto River, Lake Marion, Little Pee Dee, Lower Broad, Lower Pee Dee, Lynches, Middle Savannah, North Fork Edisto, Salkehatchie, Saluda, Santee, Seneca, South Fork Edisto, Tugaloo, Upper Savannah, Waccamaw, Wateree)
- **South Dakota** (1896-2018; Fort Randall Reservoir, Lewis and Clark Lake, Lower Big Sioux, Lower James, Lower Lake Oahe, Lower White, Middle James, Vermillion)
- **Texas** (1953-2018; Double Mountain Fork Brazos, Lake Meredith, Little Wichita, Lower Colorado-Cummins, North Fork Double Mountain Fork Brazos, North Wichita, Pease, Rita Blanca, Tule, Upper Colorado, Upper Salt Fork Red, White, Wichita)
- **Virginia** (1965-2015; Banister, Lower Dan, Lower James, Mattaponi, Middle James-Buffalo, Middle James-Willis, Middle Potomac-Anacostia-Occoquan, Middle Roanoke, Pamunkey, Roanoke, Upper James, Upper Roanoke)
- **Washington** (1978; Lower Snake, Lower Snake-Tucannon)
- **Wisconsin** (1923-2017; Lake Michigan, Lake Winnebago, Lower Fox, Middle Rock, Milwaukee, Upper Fox, Upper Rock, Wolf)
- **Wyoming** (1993-2004; Glendo Reservoir, Middle North Platte-Casper, Middle North Platte-Scotts Bluff)

This species is in trade in the United States. For example:

From Cast Away Lakes (2019):

"Flathead Catfish - 40 lb & Up
Our price: $3.50 Per Pound"

Means of Introductions in the United States

From Fuller et al. (2019):

"The Flathead Catfish has been intentionally stocked in most cases. In Idaho, however, flatheads were accidentally stocked instead of blue catfish (Simpson and Wallace 1978). Populations in the Apalachicola River, Florida, probably spread from introductions upstream in the Flint River, Georgia. It is believed that flatheads were stocked by anglers circa 1950 in the vicinity of Potato Creek in Upson County, Georgia, with stock from the Tennessee drainage (Quinn 1988). They were recorded in the Flint River below the Warwick Dam at Lake Blackshear in the early 1960s, and at Albany in the early 1970s (Quinn 1988). The species was apparently first stocked in the Cape Fear River in 1966 when 11 sexually mature fish were released near Fayetteville, North Carolina, by North Carolina Wildlife Resources Commission biologists (Guire et al. 1984, Ashley and Buff 1986). Flatheads were stocked in Atlantic drainages (Savannah and Altamaha) in Georgia in the 1970s (Bart et al. 1994, C. Jennings, personal communication). According to Bart et al. (1994), at least some of these were the result of stocking by Georgia Department of Natural Resource personnel. The first known reports of this fish in California were recorded catches made in the lower Colorado River near Yuma in 1966 (Dill and Cordone 1997). The Colorado River populations in California and Arizona resulted, at least in part, from a stocking of about 600 Flathead Catfish above Imperial Dam made by the Arizona Game and Fish Department in 1962 (Dill and Cordone 1997). According to Dill and Cordone (1997), the believed route of the Flathead Catfish was downstream to Imperial Dam and subsequently into the All American Canal system to the Imperial Valley. Minckley (1973) reported that the species was introduced prior to 1950 into the Gila River system, a tributary of the Colorado River; however, Dill and Cordone (1997) indicated that, as far as is known, the Flathead Catfish was not taken in the lower Colorado River basin until after 1962. A single fish was taken 20 November 1995 in Arizona from the upper San Pedro River, about 32 kilometers from the Mexican border (S. Stefferud, personal communication). It is not known how the species gained access to the upper reach of this river. In Wisconsin, flatheads probably entered the Wolf and Fox drainages via the canal at Portage (Becker 1983). The Ochlockonee River introduction in Florida and Georgia was probably due to illegal stocking by anglers with fish from the nearby Apalachicola River, where the fish had also been introduced. The flathead's presence in eastern Pennsylvania is most likely due to stock contamination of channel catfish shipments (M. Kaufman, personal communication)."

From Fuller and Whelan (2018):

"Flathead catfish have not been widely stocked for sport in the Great Lakes Region. The only public fisheries agency stocking that took place in Ohio was in 1968 in the Huron River (K. Kayle, Ohio Department of Natural Resources, personal communication, 2017), a location where flathead catfish were already found. Michigan DNR stocked flathead catfish in Manistee Lake in 1995 to enhance the population for sport fishing and has also stocked the species in six isolated inland lakes for controlling overpopulation issues with bullhead *Ameiurus* spp. and sunfish *Lepomis* spp."

"Much of the flathead catfish movement from the initial areas of introduction and spread through the Great Lakes themselves, appears to have been volitional."

"Based on our analysis, there at least 20 locations [in the Great Lakes region] that have been stocked without authorization from the relevant state agency, mostly in Michigan […] Angler introductions have been largely responsible for the spread of flathead catfish in numerous rivers on the Atlantic Coast (Bonvechio et al., 2009; Sakaris et al., 2006; Thomas, 1995)."

Remarks

A previous version of this ERSS was published in 2014.

From Fuller et al. (2019):

"The species may actually be native to the upper Tennessee drainage in North Carolina (Jenkins and Starnes, personal communication). In their book on Alabama fishes, Mettee et al. (1996)

presented conflicting information regarding native versus introduced ranges. These researchers stated, in the species account, that *Pylodictis olivaris* is introduced to the Conecuh and Escatawpa river systems, but they listed the species as "native" in their summary table."

"Despite the fact that Wydoski and Whitney (2003) say Flathead Catfish were in the lower Snake and Columbia rivers by the mid 1970s, neither the regional fishery biologist for that area, nor the warmwater fisheries manager for the state have ever seen or heard of one in the state (Chris Donnelly and Bruce Bolding, Washington Department of Fish and Wildlife, personal communication 1/6/2016, 1/7/2016). Although there is a supposed Washington State Record fish (22.8 lbs from the Snake River in 1981 ({Game, 2016c #11074})), Bolding believes this was a misidentified Channel Catfish."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2019):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Ictaluridae
Genus *Pylodictis*
Species *Pylodictis olivaris* (Rafinesque, 1818)"

From Fricke et al. (2019):

"**Current status:** Valid as *Pylodictis olivaris* (Rafinesque 1818). Ictaluridae."

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Maturity: Lm ?, range 46 - 50.8 cm
Max length : 155 cm TL male/unsexed; [Page and Burr 2011]; max. published weight: 55.8 kg [IGFA 2001]; max. reported age: 20 years [Hugg 1996]"

Environment

From Froese and Pauly (2019):

"Freshwater; demersal. […] ? - 33°C [Eaton et al. 1995]"

From Bringolf et al. (2005):

"The 96-h median lethal concentration (LC50) for fish exposed to NaCl at 18°C was a salinity of 10.0‰ with a 95% confidence interval (CI) of 9.0–11.1‰, whereas the 96-h LC50 for fish in synthetic seawater (Instant Ocean) at 18°C was 14.5‰ (95% CI, 13.7–15.5‰). […] Our results provide evidence that flathead catfish could tolerate exposure to many brackish waters along the Atlantic and Gulf of Mexico coasts of the United States and that the dispersal of introduced flathead catfish populations among rivers may not be limited by estuarine salinities."

From Lee and Terrell (1987):

"Based on selection and avoidance of thermal zones in the Wabash River, Indiana, the preferred temperature range of 100- to 200-mm flatheads is 31.5 to 33.5 °C (Gammon 1973). Stauffer (1975) studied the ichthyofauna of the New River, Virginia, to determine the effects of a fossil fuel plant on fish behavior, condition, community structure, and distribution. He found flatheads in water of 21.7 to 30 °C (71 to 86 °F), with highest abundance at 27.2 °C. The temperature range (21.7 to 30°C) at which flathead catfish were found probably also is the range where adult growth occurs."

"Water temperatures during spawning range between 20 to 25 °C (Henderson 1965; Turner and Summerfelt 1970) and 24 to 29 °C (Snow 1959; Turner and Summerfelt 1971). At the San Marcos Hatchery in Texas, fry failed to absorb their yolk sacs and died when incubated in water at 28.3 °C (Gholson 1971)."

From Fuller and Whelan (2018):

"Flathead catfish do not undergo migrations in waters less than 10 °C (Vokoun and Rabeni, 2005)."

"The minimum temperature for flathead catfish to spawn is 19–22 °C (Jackson, 1999; McInerny and Held, 1995; Turner and Summerfelt, 1971)."

Climate/Range

From Froese and Pauly (2019):

"Subtropical; […] 47°N - 26°N, 108°W - 80°W [Page and Burr 2011]"

Distribution Outside the United States

Native

From Fuller et al. (2019):

"Lower Great Lakes and Mississippi River basins from western Pennsylvania to White-Little Missouri River system, North Dakota, and south to Louisiana; Gulf Slope from Mobile Bay drainage, Georgia and Alabama, to Mexico (Page and Burr 1991)."

"Native to Lake Erie and tributaries to Lake Erie and Lake Michigan (Hocutt and Wiley 1986)."

Introduced

From Goodchild (1993):

"The Flathead Catfish, *Pylodictis olivaris*, is a large catfish only recently discovered in Canada. There have been only two reported captures both from Ontario; from Lake Erie in 1978 and the Thames River in 1989. Data are insufficient to determine if breeding populations exist in Canada or if its occurrence resulted from accidental introductions. Alternatively, Flathead Catfish may be dispersing into southwestern Ontario due to more favourable climatic conditions."

From Espinosa-Pérez and Ramírez (2015):

"*Pylodictis olivaris* (Rafinesque, 1818) is now established in the lower Rio Colorado basin, including parts of Baja California and Sonora (Miller et al. 2009). The only voucher specimen is from northwestern Mexico was captured [*sic*] in the junction of the Rio Colorado and Rio Hardy (Ruiz-Campos et al. 2012)."

Means of Introduction Outside the United States

From Goodchild (1993):

"Based on several ecological characteristics, Flathead Catfish were judged to have the potential to further invade the Great Lakes basin during a warming trend (Mandrak 1989)."

"If Flathead Catfish are becoming established in southwestern Ontario, they probably dispersed northward through Lake Erie or around the western periphery of Lake Erie from the Huron River, Ohio."

From Espinosa-Pérez and Ramírez (2015):

"Ictaluridae: Five species of this family have been introduced in Mexican water systems for aquaculture."

Short Description

From CABI (2019):

"*P. olivaris* has a slender, elongated body becoming moderately robust in adults (Ross, 2001). It has a depressed or flattened head with small eyes (Hubbs et al., 1991) and a terminal mouth (Goldstein and Simon, 1999) whose lower jaw projects forward beyond the upper jaw (Ross, 2001) except in juveniles (ISSG, 2005). This protruding lower jaw is an important characteristic when identifying the species as it distinguishes *P. olivaris* from other catfish and contributes to it being placed in a genus of its own (ISSG, 2005). In all individuals except large adults, the caudal fin of *P. olivaris* has a white tip on the upper lobe (Page and Sheehy, 2007).The body is yellow to dark purple-brown with black or brown mottling above and white to yellow below with white to yellow chin barbels and mottled fins (Page and Sheehy, 2007)."

"*P. olivaris* has 8-10 gill rakers, 6-7 dorsal rays, a short and rounded anal fin with 16-17 or 14-17 anal rays, 8-11 pectoral rays, and 9 pelvic rays (Ross, 2001). It has a premaxillary band of teeth on the upper jaw with a lateral backward extension on each side (Hubbs et al., 1991)."

Biology

From Froese and Pauly (2019):

"Inhabit pools with logs and other debris in low-gradient to moderate-gradient, small to large rivers. Also found in lakes and impoundments. Young occur in rocky and sandy runs and riffles [Page and Burr 1991, 2011]. Juveniles feed on aquatic insect immature [*sic*] in riffle areas [Etnier and Starnes 1993]. Older individuals consume crayfish, clams and fishes [Murdy and Musick 2013]."

From Lee and Terrell (1987):

"Flathead catfish habitat requirements vary with age and habitat. Young flathead catfish are often found in riffles (Hubbs and Lagler 1947; Koster 1957; Minckley and Deacon 1959; Pflieger 1971,1975; Gholson 1975; Smith 1979). Minckley and Deacon (1959) reported that young-of-the-year flathead catfish remain in swift, rubble-bottomed riffles until they are 5.1 to 10.2 cm TL. In streams, Minckley and Deacon (1959) found that catfish 10.2 to 30.4 cm were generally dispersed; catfish 30.4 to 40.6 cm were associated with intermediate depths and cover (logs, brush piles, and downed trees), and catfish >40.6 cm were solitary and associated with cover in deep pools. Young catfish are active only at night (Pflieger 1975). The literature did not address the distribution of young-of-the-year flathead catfish in streams lacking riffles or in reservoirs."

"Flathead catfish are most abundant in large rivers (Eddy and Surber 1947; Hubbs and Lagler 1947; Beckman 1953; Cleary 1956; Koster 1957; Minckley and Deacon 1959; Pflieger 1971, 1975; Minckley 1973; Moyle 1976; Trautman 1981) and reservoirs (Koster 1957; Minckley and Deacon 1959; Gholson 1971; Pflieger 1975; Moyle 1976). Based on limited information provided by Buck (1956), Brown (1960), Cross (1967), and Moyle (1976), flathead catfish populations are higher in turbid than in clear water bodies. In large rivers, Trautman (1981) found that flathead catfish were most abundant in large, sluggish, deep pools located in low-gradient sections. Although the species inhabits extremely turbid streams, it is significant that in such streams flatheads are usually found over hard bottoms; when they are found over silt bottoms, it is in areas where silt deposition is low (Trautman 1981). Pflieger (1975) stated that the flathead catfish inhabits a variety of stream types, but avoids streams with high gradients or intermittent flow. The term "high gradient" was not defined."

"Adults usually are found associated with submerged logs or other cover (Pflieger 1975; Smith 1979). In Texas, Gholson (1975) reported that flathead catfish were most abundant near rocks, shoals, log jams, brush tops, ledges, submerged trees, and other structures that afford cover and also are associated with current. Minckley and Deacon (1959) found that debris piles ≥3 m and ≤12 m in diameter each yielded two or three large flathead catfish. Fish were absent from areas out of the main current and having soft, silty bottoms, even when these areas afforded cover. Few catfish were found in slack-water habitats such as backwaters and the upper ends of coves. In reservoirs, Layher and Boles (1980) suggested that the availability of rock rip-rap, rather than the amount of forage fish, limited flathead catfish populations. The rip-rap was used by flathead catfish for cover, spawning, and feeding on small gizzard shad that were grazing on rip-rap periphyton."

"Adult flatheads move from deep water or cover at night to feed in riffles and the shallows of pools (Koster 1957; Pflieger 1975; Trautman 1981)."

"Layher and Boles (1980) found that flathead catfish between 20 to 50 cm ate benthic macroinvertebrates and fish; flatheads >50 cm were entirely piscivorous. Most of the insects eaten were in the orders Ephemeroptera, Trichoptera, and Diptera. Adult flathead catfish (≥20 to 40.6 cm, depending on the study) feed mainly on fish and crustaceans (Brener 1947; Swingle 1954; Minckley and Deacon 1959; Brown and Dendy 1961; Langemeier 1965; Morris et al. 1968; Holz 1969; Singleton 1970; Edmundson 1974). Gizzard shad (*Dorosoma cepedianum*), freshwater drum (*Aplodinotus grunniens*), and common carp (*Cyprinus carpio*) were the fish species most commonly eaten by flathead catfish in studies reported by Minckley and Deacon (1959), Jester (1971), Summerfelt (1971), Turner and Summerfelt (1970, 1971), and Turner (1977); however, many other species are consumed […]"

According to Tiemann et al. (2011), *P. olivaris* is a host for the following unionoid mussel species in North America: Threeridge (*Amblema plicata*), Purple wartyback (*Cyclonaias tuberculata*), Spike (*Elliptio dilatata*), Creek heelsplitter (*Lasmigona compressa*), Washboard (*Megalonaias nervosa*), Gulf mapleleaf (*Quadrula nobilis*), Wartyback (*Quadrula nodulata*), Pimpleback (*Quadrula pustulosa*), Mapleleaf (*Quadrula quadrula*), and Pistolgrip (*Tritogonia verrucosa*).

Human Uses

From Froese and Pauly (2019):

"Gamefish: yes; aquarium: public aquariums"

This species is in trade in the United States. For example:

From Cast Away Lakes (2019):

"Flathead Catfish - 40 lb & Up
Our price: $3.50 Per Pound"

Diseases

There are no known OIE-reportable diseases (OIE 2019) for this species.

Robinson and Jahn (1980) report three parasites from *P. olivaris* in the Mississippi River: *Dacnitoides* sp., *Cleidodiscus floridanus*, and *Corallobothrium fimbriatum*.

Poly (1997) reports parasitic crustaceans of the genus *Argulus* from *P. olivaris* in the Ohio River basin.

From Leis et al. (2017):

"A novel species of *Henneguya* was isolated from flathead catfish (*Pylodictis olivaris*) captured in the upper Mississippi River near Lansing (Allamakee County), IA, and La Crosse (La Crosse County), WI. Designated *Henneguya laseeae* n. sp., this novel species is described using critical morphological features, histology, and 18S ribosomal RNA gene sequence. "

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

From Fuller et al. (2019):

"Many feeding studies have found that Flathead Catfish prey heavily on sunfish *Lepomis* spp. (Quinn 1988). One study found that they reduced the number of common carp *Cyprinus carpio* and bullheads *Ameiurus* spp. (Quinn 1988). However, the introduced population in the Flint River system was found to prey largely on crayfish, and that young-of-the-year flatheads fed on darters *Etheostoma* spp. clupeids, catostomids, ictalurids (including other flatheads), and centrarchids were also consumed (Quinn 1988). According to Quinn (1988), introduced flatheads in the Flint River rely more on crayfish than any other catfish population yet described. A severe decline in native fish species, particularly native bullhead species, was observed in the Cape Fear River within 15 years of the first Flathead Catfish introduction (Guire et al. 1984; Jenkins and Burkhead 1994). Feeding studies conducted in the Cape Fear River showed that flatheads consume mainly bullheads, catfishes, shad, and sunfishes (Guire et al. 1984; Ashley and Buff 1986). In 1979, flatheads in the Cape Fear River fed primarily on bullheads. However, by 1986, bullhead populations had declined and Flathead Catfish had switched to preying on shad (Ashley and Buff 1986). Diet studies also have been conducted in the Oconee River in Georgia, where this catfish had been implicated in causing declines of native bullheads and sunfishes (especially redbreast sunfish *Lepomis auritus*). However, findings of that initial study were inconclusive since most of the Flathead Catfish examined had empty stomachs (C. Jennings, personal communication). Flathead Catfish also may be responsible for declines in other native species in the Altamaha drainage (C. Jennings, personal communication). In the Ocmulgee River, Georgia, abundances of silver redhorse *Moxostoma anisurum*, robust redhorse *M. robustum*, snail bullhead *Ameiurus brunneus*, flat bullhead *A. platycephalus*, and redbreast sunfish *Lepomis auritus*, were negatively correlated with Flathead Catfish occurrence and abundance (Bart et al. 1994). This correlation may be due to direct predation. Several authors have reported suckers and catfish as common prey items of flatheads (Bart et al. 1994). The snail bullhead and flat bullhead appear to be most affected by the presence of Flathead Catfish in the Ocmulgee drainage (Bart et al. 1994). It is suspected flatheads may be contributing to the decline of the federally threatened Gulf sturgeon *Acipenser oxyrinchus desotoi* by consuming the young benthic fish in the Apalachicola River (J. Williams, personal communication). The Flathead Catfish is thought to be contributing to the decline of the razorback sucker *Xyrauchen texanus*. For instance, Marsh and Brooks (1989) found that intensive predation by Flathead Catfish and channel catfish on juvenile razorback suckers is likely to prevent hatchery transplants of this southwestern endangered sucker from becoming re-established in portions of its natural range. If the Flathead Catfish becomes established in the San Pedro River, it could mean a major loss for recovery of several species (S. Stefferud, personal communication). Introductions of Flathead Catfish are probably the most biologically harmful of all fish introductions in North America (C. Gilbert, personal communication). Flathead Catfish, along with other nonnative piscivorous fishes, have been shown to reduce the abundance and diversity of native prey species in several Pacific Northwest rivers (Hughes and Herlihy 2012).

From Bonvechio et al. (2009):

"A standardized sampling dataset collected from 1991–2007 on the Satilla River, Georgia, was used to document changes in bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and redbreast sunfish (*L. auritus*) populations after the introduction of flathead catfish (*Pylodictis olivaris*). Repeated measures ANOVA was conducted incorporating a control area, where flathead catfish abundance is extremely low, and a flathead area, where flathead catfish have become well established, for both before (1991–1995) and after (1996–2007) flathead invasion. The analyses revealed that the mean log-transformed electrofishing catch per hour (log10–CPH) of redbreast sunfish and largemouth bass decreased significantly in the flathead area but not in the control area following flathead introduction. Mean log10–CPH of largemouth bass between 150–299 mm TL increased in the control area but remained unchanged in the flathead area. No other significant differences in trends were found for bluegill or other size groups of these sport fishes between areas following flathead introduction ($P > 0.10$). Our analyses suggest that establishment of flathead catfish in the Satilla River may have contributed to observed declines in some sportfish populations in the Satilla River."

From Dobbins et al. (2012):

"Four sites in the Choctawhatchee River, Florida, were sampled from 1997 to 2011, a time period spanning several years before and after the presence of flathead catfish at all sites. Flathead catfish expanded more than 91 river km in 2 years. The population increased rapidly and became the numerically dominant ictalurid at each site within 3 years of first detection at the site. Concurrent with the increases in flathead catfish was the precipitous decline of the native spotted bullhead, *Ameiurus serracanthus* (Yerger & Relyea). Electric fishing catch rates of flathead catfish significantly increased ($P<0.03$) over time at all sites, while spotted bullhead catch rates significantly declined ($P<0.03$) at three of four sites. Catch rates of flathead catfish and spotted bullhead were negatively correlated at all but the last site to be colonised by flathead catfish. This study provides evidence that introduced flathead catfish can quickly and significantly impact native ictalurids."

From Lucchesi et al. (2017):

"Flathead catfish predation has been shown to reduce or nearly eliminate centrarchids in ponds (Hackney 1966; Swingle 1967) and rivers (Evans 1991; Thomas 1993), but has not been definitively tied to a decline in centrarchids in impoundments similar in size to Lake Mitchell. Herndon and Waters (2002) suggested that flathead catfish would have an impact on the largemouth bass and sunfish fishery in Lake Sutton, a 445-ha cooling reservoir, based on their high abundance and use of centrarchids as prey. Although assessing the impact of flathead catfish predation on bluegill and crappie populations in Lake Mitchell would be difficult as both are cyclical, the recent unprecedented decline in bluegill abundance gives some cause for concern. The four lowest trap-net catches of bluegill in the last 20 years were recorded from 2013 to 2016 ([…] SDGFP [South Dakota Department of Game, Fish and Parks], unpublished data). Troughs in bluegill abundance have traditionally lasted for only about a year before the numbers rebound in Lake Mitchell. Thus, the high percentage of centrarchids in flathead catfish diets along with an increase in flathead catfish abundance coinciding with a prolonged decrease in bluegill abundance may indicate that flathead catfish are negatively impacting the bluegill population in Lake Mitchell."

From Marsh and Brooks (1989):

"Juvenile razorback sucker (*Xyrauchen texanus*), 45 to 168 mm standard length, reintroduced within their native range into the Gila River, Arizona, suffered intensive predation by two, non-native ictalurids, channel catfish (*Ictalurus punctatus*) and flathead catfish (*Pylodictis olivaris*). Estimated losses in the 2.5-km study reach over a 2-day post-stocking period were up to 900 individuals/ km in autumn. If typical, predation may be high enough to preclude local re-establishment of the species by juvenile stockings at that time of year. Predation in autumn was lower when average size of stocked fish was increased from 68 to 113 mm standard length."

"In January 1986, four of five flathead catfish had eaten razorback suckers […]"

From Thomas (1993):

"A standardized stream monitoring program conducted on the Altamaha River, Georgia, from 1988 to 1992 was successful in detecting substantial changes in sport fish populations. Flathead catfish (*Pylodictus olivaris*) electrofishing catch rates generally increased from 1988 to 1992 reaching a peak CPUE of 90 fish per hour in 1990. CPUE of flathead catfish was significantly different ($P < 0.05$) between years and sites. Percent composition of flathead catfish in ictalurid samples doubled over the 5-year study period. A concurrent decrease in native bullhead populations was observed in annual creel and electrofishing surveys. Redbreast sunfish catch rates precipitously declined in both electrofishing samples and creel surveys taken from 1988 to 1992. Differences in mean CPUE of redbreast sunfish were significant ($P < 0.05$). Annual monitoring results suggest that the invasion and subsequent rapid expansion of flathead catfish in the Altamaha River has affected native sport fish populations."

4 Global Distribution

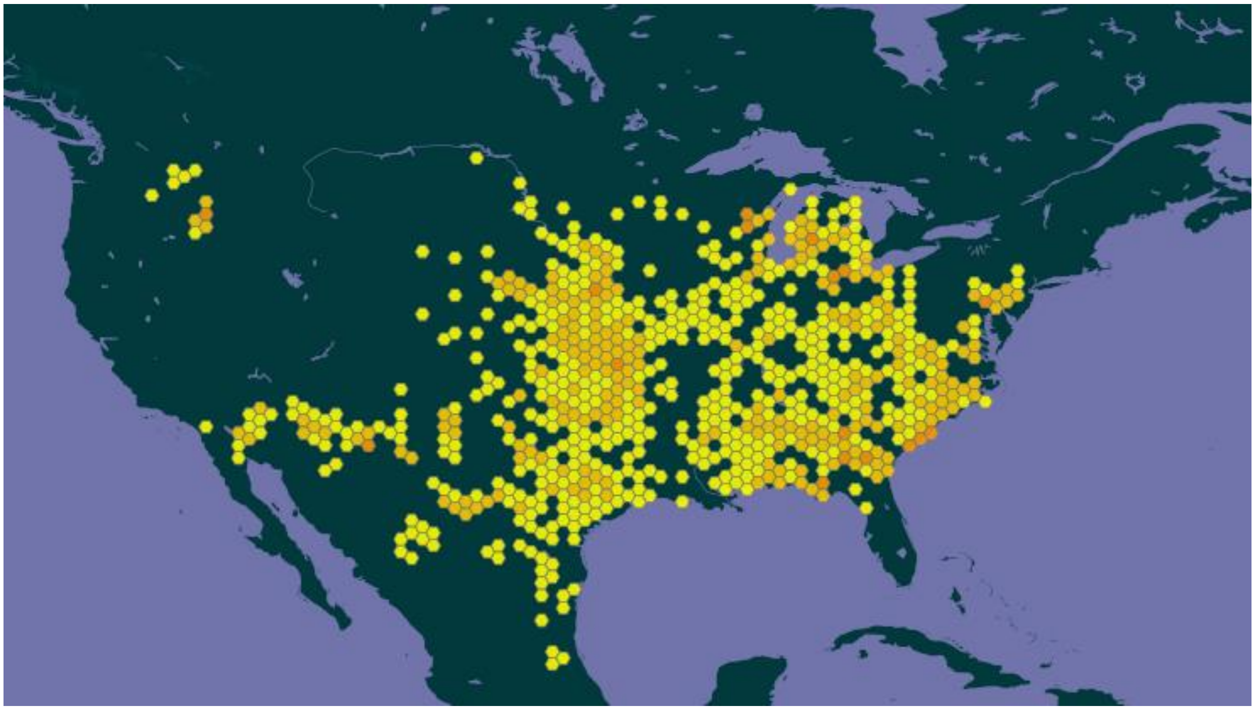

Figure 1. Known global distribution of *Pylodictis olivaris*. Map from GBIF Secretariat (2019). Occurrences reported in China (GBIF Secretariat 2019) were excluded from this map and the climate matching analysis because of major coordinate errors; *P. olivaris* has not been introduced or become established in China.

5 Distribution Within the United States

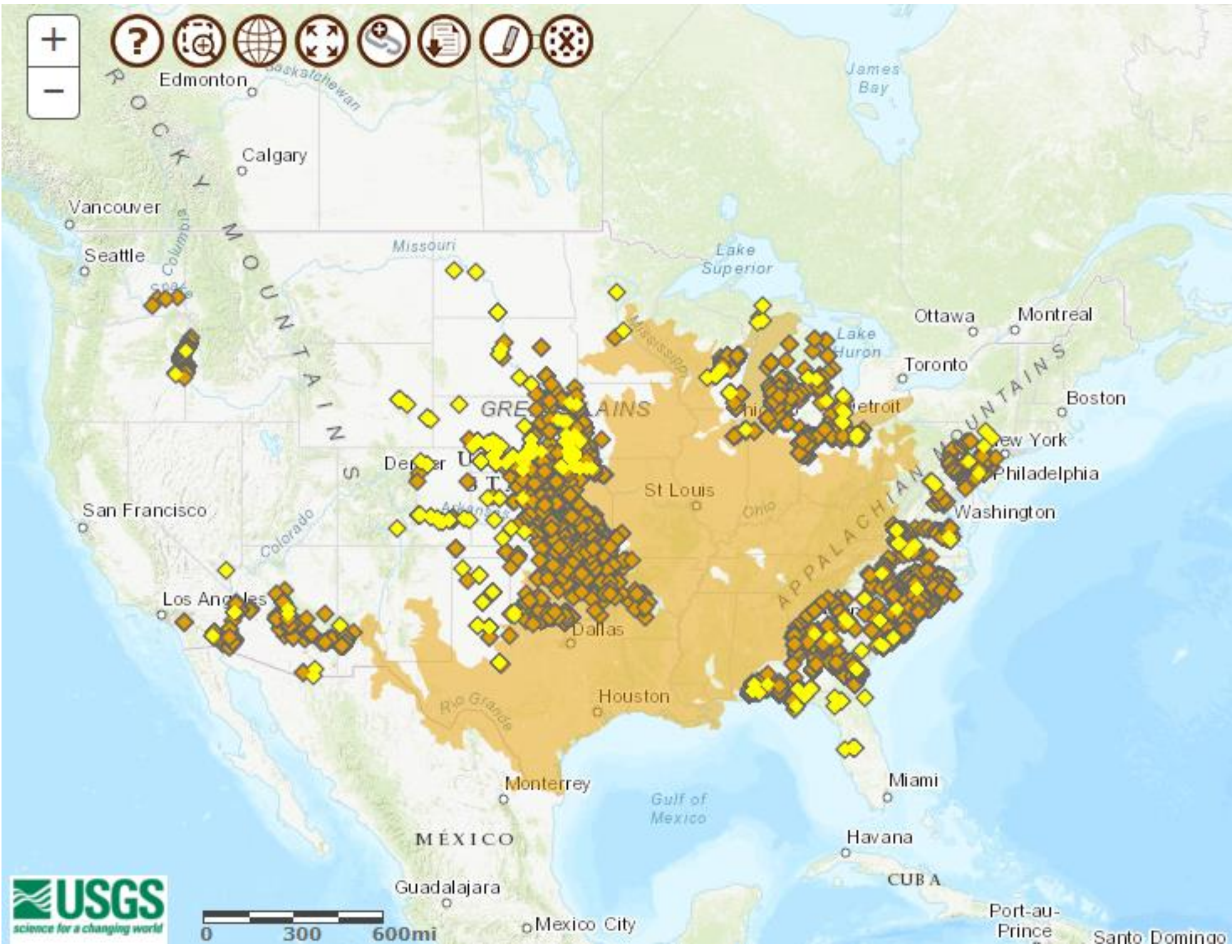

Figure 2. Known distribution of *Pylodictis olivaris* in the United States. Map from Fuller et al. (2019). The shaded orange area indicates the native range of the species. Orange points indicate known established locations outside the native range, while yellow points indicate locations where the species has been reported but has not been confirmed as established. Only established occurrences were used as source points in the climate matching analysis.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.941, indicating a high overall climate match. Scores of 0.103 and above are classified as high match. State climate scores were all classified as high. Most of the contiguous United States had a high match. The only low matches occurred to the east and west of the Cascade Range in the Pacific Northwest. Medium matches occurred in eastern New England and parts of the Rocky Mountains and California.

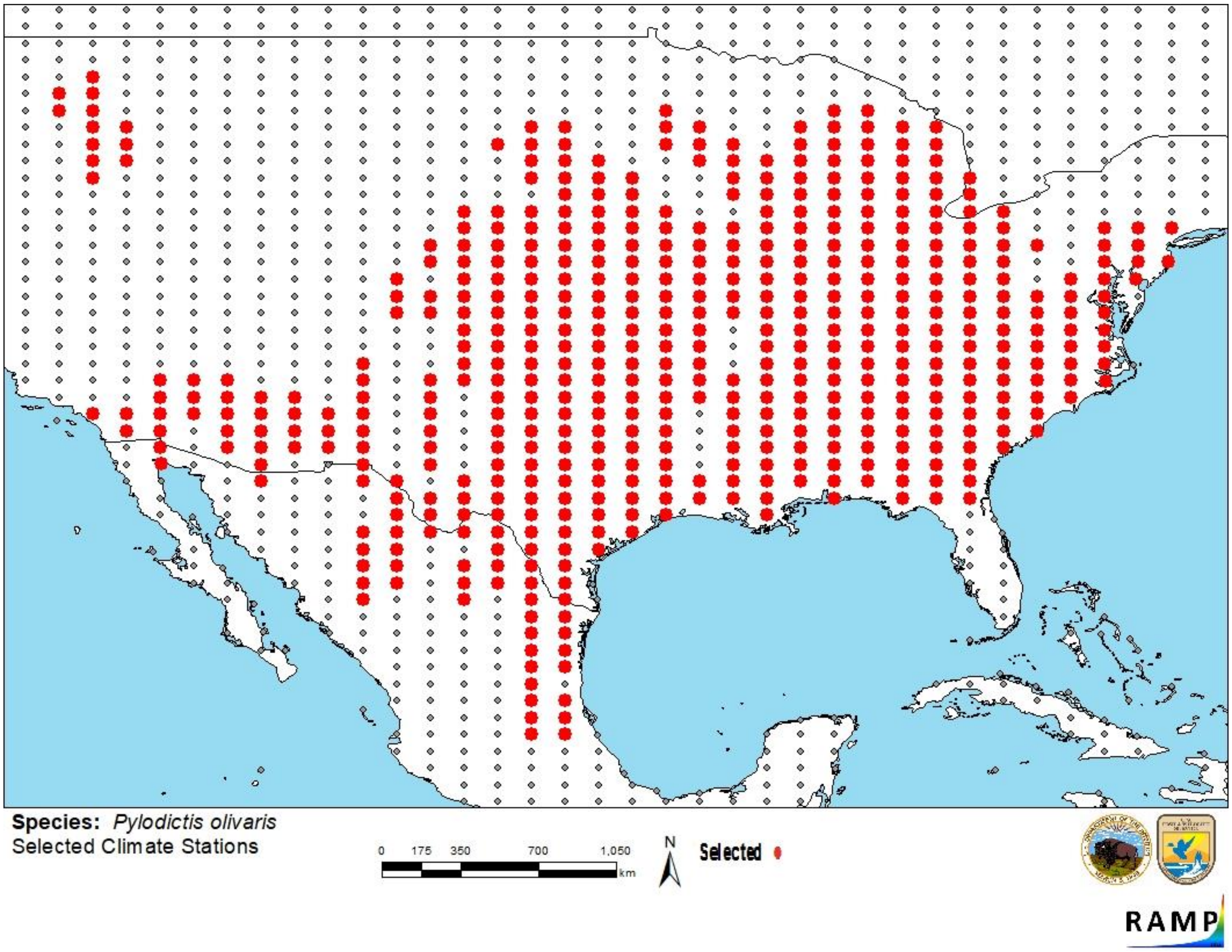

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; United States, Canada, Mexico) and non-source locations (gray) for *Pylodictis olivaris* climate matching. Source locations from GBIF Secretariat (2019) and Fuller et al. (2019).

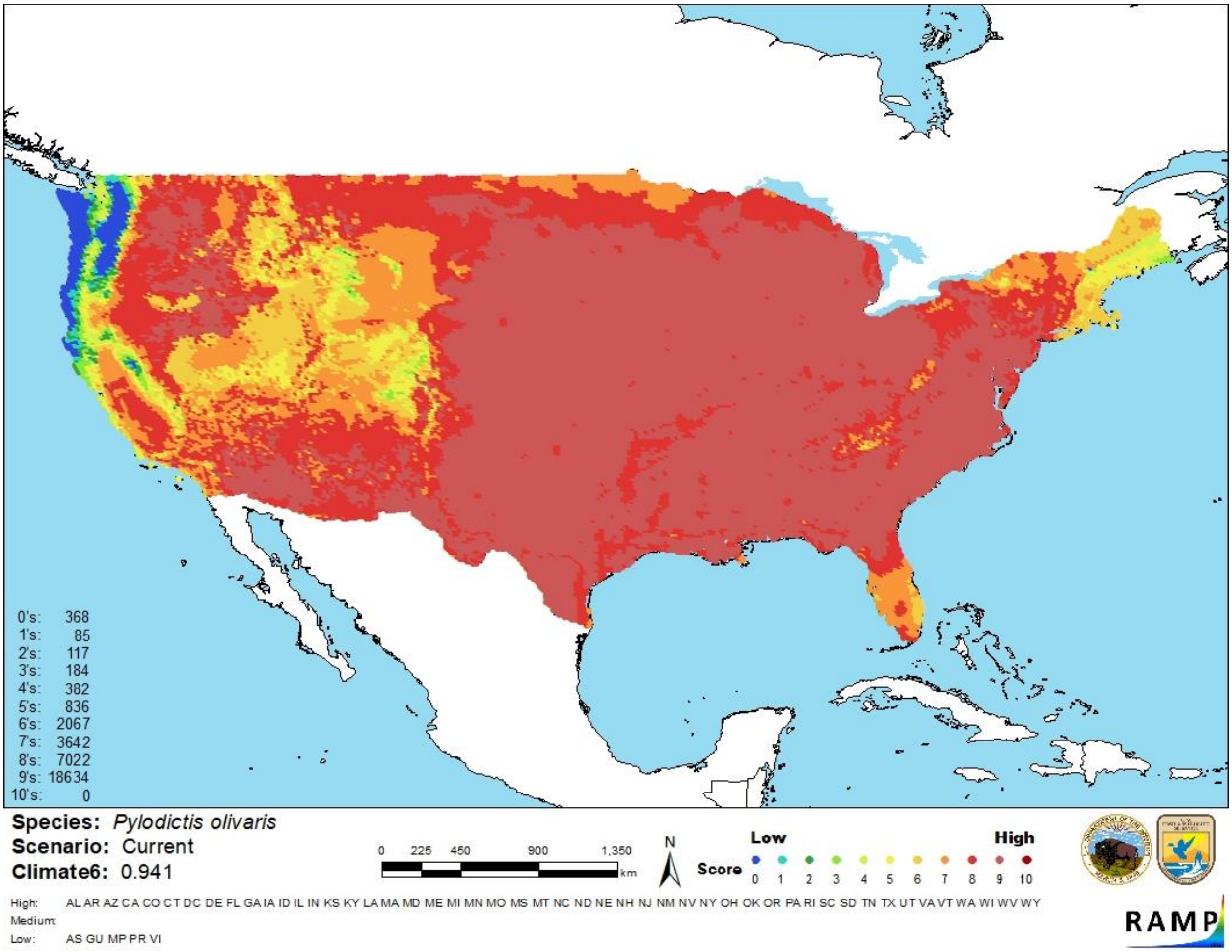

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Pylodictis olivaris* in the contiguous United States based on source locations reported by GBIF Secretariat (2019) and Fuller et al. (2019). 0= Lowest match, 10= Highest match.

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 biology, ecology, distribution, and impacts of *Pylodictis olivaris* are well-documented in the scientific literature. Impacts have been clearly documented in peer-reviewed studies in the southeastern United States, with additional probable impacts in the north-central, southwest, and Pacific Northwest United States. No further information is needed to evaluate the negative impacts the species is having where introduced. Certainty of this assessment is high.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Flathead Catfish (*Pylodictis olivaris*) is a freshwater fish native to the lower Great Lakes, Mississippi River basin, and parts of the Gulf Slope in the United States and Mexico. Much information is available on *P. olivaris*, leading to a high certainty of assessment. *P. olivaris* is a prized sportfish and has been introduced throughout much of the United States. It is also displayed in public aquaria. Impacts of these introductions are well documented and include competition and predation on native fish and invertebrate species, leading to declines in those populations. Several of the native species affected by *P. olivaris* introduction are federally listed under the Endangered Species Act. History of invasiveness is high. Climate match with the contiguous United States is high overall, with only small regions of low or medium match. Overall risk posed by *P. olivaris* to the contiguous United States is high.

Assessment Elements

- **History of Invasiveness (Sec. 3):** High
- **Climate Match (Sec. 6):** High
- **Certainty of Assessment (Sec. 7):** High
- **Overall Risk Assessment Category: High**

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